# CompeTender

## An exploratory research into competencies for tender management

Hilde Keizer

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An exploratory research into competencies for tender management on the supplier's side

by

Hilde Keizer

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Student number 4085310

**Graduation committee**

| | |
|---|---|
| Prof. Dr. H.L.M. Bakker | *Chair, TU Delft* |
| Dr. Ir. M.G.C. Bosch-Rekveldt | *First supervisor, TU Delft* |
| Dr. Ir. L. Volker | *Second supervisor, TU Delft* |
| Dr. Ir. L.H.M.J. Lousberg | *Third supervisor, TU Delft* |
| Remco Hofstede | *Company supervisor, Sweco* |

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# PREFACE

In front of you lies the result of my graduation research to retrieve my master's degree in construction management and Engineering from Delft University of Technology.

At the beginning, I was very eager to start this graduation process, as I felt this would be the ultimate test before graduating. While most of the master courses of the CME program are conducted in groups, I was not always exactly certain of my own capabilities. Therefore, the graduation project seemed like a perfect opportunity to explore and show off just about how much I had learned over the past couple of years. And what a ride it was. But, in the end, I achieved my goal and believe that I am now, more than ever, aware of my capabilities and interests for the future.

At my kick-off meeting, my graduation committee suggested to explore the option of developing a serious game as this would be way more fun than the standard research that I first had in mind. Imagine being a person who does not necessarily enjoys playing games herself, with a research that completely evolves around the development and execution of a game. My thoughts exactly. But way more fun it was in the end. As a game requires participation of many people, and a lot of other people are also curious about the game, this formed the perfect opportunity for me to get in touch with a lot of employees from Sweco and share my thoughts on tender management with them. As I am a person who likes to socialize a lot, the game formed to perfect entrance to start a conversation with anyone interested. Therefore, I am grateful to my graduation committee. They opened my eyes and pushed me to explore this research method.

I have several groups and people that I want to thank, because without them this research would not have been possible. First, I want to thank my colleagues from the BIDcenter for their warm welcome. They made me instantly feel at home and even more enthusiastic about tenders. Besides that, they introduced me to a lot of employees from Sweco, which in their turn participated in my research by playing CompeTender and contribute to this research. I am very grateful for their dedication and enthusiasm. Furthermore, I want to thank my graduation committee for their guidance throughout the entire process. They shared valuable knowledge and insights with me, which helped me to look at the project from a scientific perspective. I also want to express my gratitude towards my family and boyfriend for the dedication and patience they showed during this process, as they always offered a listening ear or a helping hand. Together with my friends and roommates, they offered the very welcome distraction after office hours. Finally, I was not completely alone in this graduation process. Looking at my roommate during the summer holidays, also infected by what we called 'the thesis' as if it was a virus, always made me feel a little better. For that, I thank you.

To conclude, I hope you all enjoy reading my research.

Best regards,
Hilde Keizer

Rotterdam, November 2018

# EXECUTIVE SUMMARY

Winning tenders is vital to the acquisition of work for project-based organizations (Philbin, 2008; Morris & Pinto, 2004). This necessity is due to the fact that within The Netherlands 80% of all revenue within the GWW sector is initiated by the government and therefore must be awarded through a tender procedure consistent to European procurement legislation (PianoO, 2018a). As tender legislation and the amount of available work changed significantly over the last decades, the approach of tenders by supplying organizations has also changed. Here, tender management appeared as an emerging discipline that focusses on adding value by professionalizing the approach of the tender process within supplying organizations. Besides, it incorporates information from the entire organization in order to persuade the client to accept the bid. Tender management in this research is considered to be the management of bid development by supplying organizations.

As employees are likely to perform better when their competencies meet their job requirements, this research focusses on establishing a competency-based profile. This profile will eventually help the approach of tenders mature and therefore enlarge the chance of success for supplying organizations in the tender process. This research will therefore provide an answer to the following research question, which can be divided into three components (underlined in the stated research question below) that will form the basis of the research:

> *Which competencies are important for tender management when preparing a bid for different infrastructure project types in an engineering firm?*

A tender is defined as a "*bid prepared by a company to fulfil a request from a client*" (Pellicer *et al.*, 2013, p.5) and aims to persuade the client to accept that bid. As tenders are usually highly competitive and put a claim on the equity of an organization, it is very important for organizations to make a well-founded decision on whether or not they will produce a bid. It remains uncertain whether the money and time invested when preparing a bid will be recovered. Tender management aims to streamline the internal bidding process and emerged as a combination of project management and sales department of an organization. Therefore, regular project management practices and competencies seem insufficient to succeed in tender management which is mainly caused by the short time span of tender procedures, the position of tender management between the client and the supplying organization and the fact that the final product is not a project, but an offer. The goal of tender management is to persuade the client needs to accept the bid, which clarifies the inclusion of sales competencies for the profession. Tender management must be carefully executed due to the potential (financial) impact of the content of the bid on the bottom line of a delivered project, as supplying organizations need to satisfy their promises towards the client once the tender is won. Engineering companies encounter three different types of projects, based on the degree of fuzziness with respect to the end product: framework agreements, engineering services and contractor services. Framework agreements are used as a sort of preselection of preferred suppliers for a longer period of time. These projects do not contain actual work and therefore the quality criteria often focus on soft factors. For engineering services, which connect with the main activities of the research company, the soft factors are joined by several more technical quality criteria. Finally, the contractor services result into the realization of the actual, physical work and are therefore least fuzzy. There is a suspicion that different competencies are important for each project type.

Competent personnel is a critical success factor for the quality of delivered work. Proposals must be of good quality to have a shot at winning. Therefore, insight in the competencies of tender management personnel can result in an increase regarding the quality of work. The competency-based profile for tender management consists of competencies divided in six different categories: Personal competencies, Social competencies, Organizational competencies, Technical competencies, Artistic competencies and Data handling competencies. The importance of each of the categories is ranked according to the occurrence of these competencies in the overall competency-based profile for tender management. From literature follows that mainly the categories Data handling competencies, Artistic competencies and Technical competencies are important. As regards to the disjoint competencies, *communicating*, *analysing*, *being customer-oriented, handling procedures & methods, being expressive*, *being quality-oriented, planning & organizing, collaborating, being creative* and *being cost-conscious* form the top ten most important competencies for tender management. This ranking is the result of a coupling between the tasks for tender management and competencies for bid and proposal managers.

A practice-oriented perspective on competencies for tender management was retrieved through the development and execution of the serious game CompeTender. This puzzle game was specially designed for this research, in order to question professionals experienced with tender management about their opinion about competencies for tender management. When playing the game, participants have to compose competency-based teams that match the tasks of

the different phases of a tender process. In the meantime, they have to keep in mind that they are managing the preparation of a fictional bid for one of the identified project types. The game serves therefore as a combination of a survey and interview-related activities. In total, 34 professionals experienced with tender management participated in the research. All participants compiled five teams (one for every phase of the tender process), which resulted in an overview of important competencies for tender management over the different phases of a tender and is displayed in Table 1.

*Table 1: Important competencies for tender management for all tender phases*

| | | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|
| 1 | Being cost-conscious | x | x | x | x | x |
| 2 | Being creative | x | x | x | x | x |
| 3 | Having environmental awareness | x | x | x | x | x |
| 4 | Planning & organizing | x | x | x | x | x |
| 5 | Analysing | x | x | x | x | |
| 6 | Developing vision/strategy | x | x | | | |
| 7 | Team building | x | | | | |
| 8 | Deciding | x | | | | x |
| 9 | Leadership | x | | | x | x |
| 10 | Handling procedures & methods | | x | | | |
| 11 | Being expressive | | x | x | | |
| 12 | Information gathering | | x | x | | |
| 13 | Structuring | | x | x | | |
| 14 | Being customer-oriented | | x | x | x | x |
| 15 | Communicating | | | x | x | x |
| 16 | Being critical | | | x | x | x |
| 17 | Being quality-oriented | | | x | x | x |
| 18 | Being stress-resistant | | | | x | x |
| 19 | Take responsibility | | | | | x |

As can be seen, every phase results in a (slightly) different profile for tender management professionals. Therefore, if the ultimate goal is to have a perfect competency-based match between the demanded competencies of a certain phase and the tender management professional, it is plausible that the job should be fulfilled by multiple employees. As handovers usually result in information loss, this is not desirable and therefore an overall profile based on input for all phases is deducted. The comparison of the most important competencies resulting from literature research and CompeTender is shown in Table 2.

*Table 2: Comparison of the most important competencies for tender management according to CompeTender and literature*

| | CompeTender |
|---|---|
| 1 | Being creative |
| 2 | Having environmental awareness |
| 3 | Planning & organizing |
| 4 | Analysing |
| 5 | Being cost-conscious |
| 6 | Being customer-oriented |
| 7 | Communicating |
| 8 | Being critical |
| 9 | Deciding |
| 10 | Being quality-oriented |

| | Literature (APMP) |
|---|---|
| 1 | Communicating |
| 2 | Analysing |
| 3 | Being customer-oriented |
| 4 | Handling procedures & methods |
| 5 | Being expressive |
| 6 | Being quality-oriented |
| 7 | Planning & organizing |
| 8 | Collaborating |
| 9 | Being creative |
| 10 | Being cost-conscious |

*Being creative* is very important for creating innovative tender proposals, which are fit for purpose and have a surprising effect on the client (distinctive character). Besides that, this competency is related to the development of new approaches (innovations), which help to reduce both cost and time. The importance of *having environmental awareness* and *being customer-oriented* follows from the position of tender management between the client and the supplying organization. *Analysing* is an important competency for tender management due to the obligation to completely understand the customer demand, which often concerns a complex problem. *Planning & organizing* needs to be incorporated as tender processes usually take place in a short time-span, but require involvement with a lot of different people. Finally, *being cost-conscious* is very important, as bids are usually judged on both price and quality.

For a differentiation in important competencies for different project types no sufficient underpinning was found, except for the fact that *being creative* becomes even more important when tendering for contractor services.

In order to distinct themselves from the competition, it is recommended to select tender management professionals mainly on their *creativity* and whether they *have environmental awareness, are customer oriented, are cost-conscious* and are good *analysers*. This will lead to a higher quality of bids, which reflect distinctive value and therefore outcompete the competition.

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# 1. INTRODUCTION

Winning tenders is vital to the acquisition of work for project-based organisations (Philbin, 2008; Morris & Pinto, 2004). Sweco, an engineering firm in The Netherlands, is such a project-based organisation and is therefore dependent on the quality of their bids in tender procedures. This necessity is due to the fact that within The Netherlands more than 80% of all revenue within project in the ground, road and waterway (GWW) sector is initiated by the government (PianoO, 2018a). When a project in The Netherlands is initiated by the government and the costs are expected to exceed the predetermined thresholds as stated by the European Union, it has to comply with the European procurement legislation and therefore a tendering procedure is part of the process of project acquisition. Wamelink *et al.* describe procurement as *"the process whereby a contracting authority announces that it wishes to have an assignment carried out and asks companies to subscribe to that order by means of an offer"* (2009, p. 17). A tender is the assessment process of bids that aim to satisfy the client requirements.

This provides an indication of the enormous influence the government, and therefore its procurement processes, have on the amount of work that is available within the sector (Morris & Pinto, 2004). Besides that, it underpins the importance of winning tenders for project-based organisations because in case of constant failure of obtaining work, a company will go bankrupt. Due to the importance of winning tenders, the discipline of tender management arose within the civil engineering sector (Morris & Pinto, 2004). This research considers tender management to be the management of bid production by supplying organizations, as this terminology is most common within the engineering company and tender management is often interchanged with bid and proposal management in literature (Lewis, 2015; Smartt & Ferreira, 2010; Thought Bubble, 2013; Pellicer *et al.*, 2013).

Originally, the tender process is part of the project management life cycle (Morris & Pinto, 2004; Westland, 2006) and is not necessarily new within the civil engineering sector. However, due to several developments within the sector, the emphasis on the tender process increased and tender management is more often considered a profession of its own. This can, among others, be concluded from the fact that nowadays almost every company active in the civil engineering industry has one or more vacancies for tender managers, tender strategists and tender writers which emphasizes the emergence of the discipline. Snoep & Jongkind (2016) add to that that tender management is of great importance to a lot of companies, due to the fact that tenders more and more often concern large contracts, which implicates a large amount of money that is dealt with. These large contracts often ask for an integral, multidisciplinary team approach of a potential supplier, with involvement of experts on different topics from throughout the complete organization (Snoep & Jongkind, 2016). Morris & Pinto (2004) underpin this importance by pointing out that tenders often involve a lot of risk for a company, because a large amount of money is put into the bid without even knowing if a company will be able to recover this costs by winning the project. Finally, Bertolini, Braglia and Carmignani (2006) acknowledge the importance of proper tender management, as they point out the importance of management of the proposal phase in their article. They state that *"unsuitable management of the proposal phase can lead to miscommunication, misallocation of resources and in many cases missed contract opportunities"* (Bertolini *et al.*, 2006, p. 422), which emphasizes the impact of the tender phase on the subsequent development of the project once the tender is won.

## PRESSURE ON THE DUTCH CONSTRUCTION MARKET

Not only the impact of tenders itself has been increasing over the last years, also there is case of a constant pressure on the civil market in The Netherlands. This is due to several developments in the recent years, which affected the way tenders are treated by both clients and suppliers.

First, at the start of the 21st century the 'Bouwfraude' (Dutch construction fraud) came to the attention of the public. During a period of ten years, private construction companies arranged forbidden mutual agreements on the prices of their tender proposals towards the public clients (Openbaar Ministerie, 2006). Due to these mutual agreements, every party was assured of a certain amount of work (as they pre-arranged which party was going to win the deal) and on top of that was also assured of an extra fee due to the fact that the agreements also included price arrangements which were very favourable for the contracting parties as the winning prices always turned out to be higher than the actual value of the project. This resulted in unfair competition in the construction sector. When the Dutch government revealed this fraud-case, all trust in the private parties was gone and there was need for a new way of procuring work in The Netherlands. The reason that this could happen was the fact that at that time, most of the contract award procedures (procurement) were mainly price-based (Europese Unie, 2004). Therefore, the party that offered the lowest price in a tender procedure, always won the work. As the fraudulent parties were aware of the prices of each other's offers, they could easily all adjust their stated prices upwards with a certain amount and still have the same result. The extra money

that was gained by the winning private party this way was then divided among all parties that were part of the agreement.

In order to make sure that nothing like this would happen again, a new way of contract-award was chosen, which still complied with the European legislation law. The European Union prescribes that public parties may choose from two clear criteria, when awarding a contract to a party: they either select the 'lowest-price' offer, or they select the Economically Most Advantageous Tender (EMAT) (Europese Unie, 2004).

Therefore, the 'Aanbestedingswet 2012' was introduced in 2013 within The Netherlands. This legislation introduced EMAT as the new criterion for project award, causing a larger influence of the quality aspect in the ranking of projects. PianoO (2016) recorded an increase in projects awarded on the basis of both price and quality from 20% to 80% over the course of the last years. This increase is also noticed by Economisch Instituut voor de Bouw (EIB) and captured in Figure 1. The blue line provides an indication of the percentage of projects that was awarded with the usage of the EMAT principle. In 2013, a strong increase can be observed, due to the introduction of the 'Aanbestedingswet 2012'.

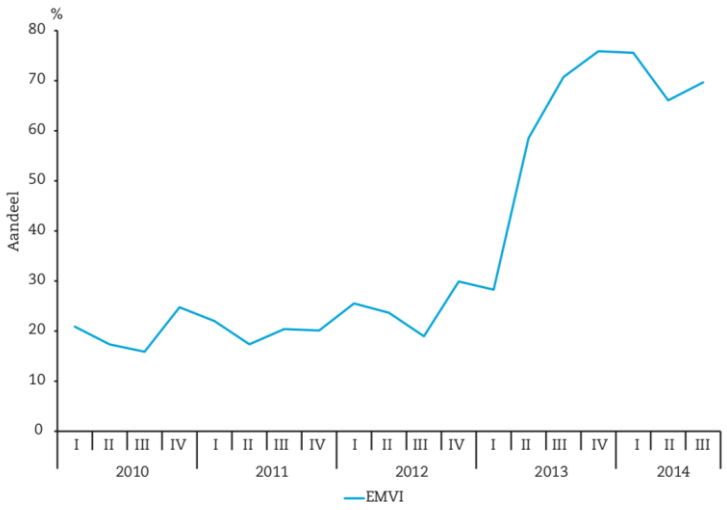


*Figure 1: Share of projects awarded by public clients using EMAT (EIB, 2014)*

This big change in the basis for contract-award demanded a different approach from engineering companies towards the production of a tender proposal, as the quality aspect of their offer now also could influence the ranking due to shifting emphasis towards this component.

Another factor putting a lot of pressure on the civil industry was the economic crisis, that hit The Netherlands in 2008. During the economic crisis, less work was available for all parties, which painfully revealed the importance of winning tenders (EIB, 2012). As a result of this necessity, the amount of tenderers became very high, as all organizations wanted to have a shot at winning for all projects. At this time, Sweco introduced tender management within their organization.

## THE RISE OF TENDER MANAGEMENT

Several trends can be discerned when it comes to a shift of focus towards tender management within the project management life cycle. First, there is the increasing need for an overarching discipline for the integral, multidisciplinary approach of tenders within a company. The Marktvisie (Rijkswaterstaat, Rijkvastgoedbedrijf, ProRail, Bouwend Nederland, NL Ingenieurs, Vereniging van Waterbouwers, MKB Infra, Uneto VNI & Astrin, 2016) indicates that alignment of functions within the construction chain is what eventually is aimed for. This is indicated as one of the biggest challenges for project procurement by Morris and Pinto (2004). Smyth and Kusuma (2015) state that there is currently a lack of cross-functional integration. Besides that, bigger challenges for both client and supplier in the field of procurement and tendering ask for an overarching discipline which enlarges tender success and provides structure for the tender process. Tender management aims to serve as such a kind of overarching discipline, as it incorporates the input of all concerned supplying parties into one bid, and could therefore become a very valuable discipline in the construction sector.

The second trend that can be distinguished is the increasing complexity of projects (Rijkswaterstaat *et al*., 2016). The increasing complexity of projects has multiple effects on the tender phase of a project. First, the client demand is less clear, as this complexity is also present when the client specifies his wishes. The second problem that arises is that due to the complexity, more specialist knowledge is needed in the tender phase in order to get to the core of the problem.

Only this way, a tender offer can be presented that is truthful, contains a possible solution to the client's problem and incorporates and deals with all complexities in order to satisfy the client. However, the incorporation of more specialist knowledge implies that more professionals have to cooperate in the tender phase. Here, the Marktvisie (Rijkswaterstaat *et al.*, 2016) foresees some difficulties as it states that there will be an increasing demand for integrated specialised knowledge, but that specialists nowadays hardly can work together anymore due to barriers resulting from contract complexities and financial aspects. Tender management aims to bring together specialists from throughout the chain and facilitates collaboration in order to come to a multidisciplinary solution for the problem the client is facing. However, no literature was found on what competencies a tender manager then should possess in order to achieve this goal. Lousberg and Heintz (2017) highlight that "*the increasing complexity of projects requires a different set of competences*"(p.1), so therefore the competencies for tender management need examination.

## 1.1 PROBLEM DEFINITION

As indicated earlier, the tendering procedures changed a lot over the years (due to the introduction of the EMAT-criteria) and parties see the need for a professionalized approach of the tenders. Sweco noted that in their company, tender management was mainly performed by people who are project managers and therefore used to managing projects, not tenders. Although there are some researchers (Whitley, 2006; Simister, 2003) who believe that managing a tender is similar to managing a project, as a tender is in fact a (small) project, there are also researchers (Pellicer *et al.*, 2013; Nickson, 2003; CTB xRM, 2016) that believe that there is way more to it than only managing a project. Due to the high time pressure, the difficulty of convincing the client of your approach and the fact that not all information on a project is available yet during the tender phase, they believe that there are definitely differences in the profile of tender managers compared to project managers. Several employees from Sweco acknowledge this, as they feel that project managers are not always capable of handling the complex problems that arise in the tender phase. Whitley (2006) states that companies have been tendering for business for ages now, but it never came to their mind earlier to acknowledge it as a separate discipline.

Besides that, it is currently the case that when a project manager is assigned a tender manager job, and the work is won, the project manager will become project manager of the project and will be unavailable for tenders for the coming period. Therefore, knowledge (which is still often located within the people) is lost, due to the fact that this project manager is not available for tenders anymore.

Morris and Pinto (2004) point out that there is a lot of risk involved with tendering, and therefore it is important that the tendering is done in a competent way. Besides that, it is important to preserve the gained knowledge through tenders as a competitive advantage within your company (Morris & Pinto, 2004). Therefore, a research into competencies for tender management is proposed in order to develop a competency-based profile for tender management professionals. This way, quality of the tenders can be more easily assures, and besides that Sweco will be able to develop a tender management profile in order to select employees purely for tendering which benefits the learning curve regarding tenders of the company.

Morris and Pinto (2004) finally state about tender management "*done well, it can significantly improve the profitability of both project owners and contractors*"(p.741).

## 1.2 RESEARCH OBJECTIVE

This research is conducted in order to provide more insight in the competencies for tender management within an engineering firm in The Netherlands. The main objective of this research is to provide an overview of competencies that are important in order to be able to conduct tender management for the different project types an engineering firm encounters when bidding for work. Based on the outcome of this research, conclusions can be drawn regarding the consideration of tender management as a self-contained profession within the civil engineering sector. It will also help to professionalize the discipline, which aims to ensure and increase the quality of bids where project-based organizations are dependent on.

## 1.3 RESEARCH QUESTION

In order to fill the indicated knowledge gap and meet the research objective as stated earlier, a research question and several sub questions were formulated. The aim of the sub questions is to provide all useful and necessary information to answer the main research question, and therefore make sure that the research objective will be met (Verschuren & Doorewaard, 2010). For this research the following main research question was established:

***Which competencies are important for tender management when preparing a bid for different infrastructure project types in an engineering firm?***

The sub-questions that follow from this main research question are:

1. *What is tender management?*
2. *Which competencies are associated with tender management in an engineering firm?*
3. *Which different project types can be distinguished for tender management within an engineering firm?*
4. *How can competencies for tender management be identified in practice?*
5. *Which competencies are considered important for tender management throughout the different phases of a tender process?*
6. *What are the differences in competencies required for different project types?*
7. *How can the competence-based selection of tender management be improved?*

## 1.4 THESIS OUTLINE

This research into competencies for tender management regarding different project types consists of 8 chapters in total. The cohesion among the different chapters is displayed in Figure 2.

Chapter 1 provides an introduction to the research and elaborates on the current situation as a point of departure. This results in a problem definition, where a research gap is indicated. The research objective aims to identify the contribution of this research regarding the indicated knowledge gap. In order to meet the research objective, a main research question was developed and this was split up into several sub-questions to assure full coverage of the research topic within its scope. Finally, the outline of the thesis is discussed in order to provide an understanding of its structure and cohesion.

Chapter 2 elaborates on the methodology that will be used to conduct this research. First, the used methods and their goals will be described, followed up by the determination of the scope and the relevance of the research. These two chapters will form the basis for the execution of the research.

Chapter 3 forms the theoretical framework and will provide an overview of the relevant literature. The framework consists, as indicated in Figure 2, of three main parts: tender management, competencies and project types. Based on the result of these three pillars, a serious game will be developed which is called CompeTender.

Chapter 4 will present a way to subtract competencies for tender management from practice in the form of a serious game. This chapter dives further into the development of this game and examines the necessary and designed elements of the serious game. Besides that the gaming operationalisation including game procedure, rules and the testing and adjustments of the game will be discussed.

Chapter 5 contains all information about the data gathering and data analysis from CompeTender gaming sessions. This chapter will elaborate on the profile of the participants and the data analysis protocol that serves as a guideline when going through the data. Several data analysis questions will be established in order to structure the process. This chapter will conclude with a preliminary conclusion about a competency-based profile for tender management following from the CompeTender data.

Chapter 6 will elaborate on the evaluation of the results from CompeTender, comparing it with findings from literature. Remarkable findings are highlighted and discussed with a tender expert in order to gather more insight. Besides that, the actual design of the game will be evaluated, and several points of improvement will be highlighted.

Chapter 7 contains the discussion of the results and the implications of the research for Sweco. Besides that, several recommendations for implementation of the findings within their company are addressed. The thesis ends with chapter 8, which consists of the limitations of this research, an answer to all sub questions, the main conclusion and recommendations for further research.

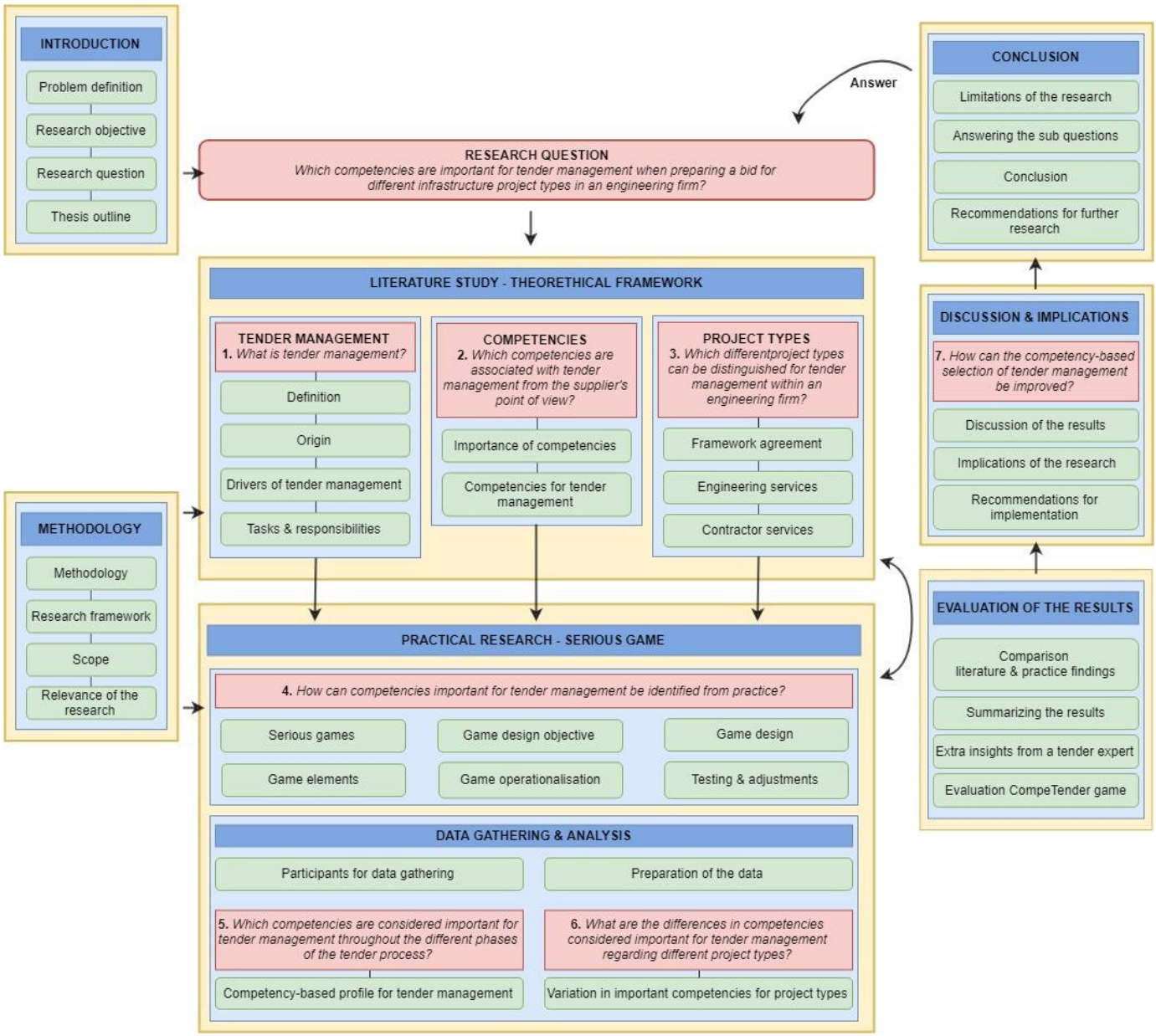


*Figure 2: Thesis outline*

# 2. METHODOLOGY

This chapter will provide an overview of the methodology that was used in order to conduct this research into competencies for tender management. First, the methods that were used are addressed, followed by the scope of the research and the relevance of this research regarding literature and demand.

## 2.1 METHODS

This research makes use of different research methods in order to provide an answer on the established research question. Roughly, this research can be divided into two main body parts: a theoretical part which focusses on the establishment of a theoretical framework, and a more practical oriented part, which uses the theoretical framework to gather data from practice by means of an explorative study. Both parts will eventually be combined and result in an overall conclusion.

The first part of the research focusses on the building of knowledge and therefore consists of literature review, focussing on three pillars which serve as a framework for the second part of the research. The three pillars for this framework are tender management, competencies and project types.

The literature review on tender management will focus on the establishment of an image of what tender management actually is and which tasks and responsibilities are linked to the profession. As there was little literature found on tender management within the construction sector, also literature on tender-, bid- and proposal management within other sectors is assessed as there is aimed for a broad understanding of the topic. This will then be aligned with the findings for tender management within the construction sector.

The literature review on competencies will first explain the concept of competencies in general and how a profile can be established. Subsequently, the review will zoom in specifically on competencies for tender management and the translation of these very elaborate competencies in a more generalized terminology.

Finally, literature on project types within an engineering firm will be assessed. Based on a pragmatic approach of the options following from literature, a distinction will be made between three project types encountered by Sweco: the framework agreement, engineering services and contractor services.

The second part of the research focusses on the practical view on competencies for tender management in an engineering firm by professionals experienced with tender management. For this part, a serious game was developed that examines which competencies are valued highly during the tender process (established on the basis of both literature and internal Sweco practice) by professionals involved with tender management. In order to develop this game and make sure that it will meet its stated objectives, first a brief literature study on serious games, their characteristics and their establishment is conducted. Based on the handles that follow from this review, the game will be developed and tested. The serious game that was developed for this research forms a kind of middle between conducting interviews and a survey within a strongly demarcated environment. Due to this twofold character of the research, different types of data will be retrieved from the serious game. Based on the quantitative data retrieved from the game, several conclusions can be drawn on the credibility of the data and the influence of different phases in the tender process on the compilation of an overall competency-based profile.

Both quantitative and qualitative data will eventually lead to the establishment of a competency-based profile for tender management according to professionals experienced with tender management. The quantitative data serves as a point of departure, which will be underpinned by the usage of qualitative findings. This is an iterative process, as qualitative findings will in their turn be underpinned by quantitative findings.

Finally, findings from the literature review (chapter 3) will be combined with findings from the serious game (chapter 5) in order to draw preliminary conclusions on important competencies for tender management. As some findings remain unclear due to lacking qualitative justification in the game or a big difference between the findings from literature and the game, more insight is sought with a tender management professional, who is involved with tender procedures due to his role as division director. This step aims to provide more insight in the unclear findings that were identified earlier in chapter 6. The combination of findings from literature, insights gathered through gaming sessions and an extra session to acquire more insight in remarkable results with a tender management professional eventually results in an answer on the main research question.

## 2.2 SCOPE

Demarcating the research area in order to make this research manageable results in the establishment of a research scope. As can be seen in Figure 3, the tender process is a dynamic process between a client and a supplying party. This research focusses on competencies for individuals executing tender management from the supplier's point of view, during the phases in which the development of the tender offer is executed (indicated in orange). Therefore, influencing the client beforehand to the procurement is left out of consideration, just like contract negotiations after winning the tender procedure.

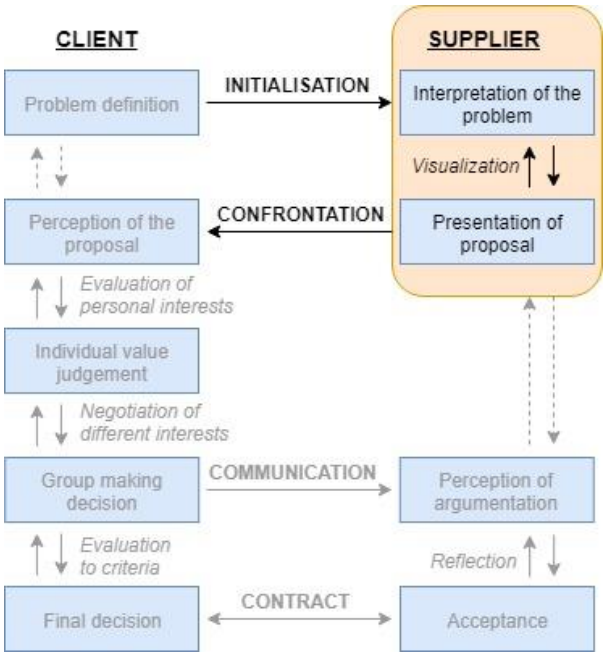


*Figure 3: Overview of the tender process with an indication of the research scope (Volker & Kuitert, 2017)*

As this research is conducted within the division Transportation and Mobility, from Sweco, an engineering firm in The Netherlands, only tender procedures from within Europe will be considered relevant, as all European parties working for a public client have to comply with the European Procurement legislation. However, the Best Value Procurement procedures (BVP) are left out of the research context, as this form of procurement demands very different things from supplying parties and therefore tender management could be considered in a way different light. This would complicate the research majorly, and is therefore left out of consideration.

A final remark on the scope of this research concerns the competencies. Possessing a certain competency can be measured on different levels of mastery. However, this research flattens this concept, as it only considers whether or not a competency is important. Therefore, the degree in which a competency is mastered is not relevant for this research. This is due to the fact that this is a first research into competencies for tender management within a project-based civil engineering company and no basis in this field has been established yet.

## 2.3 RELEVANCE OF THE RESEARCH

Mumford, Zaccaro, Jognson, Diana, Gilbert and Threlfall (2000) concluded in their research that managers whose characteristics are in line with what is expected from them in their jobs, are likely to perform better and remain longer in their position than when this is not the case. Besides that, Smartt and Ferreira (2010) indicate that the literature currently available on bid management, mainly focusses on the development of a bid and the process that should be followed in order to complete the bid and persuade the client to accept it and is therefore lacking insight into competencies for this discipline. Also, Rodney Turner (2003) points out that the literature that focusses on the part of project initiation, mainly is described from the client point of view, which is contradictory from what this research does, as this research focusses on a supplier's perspective. Therefore, a clear link to what competencies a person managing the tender process should have, is currently lacking.

As tender management is an emerging discipline in the construction sector (Philbin, 2008) and Sweco wants to professionalize its approach of tender projects, it becomes clear that insight into the competencies for tender management can be of great value. Lewis (2015) points out that in many organizations tender management is completely lacking, and that production of the bid is sometimes even allocated with a random employee who happens to have time. This will not lead to success, as Nickson (2012) underpins this by saying that experience really benefits the quality of proposals. With the establishment of a competency-based profile that fits the activities of tender management (ISBW, 2015), hiring the right people and guiding tender management in the right direction might be achieved. This eventually benefits the quality of tender management and bid proposals. Also, people applying for a job in tender management can use this research in order to gain insight into the establishment of a generalized tender process and the competencies that follow from it, in order to for example highlight them on their resumé. Finally, employees who are not familiar with tendering, the tender process and other things that it might entail, can use the game in order to gather a better understanding of what the discipline contains.

# 3. LITERATURE STUDY THEORETICAL FRAMEWORK

Tender management is a rising discipline in the construction sector, that wants to professionalize rather sooner than later in order to increase the percentage of tender procedures won by project-based organizations. This research focusses on the development of a competency-based profile for tender management in order to increase the level of professionality of the discipline. This profile will be drawn up on the basis of competencies that are relevant for a tender management professional to possess. To achieve this, first an exploratory study into the available literature and documents on tender management was conducted. This exploratory study aims to provide insight into three topics concerning competencies for tender management of different project types an engineering firm encounters. Therefore, this chapter will be divided into three paragraphs (pillars), which will all address a part of this topic of insight. This will result into a theoretical framework which serves as a basis for the development of the practice-based research model of a serious game (chapter 4). The literature study aims to provide insight in the topics of tender management, competencies for tender management and project-types that are encountered by tender management. By addressing these topics, and relating them to tender management in an engineering firm, interfaces and relationships between the topics will arise and can be used in order to establish a competency-based profile for tender management professionals.

First, the topic of tender management will be explored from a supplier's point of view. The research will highlight what exactly is considered tender management and which tasks and responsibilities come with the job. Besides that, an explorative study will be conducted into the origin of tender management in order to discover the drivers that might lead to tender management becoming a self-contained discipline. These drivers might be exactly where the discipline differs itself from other professions and are therefore important for the establishment of the competency-based profile.

Second, the subject of competencies will be assessed. First a general definition of the concept will be drawn up, followed up by the usage of competencies for the establishment of a profile for tender management. Subsequently, specific competencies will be linked to tender management, based on the tasks that were identified in the previous paragraph. This will result in an overview of competencies for tender management.

Finally, this research aims to identify whether different competencies should be present within tender management when tendering for different project types. Therefore, the topic of project types will be evaluated and linked to the project types an engineering firm encounters when tendering for work. As there was no literature found which links competencies to different project types, this part of the theoretical framework will merely serve as an input for the development of the practice-based serious game.

## 3.1 TENDER MANAGEMENT

The first pillar of the theoretical framework revolves around the concept of tender management and aims to provide an answer to sub question 1: *What is tender management?*

Tender management is in this research considered to be the management of the production of a bid within a supplying organization. Project-based infrastructure organizations are very dependent on the quality of their bids, as almost every project starts with a bid from the supplier (company) to the client, which has to be accepted in order to be allowed to execute a project (see Figure 4; Pellicer, Yepes, Teixera, Moura & Catalá, 2013).

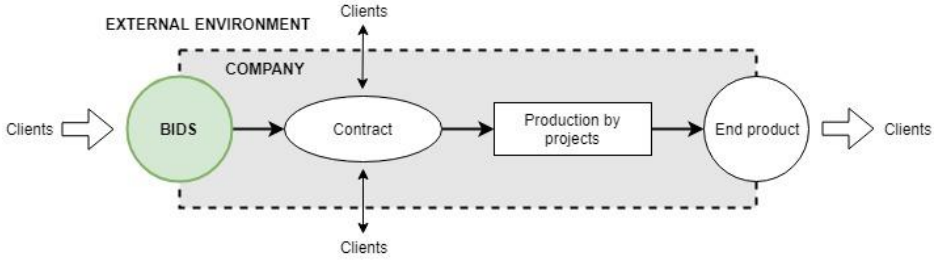


*Figure 4: Location of tender management is between the client and the supplying organization (adjusted from Pellicer, Yepes, Teixeira, Moura & Catalá, 2013)*

In order to get a better understanding of what tender management is, this section will discuss both the concepts of *tender* and *tender management* within a project-based organization. Also, the origin of this facet of management is discussed, as this provides insight into the position of tender management within an organization and the interfaces that it possibly has with other professions. Drivers to consider tender management as a self-contained discipline helps scoping the profession and serves the determination of what is and what is not part of the responsibility of tender management. Subsequently, the tender process and the corresponding tasks and responsibilities will be discussed which leads to an understanding of what tender management should be doing.

### 3.1.1 DEFINING TENDER MANAGEMENT

In order to have a good understanding of what tender management is considered to be in this research, first a definition is established. The term tender management follows from the terminology that is common within an engineering firm, but does in this case refer to bid management. Engineering firms participate in a tender process, and produce a bid which they eventually submit in order to persuade the client to accept it. In literature, the word *tender* is often interchanged with *bid, offer* or *proposal* (Lewis, 2015; Smartt & Ferreira, 2010; Thought Bubble, 2013; Pellicer *et al.*, 2013). Tender management consists on both the client and the supplying side, but this definition aims to provide an understanding of tender management from the viewpoint of the supplying party. Within the company where this research is conducted, the term tender management is most common, while the term bid management is not used here. Therefore, this research revolves around tender management. For a matter of convenience, tender management on the client side will be considered procurement management in this research. Therefore, the word *procurement* is not considered identical to *tender*. Westland (2006) clearly illustrates this by defining that procurement is *"the ordering and delivery of the products"* (p. 10).

#### TENDER

A tender is basically a kind of competition, and within an engineering firm considered a *"bid prepared by a company to fulfil a request from a client"* (Pellicer *et al.*, 2013, p.5). Lewis (2015) adds to this definition that it often concerns a formal written offer, stating a certain price for which the work or services can be established by the party. During a tender procedure, multiple companies prepare an bid regarding a certain demand the customer (often a public client) is facing. The client usually decides to procure (parts of) a project when certain specialized knowledge or an innovative solution is desirable, and the client cannot perform this act itself due to a lack of in-house knowledge. The party that satisfies this request best, considering predetermined qualification criteria (Lewis, 2015), wins the award of the contract. An important aspect of tenders is the fact that the bids must be submitted before a predetermined deadline, which puts the tender preparation in a light of time-pressure (Whitley, 2006; Investopedia, 2018).

The obligation to make use of a tender procedure follows from European Union regulation, that aims to provide equal chances for all parties in the European market (Chao-Duivis, 2016). However, not all initiated projects follow a tender procedure which has to comply with this legislation. This is dependent on whether or not the intended project exceeds financial thresholds stated by the European Union. If a project is initiated by a public client, which is often the case for civil engineering works (Pellicer *et al.*, 2013), and the initiated project exceeds the threshold, which is also often the case as infrastructure projects are very costly (Snoep and Jongkind, 2016), the tender procedure has to comply with a European tender procedure. This research focusses on tender procedures for public clients exceeding the European thresholds.

Within European procurement law, several tender procedures can be distinguished, which aim to identify the Economically Most Advantageous Tender (EMAT). The EMAT is determined on basis of the ratio between the price of the offer and the quality that is offered. The differentiation in tender procedures aims to provide a fitting procedure for different sizes and degrees of complexities for projects. Ivanova (2016) established an overview of the different tender procedures within the European Union (on the basis of the European Commission (2015)) and their award criteria, which is shown in Table 3. As can be seen, nowadays all tender procedures exceeding the threshold, have an award mechanism based on either EMAT of a Best Value Procurement (BVP) procedure. The BVP procedure in its turn is also awarded on the basis of EMAT, but does contain a substantial quality component (at least 75%) which aims to eliminate price divers from the competition (PianoO, 2018b). The influence of the quality component, and its division into subcomponents, has to be made known to all competing parties in advance (Lewis, 2015). This way, the competing organizations have an indication on what knowledge a client is seeking to achieve from the tender and can include this in their offer. Based on the score a party receives for the quality components a relative discount on the initial price in monetary terms is established for every party. This allows the client to compare price with quality.

*Table 3: Overview of the tender procedures within the European Union (Ivanova, 2016)*

| | TENDER PROCEDURE | EXPLANATION | AWARD MECHANISM |
|---|---|---|---|
| UNDER THRESHOLD | Single negotiated | One provider is asked to submit a bid. After possible negotiation, the order can be placed | Individual offer |
| | Negotiated | A number of tenderers (3-5), chosen on objective grounds, is asked to submit a bid | Lowest price or EMAT |
| | National | On a national level, the open and negotiated procedures can be performed | EMAT or BVP |
| | | | |
| ABOVE THRESHOLD | Open | All parties have the right to register for the tender | EMAT or BVP |
| | Restricted | All parties have the right to register. Based on pre-announced criteria, the client chooses the candidates, who are invited to submit a tender. | EMAT |
| | Negotiated<br>- With publication of a contract notice | After the tender is announced, and parties have registered themselves, the client selects, at least three candidates who are invited to submit a tender. | EMAT or BVP |
| | - Without publication of a contract notice | Without an announcement, the client selects, at least, three candidates, who are invited to submit a tender.<br><br>The procedure is only allowed under certain circumstances. | EMAT or BVP |
| | Competitive dialogue | Several discussion rounds between client and potential vendors, during which all aspects of the tender can be discussed.<br>The procedure is only allowed under certain circumstances. | EMAT |
| | Best Value Procurement (BVP) | Selection through limited items to be submitted and the use of dominant information | EMAT with a higher quality component. |

## TENDER MANAGEMENT

Tender management is in this research considered to be the management of a bid production process within an organization. Steel (2004) states that *"tender management is responsible for coordinating the company resources and producing a winning bid that will be profitable for the company"* (p. 740). By doing this, tender management aims to provide the competing party with the privilege of becoming the preferred supplier (Simister, 2003). If tender management structurally fails to do this, the organization might end up in great problems, as their workload eventually diminishes (Simister, 2003). This underlines the criticality of tender management within an organization (Nickson, 2003; Philbin, 2008).

A winning bid is considered to be compelling, consistent, compliant and clear (Whitley, 2006) and does justice to the abilities of the company that the tender offer represents (Lewis, 2015). Tender management aims to lead the development of the bid in the right direction, by focussing on these aspects of a winning bid though employing the right people for the job. Due to the position of tender management, which was already illustrated in Figure 4, the function of this profession is actually twofold (Nickson, 2012). On one side, it aims to establish the offer within the supplying organization and on the other side it aims to persuade the client to accept the offer. Here, it becomes clear that tender management is at the interface between the supplying party and the client and therefore fulfils a vital role in the acquisition of work.

However, the production of the offer and persuading the client to accept it is not as easy as it seems, as there is also involvement of a large financial component. Winning the bid does not necessarily guarantee that the awarded organization makes profit over the project that is to be established (Smartt & Ferreira, 2010).
After award of the contract, the supplying party has to live up to its agreements with the client. Therefore, proper preparation of the tender offer is of great importance, in order to ensure that the offer does not contain any agreements that the supplying party cannot live up to. However, the offer should be seductive enough in both terms of money and quality, that it persuades the client to accept it. Therefore, overpricing is not an option.

### 3.1.2 ORIGIN OF TENDER MANAGEMENT

In order to investigate why tender management should be considered a self-contained discipline, it is important to find out where the profession originates from. Knowing this provides an understanding of the processes and procedures that initially formed the foundation of tender management. This might also indicate drivers that caused the discipline to loosen itself from its initial roots and highlights discipline-specific characteristics.

Philbin (2008) and Whitley (2006) state that tender management is an emerging discipline in the engineering sector and that until recently it was hardly recognized and researched in this sector, but has a large potential. As explained in chapter 1, the urge to professionalize tender management can be due to multiple influences. Opinions regarding the origin of tender management are divided, and immediately show an interesting interaction between different business units of an organization. Nickson (2012) states that bid management has a strong overlap with both project management and sales management, and therewith summarizes the divided opinions of researchers perfectly.

Multiple researchers (Whitley, 2006; Simister, 2003; Philbin; 2008) are of the opinion that tender management descends from project management, as there are many similarities between managing a project and managing a tender. Whitley (2006) believes that managing a tender comes down to the proper management of costs, quality and time, which form the three conflicting imperatives in project management. When looking at the project life-cycle (see Figure 5), where the procurement process and therefore the tender process is part of, established by Westland (2006), the origin of tender management from project management becomes even more plausible. As project management embraces the management of all phases of a project, it seems argumentative that tender management once was part of project management, but developed due to the enlarged emphasis on the importance of this part of the project life-cycle. Whitley (2006) adds to this that the end product of both management disciplines is different, as not a completed project is the final deliverable, but a bid for business.

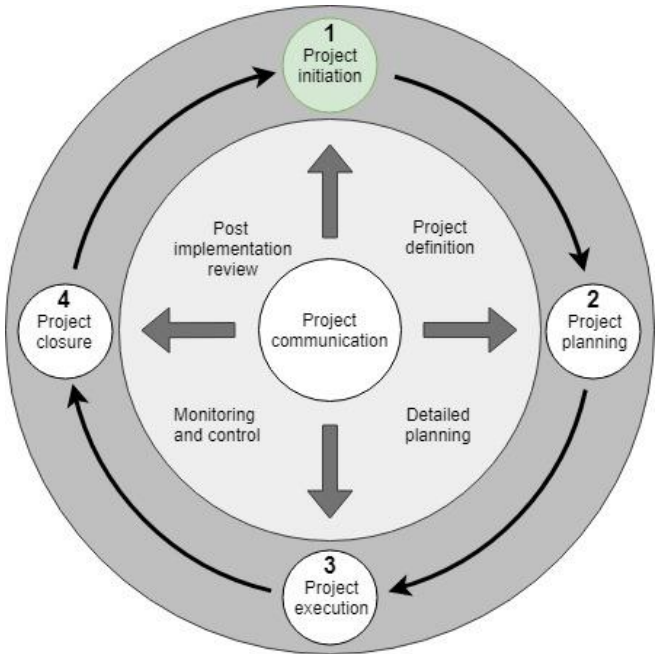


*Figure 5: Project life-cycle with indication of the tender process (Westland, 2006, p.4)*

However, there are also some people who believe that tender management has a way more commercial character and therefore origins from the sales or more commercial departments of an organization (Pellicer *et al.*, 2013; Nickson, 2003; CTB xRM; 2016). Since tender management is located between the client and the organization (see Figure 4), it is plausible that customer knowledge and business development are important aspects which have a direct relationship with tender management. Simister (2003) is of the opinion that tender management originates from project management, however, he feels that within large organizations tender management should be executed by business developers (who are responsible for the relation with potential customers within an organization) who have experience with project management in previous roles. Pellicer *et al.* (2013) states that the commercial department is where tender management is executed and that this is linked to the public relations of an organization.

Both perspectives show that there is something to say for each case, and therefore it seems plausible that the sales/commercial department and project management joined forces, as Steel (2004) indicates that the influence of tender management on the bottom line is in potential very large.

### 3.1.3 DRIVERS OF TENDER MANAGEMENT

Based on the insights resulting from the research into the origin of tender management, several drivers can be identified that make tender management interesting to consider as a self-contained discipline.

The first driver is time. Despite the fact that Whitley (2006) points out that time is also an important factor to incorporate in project management, there is a large difference between managing a project and managing a tender. Pellicer *et al*. (2013) state that it is often the case that the tender offer needs to be prepared within a short period of time (one or two months). This is a very short period, which results in a high pressure on the efficient production of the tender. Besides that, Philbin (2008) indicates that during a tender, usually only the client can extend the deadline for handing over the proposals and requests for extension of this deadline by suppliers are usually ignored.

Another subject that tender management has to cope with is decision-making with large uncertainties (Simister, 2003; Philbin, 2008). This is also closely related to the high time pressure, as there is simply not enough time (and budget) to thoroughly investigate all aspects of the tender into detail. Philbin (2008) states that this is one of the major differences between project management and tender management, which has to be taken into account.

As tenders have become day-to-day business for large, project-based organizations (Lewis, 2015) some sort of standardization of the process and the approach should be established in order to control and decrease the average costs of a tender. Besides that, the standardized process can help employees master tender management skills more easily which help for example with the identification of risks (CTB xRM, 2018).

The penultimate driver that was identified is the qualities a tender manager needs to possess in the field of creativity and sales. Nickson (2012) believes that this is exactly what makes project managers poor bid managers, as project managers in his opinion are not capable of incorporating these things into a tender proposal. They rather tend to focus on the technical parts of the bid. Also, a more business oriented attitude of the tender manager is underlined by Lewis (2015), who believes that only tender managers should only chase projects that can be aligned with the business strategy of an organization.

Finally, the influence tender management has on the end result of a project should not be underestimated (Steel, 2004). Rauch, Scheiblich, Ceauşu and Buchmüller (unknown) state that 60% of the projects with negative returns owe this to improper development of the tender offer. As tender management aims to secure the quality of tender proposals, this potential on the financial bottom line should definitely be incorporated.

### 3.1.4 TASKS AND RESPONSIBILITIES

As winning tenders is essential for the survival of project-based organizations who mainly work for public clients within the European Union (Smartt & Ferreira, 2010), the main responsibility of tender management is becoming the preferred supplier (Simister, 2003). In order to be able to do that, Nickson (2012) distinguishes two main functions of tender management: to *define* and to *persuade*. The previous paragraphs already highlighted that the position of tender management within an organization differs per company, but concluded that it origins from both project management and the sales or commercial department. Therefore, the set of tasks should also reflect this intersection. This paragraph will establish an overview of the tasks and responsibilities of tender management, in order to use this as a basis for the establishment of a competency-based profile.

Figure 6 illustrates the position of tender management within an organization, considering both sales management and project management as a clear link to tender management. As can be seen, tender management (whether only executed by the assigned tender manager or supported by other tender management roles) forms a clear link between the sales department and other departments (technical, commercial, legal, project management and delivery managers). However, due to this position there is also case of some overlap in responsibilities. Therefore, a clear distinction between the different roles in a tender (not to be confused with roles in tender management, as these roles are all contributing to the management of the tender, not necessarily to the content development of the bid) and their corresponding responsibilities is key to the success of the bid (Nickson, 2003).

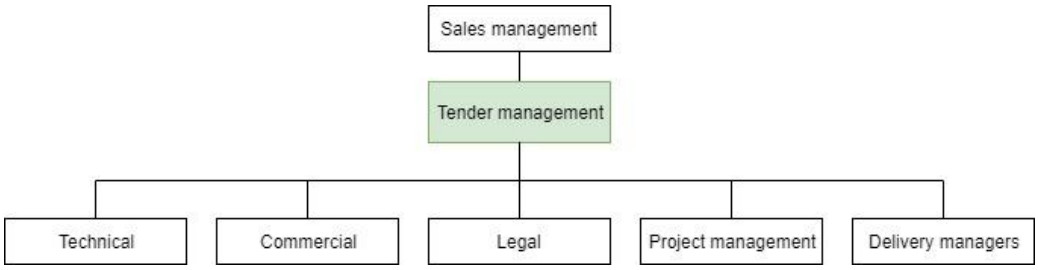

*Figure 6: Position of tender management within the organization when bidding for work (based on Nickson, 2003, p. 11)*

This research evolves around the concept of tender management, not to be confused with the tender manager. It appeared that within every organization, different roles are involved with tender management (Nickson, 2003). On top of that, the roles did not seem to have fixed responsibilities, but that this is dependent on the size of the tender and the skills of the tender manager (Whitley, 2006; Nickson, 2003). This results into the possibility of combining different roles into one person when there is tendered for a small work, or multiple employees can be involved in different roles when the size of the tender increases (Steel, 2004). Therefore, for this research it was decided to consider the whole discipline of tender management when establishing a competency-based profile and not to narrow this profile down on a specific role.

The first and foremost action that must be undertaken is the bid/no bid decision on the basis of the client demand (Pellicer *et al.*, 2013; Thought Bubble, 2018; Steel, 2004). In order to make a well-founded choice, the potential bidding party needs to consider whether the organization makes a substantial choice of winning the bid, ánd if it wins the bid that it has the capacity and capability to execute the project. Pellicer *et al.* (2013) underpin the importance of a well-considered decision by pointing out that the establishment of a tender offer is often causing the organization to make big costs and that it is not certain on beforehand whether these costs will be recovered due to the uncertainty of winning the tender.

In order to enlarge the chance of success, the competing party should handle the tender offer very carefully as the price and quality offer ultimately is dependent on the quality of the estimates (Pellicer *et al.*, 2013; Lewis, 2015). Besides that, a careful consideration of the client demand is more likely to result in a project-specific offer (so no copy-pasting) that exploits the opportunities and is well-considered regarding the request of the client (Lewis, 2015). In order to succeed in this intention, it is important to be well-aware of what is going on in the market (Nickson, 2003). This results into the fact that organizations are constantly influencing the client and gathering knowledge on upcoming projects, in order to exert this as a head start when the project is actually issued to the market. Influencing the market might not be one of the key responsibilities of tender management, however, gathering this very valuable information from other people within the organization and incorporating this into the offer is a responsibility (Nickson, 2012).

Ultimately, the responsibility of tender management is handing over a competitive offer in time which very much respects the client demand (Nickson, 2003). In order to achieve this, Lewis (2015) is of opinion that a standardized tender process could be of great importance for the development of the profession and the quality of the offers, as standardizing this process eventually results in an increase in quality and consistency of the offers, partly due to a learning curve established by going through the same process each time. Besides that, employees become trained in going through this process and its separate components, which results in a decrease in preparation costs for tenders (Lewis, 2015).

There are multiple sources that describe such a process, but they do not seem to agree on which tasks should and should not be included. Therefore, first an overview of all tasks to be executed by tender management according to literature are outlined below.

- Analysis of the bid requirements set by the client (Lewis, 2015; Nickson, 2012; Steel, 2004)
- Bid/no bid decision (Pellicer *et al.*, 2013; Thought Bubble, 2018; Steel, 2004; Lewis, 2015; Nickson, 2012; Springer, 2005)
- Nomination of bid manager (Lewis, 2015; Springer, 2005)
- Organise the required activities and meetings for the bid development (Whitley, 2006)
- Make tender planning in order to meet the deadline (Whitley, 2006; Steel, 2004; Lewis, 2015)
- Determine budget in order to develop tender proposal (Lewis, 2015; Springer, 2005)
- Determine the scope of the tender (Springer, 2005)
- Formation of the bid team (Lewis, 2015; Steel, 2004; Springer, 2005)
- Consult financial personnel on price development (Lewis, 2015)
- Arrange, if necessary, the involvement and contribution of other offices (Lewis, 2015)

- Organise critical issues meeting/bid planning meeting (Steel, 2004; Lewis, 2015; Whitley, 2006; Springer, 2005)
- Develop tender strategy (Steel, 2004)
- Investigate the competition (Steel, 2004)
- Examine the perception of the client (Steel, 2004)
- Preparation of bid development worksheet based on compliance criteria from the client (Lewis, 2015)
- Manage documents and version control (Lewis, 2015)
- Allocate writing tasks (Nickson, 2012; Lewis, 2015)
- Decision on specialist bid writing assistance (Lewis, 2015)
- Maintain a write-protected master text (Lewis, 2015)
- Align communication within bid development team (Whitley, 2006)
- Forward all client documentation to involved team members (Lewis, 2015)
- Develop first drafts of text (Lewis, 2015; Nickson, 2012; Steel, 2004; Springer, 2005)
- Organise the production of images (Nickson, 2012; Steel, 2004; Lewis, 2015)
- Monitor bid budget (Lewis, 2015)
- Monitor and act on the bid development progress (Lewis, 2015)
- Perform a risk analysis (Steel, 2004)
- Organise reviews (Nickson, 2012; Steel, 2004; Lewis, 2015; Springer, 2005)
- Pricing decision (Steel, 2004)
- Revise draft documents based on review comments (Lewis, 2015; Nickson, 2012; Springer, 2005)
- Quality assurance and peer review (Lewis, 2015; Whitley, 2006; Lewis, 2015; Springer, 2005)
- Produce the final tender offer (Lewis, 2015; Nickson, 2012; Springer, 2005)
- Hand the final offer over to the production unit for lay-out and design (Lewis, 2015)
- Check the offer on consistency (Lewis, 2015)
- Submit the bid in time(Lewis, 2015; Nickson, 2012; Steel, 2004; Springer, 2005)
- Organize the preparation for presentations and/or interviews (Lewis, 2015)

Several tasks are acknowledged to be part of tender management responsibilities by multiple sources, and some of them are only included once. However, listing these tasks does not necessarily result into a standardized process, which is desirable according to Lewis (2015). Therefore, this overview of tasks will in chapter 4 be linked to the internal bidding process that is acknowledged by Sweco in order to derive at a standardized process. This process can then be used for the establishment of the practice oriented research.

## 3.2 COMPETENCIES

The second pillar of the theoretical framework revolves around competencies for tender management. This section aims to provide an answer to sub question 2: *Which competencies are associated with tender management in an engineering firm?*

### 3.2.1 THE IMPORTANCE OF COMPETENCIES

The competence of tender personnel is a critical factor for success due to its influence on the finally achieved quality of work (Steel, 2004; Crawford, 2005; Skulmoski & Hartman, 2010). However, currently little is known about the competencies for tender management. Therefore, this part of the research will first establish an insight into competencies in general and will then funnel this towards the profession of tender management, based on the overview of tasks from the previous section.

Competency is a term familiar to all of us, however the exact definition appears to be a problem as it seems to be very context-driven (Skulmoski & Hartman, 2010). Literature research into the concept of competencies revealed that many definitions combine the terms *skills*, *knowledge*, *personal characteristics* and *attitudes* (IPMA, 2015; Muller & Turner, 2010; Mulder, 2011; Ogata, 2007). It was decided to adhere to the definition of Skulmoski and Hartman (2010) as they established a, in their words, broad definition of the term which seems very applicable: *"Competency is performance-based and includes knowledge, skills, attitudes and personal characteristics that can be improved with experience and/or training"* (p. 61). Ogata (2007) remarks that a distinction can be made in the different aspects regarding competencies when they are mapped in the 'iceberg model'. This model distinguishes the hard skills (visible behaviour, knowledge, skills) from the soft skills (personality and motives) and Ogata (2007) states that employers mainly focus on the hard skills, as these are most hard to develop.

The development of competencies is a very valuable subject for organizations, as the potential regarding competencies of employees forms a good opportunity for companies in order to increase their competitiveness in the market (Dainty,

Cheng & Moore, 2004). Due to the fact that it is very costly to develop competencies (Mulder, 2011) and the fact that soft skills are not that easily developed, recruiting and keeping the right employees is very important (Mulder, 2011). Besides that, managers who's competencies are in line with their job requirements, are likely to perform better (Mumford, Zaccaro, Jognson, Diana, Gilbert and Threlfall, 2000; Ogata, 2007). This emphasizes the importance of recruiting the right people for the execution of tender management. Finally, ISBW (2015) highlights that the development of core competencies of an organization determine its competitive advantage compared to its competitors. Therefore, these core competencies should be very clear throughout the whole organization.

### 3.2.2 IDENTIFYING COMPETENCIES FOR TENDER MANAGEMENT

This research aims to identify competencies for tender management in order to be able to consider it as a self-contained discipline. Therefore, this part of the research builds a bridge between the tasks and responsibilities belonging to tender management which were identified in the previous section of this research, and the competencies that one needs to possess to be able to execute tender management. In order to do so, first some competencies following from the literature research will be cited. Subsequently, an extensive overview of competencies for bid- and proposal management from APMP (the Association of Proposal Management Professionals) will be linked to a more generalized terminology, in order to be understandable for everyone and aligns with job descriptions for other professions.

#### COMPETENCIES FROM LITERATURE

Especially Pellicer *et al*. (2013) and Lewis (2015) provided some insight into competencies for tender management, as they already initiated tender management profiles in their research. Pellicer *et al*. (2013) are of opinion that a good tender manager should be able to cope with uncertainties because on beforehand a company cannot exactly determine whether or not the contract award will be in its favour due to the fact that for example the number of competitors and the content of their offers is unknown. Besides that, they feel that organizational skills and being stress-resistant are important for a tender manager, as the time to submit the tender is usually very short and the competition is high. Finally, Pellicer *et al*. (2013) state that *"team building is key factor for project success*" (p. 51), which provides an indication of the importance of team building to collaborate effectively.

Lewis (2015) adds to this that successful bid writers *"are bright technically, know how to write clearly and directly, work conscientiously and methodically, do what the client asks, care about detail, perform well in a team and finally understand the outputs and meet deadlines"* (p. 7).

Literature review, however, does not provide an extensive image of competencies necessary for tender management yet. Therefore, the extensive list with competencies for bid- and proposal management (from APMP) was addressed (see Appendix 2). APMP distinguishes 141 different competencies, which are organized in five categories, each of them divided into multiple sections (APMP, 2016). An overview of these categories and related sections is displayed below:

- Information research and management
    - Information gathering
    - Knowledge management
- Planning
    - Schedule development
- Development
    - Opportunity qualification
    - Winning price development
    - Teaming partner identification
    - Proposal strategy development
    - Executive summary development
    - Content plan development
    - Requirement identification
    - Compliance checklist development
    - Persuasive writing
    - Graphics development
- Management
    - Review management
    - Kick-off meeting management
    - Risk management
    - Report management
    - Production management

    - Lessons learned analysis and management
    - Process management
    - Virtual team management
- Sales orientation
    - Communicating with others
    - Quality orientation
    - Building strategic relationships and a successful team
    - Decision-making and delegating responsibility

## GENERALIZED TERMINOLOGY FOR COMPETENCIES

This list consists of 25 sections, which are in its turn divided into one or more competencies. Therefore, the complete list of competencies established by APMP contains 141 competencies, which are very task oriented (see Appendix 2). Due to the extensiveness of the list and the fact that it is very task oriented, its terminology might not be very recognizable by people not familiar with the profession. Besides that, the task-oriented character makes it hard to compare with other professions, which is desirable for, for example, the HR department. Therefore, a less extensive list of competencies in a more generalized terminology that is not necessarily directly linked to tasks is desirable for the understandability of this research.

In order to retrieve such an overview of competencies for tender management, a translation of the competencies identified by APMP (from now on referred to as APMP competencies) towards a more generalized terminology was conducted. Based on the above established requirements for an overview of important competencies, the terminology of FNV was used as a point of departure. FNV is the biggest Dutch trade union, that contributes to the establishment of the collective labour agreement (CAO) of Sweco (Sweco, 2018). Besides that, this trade union represents employees in all different sectors of labour within The Netherlands. Therefore, its definition and terminology regarding competencies is not limited to the building sector but aims to apply to all employees and is very well understood.

FNV developed a list of competencies (from now on referred to as FNV competencies), which in their turn are all part of a category. The list is originally in Dutch, but for this research the following translation of the competencies and their corresponding categories was established in English:

**A. PERSONAL COMPETENCIES**
A1. Being stress-resistant
A2. Being proactive
A3. Being flexible
A4. Handling conflicts
A5. Taking responsibility
A6. Being critical

**B. SOCIAL COMPETENCIES**
B1. Communicating
B2. Interactive learning
B3. Collaborating
B4. Showing sensitivity
B5. Being sociable
B6. Showing tact
B7. Influencing
B8. Team building
B9. Networking

**C. ORGANIZATIONAL COMPETENCIES**
C1. Self-managing
C2. Planning & organizing
C3. Controlling
C4. Delegating
C5. Motivating
C6. Coaching
C7. Leadership
C8. Deciding

**D. COMPUTER COMPETENCIES**
D1. Working with programs
D2. Using and designing ICT
D3. Managing the network

**E. TECHNICAL COMPETENCIES**
E1. Handling procedures & methods
E2. Handling tools and materials
E3. Technical functional designing
E4. Spatial designing
E5. Being cost-conscious

**F. ARTISTIC COMPETENCIES**
F1. Being creative
F2. Being innovative
F3. Being expressive

**G. OTHER COMPETENCIES**
G1. Information gathering
G2. Analysing
G3. Having judgement
G4. Being quality-oriented
G5. Being customer oriented
G6. Negotiating
G7. Having environmental awareness
G8. Structuring
G9. Developing vision/strategy

## LINKING COMPETENCIES TO TASKS

This provides an overview of the competencies that are distinguished by FNV and could be applicable for all kinds of job descriptions. Though, currently the list is not yet focussed on tender management and might contain competencies that are not relevant for the discipline. Therefore, the list of competencies established by FNV will be linked to the competencies distinguished by APMP following the process illustrated in Figure 7. This process eventually results into an overview of competencies for tender management.

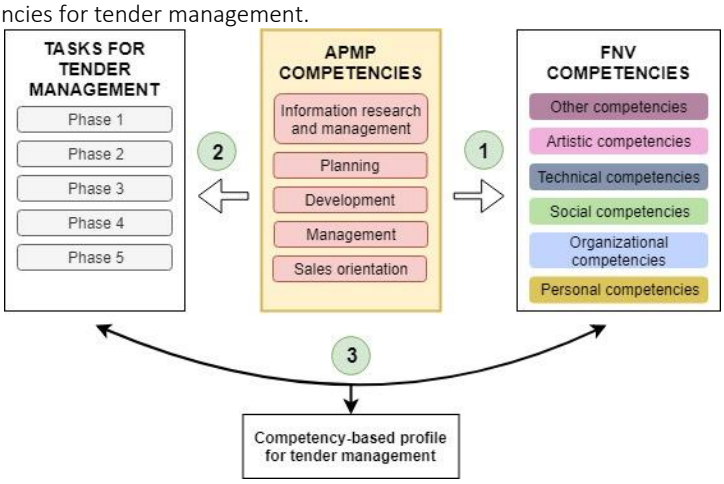


*Figure 7: Translating competencies towards a general terminology*

The competencies defined by APMP (Appendix 2) were used as a point of departure. First, these competencies were linked to the terminology established by FNV (step 1). This linkage is included in Appendix 3. Subsequently, the APMP competencies were linked to tasks for tender management (step 2; see Appendix 4). This was possible because the APMP competencies are defined in a task-oriented way. Subsequently, it was possible to link the FNV competencies to the tasks for tender management and establish a competency-based profile for tender management in a generalized terminology (step 3). The result of this final link is presented in Appendix 5. In order to increase the quality of this linking job, that was executed by the researcher, a verification on this linkage was done. In the verification step, the researcher linked the tasks directly to FNV competencies (instead of basing this link on the APMP competencies) and compared this with the results from step 3 in order to fine-tune the competency-based profile for tender management.

The linkage between tasks for tender management and the FNV competencies resulted in an overview of competencies for tender management. Table 4 contains an overview of how many times each competency was included in this linkage (Appendix 5) and therefore provides a ranking of the degree of importance of competencies for tender management. The numbers in this table correspond to the amount of times a certain competency is linked to the tasks of tender management and therefore provides indication of its importance for the discipline. The colour allocation refers to the competency category that the individual competencies belong to, according to the FNV categorization.

*Table 4: Competencies for tender management based on the link between tasks, APMP competencies and FNV terminology*

| RANK | COMPETENCY | # |
|---|---|---|
| 1 | Communicating | 18 |
| 2 | Analysing | 16 |
| 3 | Being customer oriented | 13 |
| 4 | Handling procedures & methods | 11 |
| 5 | Being expressive | 10 |
| 6 | Being quality-oriented | 10 |
| 7 | Planning & organizing | 9 |
| 8 | Collaborating | 8 |
| 9 | Being creative | 8 |
| 10 | Being cost-conscious | 7 |
| 11 | Leadership | 6 |
| 12 | Gathering information | 6 |
| 13 | Developing vision/strategy | 5 |
| 14 | Interactive learning | 5 |
| 15 | Delegating | 5 |
| 16 | Having judgement | 4 |
| 17 | Influencing | 3 |
| 18 | Deciding | 3 |
| 19 | Controlling | 3 |
| 20 | Motivating | 3 |
| 21 | Networking | 3 |
| 22 | Taking responsibility | 3 |
| 23 | Showing sensitivity | 3 |
| 24 | Having environmental awareness | 3 |
| 25 | Structuring | 3 |
| 26 | Negotiating | 2 |
| 27 | Team building | 2 |
| 28 | Being stress-resistant | 2 |
| 29 | Being proactive | 2 |
| 30 | Being critical | 2 |
| 31 | Coaching | 1 |
| 32 | Innovating | 0 |
| 33 | Showing tact | 0 |
| 34 | Being flexible | 0 |
| 35 | Handling conflict | 0 |
| 36 | Being sociable | 0 |
| 37 | Self-managing | 0 |
| 38 | Working with programs | 0 |
| 39 | Using & designing ICT | 0 |
| 40 | Managing networks | 0 |
| 41 | Handling tools & materials | 0 |
| 42 | Technical functional designing | 0 |
| 42 | Spatial designing | 0 |

As can be seen in Table 4, not all competencies identified by FNV appear to be relevant for tender management (their score of inclusion is 0). Therefore, the competency-based profile that will be established on both input from literature and practice, will only consist of competencies that are present in the linkage between APMP competencies, FNV competencies and tasks for tender management (score >0 in Table 4). This results into all competencies having a score of 0 being excluded from this research. Because of this, all Computer competencies are excluded and also three out of five Technical competencies (*handling tools & materials, technical functional designing, spatial designing*), one Organizational competency (*self-managing*), two Social competencies (*showing tact, being sociable*), an Artistic competency (*being innovative*) and two Personal competencies (*being flexible, handling conflict*).

When this exclusion is taken into account, the list of competencies for tender management still consists of 31 competencies. However, in order to draw a final conclusion on competencies for tender management for this research, the results on competencies following from literature (chapter 3) need to be compared with results about competencies following from the practice-based part (chapter 4). As the practice-based part of this research benefits from a less extensive list of competencies (this makes it less complicated and therefore more workable), the list will be shortened.

In order to shorten the list established in Table 4, several adjustments are made based on assumptions and insights from the researcher following from the internal research period at the engineering company. This resulted into the assumption of *coaching* being a part of *team building*, as this competency was mainly linked to team building activities in the tender process. Also *motivating* is excluded from the research as a separate term, since this competency can be linked to *leadership* (Carrièretijger, 2018). Besides that, *influencing* was excluded as a separate term in this research, as this competency was either linked to activities that have to do with creating commitment and the development of a strategy. These activities are in their turn mainly linked to *team building* and *developing vision/strategy*. Finally, *being proactive* was excluded from the list of competencies for tender management as a separate competencies, as this is associated with *taking responsibility*.

There is case of one exception for inclusion of a competency, namely *being flexible*. This competency is included anyway on the basis of the experience the researcher has following from the intern period in the engineering company where the research was conducted. Due to the fact that within a tender process sometimes big changes appear (new information of the client, a change in demands for the final delivery product) it seems plausible that *being flexible* is an important competency to possess in order to be able to cope with these uncertainties and changes. The lacking importance of *being flexible* resulting from the linkage between tasks and competencies, can be explained by the fact that the tasks for tender management (identified in section 3.1.4) do not entail a big change regarding the customer demand. As the researcher experienced that changes like this are common, it was decided to include *being flexible* anyway.

## COMPETENCIES FOR TENDER MANAGEMENT

Based on these alterations of the list of competencies for tender management, the following overview including categorization of the disjoint competencies was established and presents competencies for tender management:

A. PERSONAL COMPETENCIES
- A1. Being stress-resistant
- A3. Being flexible
- A5. Taking responsibility / Being proactive
- A6. Being critical

B. SOCIAL COMPETENCIES
- B1. Communicating
- B2. Interactive learning
- B3. Collaborating
- B8. Team building
- B9. Networking

C. ORGANISATIONAL COMPETENCIES
- C2. Planning & organizing
- C4. Delegating
- C7. Leadership
- C8. Deciding

E. TECHNICAL COMPETENCIES
- E1. Handling procedures and methods
- E5. Being cost-conscious

F. ARTISTIC COMPETENCIES
- F1. Being creative
- F3. Being expressive

G. DATA HANDLING COMPETENCIES
- G1. Gathering information
- G2. Analysing
- G4. Being quality-oriented
- G5. Being customer-oriented
- G7. Having environmental awareness
- G8. Structuring
- C9. Developing vision/strategy

A final alteration that was made based on the established list of competencies, is the name of category G. FNV groups these competencies under the title 'Other competencies'. However, this seems a little vague as with this term the category could contain all kinds of competencies. Therefore, an umbrella term was sought that covers the load of the disjoint competencies present in this category. This resulted into the category 'Data handling competencies', as all competencies in this category deal in their own way with a certain type of data.

Not every competency and category is of equally importance for tender management. The ranking in Table 4 shows that the competencies *communicating, analysing, being customer oriented, handling procedures & methods, being expressive, being quality-oriented, planning & organizing, collaborating, being creative* and *being cost-conscious* form the top 10 of most important competencies for tender management. Category-wise, it is at first sight hard to tell which categories are most important for tender management. In addition to that, not every category contains the same amount of competencies which impedes the comparison of categories.

In order to provide an indication of important competency categories for tender management, it was decided to rank the categories based on their average score following from Table 4. For every category, the amount of times the competencies from this category are present in the table were added up and then divided by the amount of competencies that this category contains. This results in an average value for every category, presented in Table 5.

*Table 5: Ranking competency categories following from linking FNV to tasks for tender management*

| | | |
|---|---|---|
| G | DATA HANDLING COMPETENCIES | 9,33 |
| F | ARTISTIC COMPETENCIES | 9 |
| E | TECHNICAL COMPETENCIES | 9 |
| B | SOCIAL COMPETENCIES | 7,2 |
| C | ORGANIZATIONAL COMPETENCIES | 5,75 |
| A | PERSONAL COMPETENCIES | 1,75 |

This categorized ranking provides an indication of the importance of each of the competency categories for a competency-based profile for tender management. Besides that, it helps to simplify the results and serves as a point of departure for the data analysis that will be established in chapter 5. As can be seen, from literature it follows that mainly Data handling competencies, Artistic Competencies and Technical competencies are important for tender management. This is a result from the high ranking of the disjoint competencies *analysing, being customer-oriented, being quality-oriented* (Data handling competencies), *being expressive, being creative* (Artistic competencies), *handling procedures & methods* and *being cost-conscious* (Technical competencies).

## 3.3 PROJECT TYPES

The final topic that is discussed in the theoretical framework concerns the different project types an engineering firm encounters when bidding for work. This section aims to answer sub question 3: *Which different project types can be distinguished for tender management within an engineering firm?*

### 3.3.1 CATEGORIZATION OF PROJECTS

Within the construction industry production of new goods or services either takes place traditionally or by projects (Pellicer *et al.*, 2013). Skulmosi and Hartman (2010) concluded on the basis of a thorough literature reviews that we have become a project-oriented society. All initiatives are formed into a project, which can be handed-over to a supplier of the solution. This is also the case within engineering firms, as they are all project-based organizations. As highlighted in chapter 1, a project-based organization cannot survive without winning tenders as they form the supply of projects from the client-side. Pellicer *et al*. (2013) point out that when the production is project-based, the order of a traditional process is modified. Instead of starting with the design, followed up by the production, marketing and sale of products, the project-based establishment of products starts off with the initiation and idea sold to the client. This ultimately results into a unique product, which is one of the main characteristics of infrastructure projects.

Due to the fact that every project is unique (Rauch *et al.*, unknown), it desires a unique approach. Therefore, the processes are not exactly repetitive, but the construction industry succeeded into the establishment of a systematic approach of projects in broad lines (Pellicer *et al.*, 2013). This thesis aims to investigate whether different project types require different competencies from tender management. In order to do so, a categorization of different projects for engineering firms needed to be established, as this makes the approach more manageable (Crawford, Hobbs & Turner, 2005).

There are many options when trying to categorize different tender projects. A categorization can be established on the basis of different tender processes, or for example on the level of complexity that the tender encompasses. However, for this research a quite pragmatic approach was taken, as the BIDcenter from Sweco considers three different tender types. Therefore, it seems reasonable to continue with this form of categorization, as this is also familiar for the employees of the engineering firm.

### 3.3.2 PROJECT TYPES AN ENGINEERING FIRM ENCOUNTERS

The BIDcenter from Sweco defines three project type categories when tendering: framework agreements, engineering services and contractor services. The coherence between these three project types and their content is discussed in this section. This categorization follows from the degree of fuzziness that is encountered when the customer demand arrives with respect to the end product. Framework agreements are used as a sort of preselection of preferred suppliers for a longer period of time, but do not contain actual work and therefore the EMAT-criteria often focus on soft factors. For engineering services, which connect with the main activities of the research company, the soft factors are joined by several more specific EMAT criteria. Finally, the contractor services result into the establishment of the actual, physical work and are therefore least fuzzy. There is a suspicion of differentiation in the valuation of competencies between the three project types.

Figure 8 provides an overview of all three different project types and describes the interaction between the client and the supplier side. This process is focussed on an engineering firm. As the process moves more towards the right side of the image (towards the 'contractor services'), the requests of the client will become more specific as the project types have a more execution-oriented character.

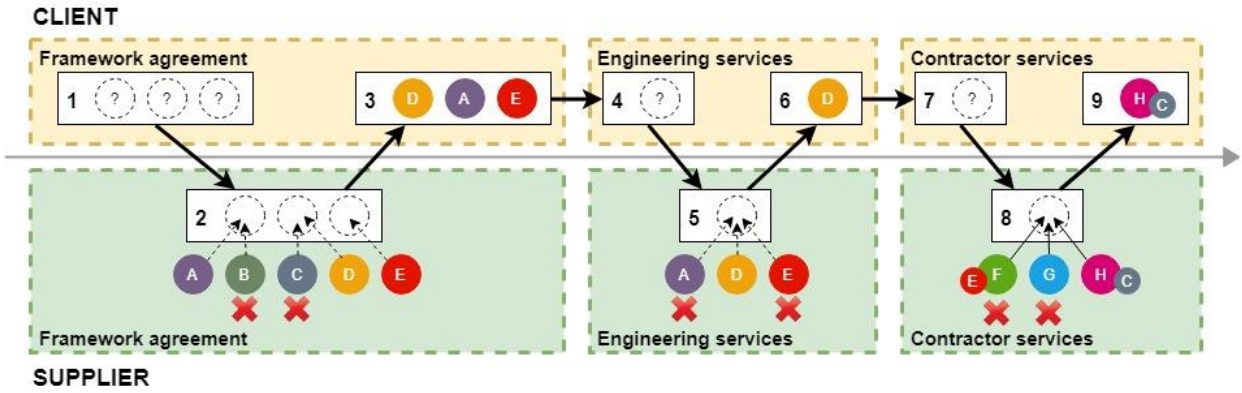


*Figure 8: Overview of different project types and their coherence*

1. *Client issues request for proposal concerning the framework agreement*
2. *Multiple engineering firms (A, B, C, D, E) join the tender process in order to end up in the framework agreement*
3. *Three engineering firms (D, A, E) end up in the framework agreement with the client and therefore become preferred supplier*
4. *The client issues a request for proposal for engineering services following from the framework agreement. Parties A, D and E can enter the tender procedure, as they are in the framework agreement*
5. *All three engineering firms from the framework agreement want to acquire the work issued by the client.*
6. *Engineering firm D wins the contract for engineering services.*
7. *The project executed for engineering services results in a request for proposal from the client regarding contractor services.*
8. *Multiple contractors (F, G, H) want to obtain the project. Several joined forces with another party (for example an engineering firm) who joins them for the tender procedure.*
9. *The contract for contractor services is rewarded to a combination of contractor H and engineering firm C, who assisted the contractor during the tender process and was (in this case) responsible for the bid management.*

### FRAMEWORK AGREEMENT

A framework agreement (FA) is some sort of preferred supplier pool, which aims to narrow the number of competitors for individual contracts down and outline agreements with these suppliers before the tender procedures for the actual works or services start. Nevi (2018) states that a framework is often used when a client cannot exactly foresee what its demand will be for the coming period (often a couple of years) but that it is plausible that multiple projects of interest for comparable parties will be procured in this period. An important notice about the framework agreement is the fact that this is not an actual award of a project yet, it is only a preparatory step in order to achieve work from public clients (PianoO, 2018c). If an engineering firm does not make it into the framework agreement, it cannot perform work for the corresponding client in the field of the framework agreement for the coming years. Therefore, it is of great importance for supplying parties to be part of the framework agreement.

### ENGINEERING SERVICES

The project type Engineering Services is actually the regular work for engineering parties. It entails many possibilities, but often includes services like technical recommendations towards either the client or a executing party. It can be procured on the basis of different tender procedures, as shown in Table 3. However, in this research the Best Value Procurement (BVP) procedure is not included. This is due to the fact that a BVP procedure asks for a very different approach of the tender from the supplier and should therefore be considered as a separate project type.

### CONTRACTOR SERVICES

The final project type that was distinguished, were Contractor Services. This is actually a little bit of an odd category, as this entails a collaboration between an engineering firm and a contractor. The BIDcenter from Sweco offers contractors the possibility to hire their employees in order to guide the tender process of a contractor and in this way join forces. This results into the fact that employees of Sweco then participate in an external process and become part of the contractor tender team.

# 4. DEVELOPMENT OF A SERIOUS GAME

This part of the research will focus on the acquisition of data about competencies for tender management within a project-based civil engineering company from a practice oriented view. The following sub-question is central to this chapter:

*How can competencies for tender management be identified from practice?*

In order to obtain a perspective from practice, a serious game will be developed which reveals prioritization in necessary competencies for tender management according to tender management professionals. The serious game is chosen as a method due to its potential to engage people in the process and the possibility of using the gaming environment as a way of combining survey methodology with a small interviewing/reflection part.

The main goal of the practical research is to establish a profile for tender management based on valuation of competencies by tender management professionals. This valuation will be established by means of a serious game. This chapter will therefore dive deeper into the concept of a serious game and the definition of this game as a research method. The definition will reveal indispensable elements of serious games, which should be taken into account for the design. Furthermore, this chapter will reveal the main objective for the development of the serious game, which will result in a number of constraints in the design. After a proper definition of the objective, a closer look will be taken at the actual design of the serious game and the different elements that are the result of this research-phase. Before diving deeper into the operationalization of the serious game, which is called CompeTender, first the test-sessions of the game will be evaluated and lessons learned will be made explicit in order to illustrate the iterative process of the game-design. This chapter will end with a paragraph dedicated to the operationalization of CompeTender which has to result in the gathering of useful data for chapter 5.

## 4.1 SERIOUS GAMES

This research will make use of a serious game in order to reveal the competencies that are valued highly by tender management professionals when performing tender management. This paragraph will take a closer look at serious games in general, provides a definition and will reveal elements that have to be taken into account when designing a game.

Susi, Johannesson and Backlund (2007) analysed a lot of literature available on the concept of serious games, in order to come up with a proper understanding of what a serious game actually is. In their article they came to the conclusion that the definition of a serious game is very dependent on the context, actors involved and the initial objective of the game (Susi *et al.*, 2007). However, an overall consensus on the definition of serious games states that *"serious games are games used for purposes other than mere entertainment"* (Susi *et al.*, 2007, p. 1). Michael and Chen (2006) underpin this by stating that *"a serious game is a game in which education (in its various forms) is the primary goal, rather than entertainment"* (p. 17).

Serious games can be used for various objectives, such as the training of employees or students, advertising, simulation of real life experiences and education on certain topics (Susi *et al.*, 2007). Often, serious games are used to generate a certain learning experience or the development of certain skills, that are, for example, too costly or too risky due to a lack of experience to perform in the real world (Susi *et al.*, 2007; Armstrong, Landers & Collmus, 2016; Corti, 2006).

But what makes a game a *serious* game? Based on their literature research, Susi *et al.* (2007) came up with a framework concerning four topics in which serious games differ from entertainment games. A summary of the conclusions is shown in Table 6. Since serious games are often used to teach a certain skill or provide a certain insight, which after experiencing it in a game environment can be applied in real life, it is very important that the simulation will not teach the player the wrong set of skills (Susi *et al.*, 2007).

As a serious game is based on a model from real life, assumptions play a big role. The assumptions form the background of the model, which is used as a point of departure in the game. Therefore, Michael and Chen (2006) state that it is of great importance to align the assumptions for the serious game with real life in order to make workable and correct

simulations. A real life simulation should also reflect real life communication, so therefore one should take into account, when looking at the results of a serious game, that communication is never perfect and could therefore influence the results of the game in a certain way.

*Table 6: Differences between entertainment and serious games (Susi et al., 2007, p. 6)*

| | SERIOUS GAMES | ENTERTAINMENT GAMES |
|---|---|---|
| Task vs. rich experience | *Problem solving in focus* | *Rich experiences in focus* |
| Focus | *Important elements of learning* | *To have fun* |
| Simulations | *Assumptions necessary for workable simulations* | *Simplified simulation processes* |
| Communication | *Should reflect natural (i.e. non-perfect) communication* | *Communication is often perfect* |

A game, whether serious or not, is intended to be played. Johan Huizinga (1955) once defined six characteristics of play, which are basically applicable for all sorts of games and can be seen as elements that need to be embedded when designing a game.

1. *"Voluntary, a form of freedom: "play to order is no longer play"*
2. *Pretend: "play is not 'ordinary' or 'real' life"*
3. *Immersive, or taking up a player's full attention*
4. *"It is 'played out' within certain limits of time and place"*
5. *Based on rules: "it creates order,* is *order"*
6. *Social, creating a social group of the players or tending to cause people involved in a particular kind of play to identify themselves as a group" (Michael & Chen, 2006, p.19)*

Besides this, Michael and Chen (2006) highlight that competitiveness can be an aspect that can be of great influence for the player experience. Corti (2006) emphasizes that important aspects which enhance the learning experience are embedded in the engagement, motivation, role playing and repeatability that these games facilitate. Vissers (2016) conducted a research into necessary elements of a serious game and came to the conclusion that there are in total seven topics that need to be addressed when designing a serious game. He states that a relevant gaming experience should be:

- *"**Flexible and reusable**: The game should be usable for, or adaptable to, a range of similar situations and different learning contexts*
- ***Dynamic**: The game needs to react on the actions of participants*
- ***Transparent**: The results should be clear and understandable for all participants*
- ***Fast and easy to use**: The gaming time should be relatively short and non-experts should be able to play the game.*
- ***Integrative**: The game should consider different aspects, layers of design and decision making in a holistic and systematic way.*
- ***Interactive**: The game should support the negotiation process among participants.*
- ***Communicative**: The game should be able to convey meaning and insight to stakeholders about problem structure, alternatives, and different perspectives."* (Vissers, 2016, p. 56)

Paragraph 4.5 elaborates on the operationalisation of the serious game as a research method. This paragraph will highlight how the necessary elements of a serious game are embedded in the design of CompeTender, the serious game developed for this research.

## 4.2 GAME DESIGN OBJECTIVE

This research aims to identify competencies for tender management in a project-based civil engineering company while tendering on the supply side of the procurement system. Therefore, this objective should also apply for the practical part of this research. The development of the serious game in order to provide workable data will be executed on the basis of this objective and every design activity should be aligned with this objective. The design of the game will develop into an iterative process, where the game and its results constantly will be mirrored to the desired sort of outcomes to make sure that they will benefit the research objective.

As mentioned in paragraph 4.1 a serious game can be used to provide a learning experience. In most serious games, it is intended that the player receives a learning experience about for example a certain internal process or actions that need to be taken when a certain situation occurs. However, in this case the initial goal is to provide the game master

with a learning experience about the competencies that are involved with tender management. Nevertheless, the learning experience is twofold in this case, as there is also case of a learning experience for the player. The player gains insight in the tendering process and explores the opportunity to compile teams purely based on competencies. Furthermore, it is important that participants experience fun while playing the game, as it needs to engage their attention and they voluntarily need to participate.

### SERIOUS GAMES FOR COMPETENCE ASSESSMENT

As stated above, the main objective of the serious game that will be developed for this research is to reveal competencies that are involved with tender management according to professionals in tender management. Therefore, it makes sense to take a further look into competence assessment which make use of serious gaming, as this might provide valuable insights into the methods and procedures available when it comes to revealing competencies. Armstrong, Landers and Collmus (2016) devoted chapter to the usage of serious games for human resource management and within this chapter they distinguish four areas of interest for the usage of these games: recruitment, selection, training and performance management. Armstrong *et al.* (2016) state that within the second area (selection) assessments are often used in order to score job applicants on multiple subjects, among others on personality, skills, abilities and knowledge. As competencies were defined in paragraph 3.2 as a combination of skills, knowledge, attitude and personal characteristics, gamification of selection assessments could be of great value when it comes to insight about competence revelation. Armstrong *et al.* (2016) state that gamification of the selection process might have a positive effect on the objectivity of the data retrieved on the applicants, as they state that *"desirable behaviours within the serious game may be less obvious to players"* (p. 146).

It is because of this that a serious game might provide the players with the opportunity to consider the game as a stand-alone opportunity to share their experience and opinion. It is likely that tender management professionals share their expertise on competencies for tender management in a game setting, as Ajzen (1991) highlights that past behaviour is considered to be a good predictor of future behaviour and preferences. However, when designing the game one should take the learning curve of players into account, as players tent to perform better on competence assessments once they are familiar with the procedure (Armstrong *et al.*, 2016). An important element of the design of the serious game for this research is the fact that this research does not aim to qualify tender managers on their competencies, but serves as an element to gather their knowledge about this topics in order to gather insights, as there is not much knowledge available yet on competencies for tender management (see also paragraph 3.2.2). Therefore, the literature and points of consideration about serious games for competence assessment might serve as a source of inspiration for this research, but might not be completely applicable as it does not aim to score tender management on their suitability for the job but wants to gather and structure their thoughts about the competencies for the job.

## 4.3 GAME DESIGN

As stated in paragraph 4.2, the main objective of the serious game is to reveal competencies that have to be present when performing tender management within a project-based civil engineering company on the supply side of the procurement system. Therefore, the serious game should enable the player to make clear which competencies he or she thinks should certainly be present while performing tender management. Gamification of the assessment process did not seem appropriate due to the mismatch in research objectives. Therefore, inspiration was sought in existing entertainment games which enable the player to go through a certain process and entertainment games which focussed on the expansion of a certain character.

This paragraph will elaborate on the design of the game and the considerations that influenced the final design. After this, all elements present in the game and their coherence will be explained. As the game needs to enable players to give their opinion about necessary competencies in tender management, the name of the game became CompeTender. CompeTender will be played by employees from Sweco who have experience with tendering.

### 4.3.1 TEAM BUILDING FOR TENDER MANAGEMENT

When a tender procedure starts, one of the first tasks for tender management is to analyse the customer demand and decide what input is necessary in order to make the tender a success. Based on this information, the compilation of a team starts. This idea serves as a basis for the serious game that is developed to reveal necessary competencies for tender management according to tender management professionals. During the game, every player gets the chance to compile its own tender team, purely based on competencies, suitable for the specified phases of the tender process. Therefore, there are two points of attention that need to be enabled by the game: first the game needs to enable the player to go through the tender process in various delineated phases. Secondly, the game needs to enable the player to

compile teams purely based on competencies. For the development of the game, inspiration was sought in existing games. The next section will elaborate on existing games which contain these elements.

### 4.3.2 ANALYSIS OF EXISTING GAMES – INTERESTING ELEMENTS

Existing games were used as a starting point for the game design process, as there are tons of existing games available which might provide useful elements for the development of CompeTender. The analysis of existing games for interesting elements is purely based on the knowledge of existence of these games by the researcher.

First of all, the game that will be developed needs to enable the player to go through the entire tendering process. A game which enables its players to a process, is the 'Game of Life' ('Levensweg' in Dutch). In the Game of Life players 'experience' big events in a person's life and have to make decisions about choices linked to this life, like education, career and marriage, which eventually results in payment of certain amounts of money. Based on these decisions, a player goes through its own, customized life (process) and collects money based on previous decisions and events he or she bumps into. At a certain point, players have a certain amount of cash on their fictional bank account which enables them to buy properties or do investments. In the end, the player with the biggest amount of money is the winner of the game. Elements of interest for the design of CompeTender were the fact that the player needs to undergo a certain process in order to collect money (or points).

Secondly, the serious game needs to enable the players to compile teams purely based on competencies in order to distinguish which competencies are valued highly by tender management professionals. A game that focusses purely on characteristics of people is 'Guess who?' ('Wie is het?' in Dutch). 'Guess who?' is a game which revolves around 24 images of fictional people, who all have their own appearance characteristics. The game is played by two persons, who play against each other and both have an overview of these 24 fictional people. In 'Guess who?' every player picks a certain card. This card portrays one of the 24 fictional characters and the goal is to eventually guess which character your opponent has. This guessing will be done on the basis of descriptive questions about the appearance of the characters. By asking well-crafted questions about their appearance, characters will be eliminated and eventually a player ends up with the character of his/her opponent. The player that guesses the character of his/her opponent first, is the winner of the game.

Within 'Guess who?' every character has its own characteristics. This was an inspiration, as within a team all team members have their own competencies to contribute to the end result of a project or tender. This resulted into the establishment of 44 characters (fictional team members) for CompeTender, who all have their own set of competencies that can be of use during the tender process. An elaboration of these characters can be found in paragraph 4.4.2. Based on these team member cards the players can compile competency-based teams for the tender process.

### 4.3.3 INFLUENCE ON GAME DESIGN FROM COMMON SWECO PRACTICES

More input for the final design of the game for this research was gathered from the procedures that are common within Sweco. Eventually, the developed game will be played by professionals experienced with tender management who are currently employed at Sweco. Therefore, the game needs to be in line with the common bid process which is usually followed within Sweco. In order to streamline their bids within the organization, Sweco developed the so called Win Business Process (WBP). This process is explained in the next section. In order to familiarize the participants with the tender process that is developed for the game, it was decided to link literature input to the current practice (WBP) within Sweco. This aims to increase the user-friendliness of the game.

#### TASKS AND RESPONSIBILITIES FOR TENDER MANAGEMENT WITHIN SWECO

In order to structure the bidding process and allocate responsibilities, Sweco developed the Win Business Process (WBP). The WBP identifies all different phases relevant for the internal tender process and links several review moments to this process in order to control the bidding process (Sweco, 2015). Besides that, the BIDcenter linked their own generic tender process to the WBP. The tender process as identified by the BIDcenter mainly focusses on the strategy and process side of a tender. Figure 9 gives an illustration of both processes in relation to each other.

Figure 9 illustrates the Win Business Process (WBP), displayed on top of the image, in combination with the tender process of the BIDcenter, displayed at the bottom. The WBP consists of seven phases (dark blue rectangles), which can roughly be divided into two categories (yellow arrows). The WBP was originally developed to enhance the quality of tenders from Sweco which should lead to more work for the organization. This is done by organizing the process of an opportunity internally, linking it to review moments and address ownership to the various phases of the process.

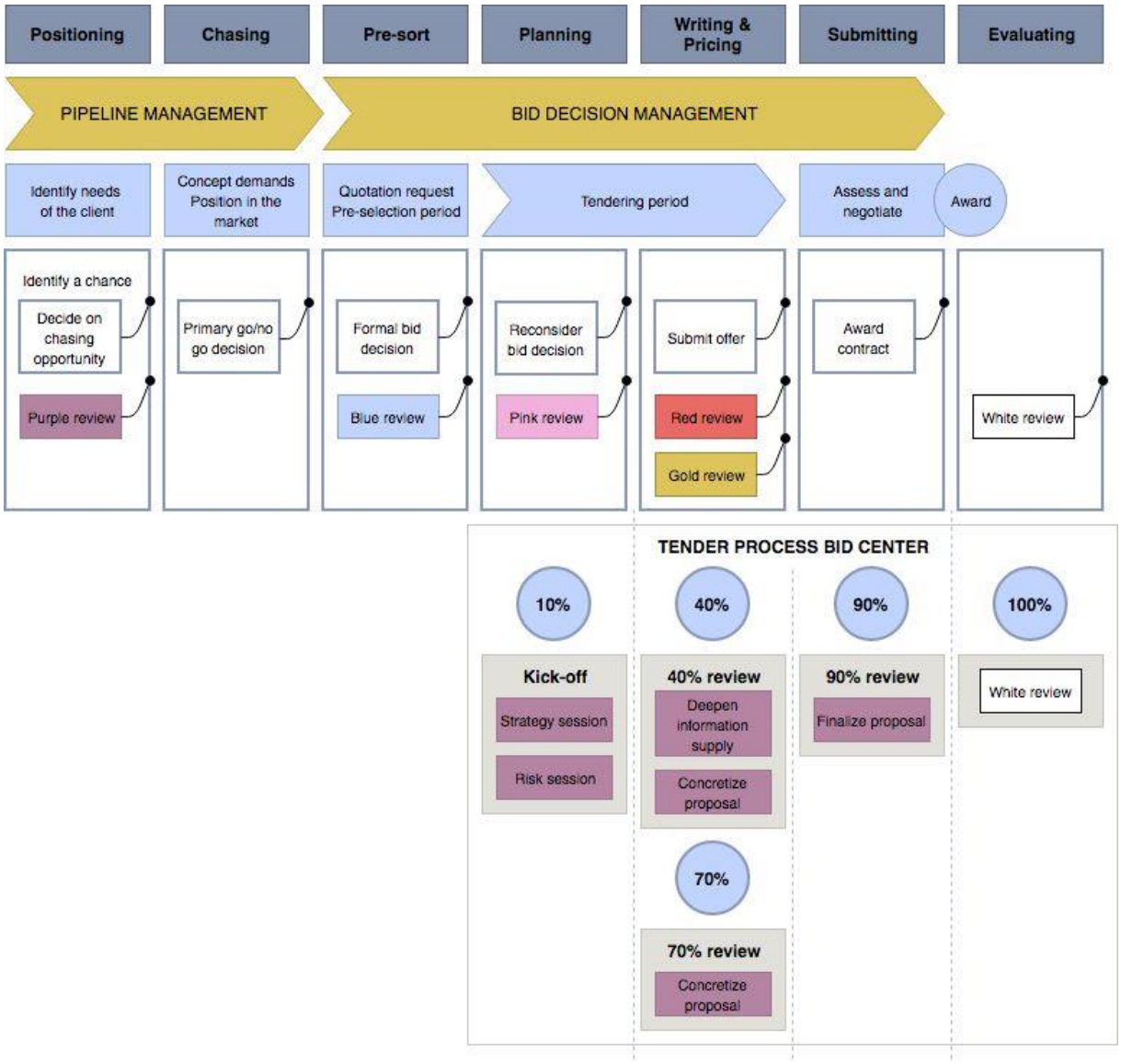


*Figure 9: Overview of the Win Business Process in relation to the tender process of the BIDcenter*

The WBP consists of the following seven phases, which all focus on a different part of the internal opportunity process. Some of them are combined in the description. As can be seen, the WBP starts long before the actual tender manager is involved. This ensures that the organisation proactively plans the upcoming projects, their chance of success, and participation in the tender.

- Positioning: this phase aims to gain a strategic advantage in comparison to the other competing parties.
- Chasing & Pre-sort: these phases aim to identify, prioritize, qualify and gather information for winning strategies when it comes to suitable opportunities.
- Planning: during the planning phase, the tender process is planned in detail to avoid waste of time and energy when actually writing the tender.
- Writing & pricing: this phase aims to write a winning bid, which reflects the values and input of the review teams.
- Submitting & evaluation: the last phases focus on closure of the bid development and the transmission towards the client and the potential project team, which has to execute the project as proposed in the bid.

The main tasks that follow from the WBP are:

- Gather information about potential opportunities
- Gather information about clients and competition
- Identify and enhance potential teams, possible competing partners and partners
- Draw up, (further) develop and approve an overall win strategy
- Determine a winning price and potential solutions
- Thorough and complete review of client demand, check for surprises and initiate bid/no bid decision

- Determine and manage the tender costs and resources
- Make a first draft of the offer, determine structure, size and content.
- Prepare division of tasks and instruct tender team
- Develop strategic sales themes and transfer these to the entire tender team
- Gather supportive evidence for the approach and accurately describe the advantages to the client
- Finalize the team composition
- Refine the costs, price and risks
- Write and rewrite the content towards a to-the-point text which covers the client criteria
- Revise the content with the tender team before handing over the plan towards the Red review team.
- Encourage reading the tender proposal critically by the Red review team from the view of the client
- Prepare the final business case review (Gold review) to get permission to submit the bid
- The presentation towards the client, conversations and reality checks
- Archive all submitted materials and update the pipeline
- Identify and draw lessons from White review, capture these and pass along
- Fully inform the project leader on the tender when it comes to strategies, assumptions, risks and negotiations
- Plan to investigate opportunities which could benefit both the client and Sweco for this and future projects.

A more extensive list of all tasks and their position within the WBP can be found in Appendix 1.

Besides the WBP, Figure 9 also displays the tender process as perceived by the BIDcenter. The BIDcenter is part of the Sweco organization and aims to enhance the quality of tender proposals by capturing lessons learned within the team and therefore make use of the learning curve of team members when it comes to tenders. The BIDcenter guides the tender process of tender teams by facilitating several sessions (which are drawn up based on past experiences), write the tender offer and sometimes serve as the tender manager for the opportunity.

In order to guide the bid process of teams, the BIDcenter came up with its own structured bidding process which includes activities and products that need to be developed during this process. Right after the formal bid/no bid decision within the WBP the BIDcenter gets involved, and takes off with the tender team. The BIDcenter process is divided into five steps (10%, 40%, 70%, 90% and 100%) which are linked to the final four phases of the WBP. In order to increase the degree of recognition among the employees from Sweco, the BIDcenter process also makes use of the formal (coloured) review moments along the process.

A brief description of the BIDcenter process is as follows:

- 10% review: Around the 10% review the BIDcenter facilitates two sessions: a strategy session, which aims to draw up a strategy for the project tendered for, and a risk session, which helps to collectively identify risks for the project which deserve proper attention and need to be captured in the tender offer.
- 40% review: the 40% review aims to evaluate the first version of the plan of approach with the tender team. The review session aims to deepen the information gathered so far in order to concretise the proposal. Besides that, the review aims to evaluate the previously determined strategy and identified risks.
- 70% review: In this phase of the tender the proposal needs concretizing. The proposal is reviewed on the basis of the degree of answering the EMAT-criteria, whether it is SMART or not, if measures are included and if the added value comes to its right in the plan.
- 90% review: The 90% review serves as a final check for the tender proposal and tests whether the proposal is sufficient project-specific, spelling is correct and an active writing style is applied.
- 100%: the proposal is finished and handed over to the client. What is left is the evaluation, both internally with the tender team and externally with the client on the basis of the outcome.

A complete overview of the BIDcenter tender process and the corresponding tasks can be found in Appendix 1.

## DIFFERENTIATION IN PROJECT TYPES

Currently, no literature was found in the differentiation in competencies regarding different project types. However, Sweco suspects that the earlier identified project types (section 3.3) each ask for a different set of competencies. This results in the inclusion of a game element (project type cards) that differentiates between the project types that are tendered for. The content of the project type cards is established in consultation with employees of the BIDcenter and represent typical customer demands.

## 4.4 GAME ELEMENTS

This section will elaborate on the elements present in the game and their mutual cohesion. Appendix 7 contains an overview of all designed elements for the game, also bigger versions of the images present in this chapter. CompeTender needs to enable the players to go through the tender process for a specific project type, while in the meantime compiling tender teams based on competencies and remaining within the set tender budget.

### 4.4.1 TASK CARDS & TASK OVERVIEW

Every player receives a light-blue coloured set of cards, the task cards. This set of cards describes all the tasks involved with tender management throughout the entire tender process. Task cards serve as the thread of the game, as players have to compile their teams based on the tasks that need to be executed in every phase of the tender process.

The tasks are retrieved from a combination of literature (section 3.1.4), the Win Business Process from Sweco and the tender process from the BIDcenter (section 4.3.3). The combined process is divided into five phases, based on the phases that are distinguished in the tender process the BIDcenter. This is done in order to make sure the employees recognize the structure of the process, as they are already familiar with the BIDcenter bid process.

#### STANDARDIZED TENDER PROCESS

**PHASE 1**

1.1 Make the bid/no bid decision
1.2 Analyse the procurement guideline
1.3 Determine tender budget
1.4 Compose tender team
1.5 Make a preliminary tender planning
1.6 Make a final tender planning
1.7 Determine and capture the scope of the project
1.8 Assign responsibilities & writing tasks
1.9 Create commitment among the team members
1.10 Determine the right tender strategy

**PHASE 2**

2.1 Identify risks (e.g. by means of a risk session)
2.2 Set up a document management protocol
2.3 Acquire information from experts
2.4 Determine the structure for the plan
2.5 Start to fill the plan (writing)
2.6 Create commitment among the team members
2.7 Monitor the tender budget
2.8 Evaluate the tender strategy so far
2.9 Evaluate the identified risks
2.10 Evaluate the quality of information so far
2.11 Identify missing information for a complete plan

**PHASE 3**

3.1 Organise the production of images
3.2 Collect information from experts
3.3 Write tender proposal
3.4 Organise peer review by specialists
3.5 Monitor the tender budget
3.6 Ensure unique, added value in the plan
3.7 Write everything down in a SMART way
3.8 Check whether the EMAT is sufficiently answered
3.9 Add measures

PHASE 4

4.1 Set offer price
4.2 Incorporate information from peer reviews
4.3 Make the tender offer consistent
4.4 Ensure an answer to the customer demand
4.5 Check spelling
4.6 Ensure an active writing style in the proposal
4.7 Check for sufficient project specificity
4.8 Check compliance with customer requirements

PHASE 5

5.1 Organise the transfer of the offer towards the layout/production team
5.2 Submit the offer on time
5.3 Prepare presentation / interview(s)
5.4 Give presentation / interview(s)

## TASK CARD DESIGN

Figure 10 shows the lay-out from the task overview on a poster. This lay-out is similar to the one for the task cards, which are all displayed in Appendix 7. The task cards describe each phase individually, as the player needs to deliver a team for each phase. The poster provides the player with an overview of all tasks that have to be executed by tender management throughout the entire process.

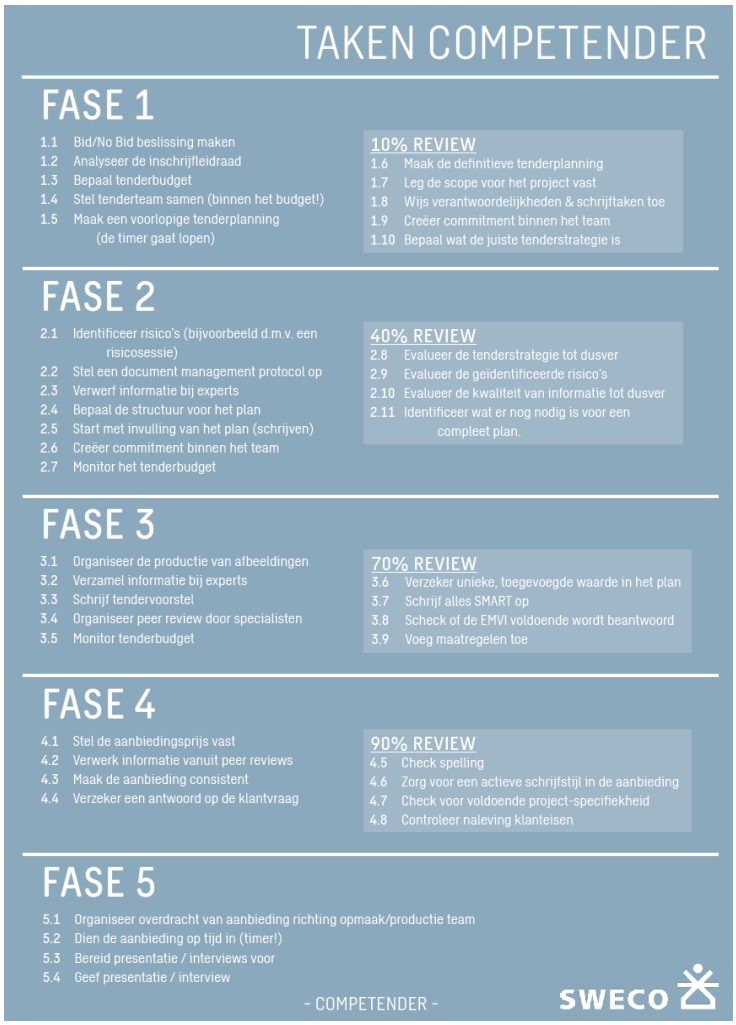


*Figure 10: Poster with tasks for tender management during CompeTender*

### 4.4.2 TEAM MEMBER CARDS

Compiling a team can be done with the team member cards. There are in total 44 potential team members, divided over three different levels of competency and price. In total, 24 competencies of interest were distinguished from the literature research when linked to the specific tasks for tender management. This list of competencies was established in paragraph 3.2.2. Subsequently, these 24 competencies were divided over the potential team members.

Figure 11 shows three examples of team member cards, a complete overview of all team member cards including names and competency allocation can be found in Appendix 7. As can be seen, the three different colours all represent a different amount of competencies and money the team members cost for participating in one phase. The eight yellow senior cards represent team members with three competencies (24/3 = 8), which cost €1600 (so that makes €533 per competency). The twelve medior pink cards represent team members with two competencies (24/2 = 12), for €1200 per phase (€600 per competency). Finally, there are 24 blue junior cards, which represent team members with only one competency for €700 per phase. Every card has an indication of their level expertise (senior/medior/junior), however, this does only reflect the amount of competencies present within that team member and does not include the extent to which they master the certain competency. Therefore, a junior with the competency *analysing* is as good in analysing as a senior who has the competencies *analysing*, *delegating* and *being quality-oriented*.

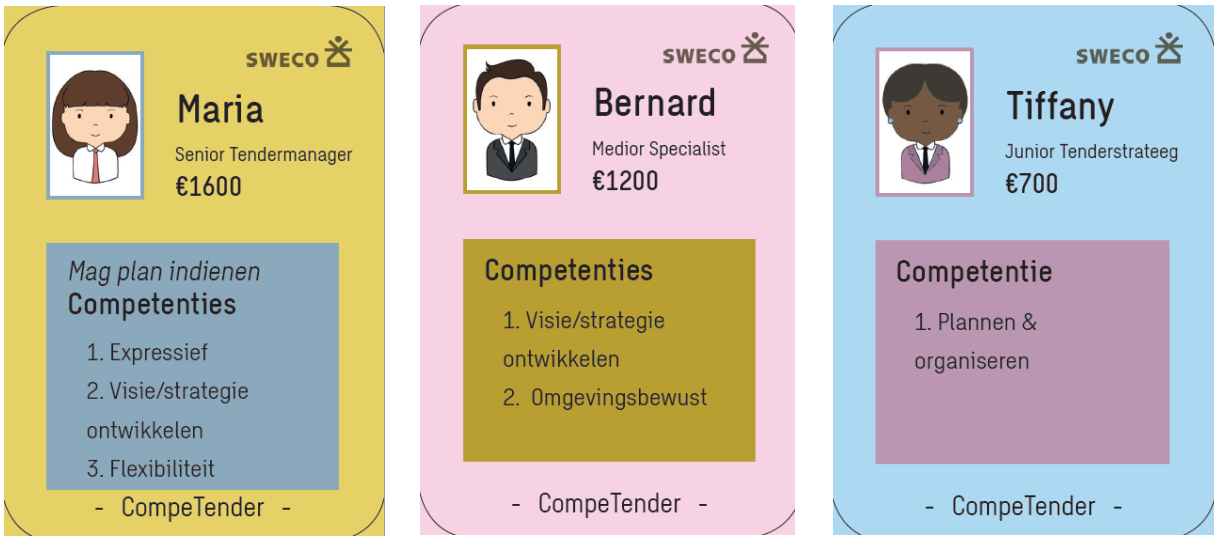


*Figure 11: Three types of team member cards*

### 4.4.3 PROJECT TYPE CARDS

As this research aims to identify competencies for tender management and discover whether there is a difference between important competencies for different project types, every player receives a project type card with a specification of the tender project. There are three different project type cards in total, one for each project type that was distinguished in paragraph 3.3.2. The project type cards contain a brief description of the customer demand and the EMAT-criteria where parties can get a discount for from their originally offered price. Every player receives a project type card and is asked to keep this assignment in mind while he or she compiles the team for every phase of the tender process. The content of the project type cards is established with help from employees from Sweco and reflect typical requests from public clients which are encountered by the engineering firm.


*Figure 12: Project type cards for a framework agreement*

Figure 12 shows the project type card for a framework agreement. The information on every project type card differs, and aims to represent a typical project for that specific project type. However, the budget for each tender type is the same (€40.000,-) in order to make sure that this does not influence the choices for certain competencies. The content is prepared together with an employee of the BIDcenter who has a lot of experience with tendering. The project type cards

### 4.4.4 ANSWER FORM

All answers are collected through an online answer form, which was designed in Google Forms. For every phase the players needed to tick boxes for the team members they want in their team and give some justification for their choices. After each phase the answer form will be submitted and the answer form for the next tender phase appears. In the end, a general review of the game, the competencies and the project type appears.

Due to the fact that the answer form is online, the answers are also automatically gathered online and therefore can easily be used as input for the score form.

### 4.4.5 SCORE FORM

The game leader receives all answer forms online and can easily copy-paste the answers to a personal score form for each player. Every player has their own score form managed by the game leader, which keeps track of the progress of the players. The score form is to a large extend automatized and automatically generates a score based on the answers of the players. It also provides feedback on the amount of budget that is used so far and the amount that remains available for the next phases. The feedback from the score form (score and budget) ensures a dynamic gaming environment, as it reacts on the input provided by the players. Besides that, the scoring forms an opening for an open conversation between the player and the game leader which leads to interactive insights about both the game and tender management. An elaboration of the score form can be found in Appendix 6.

### 4.4.6 GAME BOARD

The game board is shown in Figure 13 and is divided into five sections, which represent the five phases of the tender process the player has to address during the game. After each phase the player submits his or her answer form and receives feedback on his/her score for that phase and the remaining budget for the coming phase(s). The game board is used to visually keep track of both the score and the remaining budget by the player. The game board is laminated and can therefore be reused as people keep track of their scores with whiteboard markers. In the end, the player writes down his or her final score, which can end up at the top 5 overview in the hallway of Sweco. The top 5 overview contributes to the competitiveness among Sweco colleagues, which was mentioned in paragraph 4.1 as an important element of serious games. Besides that, it creates awareness about the fact that the game is played and serves as a starting point for a conversation about the game for the researcher with employees from Sweco.

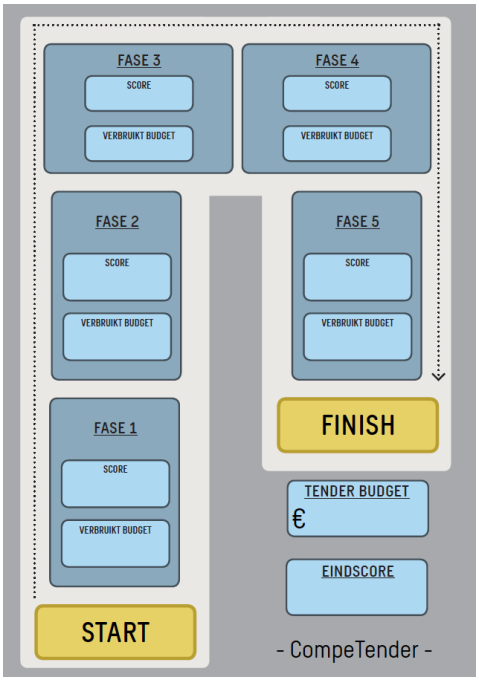


*Figure 13: The CompeTender game board*

### 4.4.7 EXTRA ELEMENTS FOR PLAYER EXPERIENCE IMPROVEMENT

There are in total four extra paper lists which aim to improve the player experience. Two lists (see Appendix 7) contain exactly the information present at the team member cards (the allocation of the competencies, name of the team member and the price) and are organized the other way around from one another. A third list contains definitions of all competencies, to make sure that all competencies are interpreted correctly (see Appendix 8). The final form is a paper overview form which the player can use to check which competencies he/she wants to have in his team at every phase.

Besides these four forms, a presentation is given at the start of the game in order to make sure the objective of the game, the elements of the game and the rules are clear. This presentation is given at the start of every session and takes about five to ten minutes.

## 4.5 GAME OPERATIONALISATION

CompeTender is an individual puzzle game, which aims to identify competencies for tender management according to tender management professionals. Every player receives a set of five task cards, one for every phase, and a set of team member cards (44 in total). For every phase, the player has to compile his own tender team, purely based on competencies he thinks are necessary to succeed in the corresponding phase, within a total time of 40 minutes. Every player has a budget of €40.000, which can be spend freely over the five phases. After each phase, the player has to submit his tender team through the online answer form. The game leader then imports the answers into the score form and provides the player with feedback on his performance score-wise and how much of the budget is remaining for the coming phases. The player with the highest score is considered the winner of CompeTender and receives a price. The remaining budget does not influence this score, but mainly serves as a tool to ensure prioritization in a player's choices regarding the included competencies.

### 4.5.1 GAMING PROCEDURE

As stated earlier, CompeTender is an individual game. However, in order to increase the efficiency of the playing time invested by the game leader, multiple players (maximum 3) can participate at once. An overview of the gaming sessions and the corresponding participants can be found in Appendix 13.

Every player has a set of task cards, a set of team member cards, a project type card, a game board including a whiteboard marker and the extra paper lists for player experience improvement in front of his seat. Besides that, a laptop for each player is provided by the game leader, to enable the players to fill in the online answer form. The game leader is situated in front of the players and maintains their score forms. The poster with the task overview for all phases

of the game is attached to the wall of the gaming room and enables the players to look ahead in the game and be aware of what might still come task-wise.

The players are situated next to one another, as cribbing is not a problem but it is not encouraged. The game leader emphasizes that the final score is not important for the research result, and that this only a game element which motivates people to participate in the game and can be displayed on the score board in the hall way in order to arouse interest from passers-by. At the end of all gaming sessions, the participant with the highest score received a small price.

Before the game starts, all participants get a presentation on the research that underlies this game, the objective of the game and the elements and rules are explained. This presentation is present in Appendix 10.
When everything is clear, the participant can start filling out the online answer form. During the game, the game leader provides feedback on the remaining playtime and make notes of remarks participants have, next to their answers. If the time is over, every participant must be finished with the establishment of 5 competency-based teams and a short evaluation is conducted. The game leader asks all participants whether or not they have used their project type card, and how this is reflected in their data. Besides that, general remarks are written down and included in the qualitative justification of all games (Appendix 13).

### 4.5.2 RULES

In order to guide the game play of CompeTender and make sure that every player has the same constraints, several rules are made up and explained beforehand to the gaming session.

#### BUDGET

Every player receives a budget of €40.000,- which they can spend on team members during the five phases of CompeTender. Every team member costs a certain amount of money, and this price needs to be paid every phase the team member is present in the team. The budget serves as a form of pressure for the players to prioritize the competencies that they really want in their team, as it is not possible to have all competencies present in each phase. If a player exceeds the budget of €40.000,- the score form will automatically generate minus points, so this is not advantageous for the player. Left over budget will not be rewarded positively, and is therefore not beneficial for the player.

#### TIME

The complete gaming session takes about an hour. This includes the introduction, the presentation and feedback at the end. For the compilation of five teams every player gets 40 minutes. The time constraint is introduced for two reasons. The first reason is the fact that the time constraint simulates the short amount of time and pressure that is associated with tenders. The second reason follows from the fact that the researcher does not want to oblige people to give up more than one hour of their time for participation in the research.

#### TEAM SIZE

As it is not desirable that teams get too large in real life for efficiency reasons, players are driven towards teams which are not larger than eight team members. In order to achieve this, a fine was introduced when a team consists of nine or more team members. This fine has a value of €1000,- for each phase the team size exceeds eight team members. The number eight was chosen based on the fact that there are in total 24 competencies, divided over 44 people. If a player wants to have every competency present in a certain phase, he can choose to make up the team of all senior team members (in total eight team members which all have three competencies) and with that cover all competencies.

#### INTRODUCTION NEW TEAM MEMBERS

In real life, new team members have to get familiar with the tender and have to be incorporated in the team. This is at the expense of efficiency. Therefore, the introduction of new team members results in a fine of €300,- per new team member per phase, except the team that is compiled for phase 1. This fine also complies for team members that have been in the team in earlier phases (for example in phase 1) and are reintroduced in a later phase.

#### OBLIGATION SENIOR ROLE

As senior team members are budget-wise most efficient (they contain 3 competencies for €1600, which results in an average price per competency of €533), the usage of the senior role is encouraged by making it obligatory for the execution of certain tasks in phase 1 and phase 5. Which senior team member the player chooses is up to him/her.

### 4.5.3 TASKS

CompeTender lets professionals experienced with tender management compile competency-based teams on the basis of a generalized tender process. The tender process that is established for the game is a result of a combination of tasks following from literature (section 3.1.4), the Win Business Process from Sweco and the bid process from the BIDcenter (section 4.3.3). This generalized tender process was displayed in section 4.4.1.

For each phase participants have to compile a competency-based team based with which he believes he can perform the tasks for that particular phase.

## 4.6 TESTING & ADJUSTMENTS

The CompeTender game development was an iterative process with multiple testing rounds. During these rounds, CompeTender was played in order to discover what difficulties might be encountered while playing. Also the testing rounds served to discover and eliminate flaws, uncertainties and ambiguities and helped the game leader to get familiar with the introduction of people to the game and achieving the goal. In total there were three separate testing rounds, with a variety of players as can be seen in Table 7. This section will discuss the difficulties that were encountered during the development and testing of the game and the alterations to the game based on the feedback that was provided by the players.

*Table 7: Overview of testing rounds*

| | Respondents | Duration | Feedback |
|---|---|---|---|
| 1 | Graduation Committee | 1 hour | A large overview of all tasks helps the player to look ahead of what has to be done in the future and besides that gives a good overview of the complete tender process.<br>The time for completion of the game was set on 30 minutes, but this appeared to be too short.<br>The linkage of specific roles to the team member cards is good for the degree of recognition players will have. |
| 2 | Msc. Students, various studies (Delft University of Technology & Erasmus University; 3 respondents) | 1,5 hour | Finishing the game in 40 minutes is doable.<br>The introductory presentation should really emphasize the fact that it is the intention to form competency-based profiles. Which competencies do you need in order to succeed in this phase?<br>Big overview of the tender process helps participants to understand what needs to be done and to better divide their available budget over all phases. |
| 3 | Msc. Students, various studies (Delft University of Technology; 3 respondents | 1,5 hour | The budget variation seems to be of small influence on the amount of competencies participants include in their team, as the prices for team member cards are established on the basis of a budget of €40.000,-. However, as the participants were mainly focussing on linking competencies to tasks, this was not discovered as really problematic yet. |

### 4.6.1 BUDGET VARIATION

As stated earlier, within CompeTender there is case of three different project types. The content of these project type cards was established in order to reflect a simplified version of a typical customer demand for that specific project type. At first instance, all project types had a different budget available for the tender team, corresponding to the amount of time that was assumed to be needed for the tender. The project type 'Contractor services' had a tender budget of €100.000,-, the 'Engineering services' had a budget of €40.000,- and the 'Framework agreement' had a budget of €25.000,-. The differentiation in the tender budget aimed to make the fictional cases as realistic as possible, as all three tender types usually have a different budget. However, the prices of the team members did not reflect this differentiation in budget and therefore players with a higher budget could make way bigger teams (and therefore did not have to funnel in the necessary competencies). This made the game unfair, as people with a higher budget could now more easily get a higher score.

During the testing rounds, this problem did not appear this clearly, due to the fact that the participants were not aware of this differentiation and did not show strategic behaviour in this area. However, it was a matter of concern before the actual data gathering started. As this design choice turned out to largely influence the outcome of the game during the first game (session 1, players 4 & 17), it was decided to make the tender budget equal for every project type (€40.000,-). Therefore, the data obtained from player 4 will be declared invalid, as the budget for this player was €100.000 and enabled the player to make way bigger teams than the other player. This decision will be further explained in section 5.2.3.

### 4.6.2 PRICE DETERMINATION

There are three different price levels present in the team member cards from CompeTender. The price levels are determined on basis of the budget within participants have to set up their team, combined with the number of competencies that need to be covered in order to get a 100% score for every phase of the game. The tender budget is €40.000,- and in total a player needs to address 63 competencies divided over the five phases of CompeTender. Based on these two factors, an average price of €600 per competency was determined (40.000/63 = 635). To make senior team members more attractive in comparison to junior team members (as senior team members possess three competencies instead of one), the relative price per competency for senior team members was decided to be €533 (1600/3) and for junior team members €700.
This way, one should be able to cover all competencies and achieve a 100% score for every phase ánd remain within budget, as long as the division of the different competencies along the team member cards is beneficial.

### 4.6.3 DETERMINATION SESSION TIME

Starting point for the time a session should cover is the idea that the players must be able to complete the game within one hour, including introduction before the game and evaluation afterwards. For the first testing round it was assumed that players should be able to compile five teams within 30 minutes. This turned out to be too short, as players have to get familiar with a lot of information (how the team compilation works, all the tasks that need to be performed and the justification of their choices) before they can start with the compilation of teams. However, as the desire remained to finish within one hour, the playing time was increased to 40 minutes. This seemed to work out better, as players were able to finish within this time now. However, too much time for the game is also not desirable due to the fact that the game needs to simulate a tender process and this often is accompanied by time pressure.

### 4.6.4 TENDER ROLES

In the original design of CompeTender different roles from the tender process were linked to the team member cards. The roles should serve as a point of recognition for the CompeTender players, as they are familiar with these roles in real life. All senior team members had the role ‘Tender manager’, all medior team members were ‘Specialists’ and the junior team members had the role of ‘Tender strategist’. There was no differentiation between roles among the levels of competency, so therefore the role should not influence the decision for a certain team member or its role during the gaming sessions.

While testing the game, no difficulties arose. In the introduction it was explained that the role team member cards had, only served as an indication, but that it did not say anything about their level of competence. The role purely serves as an indication whether a team member had one, two or three competencies.

However, as soon as the game was played with employees from Sweco, questions arose. It appeared that, due to the fact that the respondents in the testing session were not familiar with the responsibilities of the assigned roles in real life, they could easily ignore the roles and see them as an indication of the number of competencies possessed by that particular team member. However, employees from Sweco are familiar with the different roles and therefore found it difficult not to focus on substantive roles that they linked to the tasks of the tender process. The game leader really had to emphasize that the game did not evolve around the different roles, but that these were purely indicative. CompeTender is a game which should be played purely competency-based, as the main objective is to discover which competencies are valued highly. Therefore, one’s role is not important and should therefore also not influence the result of the game. As after a few games, adding a role indication did not seem to serve any purpose in favour of the data that was gathered, it was decided to exclude the role indication from the team member cards. Therefore, the only indication that remained was either ‘senior’, ‘medior’ and ‘junior’. Employees did not consider this as a difficulty, as it was explained that this level only referred to the amount of competencies one possesses.

### 4.6.5 OBLIGATION TO USE ÅSA

In the tender process that was developed by Sweco (WBP) there is always a Bid Executive present for big decisions. One of the tasks that according to the WBP can only be performed by a bid executive, is the bid/no bid decision. Therefore, it seemed appropriate to include the role of a bid executive in the CompeTender team member cards. As Sweco recently (2018) got a new CEO, Åsa Bergman, it was decided to upgrade one of the ‘senior’ team members from the role of ‘tender manager’ to ‘bid executive’ and call this team member Åsa. In order to align CompeTender with the Win Business Process all employees are familiar with, it was decided to make Åsa, in the role of bid executive, responsible for the

bid/no bid decision. This resulted in the fact that Åsa (including her competencies) always had to be included during the first phase (due to task '1.1. Make the bid/no bid decision').

However, after several sessions it was realized that this might really influence the quantitative data retrieved from the game, as the presence of the competencies from Åsa (*having environmental awareness, team building* and *deciding*) was overdone due to the obligation to use this card in phase 1. As soon as this was realized, this obligation was excluded from the game and Åsa became one of the regular 'senior' team member cards.

# 5. DATA GATHERING, PREPARATION AND ANALYSIS

This chapter will elaborate on the actual gathering of the data and the analysis of this data gathered through the game rounds of the game CompeTender, described in chapter 4. The data will serve as a basis for an answer to the research question. The goal of the data analysis is the establishment of preliminary conclusions on the necessary competencies for tender management according to tender management professionals.

The data gathered from CompeTender contains both quantitative data and qualitative data and was collected in two ways. First, data on the team compilation and the reasoning behind these choices was collected with the help of a Google Forms online survey. This data consists of both qualitative and quantitative output. Secondly, the game leader took notes of remarks that players made while playing the game, which results in qualitative data (see Appendix 13).

First, an overview of the demographics of the participants who contributed to this research is given. Thereafter, the data preparation for the data analysis is discussed. The data preparation is conducted on the basis of a data analysis plan, which results in analysing questions and the preparation of a workable dataset. Subsequently, this dataset is used in order to draw preliminary conclusions on competencies for tender management according to professionals experienced with tender management. Finally, it is investigated whether this data shows a differentiation in important competencies for different project types an engineering firm encounters. This means that this chapter will provide an answer to sub question five and six, being: *Which competencies are considered important for tender management throughout the different phases of a tender process?* And *What are the differences in competencies required for different project types?*

## 5.1 PARTICIPANTS FOR DATA GATHERING

The data gathering from this research took place using the serious game CompeTender. Chapter 4 elaborates on the establishment of the game and also elaborates on the way the data was gathered. This paragraph will provide insight in the participants that were used in order to gather the data.

CompeTender aims to identify competencies for tender management as perceived by tender management professionals within a project-based civil engineering company. Therefore, a list of employees often involved with tender management within the division Transportation & Mobility from Sweco was compiled together with an employee from the BIDcenter. This division consists of eight departments (Real estate, Rail, Hydraulic engineering, Mobility, Roads, Assetmanagement & monitoring, Capital consultants and GIS & ICT), as shown in Figure 14. Not all departments are represented in this research, and therefore three are red (as they were not represented) and five are green (and include the number of employees that participated in this research). As can be seen, the department roads has the most participants. This is mainly due to the fact that the BIDcenter is located within this department.

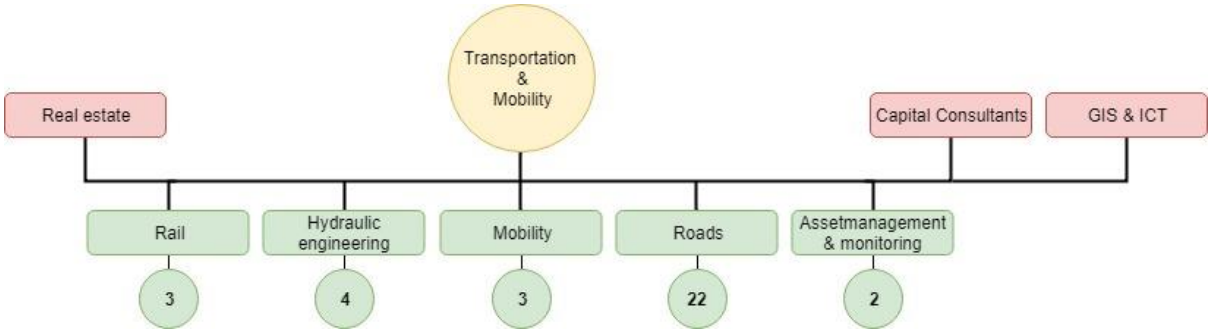


*Figure 14: Organogram division Transportation & Mobility including the number of participants per department*

The list with selected people who were to be approached consisted of 40 employees who often have performed the role of tender manager, project manager or tender strategist during multiple tenders. All selected employees were informed about the game via email and were asked to pass along their availability through an online form. Based on this availability an individual appointment was made to play CompeTender. Besides this, every participant was, after playing the game, asked whether he or she knew people who could contribute to the research and had experience with

tendering (this is known as the 'snowball technique' which was described by Mason (1996)). The potential participants that were identified this way were also approached and asked whether they would participate in the research. If employees did not respond to the approach, they were reminded either via email or direct. This resulted in a total of 34 participants, divided over nineteen gaming sessions (see Table 45). Table 8 provides an overview of the game sample demographics and an overview of the division of all participants over the gaming sessions can be found in Appendix 12 .

*Table 8: Game sample demographics*

| Interview sample demographics | | | | Experience with tendering | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-5 times | | 6-15 times | | 16-30 times | | >31 times | |
| *Selection* | First selection | 25 | 74% | 4 | 12% | 5 | 15% | 6 | 18% | 10 | 29% |
| | Snowball selection | 9 | 26% | 3 | 9% | 0 | 0% | 1 | 3% | 5 | 15% |
| | ***TOTAL*** | ***34*** | ***100%*** | ***7*** | ***21%*** | ***5*** | ***15%*** | ***7*** | ***21%*** | ***15*** | ***44%*** |
| *Gender* | Male | 24 | 71% | 6 | 18% | 2 | 6% | 4 | 12% | 12 | 35% |
| | Female | 10 | 29% | 1 | 3% | 3 | 9% | 3 | 9% | 3 | 9% |
| | ***TOTAL*** | ***34*** | ***100%*** | ***7*** | ***21%*** | ***5*** | ***15%*** | ***7*** | ***21%*** | ***15*** | ***44%*** |
| *Role* | Project leader | 6 | 18% | 3 | 9% | 1 | 3% | 0 | 0% | 2 | 6% |
| | Project manager | 9 | 26% | 2 | 6% | 0 | 0% | 2 | 6% | 5 | 15% |
| | Advisor | 7 | 21% | 2 | 6% | 2 | 6% | 2 | 6% | 1 | 3% |
| | Team manager | 6 | 18% | 0 | 0% | 1 | 3% | 0 | 0% | 5 | 15% |
| | Tender strategist | 6 | 18% | 0 | 0% | 1 | 3% | 3 | 9% | 2 | 6% |
| | ***TOTAL*** | ***34*** | ***100%*** | ***7*** | ***21%*** | ***5*** | ***15%*** | ***7*** | ***21%*** | ***15*** | ***44%*** |

As can be seen, 44% of the participants is very experienced in tendering, as they have participated in a tender process at least 31 times. Another thing that can be seen, is that from the more inexperienced participants (1-5 times tendering experience) five out of seven people have the role of either project leader or project manager. As these roles are quite mature to fulfil, it is good to notice that these participants might be inexperienced regarding tendering, but that they are familiar with the management of projects. The population that participated in the CompeTender sessions mainly consists of male participants (71%). This is mainly due to the fact that there is a larger population of men in the organization. Finally, the snowball effect is likely to have had a positive influence on the truthfulness of the retrieved data, as from this group five more very experienced participants were gathered.

## 5.2 PREPARATION OF THE DATA

Before the data can be analysed, a data set needs to be established that enables the researcher to draw conclusions. This section elaborated on the preparation of the data towards a workable dataset. First a data analysis plan will be set up. This data analysis plan provides structure for the following data preparation, that is focussed on meeting the research objective by establishing research questions and subsequently excludes bias from the retrieved results.

### 5.2.1 DATA ANALYSIS PLAN

As the data retrieved from CompeTender consists of both qualitative and quantitative data, it is important to first draw up a data analysis plan, as this helps the researcher to structure the research and ensure full coverage of the consideration of the data. Besides that, the data analysis plan can help control expectations from the results (Jablonski & Guagliardo, 2016). Jablonski and Guagliardo (2016) describe the data analysis plan as *"a detailed document outlining procedures for conducting an analysis on data, produced by the data analyst and presented and discussed with the team"*.

As data serves as the main input for the data analysis plan, an understanding of what data is considered to be should be present. Cuesta (2013) states as a definition of data that *"data are known facts or things used as a basis for inference or reckoning."* (p. 10). The data gathered from CompeTender consists of both quantitative data, which is defined as *"numerical measurements expressed in terms of numbers"* and qualitative data, which is known to be *"categorical measurements expressed in terms of natural language descriptions"* (Cuesta, 2013, p. 14). In case of qualitative data, it

is important to keep in mind that it can be difficult to analyse, and therefore a structured and systematical approach of the analysis is key to the success and completeness of the study (Fellows & Liu, 2015). On the plus side, Cuesta (2013) states that *"qualitative analysis can explore the complexity and meaning of social phenomena"* (p.15). Fellows and Liu (2015) add to this that "*in qualitative research, the beliefs, understandings, opinions, views and so on of people are investigated – the data gathered may be unstructured, at least in their 'raw' form, but will tend to be detailed, and hence 'rich' in content and scope"* (p. 29). As this research aims to identify competencies for tender management, this is in line with the usage of qualitative data analysis. Also, one has to take into account that the data was gathered among 34 CompeTender participants, who all played once. As 34 results is too low to be of statistical relevance, the conclusions will be mainly based on a qualitative data analysis, wherein quantitative findings will be supported by qualitative justification. The difference between the two forms of data analysis is illustrated by Cuesta (2013) and displayed in Figure 15.

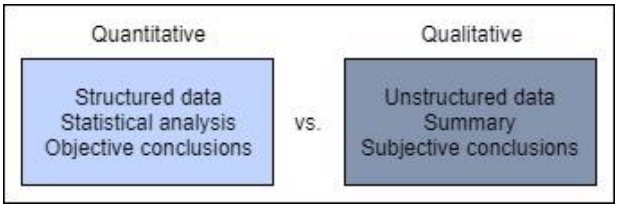


*Figure 15: Differences between quantitative and qualitative data (Cuesta, 2013, p. 15)*

The data analysis process consists of five steps, according to Cuesta (2013): the problem, data preparation, data exploration, predictive modelling and finally the visualization of the results. An overview of the steps is shown in Figure 16.

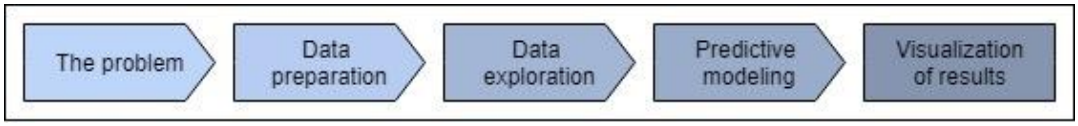


*Figure 16: The data analysis process (Cuesta, 2013, p. 11)*

Following Cuesta (2013), each step should contain the following information:

- The problem: the problem definition contains the objectives and requirements of the research.
- Data preparation: this step elaborates on the preparation of a usable dataset from the data retrieved from the research. For the preparation of a usable dataset it is necessary to have a good understanding of the objectives and requirements of the research. According to Cuesta (2013) a good dataset is complete, coherent, unambiguous, countable, correct, standardized and non-redundant.
- Data exploration: during data exploration one often uses visualization to explore patterns, connections and relations in the data.
- Predictive modelling: predictive modelling is mostly about choosing the right statistical model to predict the probability of an outcome.
- Visualization of results: this step will elaborate on the choice for certain types of visualization, based on the objective and public of the research

Due to the qualitative character of the data analysis, it was decided to exclude the 'predictive modelling' step from the data analysis plan because it would not add any value to the data analysis. Furthermore, the 'data exploration' section and 'visualization of the results' section will be combined, because these steps could support one another.

### 5.2.2 GOAL OF THE DATA ANALYSIS

As mentioned in paragraph 4.2, during CompeTender tender management professionals could present their opinions about competencies for tender management. This was done on the basis of competency-based team compilation throughout the five phases of the tender process. The data that needs to be gathered should have both a quantitative character, in order to draw an objective image of the competencies that are valued highly throughout the tender process, as a qualitative character which supports the quantitative data and provides an insight in the motives of the participants for their competency-based team compilation. Also, participants are obliged to make clear whether or not they make specific choices regarding the included competencies for different project types, or that they think that this is equal for all three identified project types.

In the end, the research needs to provide an insight in which competencies are important for executing tender management, and which competencies can be considered irrelevant for the tender management profile.

With the collected data, a lot of different questions can be answered. However, not all questions lead up to the goal of this research: to identify important competencies for tender management in a project-based civil engineering firm. In order to structure the data analysis process, several analysing questions were conducted which lead to an overview of important competencies for tender management.

### ANALYSING QUESTIONS

The data analysis aims to provide an answer to several questions with regard to the data that was retrieved through the gaming sessions of CompeTender, as they lead to an answer on several of the sub questions that were established in chapter 1. In order to draw conclusions about this data set, one first wants to know if the dataset was not biased by certain design decisions. As mentioned in paragraph 4.6 the role of Åsa changed over the gaming sessions as the research progressed. Section 5.2.4 aims to identify whether this design decision influenced the data as retrieved throughout all CompeTender sessions. For this objective, the following question was defined:

> *Did the obligation to use Åsa in phase 1 of CompeTender influence the results?*

If it is known whether the obligation to use Åsa did or did not influence the results, it is good to have an idea of the influence of each phase on the total profile of competencies as retrieved through CompeTender. Therefore, the influence of each phase is examined through an ANOVA analysis. The ANOVA analysis aims to identify whether or not every phase is of similar influence on the end result. The elaboration on this ANOVA analysis can be found in section 5.2.5, and provides an answer to the following question:

> *Can every phase be considered equally important when it comes to the establishment of a profile for tender management competencies based on the results from CompeTender?*

The previous two analysing questions establish a baseline that needs to be kept in mind when getting to the core of the data analysis. In order to establish a competency-based profile for tender management , it is necessary to analyse the quantitative data on the amount of times competencies were included in the team compilation during the CompeTender sessions, as this provides an insight in which competencies are considered important for tender management by tender management professionals throughout the different phases (sub question 5). As these quantitative overviews are probably very scattered and might seem unclear, the competencies will be categorized based on their original categories as discussed in section 3.2 and provide an answer on the following sub question:

> *Which competencies are considered important for tender management throughout the different phases of a tender process?*

Finally, this research aims to identify whether or not there are differences in the appreciated competencies regarding the three different project types that were identified earlier in this research. Therefore, the final sub question for the data-analysis aims to bring nuance into the competencies for all project types:

> *What are the differences in competencies considered important for different project types?*

## 5.2.3 ESTABLISHMENT OF A DATASET

In order to be able to analyse the data gathered from CompeTender, first a workable dataset needs to be established. Therefore, scrubbing of the dataset was used in order to establish an unpolluted dataset (Cuesta, 2013).

The data retrieved through CompeTender, consisted of lists of names and a qualitative justification for every phase from every participant. In order to be able to work with this data, the list of names (quantitative data) needed to be compiled into an overview of all incorporated competencies. In order to be able to answer the established research questions, the competencies and their number of appearance needed to be quantified.
For this translation of data, Excel was used. First, it was counted how many times every name was included into the team compilation. Then, this was translated into the allocated competencies for every name. Subsequently, the amount of times every competency was incorporated was counted. This resulted in an uniform dataset, which reflected the competencies, not the names and could be used for the data analysis.

Due to the fact that one of the participants got a bigger budget (the first one, participant 4), his results are declared invalid, as the difference in budget influenced the choice for team members too much. Therefore, the quantitative results from participant 4 were excluded from the research and the quantitative data contains input from 33 respondents.

A potential form of bias that should be taken into consideration when analysing the data is the fact personal preferences might play a role when playing the game. It could be the case that the selected participants simply have a preference for certain competencies, and that therefore they are 'overrepresented' in the data.

The variable that was present in the game, were the Project Type cards which indicate what project type is tendered for. However, as a many people provided the feedback that they had not used this card, it was decided to merge the data of all participants as this variable was not present in the game, and instead of that question the participants after finishing the game on specific differentiation in competencies for various project types.

### 5.2.4 INFLUENCE OBLIGATION USAGE ÅSA

Halfway the gaming sessions a change was made in the execution of CompeTender, which resulted in players being no longer obliged to use the team member card Åsa phase 1. Because Åsa was obligatory in the first eight gaming sessions, there is a suspicion that the profile of competencies for tender management during the first phase of CompeTender might be biased by this obligation. If this suspicion is correct, it should be the case that the competencies of Åsa are relatively more present in comparison to other competencies in the first phase when it was obligatory to use her (situation A), than when it was not obligatory to use Åsa (situation B). Therefore, this part of the data analysis aims to provide an answer to the following question:

*Did the obligation to use Åsa in phase 1 of CompeTender influence the results?*

For this part of the data analysis, the data was divided into three situations which deal with the difference of Åsa being obligatory in phase 1 or not. The first situation (situation A) takes into account all data that was retrieved while Åsa was an obligatory part of the team in phase 1 of CompeTender. Situation B shows the results from the data retrieved when Åsa was no longer obligatory to use. Situation C combines both situation A and B and shows the results from the complete dataset excluding the outliers defined in paragraph 5.2.3.

In order to determine the influence of Åsa being obligatory on the data, the following hypothesis needs to be investigated:

$H_0$: *The competencies from Åsa (deciding, having environmental awareness and team building) are relatively mentioned more often in CompeTender phase 1 in situation A (when Åsa was obligatory) compared to situation B (when she was not obligatory anymore).*

$H_1$: *The competencies from Åsa (deciding, having environmental awareness and team building) were relatively not mentioned more often in CompeTender phase 1 when Åsa was obligatory compared to when she was not obligatory anymore.*

In order to draw a conclusion on this hypothesis, the relative presence of all three competencies (*deciding*, *having environmental awareness* and *team building*) needs to be determined for both the situation with the obligation of using Åsa (situation A) and without this obligation (situation B). This relative presence is calculated on basis of the amount of competencies that was used during a certain phase. So if situation A has a total of 100 competencies for phase 1, and in phase 1 *deciding* was present ten times, the relative presence of *deciding* in phase 1 is then (10/100 =) 10%.

Table 9, Table 10 and Table 11 show the relative presence of the three competencies *deciding*, *having environmental awareness* and *team building*. The blue cells show the relative presence of these competencies for situation A and B in phase 1. If $H_0$ is valid, the blue value for situation A is always higher than the blue value for situation B. If this is not the case, then $H_0$ will be rejected in favour of $H_1$.

*Table 9: Relative presence 'deciding' throughout the phases of CompeTender for situation A, B and C*

| DECIDING | ALL PHASES | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|
| A) Åsa was obligatory | 3,8% | **8,4%** | 1,4% | 0,9% | 3,4% | 4,5% |
| B) Åsa was not obligatory | **5,3%** | 7,5% | **4,7%** | **3,8%** | **4,9%** | **5,8%** |
| C) All data | 4,4% | 8,0% | 3,0% | 2,3% | 4,1% | 5,1% |

*Table 10: Relative presence 'having environmental awareness' throughout the phases of CompeTender for situation A, B and C*

| HAVING ENVIRONMENTAL AWARENESS | ALL PHASES | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|
| A) Åsa was obligatory | **5,8%** | **10,6%** | 5,2% | 3,8% | 4,9% | 3,9% |
| B) Åsa was not obligatory | 5,6% | 6,9% | **5,3%** | **6,0%** | 4,9% | **5,1%** |
| C) All data | 5,7% | 9,0% | 5,2% | 4,8% | 4,9% | 4,4% |

*Table 11: Relative presence 'team building' throughout the phases of CompeTender for situation A, B and C*

| TEAM BUILDING | ALL PHASES | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|
| A) Åsa was obligatory | 3,8% | **9,7%** | 2,4% | 0,5% | 2,4% | 3,4% |
| B) Åsa was not obligatory | **4,2%** | 5,6% | **3,7%** | **3,8%** | **3,7%** | **4,3%** |
| C) All data | 4,0% | 8,0% | 3,0% | 2,0% | 3,0% | 3,8% |

Table 9 provides an overview of the relative presence of *deciding* throughout the phases for all three situations. As can be seen in the blue cells, the relative presence in situation A was higher (8,4%) in comparison to situation B (7,5%), which makes that the data is in favour of $H_0$ as regards *deciding*. Table 10 provides similar information, but for the competency *having environmental awareness*. The blue cells in this table indicate that the relative presence in situation A was higher (10,6%) than the relative presence of *having environmental awareness* in situation B (6,9%), which results in another given in favour of $H_0$. Finally, Table 11 provides an overview of the relative presence for the competency *team building*. Again, the value in the blue cells is higher in situation A (9,7%) in comparison to situation B (5,5%), so also this dataset is in favour of $H_o$. As all three datasets are in favour of $H_0$, it is the case that the competencies belonging to the team member card Åsa are relatively more present in the situation when Åsa was an obligatory team member (situation A) than when this was not the case anymore (situation B).

However, this does not necessarily mean that the influence of Åsa would have been much lower if all gaming sessions did not oblige participants to use Åsa. It might be expected that, when Åsa is an obligatory role in phase 1 and therefore her competencies are obligatory, this would work through in the data for the following phases. Logically it can be assumed that if the relative presence is higher in phase 1 (when comparing A with B), this will also be the case for the following phases. As can be seen, the above tables (Table 9, Table 10 and Table 11) all contain an overview of the relative presence of the corresponding overview for all phases of the CompeTender tender process, not only phase 1 is displayed. This enables us to look beyond the influence of the obligation to use Åsa in phase 1 and see whether this decision might have influenced the presence of her competencies in all phases and therefore is reflected in the profile of all phases. All three tables compare the relative presence of the competencies *deciding*, *having environmental awareness* and *team building* for situation A with situation B. In this comparison, the highest value (so the situation where the corresponding competency is used most often) is displayed in bold for every phase. This results in a surprising overview, as for all disjoint phases (so the column 'All phases' is not taken into account) the relative presence for situation B (Åsa not being obligatory) is higher than the relative presence in situation A (Åsa being obligatory in phase 1), except for phase 4 from *having environmental awareness* where both situation have a similar relative presence of the competency. Therefore, one can consider it plausible that participants think that these competencies are definitely relevant, as they have included them in their teams and that this is not achieved by any obligation.

Based on the given that for phase 2, 3, 4 and 5 the relative presence of situation B is higher than the relative presence of situation A ánd the given that the relative presence of situation A in phase 1 is higher than in situation B due to the obligation of using Åsa, one cannot conclude that the obligation of Åsa necessarily results in an overall higher ranking for the corresponding competencies.

### 5.2.5 INFLUENCE OF EACH PHASE ON THE COMPETENCY-BASED PROFILE

The overall competency-based profile resulting from CompeTender is based on the output that was generated through the answers that were given for every phase of CompeTender. As it is interesting to know whether all phases were of equal influence for the overall profile, the average number of competencies used for every phase will be compared. If the average number of competencies used by tender management professionals is equal in every phase, this implies that the influence of every phase on the overall competency-based profile is similar. The following question will be answered by this part of the data analysis:

> *Is every phase equally important when it comes to the compilation of a competency-based profile for tender management?*

In order to compare the five phase and their influence on the overall competency-based profile, all mean values regarding the amount of competencies used in a certain phase will be compared. This will be done on the basis of an ANOVA-analysis, in order to discover whether the differences between the variance of the amount of competencies used per phase in CompeTender, reflects true differences or that this difference in variance could be considered statistically irrelevant. That is to say, the variance between the five phases is big enough to state that the means of the phases differ. When the differences between the variances can be considered statistically irrelevant, one can conclude that each phase has a statistically similar mean value and the amount of competencies used in every phase is constant (Fellows & Liu, 2015). This implies that the influence of each phase on the total representation of competencies was similar. When the ANOVA analysis shows that there is an actual case of a statistical difference between the various phases of CompeTender, one can conclude that the differences in mean values represent an actual difference and the influence of each phase on the total representation of competencies in the profile varies.

An important assumption to state is the fact that ANOVA analysis assumes the data to be normally distributed. This is not the case for this dataset, so one should bear in mind that this can influence the outcome.

Appendix 11 shows the total data set for the ANOVA analysis and the calculation of the necessary values. The input for the ANOVA analysis is the number of competencies that was used per player for each phase of the CompeTender game. As can be seen in the dataset, player 4 was excluded from the results. The ANOVA analysis aims to identify whether the differences in mean values between each phase are significant. An overview of the mean values is presented in Table 12.

*Table 12: Overview amount of competencies per phase*

| | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 | All phases |
|---|---|---|---|---|---|---|
| Number of competencies | 387 | 402 | 396 | 370 | 316 | 1871 |
| Number of participants | 33 | 33 | 33 | 33 | 33 | (33*5) = 165 |
| Average number of competencies | 11,727 $\mu_1$ | 12,182 $\mu_2$ | 12,000 $\mu_3$ | 11,212 $\mu_4$ | 9,576 $\mu_5$ | 11,339 $\mu_n$ |

As can be seen, the average values differ between 9,576 (phase 5) and 12,182 (phase 2). ANOVA stands for Analysis Of Variance, and enables the user to statistically compare mean values of different subsets within a dataset. However, the analysis is only able to show whether or not the differences between mean values are significant or not.

The hypotheses that come with the ANOVA analysis, are the following:

$H_0$: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_n$

$H_1$: $\mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_n$

Whether the null-hypothesis is rejected is dependent on the so called F-test, which compares the F-value from the ANOVA analysis with the F-value from the F-table. Fellows and Liu (2015) state that *"the larger the between-groups variance relative to the within-groups variance, the larger the calculated value of F and the more likely it is that the differences among the condition means reflect true effects of the independent variable rather than error variable"* (p. 205). So in order to calculate the F value, first the between-groups variance and the within-groups variance needs to be calculated.

From the calculation in Appendix 11 follows that the 'between groups variance' results in a value of 36,491 and the 'within group variance' is 10,331. This results in an F-value of 3,532. Fellows and Liu (2015) state that *"as $F \rightarrow 1$, the likelihood that $H_0$ is valid increases; as the value of F increases, the likelihood of $H_0$ being valid decreases"* (p.206). As F is way bigger than 1 (3,532), the likelihood of $H_0$ decreases, and therefore the likelihood of $H_1$ increases. This is checked with a comparison with the value that results from the table for F-distributions (see Appendix 11), as it is the case that when $F_{calc} < F_{tab}$ $H_0$ should not be rejected. The calculation of $F_{tab}$ can also be found in Appendix 11.

As $F_{calc} > F_{tab}$ , as 3,532 > [2,319 ; 2,4472], this implies that $H_0$ should be rejected. Therefore, there is case of a significant difference between the mean values of the amount of competencies for each phase, and these cannot be considered similar. Therefore, the influence of each phase is significantly different on the end result of the profile of competencies for tender management. However, one should bear in mind that an ANOVA analysis gives no answer on the value of the differences between the mean values of each phase, so therefore no statement can be made about the exact influence of each phase on the profile of tender management competencies as perceived by tender management professionals.

## 5.3 COMPETENCY-BASED PROFILE FOR TENDER MANAGEMENT

This section of the data analysis will form the basis of the competency-based profile compilation by the data gathered through CompeTender. Based on the previous parts of the data analysis, two things are known now that have to be taken into account when looking at the data retrieved through CompeTender:

1. The obligation to make use of the character Åsa did not necessarily influence the results of CompeTender. However, it is plausible that her competencies (deciding, having environmental awareness and team building) would not be as widely represented as they currently are in phase 1.

2. Not every phase is of equal influence on the end result of the profile for competencies for tender management. Therefore, every phase should be considered on its own in relation to its relative influence on the end result.

In order to establish a profile for important competencies for tender management in a project-based civil engineering company, a ranking of all competencies for the different phases of a tender process needs to be established. The phase structure is important, as every phase comes with its own tasks and responsibilities and therefore could lead to a different competency based profile that should be part of the whole. Therefore this part of the research aims to answer the following analysing question:

> *Which competencies are considered important for tender management throughout the different phases of a tender process?*

The gaming sessions resulted in a ranking of all 24 different competencies over the five phases of CompeTender and an overall image which includes all these phases into one overview. This ranking is based on the number of times a certain competency was present in the results of a certain phase. The tables in Appendix 11 show the overview of the ranking of all competencies per phase including colour allocation for the corresponding category. As the division of the results into 24 competencies per phase makes the data analysis quite complicated, it was decided to group the competencies back to their original categories as stated in paragraph 3.2. The categories are subsequently used as a point of departure for the data analysis.

The competencies present in CompeTender are organized as follows and provided with corresponding colour allocation:

A. PERSONAL COMPETENCIES
- A1. Being stress-resistant
- A3. Being flexible
- A5. Taking responsibility / Being proactive
- A6. Being critical

B. SOCIAL COMPETENCIES
- B1. Communicating
- B2. Interactive learning
- B3. Collaborating
- B8. Team building
- B9. Networking

C. ORGANISATIONAL COMPETENCIES
- C2. Planning & organizing
- C4. Delegating
- C7. Leadership
- C8. Deciding
- C9. Developing vision/strategy

E. TECHNICAL COMPETENCIES
- E1. Handling procedures and methods
- E5. Being cost-conscious

F. ARTISTIC COMPETENCIES
- F1. Being creative
- F3. Being expressive

G. DATA HANDLING COMPETENCIES
- G1. Gathering information
- G2. Analysing
- G4. Being quality-oriented
- G5. Being customer oriented
- G7. Having environmental awareness
- G8. Structuring

The categorized results are shown in Table 13. As can be seen, not every competency category contains the same amount of competencies. Therefore, the overall results of each category (shown in the coloured rows of Table 13) cannot be considered comparable. For example, category B. Social competencies contains an overall number of 330 competencies, while category F. Artistic competencies has a value of 218 competencies. However, the value for category B. Social competencies is established on the basis of five competencies, all contributing to the overall value, while category F. Artistic competencies has only two competencies contributing to the establishment of the value 218. Therefore, a method needed to be established in order to enable the competency categories to be comparable with one another. This will be done on the basis of the average values of every competency category, displayed in the bottom

row (bold and italic) of every competency category. All these values are added up to a 'total of all averages' (one after the bottom row), which in its turn can be divided by six categories and results in a 'mean value of all averages'. This 'mean value of all averages' will be used in order to highlight the competencies of every phase that exceed this mean value (the underlined values) and therefore will be discussed in detail in the data analysis of every phase. Besides that, inclusion of competencies in the qualitative justification is as well considered a reason to discuss them in this chapter (Appendix 13). Finally, Appendix 12 provides an overview of the ranking of all individual competencies and includes the colour allocation as stated above. Therefore, this appendix (and the attached Table 44) might be of interest for the justification of the establishment of the categorized results.

*Table 13: Division of categorized competencies over all phases*

| | | | ALL PHASES | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|---|---|
| A | Personal competencies | TOTAL | 294 | 45 | 48 | 59 | 73 | 69 |
| | A1 | Being stress-resistant | 70 | 12 | 10 | 12 | 17 | 19 |
| | A3 | Being flexible | 49 | 5 | 9 | 11 | 14 | 10 |
| | A5 | Take responsibility | 87 | 17 | 16 | 17 | 17 | 20 |
| | A6 | Being critical | 88 | 11 | 13 | 19 | 25 | 20 |
| | | *AVERAGE* | ***74*** | ***11*** | ***12*** | ***15*** | ***18*** | ***17*** |
| B | Social competencies | TOTAL | 330 | 71 | 69 | 61 | 65 | 64 |
| | B1 | Communicating | 92 | 9 | 15 | 21 | 24 | 23 |
| | B2 | Interactive learning | 43 | 6 | 11 | 10 | 10 | 6 |
| | B3 | Collaborating | 69 | 11 | 15 | 13 | 15 | 15 |
| | B8 | Team building | 83 | 34 | 14 | 9 | 12 | 14 |
| | B9 | Networking | 43 | 11 | 14 | 8 | 4 | 6 |
| | | *AVERAGE* | ***66*** | ***14*** | ***14*** | ***12*** | ***13*** | ***13*** |
| C | Organizational competencies | TOTAL | 419 | 112 | 90 | 77 | 72 | 68 |
| | C8 | Deciding | 93 | 32 | 14 | 10 | 18 | 19 |
| | C4 | Delegating | 54 | 12 | 13 | 11 | 9 | 9 |
| | C7 | Leadership | 83 | 20 | 17 | 15 | 16 | 15 |
| | C2 | Planning & organizing | 112 | 26 | 25 | 26 | 18 | 17 |
| | C9 | Developing vision/strategy | 77 | 22 | 21 | 15 | 11 | 8 |
| | | *AVERAGE* | ***84*** | ***22*** | ***18*** | ***15*** | ***14*** | ***14*** |
| E | Technical competencies | TOTAL | 188 | 36 | 41 | 38 | 40 | 33 |
| | E1 | Handling procedures & methods | 75 | 15 | 19 | 16 | 11 | 14 |
| | E5 | Being cost-conscious | 113 | 21 | 22 | 22 | 29 | 19 |
| | | *AVERAGE* | ***94*** | ***18*** | ***21*** | ***19*** | ***20*** | ***17*** |
| F | Artistic competencies | TOTAL | 218 | 37 | 42 | 52 | 45 | 42 |
| | F1 | Being creative | 138 | 26 | 25 | 33 | 28 | 26 |
| | F3 | Being expressive | 80 | 11 | 17 | 19 | 17 | 16 |
| | | *AVERAGE* | ***109*** | ***19*** | ***21*** | ***26*** | ***23*** | ***21*** |
| G | Data handling competencies | TOTAL | 569 | 108 | 133 | 131 | 110 | 87 |
| | G1 | Information gathering | 75 | 12 | 24 | 24 | 10 | 5 |
| | G2 | Analysing | 105 | 25 | 28 | 22 | 17 | 13 |
| | G4 | Being quality-oriented | 86 | 8 | 15 | 18 | 25 | 20 |
| | G5 | Being customer-oriented | 107 | 14 | 20 | 25 | 26 | 22 |
| | G7 | Having environmental awareness | 117 | 37 | 23 | 21 | 20 | 16 |
| | G8 | Structuring | 79 | 12 | 23 | 21 | 12 | 11 |
| | | *AVERAGE* | ***95*** | ***18*** | ***22*** | ***22*** | ***18*** | ***15*** |
| | | TOTAL ALL AVERAGES | 521 | 102 | 108 | 109 | 107 | 96 |
| | | *MEAN VALUE OF THE AVERAGES* | ***87*** | ***17*** | ***18*** | ***18*** | ***18*** | ***16*** |

In order to be able to compare all categories with one another, an average value per competency was determined in Table 13. The average values for each competency category are combined and shown in Table 14. All values are rounded to their nearest integer, as competencies are either mentioned or not mentioned. The average value enables us to compare the different categories and their influence on the total result.

*Table 14: Average numbers present in competency categories following from CompeTender results*

| COMPETENCY CATEGORY | | ALL PHASES | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|---|
| A | Personal competencies | 74 | 11 | 12 | 15 | 18 | 17 |
| B | Social competencies | 66 | 14 | 14 | 12 | 13 | 13 |
| C | Organizational competencies | 84 | **22** | 18 | 15 | 14 | 14 |
| E | Technical competencies | 94 | 18 | 21 | 19 | 20 | 17 |
| F | Artistic competencies | **109** | 19 | 21 | **26** | **23** | **21** |
| G | Data handling competencies | 95 | 18 | **22** | 22 | 18 | 15 |
| | TOTAL | 521 | 102 | 107 | 109 | 106 | 96 |

Based on the values present in Table 14 the relative presence of each competency is determined, compared to the total amount of average values for all phases (521). This relative presence is shown in Table 15. The benefit of this table is the fact that all percentages are comparable, as they are all established on the same basis of 521 competencies. However, the differences between the percentages within a particular phase are very small and might not be easy to handle when producing a ranking of categories for every phase. Therefore, it was decided to base the ranking of competency categories on the relative presence of each category within the particular phase. These percentages are shown in Table 16 and as the proportions between the different percentages are larger, it is easier to produce a ranking for each phase.

*Table 15: Relative presence average values competency categories based on all phases-total*

| | | ALL PHASES | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|---|
| A | Personal competencies | 14% | 2% | 2% | 3% | 4% | 3% |
| B | Social competencies | 13% | 3% | 3% | 2% | 2% | 2% |
| C | Organizational competencies | 16% | 4% | 3% | 3% | 3% | 3% |
| E | Technical competencies | 18% | 3% | 4% | 4% | 4% | 3% |
| F | Artistic competencies | **21%** | 4% | 4% | 5% | 4% | 4% |
| G | Data handling competencies | 18% | 3% | 4% | 4% | 4% | 3% |
| | TOTAL | 100% | 20% | 21% | 21% | 20% | 18% |

*Table 16: Relative presence competency categories based on each phase-total*

| | | ALL PHASES | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 |
|---|---|---|---|---|---|---|---|
| A | Personal competencies | 14% | 11% | 11% | 14% | 17% | 18% |
| B | Social competencies | 13% | 14% | 13% | 11% | 12% | 13% |
| C | Organizational competencies | 16% | **22%** | 17% | 14% | 14% | 14% |
| E | Technical competencies | 18% | 18% | 19% | 17% | 19% | 17% |
| F | Artistic competencies | **21%** | 18% | 20% | **24%** | **21%** | **22%** |
| G | Data handling competencies | 18% | 18% | **21%** | 20% | 17% | 15% |
| | TOTAL | 100% | 100% | 100% | 100% | 100% | 100% |

A footnote one has to bear in mind while looking at the percentages in Table 16 is the fact that they only represent a ratio for the corresponding column. Therefore, the 14% Social competencies in the column 'phase 1' does not necessarily contain the same amount of competencies as the 14% Organizational competencies in phase 5. This is due to the fact that the average amount of competencies differs per phase, as can be seen in Table 14 (bottom row) and was underpinned in section 5.2.5.

The following sections will take off by describing the ranking of the competency categories for every phase and link these rankings to both the disjoint competencies and the qualitative justification which is displayed in Appendix 13 and was gathered during the CompeTender sessions. A final note to these remarks is in order, as the participants filled out the answering form during the gaming sessions. When the qualitative data was analysed, it appeared that a lot of participants became less precise and elaborate in their justification as the session progressed (see Table 47). Therefore, the justification for the later phases of CompeTender becomes more poorly. On the other hand, participants felt that they were constantly repeating themselves while justifying their choices and therefore decided only to elaborate on the 'new' competencies with regard to the previous phase. This results in the fact that, as this part of the data analysis progresses, the quantitative data from Table 13 will become more and more important for the underpinning of the ranking of competency categories.

### 5.3.1 CATEGORIZED RANKING COMPETENCIES PHASE 1

Phase 1 is the first phase of the tender process as considered by CompeTender. This phase consists of ten tasks that need to be performed by tender management. The ranking for phase one of the competency categories is displayed in Table 17, while Table 18 provides an overview of the most often included competencies for phase 1 of CompeTender. The complete overview of the ranking of all competencies for each phase can be found in Table 44 (Appendix 11). The percentages reflect the influence the corresponding competency has on the profile for this particular phase.

*Table 17: Competency category ranking for phase 1*

| | | |
|---|---|---|
| C | Organizational competencies | 22% |
| F | Artistic competencies | 18% |
| E | Technical competencies | 18% |
| G | Data handling competencies | 18% |
| B | Social competencies | 14% |
| A | Personal competencies | 11% |
| | | 100% |

*Table 18: Most included competencies phase 1*

| PHASE 1 | | |
|---|---|---|
| 1 | Having environmental awareness | 9,0% |
| 2 | Deciding | 8,0% |
| 3 | Team building | 8,0% |
| 4 | Being creative | 6,5% |
| 5 | Planning & organising | 6,5% |
| 6 | Analysing | 6,2% |
| 7 | Developing vision/strategy | 5,2% |
| 8 | Being cost-conscious | 4,9% |
| 9 | Leadership | 4,7% |

For the first phase it is clear that the Organizational competencies are most important. This is mostly due to the fact that the competencies *deciding*, *planning & organizing* and *developing vision/strategy* are valued highly in this phase (see Table 18). Both Artistic competencies, Technical competencies and Other competencies are considered equally important due to the fact that the average value of each competency category is used in order to make all categories equally important for the establishment of a profile. Personal competencies (*being stress-resistant*, *being flexible*, *taking responsibility* and *being critical*) are not often mentioned in phase 1 (see Table 13).

The results for each phase are captured in a word cloud, which provides an overview of all disjoint competencies and their mutual relationships for both the category that they belong to (reflected in the colour) and the degree of occurrence in the particular phase (reflected in the size of the words). The word cloud for phase 1 is displayed in Figure 17.


*Figure 17: Word cloud competencies phase 1*

The word cloud is based on the number of times the competencies are mentioned in the corresponding phase (see Table 13). Therefore, the word cloud provides an overview of the individual competencies and their occurrence per phase. When taking a quick look at the word cloud, it can be seen that two purple competencies (*analysing* and *having environmental awareness*, both part of the category Data handling competencies) are considered very important in the first phase. However, due to the fact that this category also contains several competencies that are not considered very

important, and therefore are not mentioned very often, the score for 'Data handling competencies' in phase one ends up in the middle.

Another matter that needs to be addressed is the size of the competencies *team building*, *having environmental awareness* and *deciding*. As discussed in section 5.2.4, these competencies are allocated on the team member card Åsa. As this card was obligatory to use in phase 1 for the first 8 sessions, their relative presence might be tricked by the game and it is plausible that their influence and corresponding size on the profile for phase 1 would be less visible if this obligation had not been part of the game. However, based on the qualitative justification that was given by the participants (see Table 47, Appendix 12), one can question this statement especially for the competencies *deciding* and *team building*. This is due to the fact that these two competencies, often in this exact combination, are mentioned explicitly in the justification by the CompeTender participants (see participants 17, 32, 18, 13, 1, 14, 6, 10 and 2; Table 47). As the participants were asked to provide underpinning of their choice of team members based on their competencies and link them to tasks, if they saw a strong connection between certain tasks and certain competencies, these answers could also not have included the two competencies in question. Therefore, it could be the case that these two are as important as they are currently displayed in Figure 17. For having environmental awareness it remains the case that any qualitative justification (Table 47) is lacking and therefore the value of this competency was almost certainly influenced by the decision to make Åsa obligatory in phase 1 during the first few sessions.

The Artistic competencies (*being creative* and *being expressive*) have a very high ranking. From the justification follows that this could be mainly due to the fact that *being creative* is highly valued when developing a vision and a strategy for the tender (see Table 47, participant 32, 14). This is also displayed in Figure 17, as *being creative* is one of the largest words in the word cloud and the largest pink word.

From the qualitative answers (Appendix 12, Table 47) follows that almost every participant who provides a proper justification mentioned one or more Organizational competencies in phase 1. This can be concluded due to the amount of light blue words in Table 47 in phase 1. In particular *planning & organizing*, *developing vision/strategy* and *deciding* are competencies that are mentioned often. This can be considered logical, as the tasks for the first phase of CompeTender focus on the start of a tender. The task '1.1 Make the bid/no bid decision' is probably strongly linked to the competency *deciding* (participant 32), while '1.10 Determine the right tender strategy' is probably associated with *developing vision/strategy*. Besides that, participants 5 and 2 emphasize that *deciding* is important in the first phase, as decisions have to be made on the basis of the customer requirements and in order to speed up the start-up of the tender process. *Developing vision/strategy* is also included to make sure that the strategy aims to get the highest EMAT-score (see participant 11). *Planning & organizing* is associated multiple times with the planning and organisation of the tender process (participant 33 and 2). As this is the first phase, a plan need to be drawn up and the team needs to decided when what needs to be finished and when who should be included in order to meet the deadline (task '1.5 Make a preliminary tender planning' and '1.6 Make a final tender planning'). The importance of this competency is emphasized by the fact that the competency was explicitly mentioned seven times (participant 17, 32, 18, 16, 3, 13 and 6).

Figure 17 also shows a high presence of *analysing* in phase 1. Table 13 shows that *analysing* is mentioned 25 times in 33 games in phase 1. From the justification (Appendix 12, Table 47) follows that participants link this competency to '1.2 Analyse the procurement guideline' (see answers from participants 14, 1, 5, 18). Some other participants just explicitly mention the competency (10, 6, 11, 16), which might imply that they feel the competency is definitely necessary for this part of the tendering process. Participant 13 states that *analysing* is important due to the fact that this competency is used when determining the right tender strategy. This participant also states (see Table 46) that the first phase is the most important phase of the tendering process, as this phase serves as a framework for the rest of the process.

Finally, in phase 1 Personal competencies seem to score very poorly. This competency category consists of four competencies (*being stress-resistant*, *being flexible*, *take responsibility* and *being critical*, in total mentioned 45 times in 33 games in phase 1, see Table 13). From the qualitative justification (Appendix 12, Table 47) follows that participants have the feeling that *being stress-resistant* can be considered valuable due to the time pressure of a tendering process (participants 9, 33). However, the competency *being flexible* was only captured five times in all teams from phase 1 (see Table 13) and therefore gets the average value of this category down. *Being flexible* is considered to be of importance when tendering for contractors according to participant 17 (Table 47).

### 5.3.2 CATEGORIZED RANKING COMPETENCIES PHASE 2

This section will elaborate on the ranking of the clustered competencies for phase 2 of CompeTender. Phase 2 is the most extensive phase when it comes to the amount of tasks, as during this phase eleven tasks need to be performed by tender management in the game. Table 19 shows the ranking of the categorized competencies for phase 2. Table 20 provides an overview of the most mentioned competencies from phase 2. The percentages reflect the influence the corresponding competency has on the profile for this particular phase.

The relative presence shown in Table 19 for the second phase is more scattered than the first phase, in this phase there is actually case of a clear ranking between the competency categories. As can be seen, Data handling competencies seems to be the most important competency cluster for phase 2, followed by Artistic competencies and Technical competencies. When looking at Table 13, one can see that Data handling competencies were present in phase 2 no less than 133 times, divided over 33 games. This means that on average every participants mentions about (133/33 ≈) four competencies from the category Data handling competencies.

*Table 19: Competency category ranking for phase 2*

| | | |
|---|---|---|
| G | Data handling competencies | 21% |
| F | Artistic competencies | 20% |
| E | Technical competencies | 19% |
| C | Organizational competencies | 17% |
| B | Social competencies | 13% |
| A | Personal competencies | 11% |
| | | 100% |

*Table 20: Most included competencies phase 2*

| PHASE 2 | | |
|---|---|---|
| 1 | Analysing | 7,0% |
| 2 | Being creative | 6,0% |
| 3 | Planning & organizing | 6,0% |
| 4 | Information gathering | 5,7% |
| 5 | Structuring | 5,5% |
| 6 | Having environmental awareness | 5,2% |
| 7 | Being cost-conscious | 4,7% |
| 8 | Being customer-oriented | 4,7% |
| 9 | Developing vision/strategy | 4,7% |
| 10 | Handling procedures & methods | 4,5% |
| 11 | Being expressive | 4,2% |

Especially the competencies *analysing*, *information gathering*, *having environmental awareness* and *being customer-oriented* are mentioned often. This is also demonstrated in Figure 18, where these four competencies are displayed relatively large (in purple).


*Figure 18: Word cloud competencies phase 2*

*Analysing* is in the qualitative justification (Appendix 12, Table 47) once linked to the task '2.1 Identify risks' (see participant 29) and besides that, mentioned explicitly in the underpinning of participant 10, 13, 6 and 16. It is quite surprising that the justification lacks sufficient underpinning for the choice of *analysing*, as it is the most mentioned competency within this category. Therefore, it is assumed that participant 29 is right and that more players link this

competency to '2.1 Identify risks', as during this tasks one needs to analyse the problem and see where potential risks arise.

Task '2.3 Acquire information from experts' is in the justification very often linked to the competency *information gathering*. Several participants explicitly mention the competency (participant 32, 29, 16, 3, 13, 14, 6, 10), while others link it to the information acquisition from experts (participant 18 & 1). Finally, one participant links the *information gathering* to the obligation to set-up a document management protocol (task 2.2).

Almost as equally often mentioned are the competencies *having environmental awareness* and *being customer-oriented*. The justification for the first competency, *having environmental awareness*, almost lacks fully, except for participant 29 who states that the environment is a large source for risks, and therefore should be considered properly in the risk identification (task 2.1). As far as *being customer-oriented* is concerned, this competency is associated with the risk analysis ('2.1 Identify risks') by participant 29. A very thorough justification for this phase is lacking, but Table 46 shows that *being customer-oriented* should always be considered important according to participant 7, as in the end it is the customer that pays the bill.

The second most important competency category in phase 2 appears to be the Artistic competencies. Especially *being creative* was captured a lot of times in the team compilation. In the qualitative justification (Appendix 12, Table 47) *being creative* is mentioned explicitly a couple of times (participant 32, 13, 12), but this does not provide any further insight into the reason why the competency was included in their teams. Participant 1 states (Table 47) that *being creative* is important for the further development of the plan, and participant 23 is of the opinion that *being creative* is needed to develop a proper strategy. The other competency in this category, *being expressive*, is linked multiple times to the actual writing of the proposal (task '2.5 Start to fill the plan (writing)'; participant 33, 8, 11).

Technical competencies is ranked right above the middle and contains two quite similar scoring competencies in this phase: *being cost-conscious* and *handling procedures & methods*. The competency *being cost-conscious* is included multiple times due to the fact that participants feel that this is a competency that needs to be possessed in order to monitor the tender budget (task '2.7 Monitor tender budget'; see participant 3, 11; Table 47). Besides that, the competency is included a few times, while not explicitly linked to this task (participant 4, 21, 16, 13, 14, 6, 23). As regards to *handling procedures & methods*, participant 3 states that there are a lot of procedures within Sweco that one should be aware of, and therefore it is valuable to possess this competency. Besides this, participant 5 links the competency (possessed by Famke) to the 1st EMAT-criterium from the project type 'Engineering services': Planning / Approach. In order to gain a good score on this criterium, the tendering party needs to answer how the engineering company is going to design the process in order to achieve a successful procurement process. Therefore, the party needs to be aware of standard procedures of a procurement process and able to deal with this. Several participants (13, 6) explicitly mention the competency in their justification and thereby indicate its value for their team.

The next competency category for phase 2 are the Organizational competencies. This category consists of five competencies, of which two score very high (*planning & organizing* and *developing vision/strategy*), but the other three have a very low score (*deciding, delegating* and *leadership*). The competency *planning & organizing* is mentioned explicitly by participant 32, 16 and 3 (Appendix 12, Table 47), while participant 5 links the competency to the project type card that this player received. The project type card for engineering services contains three EMAT-criteria (see Appendix 7, Figure 36), which the tender professionals have to keep in mind and where they can obtain discounts on their offer price. One of these criteria is 'Planning and Approach'. Participant 5 includes this competency specifically to benefit the score on the EMAT-criteria. Further justification for the choice for *planning & organizing* in this phase seems to be lacking. Regarding the competency *developing vision/strategy*, participant 23 indicates that this competency is of value when determining the right strategy (Table 47) and participant 32 and 8 explicitly mention the competency. In phase 2 participants have to execute the task '2.8 Evaluate the tender strategy so far', therefore it seems plausible that participants have included this competency because of this task. However, this is never explicitly mentioned and therefore remains an assumption.

Social competencies and Personal competencies are considered least important for phase 2. Both competency categories have no competencies that are mentioned more often than the phase average (see Table 13, compare the bottom row with the values for competencies in the corresponding phase). For all competencies of these two categories extensive justification is lacking in Table 47, however they are explicitly mentioned several times: *take responsibility* (participant 32, 29, 16), *being critical* (32, 13, 6, 10), *communicating* (26, 2, 13), *collaborating* (mentioned only one time, by participant 13) and *networking* (14, 16). Participant 5 states that *networking* and *being critical* are necessary competencies (Kees possesses these competencies) in order to gain a high score on the second EMAT-criteria for engineering services: Technical Expertise (see Figure 36). Participant 29 adds to his choice for *communicating* that this competency can be of added value when identifying risks (task '2.1 Identify risks'). Finally, participant 3 states that *being*

*stress-resistant* is an important competency in the tender process, due to the high time pressure. As also participant 9 stated this time pressure during the session (see Table 46), it is plausible that more tender management professionals would confirm this. Therefore, it is quite odd that *being stress-resistant* was only included 10 times in all 33 teams in phase 2.

### 5.3.3 CATEGORIZED RANKING COMPETENCIES PHASE 3

During phase 3 the participants are halfway their gaming session and have the hang of it. This phase consists of nine tasks. The ranking of the categorized competencies is displayed below in Table 21 and Table 22 indicates the most often mentioned competencies during CompeTender for this specific phase.

*Table 21: Competency category ranking for phase 3*

| | | |
|---|---|---|
| F | Artistic competencies | 24% |
| G | Data handling competencies | 20% |
| E | Technical competencies | 17% |
| C | Organizational competencies | 14% |
| A | Personal competencies | 14% |
| B | Social competencies | 11% |
| | | 100% |

*Table 22: Most included competencies phase 3*

| PHASE 3 | | |
|---|---|---|
| 1 | Being creative | 7,8% |
| 2 | Planning & organizing | 6,3% |
| 3 | Information gathering | 6,1% |
| 4 | Being customer-oriented | 5,8% |
| 5 | Analysing | 5,6% |
| 6 | Being cost-conscious | 5,3% |
| 7 | Structuring | 5,1% |
| 8 | Communicating | 4,8% |
| 9 | Having environmental awareness | 4,8% |
| 10 | Being critical | 4,5% |
| 11 | Being quality-oriented | 4,5% |
| 12 | Being expressive | 4,3% |

During phase 3 it is clear that the Artistic competencies are most important to possess. Second most important are the Data handling competencies, followed by the Technical competencies. The Organizational competencies and Personal competencies are equally important, as they both have a relative score of 14%. Finally, Social competencies are considered least important in this phase.

This ranking is also reflected in the word cloud for phase 3, visualized in Figure 19. *Being creative*, which belongs to the category of Artistic competencies, is the largest word and therefore included most in all 33 teams. In total, this competency was included 33 times, but this does not necessarily mean that every participant included *being creative* in their team. It could be the case that one or more participants have multiple team members in their team who possess this competency. The other competency in this category, *being expressive* is displayed less big in the word cloud, but the number of times that this competency was included in participants' teams is still bigger than the mean of average times a competency was included (see Table 13) and therefore it remains important for the development of a competency-based profile for tender management professionals. *Being creative* is in the qualitative justification (see Appendix 12; Table 47) twice linked to the development of images, which refers to task '3.1 Organise the production of images'. Besides that, four participants (32, 21, 13 and 14) explicitly mention the competency, which emphasizes that they were deliberately choosing this competency for the corresponding phase. For participants 24, 25 and 31 the qualitative justification in Table 47 is missing, due to technical difficulties while playing the game. However, participant 25 remarked (see Table 46) that innovating is key, and therefore being creative should always be included in the competency-based teams while tendering. *Being expressive* is stated by among others participant 11, which links the competency to the writing of tender proposals (task '3.3 Write tender proposal') and besides that the competency was explicitly mentioned by participant 16.


*Figure 19: Word cloud competencies phase 3*

The second most important competency category appeared to be Data handling competencies. This is also very clearly displayed in Figure 19, as the purple words are prominently depicted in the word cloud. In particular, *being customer-oriented* and *information gathering* were included very often (respectively 25 and 24 times in 33 teams), however also the competencies *analysing*, *having environmental awareness*, *structuring* and *being quality-oriented* surpass the mean value of all averages in Table 13 (bottom row). *Information gathering* is the competency that is mentioned explicitly most often by the participants in their qualitative justification (Table 47; participant 32, 8, 3, 11, 13, 14, 10). Participant 1 adds to this that it is important to have this competency present in the team in order to have an idea of prices in order to monitor the tender budget (task '3.5 Monitor tender budget'). Also, phase 3 contains the task '3.2 Gather information from experts', which probably influenced the choice to include *information gathering* during the team compilation. *Being customer-oriented*, the most included competency from this category, was explicitly stated two times, by participant 32 and 13. Besides that, participant 1 mentions in Table 46 that the project type card (engineering services in this case) resulted in a large emphasis on customer knowledge in the first three phases of the game. The project type card explicitly states that the party tendering for work should identify the top 5 of risks for the client and provide these with control measures. In order to identify the risks for the client, knowledge about this party is a necessary given.

Right after *being customer-oriented* and *information gathering* the competencies *analysing*, *having environmental awareness* and *structuring* follow. Again, just like for phase 2 was the case, a clear justification for the choice of *having environmental awareness* is missing. Only participant 3 mentions this competency (Table 47), and states that this competency belongs with this particular phase, however, it is not clear why this is the case. As regards *structuring*, four participants explicitly mention the competency in their justification (32, 21, 13, 6). Besides this, participant 11 states in the general remarks (Table 46) that a structured person was part of the strategy to complete the game. According to this participant, a structured person is desirable to have in the team, as this person is good at identifying risks and keeping up with them. Participant 9 adds to this (Table 46) that *structuring* is a very important competency during the first few phases of a tendering process as a lot of information is gathered, and this can be overwhelming for the listener. This can be related to task '3.2 Gather information from experts'. Also *analysing* is valued highly (21 times) and was explicitly mentioned by participants 32, 16, 13 and 10. Finally, for the Data handling competencies, *being quality-oriented* also exceeds the mean value of all averages (Table 13) and is therefore included in the data analysis. This competency was explicitly mentioned three times (Table 47; participant 16, 13 and 6). Participant 12 and 27 add to this that this is an important competency to have present in the team for the following phases and therefore have included the competency in their teams.

The next most important competency category is Technical competencies, especially *being cost-conscious* seems to be of influence. Several participants state in their qualitative justification (Table 47) that they included the competency in order to monitor the tender budget (task '3.5 Monitor tender budget'; participant 8 and 11). Another reason why it is important for the tender process in this phase is because it enables the team to gather information on prices, which has to be included in the plan of approach (participant 1). Finally, three participants (16, 13, 6) include the competency explicitly in their justification.

Organizational competencies and Personal competencies seem to be of equal importance (both have a 14% score in Table 21). The competency from Organizational competencies which exceeds the mean value of all averages is *planning & organizing*. This competency is in the qualitative justification (Appendix 12, Table 47) linked to two tasks: '3.1 Organise the production of images' and '3.4 Organise peer reviews by specialists' (both by participant 11). Participant 1 states that *planning & organizing* is an important competency for the further elaboration of the plan of approach. Besides that, three participants (32, 21, 14) explicitly mention the competency. As regards to Personal competencies, *being critical* seems to be the most important competency to possess for phase 3 of the tendering process. A *critical* person in the team could be of great value when checking whether the plan is sufficiently SMART yet (task '3.7 Write everything down in a SMART way'; participant 33 and 18). Also the participants 30, 16, 13, 1, 6 and 10 seem to consider *being critical* as an important competency for phase 3, as they explicitly mention the competency in their qualitative justification (Appendix 12, Table 47).

The least important competency category for phase 3 appears to be Social competencies. The Social competencies are very small displayed in the word cloud in Figure 19, except for *communicating* which is included 21 times in the 33 teams (Table 13). Extensive justification for the choice for this competency is lacking, however four participants explicitly mentioned the competency (33, 21, 3 and 13; Table 47). Next to *communicating*, several participants also believe that *collaborating* is a very important competency. The score for this competency stays a little behind (only 13 times the competency was included; Table 13) , which indicates that definitely not all participants feel this way, but still four participants explicitly mentioned the competency in their justification (Table 47; participant 32, 16, 26, 13). Participant 26 even states that this was the only competency that was added to his team in phase 3, which makes his emphasis on this competency very clear.

### 5.3.4 CATEGORIZED RANKING COMPETENCIES PHASE 4

The penultimate phase of CompeTender was phase 4, which consists of eight tasks need to be fulfilled by tender management during the tender process. The categorized ranking of the average values from the competency categories for phase 4 is displayed in Table 23, while Table 24 shows the most included competencies during phase 4 of CompeTender.

*Table 23: Competency category ranking for phase 4*

| | | |
|---|---|---|
| F | Artistic competencies | 21% |
| E | Technical competencies | 19% |
| G | Data handling competencies | 17% |
| A | Personal competencies | 17% |
| C | Organizational competencies | 14% |
| B | Social competencies | 12% |
| | | 100% |

*Table 24: Most included competencies phase 4*

| PHASE 4 | | |
|---|---|---|
| 1 | Being cost-conscious | 7,0% |
| 2 | Being creative | 7,0% |
| 3 | Being critical | 6,5% |
| 4 | Being customer-oriented | 6,2% |
| 5 | Being quality-oriented | 6,2% |
| 6 | Communicating | 5,7% |
| 7 | Having environmental awareness | 4,9% |
| 8 | Planning & organizing | 4,6% |
| 9 | Analysing | 4,3% |
| 10 | Leadership | 4,3% |
| 11 | Being stress-resistant | 4,3% |

In phase 4 Artistic competencies seem to be the most important, followed by Technical competencies. The categories Data handling competencies and Personal competencies form the body of the categorized ranking and both relatively represent 17% of the mentioned competencies of this phase. Least important in this phase are considered the Organizational competencies and Social competencies. The categories consist of various competencies which are all represented in corresponding colours in the word cloud in Figure 20. Although participant 1 states in the qualitative justification (Table 47) that all competencies are of importance in this phase of the tender process, there are several competencies that immediately stand out in the word cloud: *being creative*, *being cost-conscious*, *being critical*, *being customer-oriented*, *being quality-oriented* and *communicating*. These competencies have all been included in the teams between 24 and 29 times during phase 4 and therefore largely exceed the mean of average values that a competency was mentioned in this phase (18). The other competencies that exceed this threshold, but are not that prominently present in the word cloud, are *having environmental awareness*, *deciding* and *planning & organizing*.


*Figure 20: Word cloud competencies phase 4*

Most important for phase 4 is the competency category Artistic competencies. This is mainly due to *being creative*, which was included 28 times within the 33 teams. Participant 6 and 23 mention explicitly in their qualitative justificationi (Appendix 12; Table 47) that they included *being creative* deliberately. Something that is quite remarkable is the fact that the Technical competencies are ranked lower, due to a lower average value, but that this category contains the competency that was included most often in phase 4: *being cost-conscious*. The competency *being cost-conscious* is associated with the price determination in task '4.1 Set offer price' (participant 29, 11; Table 47). Participant 15 notices that there is only a price-oriented task present in phase 4 of the CompeTender tender process, but that in real tender projects price determination plays a constant role (Table 46). *Being cost-conscious* is included by participant 17 and 12 as they feel that costs play an important role in this phase. Besides that, the competency was mentioned explicitly twice (participant 33 and 6; Table 47).

Third and fourth most important categories are Data handling competencies and Personal competencies (both representing 17% of the total of all averages in phase 4). From the category Data handling competencies, three competencies exceed the threshold of phase 4 (18): *being customer-oriented*, *being quality-oriented* and *having environmental awareness*. For this last competency, any justification is lacking (Table 47) and therefore it is not known why exactly is was included 20 times in phase 4. However, it remains the case that it was included 20 times, which is a given that cannot be ignored. As regards *being quality-oriented*, only one participant explicitly mentioned the competency in the justification (participant 10; Table 47). The final competency from the category Data handling competencies that will be discussed is *being customer-oriented*. *Being customer-oriented* seems very important, as phase 4 contains the task '4.4 Ensure an answer to the customer demand'. This task is linked to the competency by participant 17 and 28. Also, participant 11 states that the tender proposal needs to comply with the customer requirements. At last, *being customer-oriented* is mentioned explicitly two times by participant 6 and 23. As to the Personal competencies, only one competency value exceeds the threshold (Table 13): *being critical* (mentioned explicitly by participant 32, 22 and 3; Table 47). The importance of this competency was emphasized by participant 21 (Table 47) who states that in particular *being critical* is an important competency to possess in this phase. Participant 29 emphasizes this by stating that *being critical* is of great importance for spelling check of the proposal (task '4.5 Check spelling'). This task is also linked to the competency *being expressive* (participant 11; Table 47; from the category Artistic competencies), but as *being expressive* does not exceed the threshold of the mean value of all averages (Table 13), this competency was not discussed earlier. However, *being expressive* is also linked to the customer demand (participant 11) and could therefore also have a relation with the competency *being customer-oriented* (which was discussed earlier).

The penultimate most important category for phase 4 appeared to be Organizational competencies. This category consists of five competencies (*deciding, delegating, leadership, planning & organizing* and *developing vision/strategy*) which generally score quite low in this phase, there are no real outliers upwards regarding the amount of times the competency was included in the team composition (Table 13). Only *deciding* and *planning & organizing* exceed the threshold, but underpinning of the choice for these competencies is lacking completely.

Least important competency category in this phase is the category of Social competencies. The average value is mainly declining due to the fact that hardly any participant included *networking* in their teams, but nevertheless only *communicating* was included more than 18 times (24 times in phase 4, Table 13). Participant 18 included Grietje, who possesses *communicating* and state that this is of importance when aligning all text sections (task '4.3 Make the tender

offer consistent') in order to provide an answer to the customer demand (task '4.4 Ensure an answer to the customer demand'). Therefore, in this phase, three competencies were associated with answering the client demand: *being customer-oriented* (participant 17 and 28), *communicating* (18) and *being expressive* (11).

### 5.3.5 CATEGORIZED RANKING COMPETENCIES PHASE 5

Phase 5 is the final phase of the CompeTender tendering process. This phase consists of only four tasks, and therefore it is not surprising that the influence of this phase on the overall profile for tender management is less big than the influence of the previous phases. This is also reflected in the percentages in the bottom row of Table 15, as phase 5 only represents 18% of the total average values of the amount of competencies per phase. The ranking of the six identified competency categories for this phase is displayed in Table 25.

*Table 25: Competency category ranking for phase 5*

| | | |
|---|---|---|
| F | Artistic competencies | 22% |
| A | Personal competencies | 18% |
| E | Technical competencies | 17% |
| G | Data handling competencies | 15% |
| C | Organizational competencies | 14% |
| B | Social competencies | 13% |
| | | 100% |

*Table 26: Most included competencies phase 5*

| PHASE 5 | | |
|---|---|---|
| 1 | Being creative | 7,6% |
| 2 | Communicating | 6,3% |
| 3 | Being customer-oriented | 6,0% |
| 4 | Being critical | 5,7% |
| 5 | Being quality-oriented | 5,7% |
| 6 | Being stress-resistant | 5,4% |
| 7 | Take responsibility | 5,4% |
| 8 | Being cost-conscious | 5,1% |
| 9 | Deciding | 5,1% |
| 10 | Planning & organizing | 4,7% |
| 11 | Having environmental awareness | 4,4% |
| 12 | Leadership | 4,4% |

In the final phase of the tender process it appears that Artistic competencies are most important to possess as a tender management professional, followed by Personal competencies and Technical competencies. Less important can be considered the Data handling competencies, Organizational competencies and Social competencies. The individual result of all competencies is captured in a word cloud, as displayed in Figure 21. As expected, an Artistic competency (*being creative*), several Personal competencies (*being critical, being stress-resistant* and *taking responsibility*) and a Technical competency (*being cost-conscious*) are displayed quite big in the word cloud, which explains the high ranking of these three categories in Table 25. However, *communicating* (which belongs to the Social competencies), *being customer oriented* (Data handling competencies) and *being quality-oriented* (also Data handling competencies) are also displayed quite large and therefore of great influence on the profile for tender management in the final phase and hence should not be underestimated.


*Figure 21: Word cloud competencies phase 5*

As the most important competency category, Artistic competencies has two competencies noteworthy: *being creative* and *being expressive*. Both competencies are associated with the preparation and execution of the presentation or interviews which are part of the tender process for CompeTender (tasks '5.3 Prepare presentation/interviews' and '5.4 Give presentation/interviews'; participants 3, 20 and 11; Table 47). Besides this, *being creative* was also explicitly

mentioned three times by participants (18, 14, 6; Table 47), just like *being expressive* (8. 14, 6). Participant 26 adds to this (Table 46) that being *creative* and *being expressive* is most important in the final phase.

The second most important competency category is Personal competencies, which is mainly due to the high scores for *take responsibility*, *being critical* and *being stress-resistant*. Participant 17 states (Table 47) *being stress-resistant* is very important in the last phase and is herein supported by the explicit mention of the competency by participant 32, 26 and 10. *Taking responsibility* has a high score, but qualitative justification is completely lacking for the choice of this competency in phase 5 (Table 47). However, one of the tasks for phase 5 is '5.2 Submit the offer in time' and of course someone has to take the responsibility to hand in on time, so this could be a reason for the high score of this competency. However, this is a big guess as no sufficient evidence was recorded for this assumption. The final competency from this category is *being critical*, which appears to be linked to task '5.1 Organise the transfer of the offer towards the layout/production team' by participant 11, who states that Kees (possesses *communicating*, *collaborating* and *being critical*) is responsible for this task. Participant 28 thinks that *being critical* is an important competency to capture in the team compilation, as it is of importance for the final price determination and the last formalities. The last part of this sentence can be interpreted as the transfer of the offer towards the layout/production team, which is task 5.1. *Being critical* was mentioned explicitly three times in the qualitative justification (participant 32, 26, 10).

The most important technical competency in phase 5 seems to be *being cost-conscious*. However, extensive justification for the choice for this competency is lacking, except for two explicit mentioning of the competency (participant 32 and 10; Table 47). Participant 15 remarked that price determination is only explicitly present in the CompeTender process in phase 4, but that this is in real life an issue in every phase of the tender process. This could clarify the relatively high value for this competency in phase 5.

The purple competencies from Data handling competencies are quite prominently visible in the word cloud in Figure 21, but are scored fourth place in the competency category ranking (Table 25). This is due to the fact that the values for all competencies within this category are very divided: two relatively high values (*being customer-oriented* and *being quality-oriented*), one value that just hits the threshold of the mean value of all averages (Table 13; *having environmental awareness*) and three competencies that score low (*analysing, structuring* and *information gathering*). Therefore, the average value of this category is relatively low, but this should not erase the influence of individual competencies from this category. Being *customer oriented* is appreciated explicitly by participants 14 and 6 (Table 47), while this was the case for *being quality-oriented* according to participants 8, 16, 14 and 10. Participant 29 states that including Herman (who possesses *being quality-oriented*) is necessary for a good completion of the tender process. This participant also included Åsa in the final team, because her competency *having environmental awareness* can be of great value when preparing and giving the interview or presentation towards the client (Table 47). *Gathering information* has a very low score, which is probably due to the fact that phase 5 is the final phase of the tender process and therefore, no new information should be included anymore.

The same problem as for Data handling competencies, also appears for the category Organizational competencies, which scores quite low in the competency category ranking (Table 25). Again, in this category, there is case of a large division of values between the different competencies within this category. While *deciding* and *planning & organizing* score above average, *developing vision/strategy* and *delegating* score very low and therefore decrease the average value of the category. As regards to *deciding*, opinions are divided. The competency is considered necessary in order to submit the documents (task '5.2 Submit the offer on time') by participant 23 (Table 47), while participant 8 explicitly states that this competency is not necessary during the final phase. However, the competency was included nineteen times within the 33 teams, and is stated explicitly by three participants (32, 16, 10). Therefore, it is not plausible that the opinion of participant 8 is shared by the others. *Planning & organizing* is being employed for multiple tasks. Participant 33 links the competency to task '5.1 Organise the transfer of the offer towards the layout/production team' (Table 47), while participants 3 and 11 believe that the competency benefits task '5.2 Submit the offer on time'.

The final competency category for phase five appears to be Social competencies. This is mainly due to the fact that there are multiple competencies which have a very low value (Table 13). However, there is one competency from this category, *communicating*, which on the other hand has a quite high value (23 times included). Therefore, this competency is one of the most included competencies from this phase, which also becomes clear from Figure 21 as *communicating* is displayed quite large in the word cloud. This results in the fact that this competency should definitely not be forgotten for the compilation of a profile for tender management, despite the fact that the category Social competencies has such a low ranking. The cause for a high *communicating*-value could be due to the fact that participants associate the competency with the task '5.1 Organise the transfer of the offer towards the layout/production team', as is done by participant 11 (Appendix 12; Table 47). Participant 14 also explicitly states the competency in the qualitative justification (Table 47).

### 5.3.6 VARIATION OF COMPETENCIES OVER THE PHASES

This part of the data analysis will focus on the position of competencies over all phases of the tender process, as this ranking is not equal for every phase of CompeTender because of the differentiation in activities that are requested from tender management. The results of the categorized competency ranking throughout the phases are displayed in Table 27. As the categorized ranking is based on the position of disjoint competencies, Appendix 12 including Table 44 will be quoted, as this table provides an overview of all separate competencies throughout the phases and has colour allocation in order to provide quick insights. Besides that,

*Table 27: Variation of the competency categories throughout the tender phases*

| PHASE 1 | | PHASE 2 | | PHASE 3 | | PHASE 4 | | PHASE 5 | |
|---|---|---|---|---|---|---|---|---|---|
| Organizational competencies | 22% | Data handling competencies | 21% | Artistic competencies | 24% | Artistic competencies | 21% | Artistic competencies | 22% |
| Artistic competencies | 18% | Artistic competencies | 20% | Data handling competencies | 20% | Technical competencies | 19% | Personal competencies | 18% |
| Technical competencies | 18% | Technical competencies | 19% | Technical competencies | 17% | Data handling competencies | 17% | Technical competencies | 17% |
| Data handling competencies | 18% | Organizational competencies | 17% | Organizational competencies | 14% | Personal competencies | 17% | Data handling competencies | 15% |
| Social competencies | 14% | Social competencies | 13% | Personal competencies | 14% | Organizational competencies | 14% | Organizational competencies | 14% |
| Personal competencies | 11% | Personal competencies | 11% | Social competencies | 11% | Social competencies | 12% | Social competencies | 13% |

As can be seen, Organizational competencies (*deciding, delegating, leadership, planning & organizing* and *developing vision/strategy*) are in particular present in phase 1. This is mainly due to the competencies *deciding*, *planning & organizing* and *developing vision/strategy*, which are associated with particular tasks from phase 1 ('1.1 Bid/no bid decision', '1.5 Make a preliminary tender planning', '1.6 Make a final tender planning' and '1.10 Determine the right tender strategy'). However, as the process progresses, Organizational competencies become less and less important. In phase 2 the Organizational competencies *planning & organizing* and *developing vision/strategy* still remain a high score (due to the EMAT-criterium 'Planning and approach' and task '2.8 Evaluate the tender strategy so far'), but the other competencies have a very low score and therefore the average value of the competency category gets down. In phase 3 only *planning & organizing* seems to be of importance for the overall profile, as this competency is linked to two tasks: '3.1 Organise the production of images' and '3.4 Organise peer reviews by specialists'. As regards to phase 4 and 5, a large difference between the influence of the separate competencies appears. For these two phases, *deciding* and *planning and organise* are still relevant, while the other three competencies score very low and therefore get the average down. This results in a low ranking for this competency category in the last phases of CompeTender. One can conclude that *planning & organizing* is the most important competency of this category, as this competency appears in the top 10 ranking of all phases (see Table 44). *Delegating* seems not to be of importance for any of the phases, as it does not exceed the 17$^{th}$ position in the rankings.

Artistic competencies, on the other hand, seems to be a quite stable scoring competency category. In particular, *being creative* is responsible for this high ranking, as this competency ends up at least in the top 4 competencies mentioned most often for all phases (Table 44). After phase 2 the Artistic competencies even take over the first position in the competency category ranking. This is due to the fact that from then on *being expressive*, the other competency from this category, is included more often in the team compilation. This competency is considered related to writing tasks (task 3.3) and the preparation and execution of presentations or interviews (task 5.3 and 5.4), which comprise the core tasks of the last three phases.

Technical competencies have a quite constant position in the ranking, as they end up either third or second place. The second place in phase 4 is mainly due to the fact that this phase contains an explicit budget-oriented task ('4.1 Determine offer price'), which appears to be strongly related to the Technical competency *being cost-conscious*. However, during the first few phases, the tender budget needs to be determined ('1.3 Determine tender budget') and monitored ('2.7 Monitor tender budget' and '3.5 Monitor tender budget'). As can be seen, *being cost-conscious* is a competency that is present in every ranking of the most often mentioned competencies during all phases of CompeTender, and even gets the top position in phase 4 (Table 44). *Handling procedures & methods* is less visible throughout the phases, but has a quite stable score right below the mean of all averages (see Table 13). Except for phase 2, when the competency appeared in the overview of most included competencies. However, there is no solid justification or link to a specific task that explains this.

The Data handling competencies have a peak in phase 2, and after this phase their influence on the profile of tender management declines. This category consists of six competencies (*information gathering, analysing, being quality-oriented, being customer-oriented, having environmental awareness* and *structuring*), which therefore is the biggest category. Due to the fact that the category is this big, the influence on the overall scoring of the category diminishes a little bit, which causes that high scoring competencies or the very low scoring competencies are not immediately localised from this score. In the first three phases, *analysing* seems to be of great importance, due to the fact that the procurement guideline needs to be analysed (task 1.2) and risks need to be identified (task 2.1). Another often included competency in the first phase is *having environmental awareness*. There is no clear justification for the choices for this competency throughout all phases, however, it was included quite often in every phase of the tender process and scores always above the mean of all averages (Table 13). After phase 1 the influence of Data handling competencies increases, and all competencies from this category appear to be relevant for the compilation of a tender management profile during phase 2 and 3. *Information gathering* is very important during these two phases, as the content of the plan needs to be collected from experts (task 2.3 and 3.2). Besides that, client information and *being customer-oriented* is of great value, as it is important to really understand and define what exactly the client wants. Towards the end of the tender process, the influence of Data handling competencies decreases again (most due to the large decrease of importance of *information gathering, analysing* and *structuring*), however *being customer-oriented*, *having environmental awareness* and *being quality-oriented* remain important.

The Social competencies are also a quite stable category in the overall ranking (Table 27), as it is either located at the bottom or right before the bottom. Three out of five competencies do not seem to be considered important at all (*interactive learning*, *collaborating* and *networking*) as they are never exceed the mean of all averages value (Table 13). *Team building* is only present in the profile for tender management during the first phase, which might be due to the fact that the role of Asa was obligatory in the first few gaming sessions. Then, the only competency that is left is *communicating*. The importance of this competency increases as the process progresses. During the last three phases the competency is included quite often, either because a hand-over of information or responsibilities is present in the process (task 3.1 and 5.1) or because an answer on the customer demand is expected (4.4).

The final category that will be discussed are the Personal competencies. The category consists of four competencies (*being stress-resistant, being flexible, take responsibility* and *being critical*), from which *being flexible* is never considered to be of sufficient added value (Table 13). *Take responsibility* seems to be important at the beginning and at the end, but a sufficient justification (Table 47, Appendix 12) is lacking. At first, the category has a very low ranking, but as the tender process progresses, its influence increases a lot. Especially in the last phase, where *being stress-resistant, take responsibility* and *being critical* gain high scores (Table 13). *Being critical* makes its way up from phase 3, where this competency is considered of added value for the task '3.7 Write everything down in a SMART way' and '4.5 Check spelling'.

### 5.3.7 CATEGORIZED RANKING COMPETENCIES OVER ALL PHASES

Data analysis on the retrieved information resulted into the establishment of a competency-based profile for the five phases of the tender process. However, there are multiple reasons in favour of the establishment of an overall competency-based profile for tender management. One of the main reasons in favour of this overall profile, is the fact that tender management for a bid is likely to be executed by one person due to the risk of losing information at the hand-over. Besides that, it is also not very common nowadays to shift people in and out of the projects, purely based on their competencies. Finally, in literature no distinction is made in the competencies for tender management in different phases of the project. Therefore, it was decided to establish an overall image of important categorized competencies for tender management resulting from the summation of all results from the disjoint phases.

Table 28 provides an overview of the ranking of the competency categories, when all data is added together. Besides that, Table 29 provides an overview of the ranking of all competencies when all phases are taken into account.

*Table 28: Competency category ranking for all phases combined*

| | | |
|---|---|---|
| F | Artistic competencies | 21% |
| G | Data handling competencies | 18% |
| E | Technical competencies | 18% |
| C | Organizational competencies | 16% |
| A | Personal competencies | 14% |
| B | Social competencies | 13% |
| | | 100% |

*Table 29: Ranking competencies over all phases*

| | | |
|---|---|---|
| 1 | Being creative | 6,9% |
| 2 | Having environmental awareness | 5,7% |
| 3 | Planning & organizing | 5,7% |
| 4 | Analysing | 5,4% |
| 5 | Being cost-conscious | 5,4% |
| 6 | Being customer-oriented | 5,2% |
| 7 | Communicating | 4,5% |
| 8 | Being critical | 4,5% |
| 9 | Deciding | 4,4% |
| 10 | Being quality-oriented | 4,3% |
| 11 | Take responsibility | 4,3% |
| 12 | Leadership | 4,2% |
| 13 | Structuring | 4,0% |
| 14 | Information gathering | 4,0% |
| 15 | Team building | 4,0% |
| 16 | Being expressive | 3,9% |
| 17 | Handling procedures & methods | 3,8% |
| 18 | Being stress-resistant | 3,5% |
| 19 | Developing vision/strategy | 3,4% |
| 20 | Collaborating | 3,3% |
| 21 | Delegating | 2,7% |
| 22 | Being flexible | 2,5% |
| 23 | Interactive learning | 2,2% |
| 24 | Networking | 2,2% |

Overall Artistic competencies are considered most important for tender management during a tender process. This is mainly due to the competency *being creative,* which has the highest rank and is therefore most often included into the team compilation of the participants. As can be seen in Table 28, Data handling competencies and Technical competencies are considered equally important. However, one has to bear in mind that this ranking is based on the average times certain categories were included in the team compilation, and that therefore this ranking is subject to the fact that not all categories contain an equal amount of competencies. When taking a look at Table 29 is becomes clear that Data handling competencies are considered very important for tender management, as four out of six competencies from this category ended up in the top ten (*having environmental awareness, analysing, being customer-oriented* and *being quality-oriented*). The category Technical competencies, which only consists of two competencies, has its high score in particular due to *being cost-conscious*, which ends up in fifth place in the overall profile. The other competency of this category, *handling procedures & methods*, is not considered that important at all. Therefore, the ranking of Data handling competencies on second place and Technical competencies on third place seems a truthful representation of the data.

The bottom half of the categorized ranking contains the Organizational competencies, Personal competencies and Social competencies. Organizational competencies appears to be a very divided category, as some of the competencies from this category end up pretty high, and some of them approach the bottom of the individual competency ranking. Therefore, its position in the middle of the averaged ranking seems reasonable. As concern for both Social and Personal competencies, their individual competencies are mainly located at the bottom of the competency ranking. Therefore, both categories are not considered important for tender management by tender management professionals.

Concluding one can state that mainly *being creative* (Artistic competencies), *having environmental awareness, being customer-oriented, analysing* (all Data handling competencies), *being cost-conscious* (Technical competencies) and *planning & organizing* (Organizational competencies) are important competencies for tender management

## 5.4 VARIATION IN IMPORTANT COMPETENCIES FOR PROJECT TYPES

CompeTender aims to identify important competencies for tender management of different infrastructure project types. Therefore, the project type card was introduced as a variable in the game. The project type card gives a brief overview of the client demand for the fictional tender that is considered during the game. This part of the data analysis will elaborate on the conclusions that can be drawn on the basis of this variable in the game. Therefore, the following analysing question is considered in this section:

*What are the differences in competencies required for different project types?*

The initial idea of the research was to make all participants play CompeTender three times, every project type once, and then compare the quantitative results from all sessions with one another in order to discover the differences in valued competencies per project type. However, many participants stated that they had not explicitly used the project type card and therefore had not made an explicit choice in competencies for their assigned project type. Therefore, there was no use in making participants play the game three times, as the only variable in that case would be the project type card, which they said to be left out of their considerations for specific competencies. Instead of gathering three results per participant, the participants were asked to provide some justification on possible differences between the three proposed project types and the quantitative results were all combined in order to serve the data analysis of the previous paragraph. This justification was collected and is included in Appendix 12, Table 46. The final column contains 'Remarks PT' which is short for 'Remarks on the differentiation in competencies regarding the project type'. These qualitative answers will form the basis in order to provide an indication of the differences between valued competencies for different project types. However, as this justification is not regarded sufficient to draw decisive conclusions, it only serves as an indication and should be researched more extensively if real facts are desired.

Table 46 states whether a participant used the project type card or not ('Used PT?'). If a participant did not use the project type card, it is assumed that there are no explicit choices made in the team compilation based on the specific project type. However, if a player did make specific choices regarding its project type, this is captured in the last column ('Remarks PT').

The following three sections will describe the justification from CompeTender participants on the competencies for specific project types. Based on these descriptions, an indicative conclusion can be drawn on specific competencies for specific project types

### 5.4.1 FRAMEWORK AGREEMENT

Very little specific comments were made by the participants on differentiation in competencies regarding tendering for a framework agreement. Therefore, no real differentiation can be established, except for the fact that one participant (20) highlighted that within a framework agreement *having environmental awareness* is very important, due to the fact that the plans for the environment in the coming few years need to be regarded.

Participant 2 adds to this that it is very common in a framework agreement to focus more on collaboration and responsibilities throughout the process. This participant believes that framework agreements demand for a very process-oriented tender process.

### 5.4.2 ENGINEERING SERVICES

As indicated in Figure 8, assignments for engineering services follow from inclusion in a framework agreement (participant 2). As both the framework agreement and the engineering services are conducted in-house when considering an engineering firm, participant 2 feels that the competencies for both project types should be similar. Participant 11 is of opinion that there is indeed a difference between the three project types, and that tendering for engineering services is characterised by the fact that very often the client demands a team with a certain expertise. In order to successfully offer this team, 11 believes that *networking* is important in order to gather the right people for the job, and *being expressive* is important.

### 5.4.3 CONTRACTOR SERVICES

In the project type 'contractor services' Sweco provides the tender guidance and tender team (except for substantive specialists) for the contractor. The contractor provides all the input for the plan, as they have to execute the work when it is acquired. The specific choice for competencies regarding this project type seems more extensively underpinned compared to the other project types, therefore this indication might actually make some sense. Several participants highlight that tendering in a contractor environment is quite different than a tender within an engineering firm. The organization might be new to the tender management team (participant 20), therefore you have to collaborate with people and systems you are unfamiliar with. Both participant 7 and 9 therefore state in their remarks that *collaboration* in this project type is of great value, as this is key to achieving a successful project. Participant 20 adds to this that *communication* is an important competency to possess, as it is your obligation to take the client (in this case the contractor) along in your train of thought.

Besides that, *being cost-conscious* is considered an important competency (participant 7) when working together with a contracting company, as margins of constructors are very low and therefore the win fee is very important (participant 30 and 11). This also results in a high valuation for *being creative* (participant 30, 25, 11) as a lot of participants feel that a contracting company is always searching for new, innovative solutions to save time and/or money.

### 5.4.4 NO DIFFERENTIATION

Finally, there are multiple participants (33, 18, 23) who believe that there should not be a different profile for different project types, as the tender process is quite generic and the tasks and responsibilities that are part of tender management are equal for all project types. Participant 3 adds to this that the choice for certain competencies is mainly influenced by the client that needs to be persuaded to accept the offer.

# 6. EVALUATION OF THE RESULTS

This chapter evaluates the results gathered with the game compared with literature. As there appear to be several remarkable results following from this comparison, extra insight was sought during a session with a tender expert. The extra insights that were gathered during this session are included in this chapter, and therefore complete the image that was gathered on competencies for tender management. Furthermore, the game developed for this research, CompeTender, is evaluated.

## 6.1 COMPARISON LITERATURE & PRACTICE

This section will elaborate on the comparison between results on competencies for tender management found in literature and following from the data analysis of the CompeTender results. First, the most important competency categories as considered important following from CompeTender will be addressed, followed by a more in-depth comparison of the importance of individual competencies in literature and CompeTender results.

The comparison between the categorized rankings or competencies from CompeTender and literature is shown in Table 30 and shows a large overlap between the categorized results.

*Table 30: Comparison categorized ranking of competencies for tender management*

| | COMPETENDER RESULTS |
|---|---|
| F | Artistic competencies |
| G | Data handling competencies |
| E | Technical competencies |
| C | Organizational competencies |
| A | Personal competencies |
| B | Social competencies |

| | LITERATURE RESULTS |
|---|---|
| G | Data handling competencies |
| F | Artistic competencies |
| E | Technical competencies |
| B | Social competencies |
| C | Organizational competencies |
| A | Personal competencies |

Both research methods result in a high ranking for Artistic competencies, Data handling competencies and to a lesser extent Technical competencies. Therefore, it is suspected that these categories contain the most important competencies for tender management professionals. The bottom halves of the rankings present in Table 30 show less similarities. The ranking following from literature research considers Social competencies more important for tender management compared to the results following from CompeTender. This causes Organizational competencies and Personal competencies to drop one spot in the ranking of literature results, compared to CompeTender results.

Table 31 provides an overview of the ranking between literature and CompeTender results on competency-level. However, one has to bear in mind that the ranking resulting from literature research is a little indicative, as the findings were interpretative due to the translation from APMP terminology to FNV terminology (see paragraph 3.2.2). The ranking for the CompeTender findings is the results of input from 33 participants, and can therefore not be influenced by the opinion of one person. This ranking is considered more fixed and therefore more representative regarding important competencies for tender management. However, the amount of data resulting from 33 participants was still too little to perform statistical analysis and therefore the exact veracity cannot be determined.

When taking a look at Table 31 it becomes clear that the higher ranking for Social competencies following from literature is mainly due to the fact that *communicating* is the most included competency in this research method. *Communicating* was included no less than eighteen times, while other competencies from this category did not exceed the value of eight (see Table 4) and are therefore of less influence.

*Table 31: Ranking of both the results from CompeTender and the link between tasks for tender management, the APMP competencies and FNV terminology.*

| | CompeTender |
|---|---|
| 1 | Being creative |
| 2 | Having environmental awareness |
| 3 | Planning & organizing |
| 4 | Analysing |
| 5 | Being cost-conscious |
| 6 | Being customer-oriented |
| 7 | Communicating |
| 8 | Being critical |
| 9 | Deciding |
| 10 | Being quality-oriented |
| 11 | Take responsibility |
| 12 | Leadership |
| 13 | Structuring |
| 14 | Information gathering |
| 15 | Team building |
| 16 | Being expressive |
| 17 | Handling procedures & methods |
| 18 | Being stress-resistant |
| 19 | Developing vision/strategy |
| 20 | Collaborating |
| 21 | Delegating |
| 22 | Being flexible |
| 23 | Interactive learning |
| 24 | Networking |

| | Literature (APMP) |
|---|---|
| 1 | Communicating |
| 2 | Analysing |
| 3 | Being customer-oriented |
| 4 | Handling procedures & methods |
| 5 | Being expressive |
| 6 | Being quality-oriented |
| 7 | Planning & organizing |
| 8 | Collaborating |
| 9 | Being creative |
| 10 | Being cost-conscious |
| 11 | Leadership |
| 12 | Information gathering |
| 13 | Developing vision/strategy |
| 14 | Interactive learning |
| 15 | Delegating |
| 16 | Deciding |
| 17 | Being critical |
| 18 | Networking |
| 19 | Take responsibility |
| 20 | Having environmental awareness |
| 21 | Structuring |
| 22 | Team building |
| 23 | Being stress-resistant |
| 24 | Being flexible |

*Being creative* is considered the most important competency for tender management, according to tender management professionals. When looking at this competency in the ranking following from literature, one can see that it might not be considered *the* most important competency, but definitely is of importance for tender management. The qualitative justification from CompeTender provided the insight that *being creative* is important when composing the tender strategy. The respondents, however, did not provide a clear justification on why they specifically included this competency throughout the entire process. As *being creative* does not explicitly follow from the origin (project management and sales departments), tasks or main responsibilities of tender management, this does not really provide any insights either. However, Nickson (2012) believes that project managers are very poor tender managers, due to a lack of creativity in their work which is addressed as the critical factor for a win in business. Therefore, the suspicion rises that being creative is linked to the development of an original bid which surprises the client and leads to a project-specific approach of the tender, but this is not explicitly mentioned.

As stated earlier, from literature it follows that *communicating* is the most important competency to possess when conducting tender management. During the gaming sessions it appeared that this competency was also considered of importance by professionals experienced with tender management (it has the 7$^{th}$ spot in the ranking), but not the most important one. It is likely that this competency was often included due to the fact that conducting a bid is considered a team-related activity (Snoep & Jonkind, 2015; Steel, 2004; Lewis, 2015; Springer; 2005).

As the literature research already highlighted, it is likely that tender management originates from project management. Project management is mainly driven by balancing time, cost and quality (the Iron triangle; Whitley, 2006) but it appears that these factors are also of importance for tender management: *planning & organizing* (directly linked to the establishment of a tender planning), *cost-consciousness* and *being quality-oriented* all make it into the top ten of most important competencies according to both tender management professionals and literature. This provides an indication of the overlap of the two professions, which can be explained by the phenomenon that several researchers consider the development of a tender proposal as a project (Whitley, 2006; Philbin, 2008).

The fact that *being customer-oriented* has a very high ranking in the CompeTender results is among others due to the association participants have between this competency and the risk analysis. A good risk register should include risks and mitigation measures as perceived by the client. Besides that, its high ranking can be owed to the fact that participants of CompeTender also acknowledge the special position tender management has between the client and the supplier organisation. As indicated in Figure 4 in the literature research, tender management is located right

between these two organizations as it has to satisfy both the requirements of the client and has to do justice to the abilities of the organization by satisfying these.

A result following from CompeTender that totally does not match the ranking in literature, is the ranking of *having environmental awareness*. In CompeTender, this competency was very often included in the team compilation. Section 5.2.4 remained inconclusive about the fact that the obligation to use Asa affected the presence of this competency, and therefore a clear justification for the inclusion of this competency was expected. However, also the qualitative data (Appendix 13) did not provide any insight into the motives that led to inclusion of *having environmental awareness*. As the competency is ranked very low according to the analysis of literature, this also does not provide sufficient insight. Therefore, this result is considered remarkable and will be discussed with a tender management expert.

A competency that, when analysing literature about tender management, was expected to end up high in the ranking by tender management professionals, was the competency *being stress-resistant*. Pellicer *et al.* (2013) and Philbin (2008) both state that tenders often come with a lot of time-pressure, and this was also acknowledged by tender management professionals during the CompeTender sessions. However, the ranking of results following from CompeTender does not show a high importance of *stress-resistance*. Therefore, this is considered to be a remarkable result that needs further investigation.

Furthermore, there are several competencies that scored high in the ranking of important competencies for tender management following from literature (right part of Table 31), but that are not considered as important by tender management professionals (left part of Table 31). These competencies are *communicating*, *handling procedures & methods* and *being expressive*. The fact that the two rankings present in Table 31 do not match can among others be due to improper matching of the FNV competencies to the tender management tasks, despite the fact that this was definitely not the intention of the researcher.

## 6.2 SUMMARIZING THE RESULTS

This section summarizes the results that were discussed in section 6.1 and sums up the remarkable findings as a result of this comparison. For tender management, the competency categories Artistic competencies, Data handling competencies and to a lesser extent Technical competencies are of important. When considering the disjoint competencies, it appears that mainly *being creative* (Artistic competencies), *having environmental awareness, analysing, being customer-oriented* (all Data handling competencies), *planning & organizing* (Organizational competencies), *communicating* (Social competencies) and *being cost-conscious* (Technical competencies) are important for tender management.

There are several ranking-related topics resulting from the comparison established in section 6.1 that remain unclear. The fact that these topics are still unclear is either due to the fact that the results from literature and CompeTender do not align (which is the case with for example *collaborating*), or that they have a high ranking in the CompeTender results, but that this ranking is still unclear due to a lacking justification from the participants. Based on observations of the researcher regarding the established results, the following topics still call for more insight:

- *Being creative* is the most included competency from CompeTender, however, it is not considered most important when looking at the literature. Besides that it is lacking sufficient qualitative justification for inclusion in the CompeTender results
- The same goes for *having environmental awareness*. The high score for this competency is very remarkable as sufficient justification from the qualitative results is lacking, and the competency is hardly considered important in literature.
- *Being stress-resistant* has a very low importance in both the game results and the findings from literature. However, several participants from CompeTender highlight that they consider tendering as a stress-full activity due to the time pressure. This time pressure is also acknowledged by literature.
- *Collaborating* is not very often included in the results from CompeTender, however, tendering is often a team affair and therefore collaboration is essential for the establishment of an integral proposal.
- *Being flexible* seems unimportant for tender management, following from both the findings from literature and CompeTender.
- *Networking* has a very low ranking, despite the fact that the composition of tender teams is a responsibility of tender management.

In order to gather more insight in these topics, it was decided to organize a meeting with the division director of the business area Transportation and Mobility from Sweco. This meeting and the clarifications that it brings along are discussed in the next section.

## 6.3 EXTRA INSIGHTS FROM A TENDER EXPERT

The previous section pointed out that there are several topics resulting from a comparison between literature and CompeTender results, that require more insight in order to make sense. Therefore, a separate session was organized with the division director of Transportation and Mobility from Sweco. In this role, the director is often involved in tender processes as he is assigned with the review of bids with a value over €250.000,- and has partial responsibility for approving the submission of these offers. This responsibility acquires him a lot of insight in the daily practice of tender management and the business development within Sweco and therefore discussing the unclear topics addressed in section 6.2 might provide more insight.

The main objective of the session is to gather more insight in motives for a high or low ranking of competencies resulting from CompeTender. In order to meet this objective, first the topic of the research and the serious game was explained, to make sure that the interviewee had a proper insight into the conducted research. Subsequently, it was addressed that there were several competencies that had either a high or a low score, while this was not necessarily expected when comparing them with ranking following from literature or that sufficient underpinning following from CompeTender was lacking. Thereafter, the topics addressed in section 6.2 were addressed one by one. The division director was asked to motivate why he thought the specific competency was ranked this way by the professionals experienced with tender management. This resulted in more insights regarding the ranking and motives to include or exclude certain competencies from the CompeTender teams.

These insights are summarized below, and serve as an additional underpinning for the importance or unimportance of competencies for tender management. One by one, all competencies asking for more insight are addressed. The content of this section is the opinion of the division director, not the researcher.

#### BEING CREATIVE

Being creative and out-of-the-box thinking is very important during a tender process. This is mainly due to the fact that the organization really wants to distinct itself from its competitors and therefore wants to stand out both in terms of the surprising effect towards the client and innovative solutions. The division director adds to this that he has observed teams without creativity, and noticed that they tend to take paths that have been walked before. This often results in a tender offer which does not completely exploits the opportunity.

Besides that, creativity is considered important for the analysis of the customer demand. A creative interpretation of what is the perceived problem from the client, can help establish an unexpected solution for the proposal. This can result into a high score on (one of) the EMAT-criteria.

#### HAVING ENVIRONMENTAL AWARENESS

The importance of having environmental awareness is very dependent on the size of the project and the level of dominance the client has regarding stakeholders involved. Every tender project has to incorporate many stakeholders and parties with an interest in the development of the project. The importance to incorporate them in the strategy and execution of the tender follows from the fact that these parties often have a large voice during the execution of a project and are very likely to cause trouble when they do not comply with the characteristics of the project. As the environment is a large influence on arising issues, this should be taken into account when analysing the risks of the project. Often, an offer must contain a risk file, which maps and elaborates on the mitigation measures for project-specific risks.

#### STRESS-RESISTANCE

There is clearly case of a rise in the considered importance of this competency, as it increases as the tender process progresses. However, the division director feels that *stress-resistance* should be present in every phase of the tender. This is mainly due to how the organization of appointing people with work is currently done. Ideally, you want the best people for the job, every time a new job appears. However, this is not always possible, as often these people are already occupied with another project/tender. This results into the fact that as a tender manager you constantly have to ask yourself whether you have the right team members present in order to win the bid, and if these people have sufficient availability for the tender. As this is not always the case, *stress-resistance* is important to be able to cope with these uncertainties and inconveniences.

#### PLANNING & ORGANIZING

This is considered to be a very important competency by the division director, as this could make or break the tender project. The tender manager and perceived project leader should be present in the team from day 1, as they have a key role into the establishment of the tender proposal. Therefore, their presence needs to be arranged beforehand to the tender hits the market. This asks for some *planning & organising* competencies, as often it is not exactly known when tender projects hit the market, and if they do the competition has started so everyone must be ready. It could be that

there is case of a relationship between *planning & organizing* and *being stress-resistant*, due to the fact that a good planning and organization might be stress-relieving.

COLLABORATING

Collaborating scores quite low, considered the fact that nowadays a lot of projects demand an integral approach of the tender project according to the division director. He believes that collaboration is an essential part of tendering and tender management as it helps to sharpen the offer and the other team members in order to establish a good end product. Besides that, an integral approach of the project demands for collaboration as often the 'island' culture within the company causes many interfaces between different parts of the project. In order to achieve a good end product, these interfaces need to be made clear and agreements on these interfaces need to be aligned with one another. This can only be done by collaboration.

NETWORKING

Networking has quite a low score, but the division director remarks that this could be due to the fact that during the tender process there is simply no time for *networking*. However, tender management should be in the possession of a large network once the tender has started. Due to the fact that the establishment of the competency-based profile is only done on the basis of the tasks for a tender process, the preconditions are easily neglected. Therefore, it could be the case that networking is a very important competency for tender management, however, not during the tender process itself. Then the network should already be established.

## 6.4 EVALUATION COMPETENDER GAME

The game CompeTender was designed in order to gather insights into important competencies for tender management from employees who have experience with tendering. This section of the research evaluates the game and indicates whether or not and where there is room for improvement. The evaluation is based on observations and interpretations of both the playing rounds by the researcher and the data collected through the gaming sessions.

### 6.4.1 REALITY OF THE CONTENT

CompeTender is developed on the basis of several inputs resulting from the daily practice within Sweco. The input that was used in order to develop the game was already discussed in section 4.3.3. This states that the WBP was used in order to develop a tender process which feels familiar for the Sweco employees, in order to enhance their playing experience and make the game feel more realistic. A remark that was retrieved during the gaming sessions, is the fact that this tender process (see 4.4.1) does only contain a pricing task in phase 4. However, developing an appropriate price for the bid should be a matter of concern in all phases according to the participant. As this is the case for multiple tasks of tender management (for example writing the content of the bid), it was decided by the researcher to not include them in every phase. This would cancel out the benefit of dividing the tender process into different phases, as people then had to include the same competencies every phase.

Another game element that aims to enhance the reality of the game, is the time pressure. Bids have to be produced in a short amount of time, and therefore one has to cope with decision-making without complete information. The participants have to hand in five teams (one for every phase of the tender process) within 40 minutes, and therefore have to work pragmatic.

Something that does not necessarily matches reality, is the fact that every team player that can be chosen in the game either possesses one, two or three competencies. This is quite rigid and is not the case in real life, as people can easily possess more than three competencies. Therefore, the amount of team members included in the game in a certain phase does not necessarily have to reflect the amount of team members that is usually present in a tender team. It refers more to the amount of competencies that a participant wants to have present in the tender team. However, during the gaming sessions there were some participants struggling a little with this difference (amount of competencies vs amount of persons in a team).

Finally, the game is based on competency-based profile matching of team members with the tasks to be executed. This is currently not very common in the daily practice within the research company. This will be discussed further in chapter 7.

### 6.4.2 COMPETENCY ALLOCATION

As explained in section 4.4.2 all team member cards were allocated with either one, two or three competencies. However, the division of these competencies was done almost random. The team member cards for junior team members all contained one competency, and therefore no division was needed. Next, the competencies were randomly allocated on the senior team member cards, who all have three competencies. Subsequently, the competencies were divided over the medior team member cards (two competencies) in such a way, that no competency-combination on a card also appeared to be a combination on the senior team member cards. This resulted in the competency allocation as shown in Appendix 7.

However, due to the fact that this competency allocation was done randomly it is basically impossible to retrieve a score of 500 points (all competencies correct ánd remain within the set budget of €40.000,-). It is most desirable to use senior team member cards, as there are relatively the cheapest per included competency (€600). However, for certain phases the division is unfortunate, which resulted into the researcher only being able to get a 100% score with a budget of €45.000,-.

### 6.4.3 POPULARITY TEAM MEMBERS

Due to the fact that the competencies were randomly divided over the different team member cards, several team members were included way more often in the team compilation than others. Inez (*planning & organizing* and *being creative*), Harry (*being creative, being cost-conscious* and *being customer-oriented*), Asa (*team building, deciding* and *having environmental awareness*) and Lieke (*information gathering*) appeared to be very popular team members. They were all included at least 14 times in one of the phases. Harry takes account for the major part of the times that *being customer-oriented* and *being cost-conscious* was included in the team compilation, so apparently his competencies were popular among the CompeTender participants. This also results from the ranking of competencies that was discussed in section 5.3.7.

However, there are also some team member cards which were selected very little (less than 10 times in total over the whole tender process). These 'unpopular' cards mainly consist of junior team members (Suzan – *deciding*, Grietje – *communicating*, Thomas - *delegating*, Bob - *being flexible*, Laura – *interactive learning*, Tess – *being customer-oriented*, Erik - *networking*, Jan – *having environmental awareness*, Ivar – *being stress-resistant*, Ronald – *take responsibility*, Kars - *collaborating*, Piet – *team building*). This is not very remarkable, as it is least efficient monetary wise to include junior team members into your team. Furthermore, one medior team member was included less than 10 times in all teams (Louise (*team building* and *networking*)).

### 6.4.4 ACHIEVEMENT OF LEARNING OBJECTIVES

CompeTender can satisfy multiple learning objectives while playing, as was already described in paragraph 4.2.
On one hand, it provides the game leader with a learning experience as insight is provided in the competencies considered to be important for tender management. On the other hand, players also receive a learning experience on the tender process and competency-based matching of team members profiles. The learning objectives will be described separately together with their implications for the learning party or parties.

#### INSIGHTS FOR THE GAME LEADER

CompeTender was originally designed in order to gather insights and data for the researcher. The game serves as an alternative way of interviewing and surveying people on their experiences regarding competencies for tender management. As CompeTender results in both quantitative data, which counts the number of times a specific competency is present in a team in a specific phase, and qualitative data, which underpins people's choices for certain competencies based on tasks or other factors, a combination of the two can be used in order to draw a competency-based profile for tender management.

#### INSIGHTS FOR PARTICIPANTS

Next to the insights for the game leader that were aimed for, the participants also had the chance to gain some insights in several topics. Although it was not always intentionally, the game could serve multiple purposes within Sweco.

First purpose is gaining insight in the tender process. When someone is unfamiliar with the tender process and the tasks that come with it, the game can easily explain how the process is put together and what should be considered when

tendering. This is mainly due to the clear indication of tasks that have to be performed by tender management during the game.

Another insight that can be explored is the possibility to shift team members in and out throughout the entire process, as the game is purely competency-based. In real life, this is often not the case, but that can also be due to the fact that very little teams are actually established purely based on competencies. This can be for example blamed on the fact that the exact competencies of people are not known by others, or that other preferences play a role in the establishment of teams. However, the game can also serve to overcome this last remark. Several participants noted that it was very nice to once take a look at the establishment of a team from a completely different point of departure (competency-based). When one thinks at first instance about the competencies that one wants present in a team throughout all phases of any process, it is more likely that the people with the right competencies are involved, and not the people who just have the biggest mouth or are simply known by others.

### 6.4.5 INTERPRETATION OF THE DATA RETRIEVED FROM TENDER MANAGEMENT PROFESSIONALS

This section evaluates the interpretation of the data that was retrieved from tender management professionals through CompeTender. In CompeTender, all participants had to compile five different teams, purely based on competencies they thought were a necessity to succeed in that particular phase.

When considering the data retrieved through the game, it is likely that participants have based their choices on previous experiences with tenders and tender management. Therefore, is becomes plausible that the included competencies stood out in a certain way during the real tender processes the CompeTender participants joined in. Competencies standing out can be interpreted either positively or negatively.

When a competency stands out in a negative way, this means that the participant missed this specific competency in the tender management of the tender team the participant was part of. As the participant explicitly noticed the absence of this competency, and he/she is of opinion that this adds to the quality of the bid development, he/she included the competency in the teams compiled during CompeTender. This way the participant shows the competencies that in a perfect team are present.

When a competency stands out in a positive way, this means that the participant has probably explicitly noticed the added value of this competency during the preparation of a bid. Therefore, he/she positively values the competency and decides to include it in his/her CompeTender teams.

One way or another, this rises the feeling that the competencies included in the CompeTender teams all stood out in a way and are therefore of added value for the bid development. This also means that these competencies therefore can lead to distinctive value of tender management when compared to the current situation.

Another implication of this approach of including competencies in the team compilation for the game, is the fact that the low scoring competencies are either just not important for tender management, or considered to be guaranteed within an organization. An example is the fact that Social competencies have a low ranking based on the CompeTender results. This could be due to the fact that participants feel that these competencies should be present all the time, not specifically in a tender process.

Concluding, the feeling rises that the insights retrieved from CompeTender point out competencies that can be of distinct value for tender management compared to the current situation.

# 7. DISCUSSION & IMPLICATIONS

This research aims to identify important competencies for tender management in an engineering firm on the basis of both a literature study and the development and usage of a serious game. This chapter will first discuss findings resulting from this research, followed by implications of the research for the company where this research was conducted. Finally, recommendations for the implementation of this research in the current practice of the research company are outlined in the third part of this chapter. These implications and recommendations intend to provide an answer to sub question 7: *How can the competency-based selection of tender management be improved?*

## 7.1 DISCUSSION OF THE RESULTS

This research elaborated on the role and tasks of tender management within an engineering firm, in order to be able to draw up a competency-based profile for tender management professionals. This part of the research will discuss the results of the results in relation to the current practice that was observed within Sweco.

### 7.1.1 COMPETENCY-BASED PROFILE MATCHING

CompeTender works on the basis of competency-based matching of team members to the tasks of the tender process. However, this approach is not very common in the day-to-day life within an engineering firm, as was remarked by several participants of the research. Multiple participants stated that it was refreshing to once look at a project and the assigned team members from this competency-based perspective, as it provides insight in what you ideally would want and who you would assign for the project. The game also allowed participants to shuffle team members in and out of the team dependent on their competencies, which is something that is also not very common in daily practice. The feeling rises that there is currently no optimal usage of the competencies of employees, which is a shame as this research earlier pointed out that possessing the right competencies and exerting them might provide an organization with a competitive advantage (Dainty, Cheng & Moore, 2004).

#### COMPETENCY DATABASE

The fact that currently there is no case of competency-based profile matching within the organization of the research company can be due to several causes. The first cause that was identified during the CompeTender sessions is that the competencies of employees are often not known by other employees when compiling a team for a tender or a project. Roughly it is known what certain people can do, or whether they have specific skills, however there is no such thing as a database which provides an overview of all employees and their competencies. Ideally, this would be the case as it eases the competency-based employment for projects and tenders, however there are some difficulties that arise when initiating this. First, and foremost, currently it is not exactly known which competencies every employees possesses, which makes it difficult to fill this kind of database. In order to establish a system like this, it is important to have a certain degree of consistency regarding the terminology used within the competency database and the awarding and validation of these competencies to employees. For this system, In order to add value, it is important that everyone is familiar with the chosen terminology and the procedures that lead to the assignment of competencies. Can employees for example add an overview of their competencies themselves, or should they maybe be rewarded on basis of a test or team manager?

The second difficulty that arises when designing a competency-based database is the privacy-related aspect. This database contains valuable information for the team compilation, when looking at competencies, but might also reveal weaknesses of employees. Therefore, this information, once it is available, should be treated with the greatest care. This rises the concern whether such a database should be available for usage for all employees, or that the database might only become available to certain target groups.

#### PARTICIPATE ON BASIS OF AVAILABILITY

With the current market conditions the amount of work available for engineering companies is sky high, which is reflected in the fact that a lot of employees are constantly occupied with enough work. Therefore, this results into not all employees being always available to participate in specific tenders, despite the fact that their competencies might match the demand. This is fortified by the business model that is adhered by engineering companies, as they work on the basis of a billing ratio. This implies that all employees have to be billable for at least a certain percentage of their time, causing a low availability of employees who are well known and highly valued by others, while others (with for example a smaller network within the organization, or who do not propagate their competencies explicitly) might be

left without work and are therefore available. Due to the fact that all employees have to satisfy their billing ratio, they are assigned with new work that is available at that time in order to be billable, no matter whether their competencies connect seamlessly to the demand of the tender or project.

Due to the fact that participation in a project or tender is currently mainly driven based on the availability of an employee, there currently seems to be no use in competency-based matching of the employees' profiles to the demands of the project or tender. However, one has to bear in mind that this might not always benefit the quality of the end product.

### DIFFERENT PROFILES PER TENDER PHASE

If competency-based profile matching is the ultimate goal, then it is likely that different employees join the tender process every phase, as this research showed that not all phases demand the same set of competencies. When analysing the results, present in Appendix 12 (Table 44), one can see that every phase demands different competencies, which results in Table 32. As can be seen, there are four competencies that are valued highly in every phase (*being cost-conscious, being creative, having environmental awareness* and *planning & organizing*) and two that almost always desired (*analysing* and *being customer-oriented*). Furthermore, in the first few phases *vision/strategy*, *team building*, *deciding*, *leadership*, *being expressive*, *information gathering* and *structuring* are highly valued, while in the last phases of the tender process *communicating, being critical, being quality-oriented, being stress-resistant* and *take responsibility* are considered more important. That raises the question whether only one person should be in charge of tender management or that, based on the competency profiles, or that it might be more beneficial to assign two different competency profiles. However, this must be weighed against the inefficiency that this brings along, as two employees in charge of tender management probably cause a lot of information loss at the hand-over.

*Table 32: Overview of competencies demanded of tender management for every phase (based on Table 44)*

| | | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 | NEEDED? |
|---|---|---|---|---|---|---|---|
| 1 | Being cost-conscious | x | x | x | x | x | *Always* |
| 2 | Being creative | x | x | x | x | x | *Always* |
| 3 | Having environmental awareness | x | x | x | x | x | *Always* |
| 4 | Planning & organizing | x | x | x | x | x | *Always* |
| 5 | Analysing | x | x | x | x | | *Almost always* |
| 6 | Developing vision/strategy | x | x | | | | *Beginning* |
| 7 | Team building | x | | | | | *Beginning* |
| 8 | Deciding | x | | | | x | *Begin & end* |
| 9 | Leadership | x | | | x | x | *Begin & end* |
| 10 | Handling procedures & methods | | x | | | | *Beginning* |
| 11 | Being expressive | | x | x | | | *Middle* |
| 12 | Information gathering | | x | x | | | *Middle* |
| 13 | Structuring | | x | x | | | *Middle* |
| 14 | Being customer-oriented | | x | x | x | x | *Almost always* |
| 15 | Communicating | | | x | x | x | *End* |
| 16 | Being critical | | | x | x | x | *End* |
| 17 | Being quality-oriented | | | x | x | x | *End* |
| 18 | Being stress-resistant | | | | x | x | *End* |
| 19 | Take responsibility | | | | | x | *End* |

## 7.1.2 START OF A TENDER PROCESS

The generic tender process that was created in order to conduct this research starts with the 'Bid/no bid decision'. When this decision results in a go, a bid is developed and the bidding party needs to perform its best in order to produce a winning bid, because only with a winning bid the tender costs can be recovered. This decision should not be taken by only the employees performing tender management, but asks for involvement of executive management personnel as well due to the effect that the tender might have on the financial results of an organization (Steel, 2004; Pellicer *et al.*, 2013). The importance of the bid/no bid decision is underpinned with topics that executives from companies should consider in order to come up with a well-founded decision, which is displayed in the following cadre.

Steel (2004) states that the following questions should be answered with 'yes' when deciding to bid for work:
*"Is this opportunity in line with the strategic objectives of the company?*
*Is this a client the organization wishes to work with?*
*Does the organization have the competence and capacity to undertake this work?*
*Are there competitors the organization cannot hope to beat?*
*Does bidding this work make economic sense?"* (p. 740)

Furthermore, Pellicer *et al.* (2013) highlight that the following topics should be considered when deciding to bid for work:
*"- Goals, and actual capabilities of the company (type of work, plans for growth, market conditions and expected return)*
*- Physical location of the project (if it is close to the office, there is a better knowledge of the labour market, general conditions and access to the site)*
*- Time, place and cost of presenting the bid*
*- Method and cost of obtaining the contract documents and specifications*
*- Legal and other official requirements necessary to present the bid*
*- Scope of the construction works (global size, major units of work or resources needed, risk, visibility/impact of the project, etc.)*
*- Who is the owner (regular client, payment on schedule, reputation, plan of investments, etc.) and the architect/design team (well known, past works, etc.)?"* (p. 29)

Not only literature emphasized that this starting point is essential for the further course of the bid development. During the CompeTender gaming sessions multiple employees highlighted that it is very important to consider why the company should tender for this specific project. As soon as it is clear why the decision is made to prepare a proposal, the underpinning for this decision should also reflect the foreseen added value for both the bidding company and the procuring client. Subsequently, this essential bidding information can be used in order to draw up a tender strategy which serves as some kind of stepping stone for the development of the rest of the plan.

Also, during the CompeTender sessions, participants highlighted that it is quite common to start off with a small team, in order to benefit the decision-making process and draw up a tender strategy, as they feel that this is vital to the tender process. When considering the opinion of several participants of CompeTender, apparently not all employees act as if this start of the tender process is vital to the quality of work. A rushed start, formed by an incompletely thoughtful bid/no bid decision and strategy that does not reflect the distinctiveness of the organization in a positive way, affects the outcome and effectiveness of the tender process and is not considered beneficial for the offer.

Next to the fact that literature emphasizes the importance of the bid/no bid decision, this is also recognised within the Win Business Process (Appendix 1) from Sweco. The WBP revises the bid/no bid decision multiple times in order to assure that the development of the proposal will actually lead to a competitive offer that is worth the investment. If at some point this decision results in a no go, the tender will be cancelled. As the WBP is part of the integral Sweco procedure, it is remarkable that several employees feel as if this decision is not weighted enough.

### 7.1.3 DISTINCTIVE CHARACTER OF PROPOSALS

In a tender, distinctiveness is of great importance, according to employees of Sweco. When a party distinguishes itself from the rest of the competition in a positive manner, this contributes to the chance of success regarding the client accepting that specific offer. It is very likely that this distinctiveness will become even more important than it already is. This is among others due to the digital revolution, which ensures that probably in the not so distant future all knowledge is available to all parties. Therefore, having a certain knowledge as an organization will no longer provide you with the level of distinctiveness that is necessary in order to produce an outstanding offer. This causes other influences to determine the level of distinctiveness, among others the efficiency and effectiveness of the tender process and the manner in which the physical proposal (in terms of visualization and design) distinguishes itself from the rest. As the emphasis for distinctiveness shifts from having the right knowledge to 'doing it in an unexpected, but good (maybe even better) way', it seems plausible that different competencies are desired in order to guide the tender process, due to the fact that organizations are always looking for manners to exclude their competition.

This research showed that *being creative* is the most important competency to possess when conducting tender management. *Being creative* is defined as *"the use of imagination or original ideas to create something; inventiveness"* (Oxford Dictionaries, 2018). One of the influences causing this competency to get a high rank, might be due to the phenomenon described earlier in this section. When *being creative* is involved in tender management, it is more likely to produce an outstanding offer as creative people are enabled to think outside the box. This outside-the-box thought causes tender teams to not strictly follow the paths that have been taken earlier (which might lead to copy-pasting and therefore is not project-specific), but to look for new, inventive solutions that are fit-for-purpose and might be more time- and cost-efficient. That is why it seems plausible that the influence of *being creative* in tender management will only increase in the future.

### 7.1.4 TIME PRESSURE DURING THE TENDER PROCESS

Another matter of discussion is the time pressure under which proposals have to be established. Pellicer *et al*. (2013) and Philbin (2008) already highlighted that time pressure plays a large role in tender development, and this is also acknowledged by the employees from Sweco during the CompeTender sessions. This time pressure might be of great influence on the competencies desired throughout the tender process, as there is little time to draw up good boundary conditions once tendering.

The boundary conditions that are referred to are for example the ability to cooperate during a tender process. Tenders are a team business (Snoep & Jonkind, 2015; Steel, 2004; Lewis, 2015; Springer; 2005), but the competencies *team building* and *collaborating* do not gain a high ranking in the overall process. This might give the impression that these competencies are not important for tender management, but this can be questioned. As also mentioned in section 6.3, it is likely that the competency-based profile that is drawn up on the basis of this study is steered towards a profile that considers the execution of tender, but neglects the profile of tender management when not actually contributing to a tender. This is due to the fact that the profile was drawn up on the basis of tasks for tender management during a tender process. However, in order to succeed in such a tender process it is likely that certain competencies are definitely needed, as they help to establish good boundary conditions for the tender process.

This might also be the case for the competency *networking*. A network is important for tender management, as it provides customer knowledge and knowledge of the organization. In order to obtain a network, one needs the competency *networking*. However, during the tender process there is no time to establish a network anymore, it already needs to be there. Extra knowledge on the client also cannot be retrieved anymore, as soon as the tender is on the market, as clients usually shut all their doors towards the market since they do not want to provide a party with a competitive advantage. Therefore, this knowledge (as it is of great value!) should already be gathered before the tender is on the market, which makes *networking* needless during the tender process, but vital for the pre-stage and the quality of the proposal.

The same goes for *team building*. During the tender process there is no time to establish a well-matched team. For competencies like *communication* and *collaboration* applies that agreements must be secured on an organizational level, not necessarily on tender level. This could also have influenced the final results, as the research only considers the tender level.

### 7.1.5 TRANSLATION OF TERMINOLOGY COMPETENCIES

This research aimed to identify competencies for tender management in such a terminology, that this could be understood by other professions as well and was not necessarily task-oriented (discussed in section 3.2.2). However, no information was found on competencies for tender management that met this requirement. Therefore, the information that was available on this topic (the APMP competency overview, see Appendix 2), needed to be translated into a workable set of competency-terminology. This resulted in an overview of competencies that were involved with tender management, but the list did not necessarily reflect a ranking. In order to establish this ranking, the serious game was developed, which led to the conclusion that *being creative* (Artistic competencies), *having environmental awareness, analysing, being customer-oriented* (all Data handling competencies), *planning & organizing* (Organizational competencies), *communicating* (Social competencies) and *being cost-conscious* (Technical competencies) are most important to possess when conducting tender management.

The previous part of this section provides an indication of the impact that the translation from APMP competencies towards more generalized terminology (FNV terminology) has on the final outcome of the results. The researcher aimed to make this translation as thoughtfully as possible, but nevertheless it cannot be ignored that this translation is subject to interpretation of the researcher. In order to make sure that the translation was conducted properly, and that no

mistake was made due to sudden inspiration, the translation was conducted both from APMP to FNV terminology, and then also from tasks to FNV. These results were in the end matched and should provide full coverage of the FNV terminology that was linked to the APMP competencies. However, when looking back at the result it would have been nice to let the linkage check by a competency-professional, for example someone from the HR department, in order to make sure that the linkage was not biased or misunderstood.

## 7.2 IMPLICATIONS OF THE RESEARCH

This research was established within Sweco, as they wanted to professionalize their tender management process and its practice. In first instance, they were very interested in whether or not a project management professional was suitable for tender management, as their experiences with this approach differed majorly. When taking a look at literature and the results that were established through CompeTender, it is safe to say that tender management and project management might have some similarities, but cannot be considered equal and therefore demand a different approach in human resources (HR).

As a result from the CompeTender data it appeared that Artistic competencies (*being creative*) and Data handling competencies (*having environmental awareness, analysing, being customer-oriented, being quality-oriented*) are important competencies for tender management. This indicates that, when assigning a project manager with a tender management job, this person should be either *creative*, or very well aware of the fact that he/she is not *creative* and therefore seeks (and accepts) specific assistance for this competency in the tender development. The second option, however, is less desirable, as this means more personnel has to be involved with tender management, regardless of the size of the offer that has to be established. Also, the research showed that *being customer-oriented* and *having environmental awareness* are very important due to the specific position of tender management between the organization and the (often public and therefore politically involved) client (Figure 4). Therefore, these competencies also demand some extra attention when assigning a project manager with tender management.

The involvement of *being creative* in tender management can also increase the attractiveness of the established proposal. Although literature (Rauch, Scheiblich, Ceauşu & Buchmüller. Unknown) emphasizes the importance of the development of attractive, well-considered, high quality proposals in order to persuade the client to accept the offer, it has not fully professionalized yet within Sweco. The attractiveness (both in terms of design, readability and intelligibility) of an offer can be increased by hiring personnel that is skilled in presenting an offer in an attractive way (for example the graphical design intern who is incorporated in the BIDcenter). However, as this graphically armed employee does not necessarily have knowledge about the customer or the (technical) content of the design, supervision by tender management is necessary. Nevertheless would this increase the attractiveness and consistency in design of the offer in a great manner and is therefore very much recommended.

The third implication for the research organization is the recruitment of tender management personnel. This research showed that mainly *being creative* (Artistic competencies) and *having environmental awareness, analysing, being customer-oriented* and *being quality-oriented* (all Data handling competencies) are important to possess, and in lesser extend Technical competencies, as *being cost-conscious*. However, currently the recruitment strategy mainly focusses on personnel with the right technical abilities, and it is seen as a bonus when someone is also *creative*. However, when taking a look at the research results (both from literature (Nickson, 2012) and CompeTender), one might argue this approach. The research namely shows that this should be the other way around: first select candidates on the basis of their Artistic and Data handling competencies and if they possess certain Technical competencies in the form of *being cost-conscious*, this is a nice bonus and not a requirement (see Figure 22).


*Figure 22: Recruitment approach regarding tender management employees*

If this approach is to be embraced by the organization, it enables them to develop tender proposals with unique added value and distinctiveness, which increases the chance of success when tendering for work (given that it is not at the expense of the substantial content of the proposal). Sweco desires to become the number one engineering company within The Netherlands, which can be interpreted in multiple ways: employing the largest number of employees, having the highest revenue or profit, but also becoming the number one preferred supplier is one of the main objectives of the

organization. One can establish this by means of winning most tender procedures and thus outcompeting the competition with its distinct value. In order to establish this, Sweco has to become the pioneer when it comes to their approach of tender management. When assigning tender management personnel with high Artistic and Data handling competencies, they distinguish themselves from the rest of the market full of competitors (which was also discussed in section 6.4.5), who might still be assigning project managers with project management competencies for the tender management jobs. By assigning these tender management professionals, Sweco creates its own distinct value. This distinct value should in its turn result in a higher quality of proposals and therefore to more wins. This could then eventually make Sweco the market leader as it then is ahead of their competition by differentiating themselves through employment of tender management personnel who are exceptionally *creative,* good in *analysing*, *have environmental awareness, are quality-oriented* and *customer oriented*, followed by a sufficient base of *cost-consciousness* (Technical competencies). However, of course this approach of recruitment will probably not benefit the market position of Sweco one-to-one, but it could definitely benefit the organization.

As CompeTender uncovers the competencies that are currently highly valued for tender management, it might be interesting to repeat this research again in a few years. If the complete engineering market has embraced a *creative* approach of tender management, this will no longer provide a distinctiveness for the organization. When then playing the game and analysing the results, this might show the rise of different competencies which are important for tender management in order to acquire distinct value. Therefore, CompeTender could be used in order to expose the weaknesses of the market.

Another implication following from this research, is the fact that there is simply no time during a tender for the development and fine-tuning of boundary conditions, like *team building* and agreements about *collaboration* or the development of a *network*. As these are things that are of importance for the actual execution of tender management, the organization needs to realize that these things already have to be established before take-off. This means that the organization needs to better able to forecast the coming tenders, in order to draw up the right teams and provide them with some spare time before the tender takes off to establish these ground conditions (for example have a team building session to get familiar with everyone). This will eventually benefit the quality of the tender process and therefore the product. This is even more emphasized when collaborating in an international environment (which is sometimes the case, as Sweco has offices throughout Europe). In an international setting, team members do not regularly bump into each other and are therefore not aware of the personalities, habits and abilities of their fellow team members. This impedes the collaboration, as different team members do not understand each other (which has not necessarily something to do with language). In these settings, the establishment of boundary conditions before the tender takes off is even more important.

## 7.3 RECOMMENDATIONS FOR IMPLEMENTATION

In order draw lessons from this research, the researcher has several recommendations for implementation.

Select tender management candidates on the degree to what they possess *creativity, having environmental awareness, being customer-oriented* and *being quality-oriented* in order to establish proposals with distinct value. When candidates possess these competencies, the Technical competencies can be considered a nice additional touch, as this competency category is also considered important, but to a lesser extent.

Establish a strong relationship between project management and sales/business development department, as that is according to literature where tender management should be located due to its two-fold obligation towards both the client and the supplying organization.

Hire graphic design specialists which enlarges the degree to which the proposals appeal to the imagination of the client. This also adds to the creativity of the bid.

Ensure a proper working code of conduct within the organization, as this helps with the realization of boundary conditions for tender management. These boundary conditions should already be realized before the tender process starts.

Investigate the benefits and pitfalls of a more competency-based team compilation approach, in order to benefit from every employee's expertise.

Use the developed game for this research, CompeTender, to familiarize junior employees with the tender process. It illustrates the dynamic environment of a tender process and provides an overview of the tasks that have to be taken care of when conducting tender management.

Use CompeTender to explore the possibilities of competency-based profile matching when compiling tender teams. It also rises awareness about the competencies that are considered necessary throughout all phases of the tender process.

Make sure that the focus of the BIDcenter activities remains on value-adding activities. As indicated in the first chapter of this research, there is a large need for overarching disciplines in the market that connects all business areas into one project. The BIDcenter delivers these kinds of services and should therefore propagate and professionalize them in order to be of added value.

# 8. CONCLUSION

The main objective of this research is to provide an understanding of competencies that are important in order to be able to conduct tender management for the different project types an engineering firm encounters when bidding for work. This chapter first presents the limitations of the research, followed up by an answer to the sub questions, which leads to the conclusion that provides an answer to the main research question established in order to meet the research objective. Besides that, recommendations for further research are outlined.

## 8.1 LIMITATIONS OF THE RESEARCH

Due to the time frame in which this research was conducted, the availability of information and the chosen methods in order to conduct this research, there are several limitations which can be identified. This section will highlight these limitations and elaborate on them as they need to be considered when defining the conclusion of this research. The limitations are divided into two parts. First the limitations of the theoretical framework, that was used in order to develop the game, are discussed, followed by the limitations of the practical research: playing the game.

### 8.1.1 LIMITATIONS FOR THEORETICAL FRAMEWORK

There was no explicit literature found on competencies for tender management in an engineering firm in The Netherlands. Therefore, the researcher had to improvise and cope with the information on competencies for proposal management that was available.

The researcher aimed to investigate literature on tender management from other sectors besides the civil engineering sector, as for this specific sector little literature was found. However, not all sectors that make use of tender management are known to the researcher, which impedes the progress in this field.

Literature often reviews tender management from the client's perspective. As this research focusses on the supplier's perspective, this literature could not be used for the research, as the tasks and goals from both sides differ too much.

Only Dutch and English literature was used for two reasons. It is considered likely that tender management and the corresponding competencies are subject to certain cultural influences, which makes literature written in other languages more likely to not be suitable for the Dutch engineering environment. Besides that, for literature in other languages exists a language barrier.

### 8.1.2 LIMITATIONS FOR THE PRACTICAL RESEARCH

There are multiple sample limitations identified for this research:

Every participant from this research is employed within Sweco. Therefore, it could be the case that the results (unintentionally) contain a small influence from the company's culture.

The number of participants is insufficient for a statistical analysis of the quantitative data. Despite the fact that the statistical analysis of this type of data was never aimed for, a combination of quantitative data with an underpinning of qualitative findings resulted into a solution. However, due to this fact, the ranking of competencies cannot be considered set in stone, which could be improved by increasing the number of participants.

Next to sample limitations, there were several other limitations identified for the practical research:
In order to cater the participants, the gaming sessions should be conducted within an hour. This does not leave a lot of time to evaluate extensively on their strategies and their opinions about competencies for tender management. Therefore, the researcher really had to guide the conversation afterwards to the game.

For CompeTender a generalized tender process was conducted in which all tasks were equally important. This was done in order to reduce the complexity of the game. However, depending on the size and complexity of the procured project, it could be that great differences in the focus on certain tasks is in order.

Another limitation that resulted from complexity reduction of the game, is the degree in which competencies are possessed by team members. APMP (see Appendix 2) makes a distinction in different professional levels that need to

possess certain competencies, in order to consider themselves a professional from that particular level. In this research the level of expertise is flattened, but this could be pulled apart in further research.

Finally, for this research it was hard to compare competency categories and make a representative ranking as not all categories contain the same amount of competencies. Therefore, this results into a limitation for the degree of representativeness of the categorized ranking. A more consistent result could be established if all categories contain the same number of competencies.

## 8.2 ANSWERING THE SUB QUESTIONS

For this research, seven sub questions were established in chapter 1 which all add up to the answer of the main research question. Therefore, all sub questions will be answered one by one before the final conclusion of the research is drawn.

1. *What is tender management?*

Tender management is within engineering companies considered to be the management of bid preparation within a supplying organization. This management discipline aims to professionalize the internal approach of tenders and thereby enhance the quality of bids, to eventually make the organization the preferred supplier.

Tender management arose as a combination of project management and sales management, due to the dependency of project-based organizations on the quality of their tender proposals. The development of a bid takes place on the interface between client and supplying organization, and therefore tender management is located on this place within an organization. This is illustrated in Figure 23.

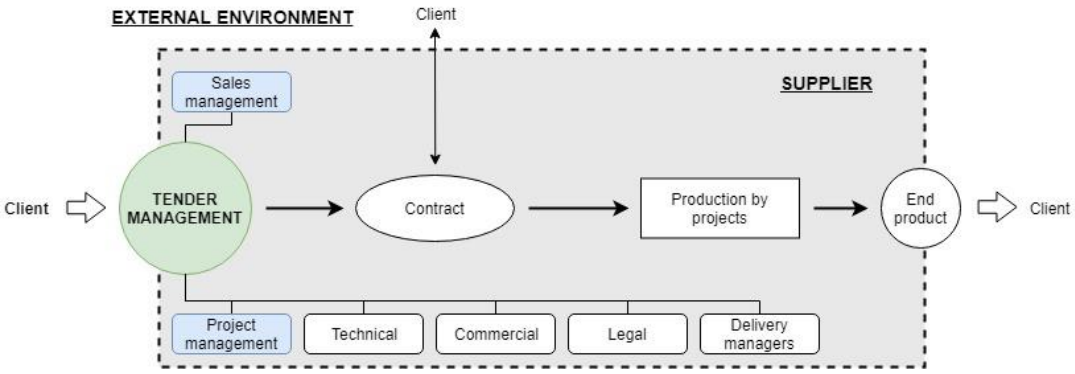


*Figure 23: Position of tender management within an organization*

2. *Which competencies are associated with tender management from the supplier's point of view?*

As competence of tender management personnel is a critical success factor for the quality of the delivered work, insight in these competencies is very valuable. The competency-based profile for tender management consists competencies in the field of information research & management, planning, development, management and sales orientation. After a translation of these competencies into generalized terminology, one can conclude that mainly *communicating, analysing, being customer-oriented, handing procedures & methods, being expressive, being quality-oriented, planning & organizing, collaborating, being creative* and *being cost-conscious* are important competencies for tender management. All competencies from the category Computer competencies are considered irrelevant. When looking at the competency categories established in chapter 3, mainly Data handling competencies, Artistic competencies and Technical competencies are important to possess when conducting tender management.

3. *Which different project types can be distinguished for tender management within an engineering firm?*

The project types encountered by an engineering firm can be categorized in many ways. However, based on a pragmatic approach, this research distinguished three types of project when conducting tender management. The BIDcenter of Sweco divides the projects they encounter in framework agreements, engineering services and contractor services.

4. *How can competencies for tender management be identified from practice?*

To identify competencies for tender management from practice, input from professionals experienced with tender management was considered necessary. In order to extract these competencies, a serious game (CompeTender) was developed, which enabled the participants to show their opinion on important competencies for tender management throughout the phases of the tender process. This method was chosen as a serious game is known for its ability to engage people and the possibility of using the game to simultaneously conduct some kind of survey combined with interview aspects.

The game enables participants to compile competency-based teams for the different phases of the tender process, based on a fictional case study. The teams need to be compiled with team member cards, which all contain a certain amount of competencies and have a certain price. As every phase of the tender process demands different tasks to be executed, the participants have to compile five competency-based teams within the total budget of €40.000,-. This forces them to prioritize in their choices for competencies and therefore lets them reflect which competencies are important in each phase of the tender process. Based on the teams that are compiled during the game sessions, it can be experienced which competencies are considered important (due to inclusion in the competency-based teams) and which are not (due to exclusion of these teams).

5. *Which competencies are considered important for tender management throughout the different phases of a tender process?*

The tender process as considered for this research, consists of five phases which all have their own tasks to be executed by tender management. Therefore, it seems reasonable that every phase demands a different set of competencies from tender management. In order to structure the data analysis, the disjoint competencies were grouped back to their original competency categories which enabled the researcher to discover certain patterns in the inclusion of competencies over the phases of the tender process.

In the first phase the Organizational competencies are considered most important, followed by Artistic competencies, Technical competencies and Data handling competencies. *Deciding* is ranked high, due to the bid/no bid decision that has to be taken. Furthermore, the first phase mainly evolves around the start-up of the tender process. Therefore *having environmental awareness, team building, being creative, planning & organizing, analysing, developing vision/strategy, being cost-conscious* and *leadership* are important competencies for tender management in this phase.

In the second phase, the ranking of the competency categories shuffles and Data handling competencies become most important, followed by Artistic competencies. After the start-up, information needs to be gathered and it has to be determined what exactly the client demands. Furthermore, a planning needs to be drawn up as the bid needs to be submitted in time. Based on these tasks for tender management, it appeared that *analysing, being creative, planning & organizing, information gathering, structuring, having environmental awareness, being cost-conscious, being customer-oriented, developing vision/strategy, handling procedures & methods and being expressive* are important competencies for this phase.

Halfway the tender process, the bid needs to be produced, accompanied with images and reviewed by specialists to ensure the technical content of the bid. This resulted in important competencies being *creative, planning & organizing, information gathering, being customer-oriented, analysing, being cost-conscious, structuring, communicating, having environmental awareness, being critical, being quality-oriented* and *being expressive*.

Towards the end, Technical competencies become more important, next to the Artistic competencies. As the price for the bid needs to be determined in this phase, *being cost-conscious* is considered to be most important in phase four. This is followed by *being creative, being critical, being customer-oriented, being quality-oriented, communicating, having environmental awareness, planning & organizing, analysing, leadership* and *being stress-resistant*. This last competency becomes more important as the deadline for submission of the bid is near.

The final phase is all about finalizing the offer and presenting it to the client. A tender often includes an interview or a presentation. Therefore, *being creative, communicate* and *being customer-oriented* are most important for this phase. Besides that, tender management needs to possess *being critical, being quality-oriented, being stress-resistant, taking responsibility, being cost-conscious, deciding, planning & organizing, having environmental awareness* and *leadership*.

As can be seen, every phase demands a different set of competencies. As it is not necessarily desirable to have a different person managing the tender every phase, an overall competency-based profile is established for tender management.

This overall profile shows that mainly competencies from the categories Artistic competencies and Data handling skills are important to possess. When looking at the disjoint competencies, *being creative* is considered most important for tender management, followed by *having environmental awareness, planning & organizing, analysing, being cost-conscious* and *being customer-oriented.*

6. *What are the differences in competencies considered important regarding different project types?*

This research aims to identify whether there are differences between important competencies for tender management of different project types. However, as many participants did not differentiate their team compilation on the basis of the project type, but mainly focussed on the tasks that had to be performed (which is a generic process for all three project types), this sub question could not be answered on the basis of these results. However, many participants stated that when tendering for contractor services, the competency *being creative* becomes even more important than it already is due to the fact that new solutions saving time and money are constantly sought within a contractor organization.

7. *How can the competence-based selection of tender management be improved?*

In order to enhance tender management within the engineering firm this research was conducted, several matters of improvement are addressed. In order to improve the competence-based selection of tender management, insight into the competencies of employees of an organization is necessary. This is only possible when consistent terminology is used, and the award of competencies to employees is clear. Furthermore, as the organization wants to distinct itself from its competitors, it is proposed to alter the recruitment of tender management employees. Currently, employees for the organization are mainly selected on the basis of their technical abilities, and being creative is seen as a nice added value, but not considered crucial. This research showed that *being creative* is the most important competency to possess when conducting tender management, and that therefore tender management should be selected on the basis of their creativity.

## 8.3 CONCLUSION

Tender management is an emerging discipline within the civil engineering sector due to among others the introduction of the Aanbestedingswet 2012, the economic crisis that hit The Netherlands in 2008, the need for an overarching discipline in order to establish multidisciplinary projects and an increasing complexity of projects. All these factors resulted into regular project managers no longer being sufficient for the management of bid developments. In order to see what competencies were needed from management professionals that were able to cope with the specific conditions in tenders, the following research question was established:

> *Which competencies are important for tender management when preparing a bid for different infrastructure project types in an engineering firm?*

The theoretical framework shows that tender management in a supplying organization is located between the client and the supplying organization, on the interface of project management and the more sales or commercially oriented departments. The ultimate goal of tender management is to make the organization the preferred supplier in the eyes of the client. As professionals are likely to perform better when their competencies are in line with the competencies that are demanded for the specific job, a competency-based profile based on the tasks for tender management helps to professionalize the execution of tender management. Besides that, competencies are a very valuable asset for organizations, as it enables them to distinguish themselves from their competition.

Nowadays, tender management is often performed by project management professionals, but as a project is not the same deliverable as a tender proposal, competencies for both professions are likely to differ. This research shows with help of the development of the serious game CompeTender that tender management professionals should mainly be selected on the basis of *being creative* and to a lesser extent *being expressive* (both Artistic competencies) and besides that *have environmental awareness, are customer-oriented* and are good in *analysing* (all Data handling competencies). Also possessing the competencies *planning & organizing* (Organizational competencies) and *being cost-conscious* (Technical competencies) is important, as tender procedures have a strict deadline and need involvement of a lot of people from throughout the organization. Eventually, most bids are evaluated on both quality and price, which clarifies the importance of *being cost-conscious*.

*Being creative* is very important for the establishment of innovative tender proposals, which are fit for purpose and have a surprising effect on the client. Besides that, this competency is related to the development of new approaches, which help to reduce both cost and time. The importance of *having environmental awareness* and *being customer-oriented* follows from the position of tender management between the client and the supplying organization. *Analysing* is an important competency for tender management due to the obligation to completely understand the customer demand.

Competencies from the categories Personal competencies (*being flexible, being stress-resistant, take responsibility* and *being critical*) and Social competencies (*networking, interactive leaning, collaborating* and *team building*) are generally not considered to be of importance for tender management, aside from *communicating*.

On the variation in competencies for different project types (framework agreement, engineering services and contractor services) cannot be drawn any firm conclusions, as the final result showed no differentiation other than an even larger emphasis on *being creative* when tendering for contractor services.

Nevertheless will the competency-based profile for tender management eventually result in CompeTender tender management professionals that increases the quality of work and thereby the chance of success when submitting a bid.

## 8.4 RECOMMENDATIONS FOR FURTHER RESEARCH

This research revealed important competencies for tender management, however it did not succeed in differentiating among different project types. Therefore, a more extensive research into this differentiation could be very interesting. As there is already an indication for differentiation for contractor services, the research could also be repeated within a contractor firm and see whether there are differences and what causes them.

This research only considers whether or not a competency should be present, and makes no distinction in the level of mastery of the competencies. Therefore, research into the degree of possessing certain competencies is important for tender management is interesting.

This research reveals important competencies for tender management, however, this is not linked to tender success. In order to finetune the tender management profile to ensure tender success, this topic should be researched. Because, eventually, tender success is the goal of tender management.

This research developed the puzzle game CompeTender in order to identify competencies for tender management. However, the puzzle currently cannot be solved with a 100% score (500 points from 5 phases) within the set budget of €40.000,-. This is mainly due to the distribution of competencies over the team member cards and the introduced fine for teams bigger than eight team members. Further research could optimize this game.

As this research was conducted within Sweco, the results of the research could be improved by conducting the same research in other companies as well. Once this is done and all results are combined, company cultures are excluded from the data.

In order to evaluate the differences in competencies demanded for different project types, a follow-up research should develop a project-type specific tender process with regard to the tasks. If the tasks that have to be conducted in tender management of that specific project type differ, it is likely that this results in different competencies.

# REFLECTION

Ever since I became aware of the enormous influence the tender process and all its characteristics has on an organization, I was intrigued by this phenomenon. The interaction between clients and supplying parties is an exciting field of work, that has a highly strategic component. I am still intrigued and surprised about the enormous influence human-oriented aspects have on the execution of tenders. After all these months of researching tenders and tender management, I am still not done with the topic and look forward to keep learning about this interesting part of the project life cycle.

Looking back to when I started my graduation at Sweco, I can state that I have learned a lot about the daily practice in an organization over the past months. During my studies, I never did a real internship and therefore was inexperienced with the day-to-day life in an office. Driven by naivety it also made me realize some valuable things, like that the world is not perfect and people, no matter their experience, make mistakes. Besides that, the insight in practice also enabled me to better understand topics that I studied during my education. During your studies, all courses illuminate a part of the knowledge you need to possess as a graduate, but in real life all these parts are connected. Therefore, I really appreciate the opportunity to graduate within a company. Ever since Remco and his colleagues introduced me to Sweco, which is already a couple of years ago, I knew that I wanted to conduct my graduation research there. Now I am finished, I still support this choice.

Developing the game enabled me to explore competency-based profile matching. Before starting my intern time, I assumed that this was the standard, but nothing turned out to be less true. Nevertheless, I still feel that this concept could really benefit the quality of work delivered and therefore deserves deeper investigation. Connecting the right person to the right job seems so logical, but apparently is not always the case. In the ideal world, I always imagined this research being ground-breaking and setting the new baseline for competencies tender management professionals need to possess. However, I think it is safe to say that this not entirely the case, but that it is a nice attempt.

I would like to end with the statement that this graduation has been a bumpy ride. As mentioned earlier, I am not always as confident about my capabilities as I would like to be, which caused some troubles on the way. During the graduation process I really appreciated feedback from my committee members, as I felt like this was some kind of approval of my abilities. Handing in this final version of my thesis is the last step in this process, and therefore one of my last acts as a student. I am looking forward to put everything I have learned over the years into practice and to grow even more as a person.

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# APPENDICES

1. Win Business Process (Sweco) & BIDcenter tender process
2. APMP Competencies
3. APMP translation funnel
4. APMP competencies linked to tender management tasks
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6. Score form CompeTender
7. Design game elements
8. Additional elements for player experience improvement
9. Definition competencies
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12. Ranking CompeTender results
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# APPENDIX 1: WIN BUSINESS PROCESS (SWECO) & BIDCENTER TENDER PROCESS

This appendix elaborates on the Win Business Process (WBP) that was developed by Sweco (Sweco, 2015).
Figure 24 illustrates the coherence of this process and its elements in relation to the bid process as perceived by the BIDcenter.

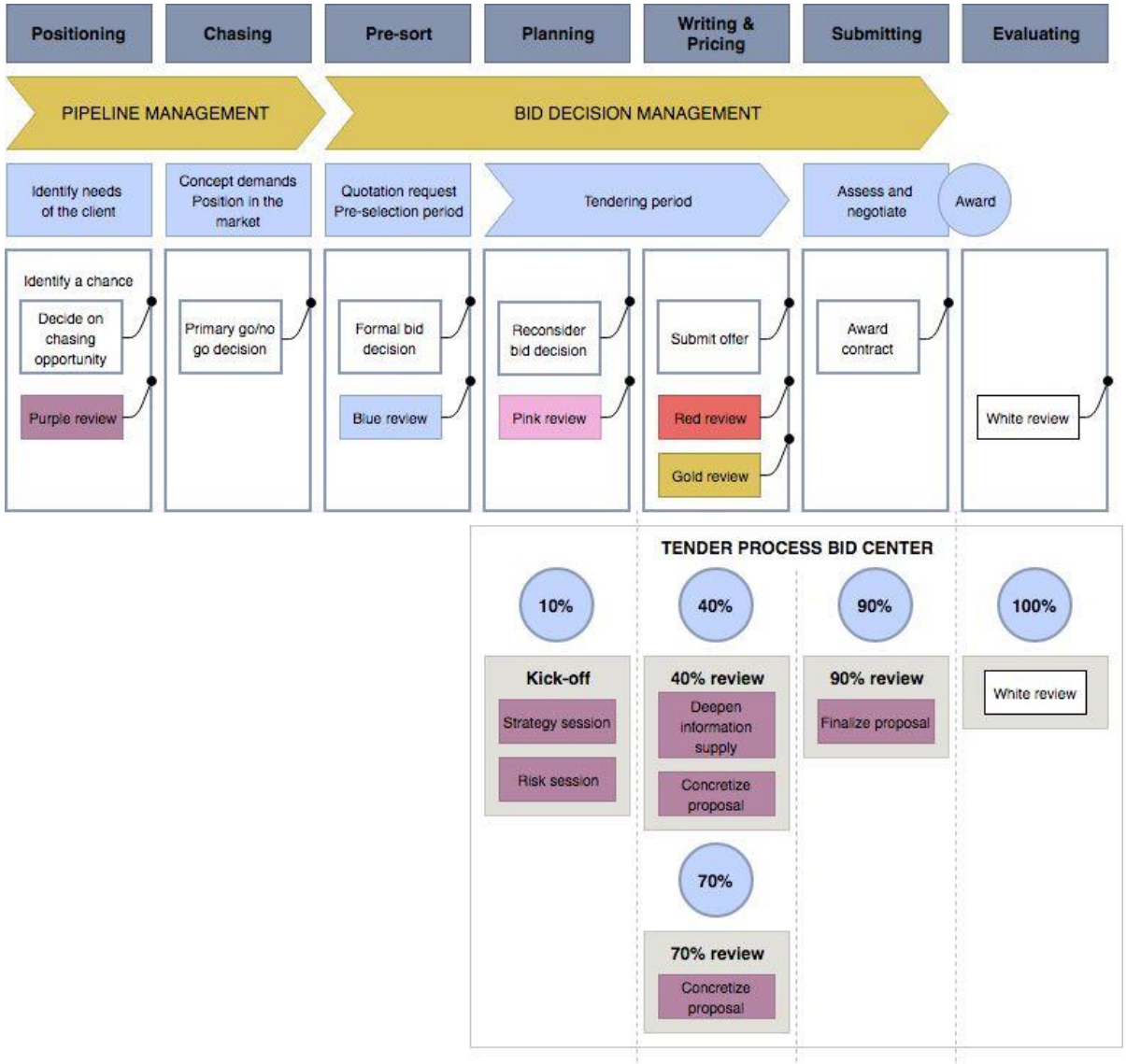


*Figure 24: Win Business Process in relation to the BID center tender process*

The WBP consists of seven phases and describes the process that a potential project for Sweco has to go through. The WBP was developed because Sweco wanted to acquire more work and needed an organised, generic process and assignment of tasks for their business opportunities. Every phase comes with its own tasks, roles and responsibilities. Sweco combines some of these phases into one stage of a bid and ends every stage with one or more review moments. The review moments serve as points of reflection and placing the potential project into context. This way, alignment of all interests within Sweco and from the client are addressed. Next to the WBP, the BIDcenter developed their own tender process in line with the WBP. The processes and roles involved will be discussed in this Appendix.

## WIN BUSINESS PROCESS (WBP)

### POSITIONING

The first stage is the positioning phase, which aims to gain a strategic advantage in comparison to the other competing parties.
The main tasks of this phase are:

1. Gather and analyse information on different market areas
2. Identify target markets and target clients
3. Closely work together with the client responsible from Sweco
4. Gather information about potential opportunities

### CHASING & PRE-SORT

The chasing and pre-sort stage aims to identify, prioritize, qualify and gather information for winning strategies when it comes to suitable opportunities.
The main tasks of this stage of the bid development are:

5. Gather information on clients and competition
6. Identify and enhance potential teams, possible competing parties and partners
7. Influence the client
8. Draw up, (further) develop and approve an overall win strategy
9. Determine a winning price and potential solutions
10. Provide answers to all initial questions from the client.

### PLANNING

The planning phase is used to plan the tender process in detail to avoid waste of time and energy when actually writing the tender.
During the planning phase, the follow core activities are executed:

11. Gather and apply lessons learned from earlier relevant tenders
12. Thorough and complete review of client demand, check for surprises and initiate bid/no bid decision
13. Make an overview of the stated conditions within the contract and send the contract with supporting information to the legal department
14. Determine and manage the tender costs and resources
15. Determine the winning price, sharpen the technical solution and make a Work Breakdown Structure (WBS)
16. Make a first draft of the offer, determine structure, size and content.
17. Prepare division of tasks and instruct tender team
18. Inform tender team during the Pink review meeting and assign tasks and responsibilities

After a first detailed session, one should continue with:

19. Development of the tender proposal to a level with more detail
20. Develop a storyboard/sketch of the individual components
21. Develop informative and powerful headlines, slogans and images
22. Develop strategic sales themes and transfer these to the entire tender team
23. Gather supportive evidence for the approach and accurately describe the advantages to the client
24. Finalize the team composition
25. Refine the costs, price and risks

### WRITING & PRICING

The writing & pricing phase aims to write a winning bid, which reflects the values and input of the review teams.
Within this phase the tender team aims to:

26. Write the offer corresponding to the approved writing scheme
27. Write and rewrite the content towards a to-the-point text which covers the client criteria
28. Determine the cost price and set a price for the offer
29. Revise the content with the tender team before handing over the plan towards the Red review team.
30. Encourage reading the tender proposal critically by the Red review team from the view of the client
31. Select a suitable proof reader who has not read the proposal yet to include new insights
32. Prepare the final business case review (Gold review) to get permission to submit the bid. This should include the following:
    a. Cost price and price of the tender
    b. Review and undertake action to alterations of the proposed contract terms
    c. Final check for completeness of the necessary project information (including the risk register)

d. Organise and perform the necessary financial and commercial reviews, which eventually lead to permission to release the bid.

### SUBMITTING & EVALUATION

The last stage of the WBP focusses on closure of the bid development and the transmission towards the client. Besides that the transfer towards the potential project team if of great importance, as they have to execute the plans developed during the tender stage.
During this stage, three main subjects are addressed in the task description:

33. Post-tender negotiations
    a. The presentation towards the client, conversations and reality checks
    b. Clarifying issues of discussion
    c. Negotiate with the client
    d. Update and resubmit the proposals (best and definitive offer)
    e. Revise contractual agreements
34. Tender closure
    a. Archive all submitted materials and update the pipeline
    b. Lead debriefing sessions, Lessons Learned session and White review
    c. Identify and draw lessons form White review, capture these and pass along.
    d. Provide relevant updates to the business plans from other departments
35. Transfer to project management team
    a. Fully inform the project leader on the tender when it comes to strategies, assumptions, risks and negotiations
    b. Working with partners
    c. Revise and update the project plan
    d. Plan to investigate opportunities which could benefit both the client and Sweco for this and future projects.

## BIDCENTER TENDER PROCESS

### 10% REVIEW

The 10% review consists of a kick-off meeting, with presence of the tender manager, tender strategist and BID supporter, a strategy session and a risk session.
During the kick-off meeting the following topics are addressed:

- Explanation of the project
- Explanation of the EMAT-criteria
- Location visit
- Planning of the tender process
- Fixed project space (location within the office or at project location)\
- Division of tasks
- Determining scope of the work

Strategy session:

- Make an inventory of the successes and concerns for the client
- Competition scan
- Location visit/online sources
- SWOT-analysis
- Discuss the scope

Risk session:

- Make an inventory of the risks plus their causes and possible consequences.
- Define control measures

### 40% REVIEW

The 40% review discusses the first version of the plan of approach with the tender manager, tender strategist, BID support and reviewers. The review session aims to answer the following questions:

- Is this the right strategy?
- Are these the right risks?
- Is the quality of the plan worthy of a 40% version?
- What is still needed to finish the plan?

After the session, the tender manager and tender strategist gather more specialised information and elaborate the plan of approach, including the remarks that follow from the 40% review session.

### 70% REVIEW

The 70% review aims to check the tender proposal with the tender strategist, tender manager, bid support and reviewers for the following subjects:

- Are the EMAT-criteria reflected well in the proposal?
- Is the proposal SMART?
- Have measures been added?
- Is the added value captured in the plan?

### 90% REVIEW

The 90% review serves as a final check before hand-in when it comes to the quality of the information captured in the plan.

Final check:

- EMAT-criteria
- Spelling
- Active writing style
- Project-specific
- To-the-point

### 100% REVIEW

The 100% review is done after handing-over the tender proposal to the client in time. This review mainly focusses on evaluation, both internally with the tender team and involved employees before and after the result is known, and externally with the client when the result is announced.

# APPENDIX 2: APMP COMPETENCIES

The Association for Proposal Management Professionals provides an extensive list of competencies for bid, tender and proposal managers. This list is shown in

*Table 33: Overview of all competencies for bid management identified by APMP*

| | | FOUNDATION | PRACTITIONER | PROFESSIONAL |
|---|---|---|---|---|
| | **INFORMATION RESEARCH AND MANAGEMENT** | | | |
| *Information gathering* | | | | |
| 1 | Identify gaps in information | x | x | x |
| 2 | Help define a plan for information gathering | | x | |
| 3 | Own and operate an information-gathering plan | | x | x |
| 4 | Use senior-level connections/networks to gather information | x | x | |
| 5 | Analyse information gathered from the plan | | | x |
| *Knowledge management* | | | | |
| 6 | Use tool(s) to add to and manage the knowledge base | x | x | |
| 7 | Use existing internal and external knowledge sources for bids | x | x | x |
| | **PLANNING** | | | |
| *Schedule development* | | | | |
| 8 | Use multiple tools and methods to develop a proposal schedule | x | x | |
| 9 | Assess customer timescales and estimate resources required to execute a proposal | x | | |
| 10 | Develop a cost estimate for a routine proposal | x | | |
| 11 | Match internal proposal tasks to specific bids | | x | x |
| 12 | Assess timescale and resource implications of the customer's procurement process, focusing on efficient use of internal resources | | x | x |
| 13 | Produce cost estimates | | x | x |
| 14 | Define a contingency plan within the schedule | | x | x |
| 15 | Approve a proposal schedule | | | x |
| 16 | Present a proposal schedule and resourcing requirements internally | | | x |
| 17 | Continuously monitor and adapt a schedule to reflect internal and external changes | | x | x |
| | **DEVELOPMENT** | | | |
| *Opportunity qualification* | | | | |
| 18 | Use multiple qualification tools to provide objective data for an initial opportunity qualification decision | x | x | x |
| 19 | Manage the bid decision process | x | x | |
| 20 | Use a consistent method/tool to qualify opportunities | x | x | |
| 21 | Assess strategic opportunities that require senior stakeholder engagement and/or other business units and/or external partners | | | x |
| 22 | Present data that has been objectively validated using a consistent method/tool at an opportunity qualification meeting | | x | x |
| 23 | Contribute to continuous qualification decisions | | x | x |
| *Winning price development* | | | | |
| 24 | Manage the process to analyse the customer's budget and competitors' price | | x | x |
| 25 | Help to establish an early winning price target | | x | x |
| 26 | Lead the development of a sound internal business case for positioning customer expectations | x | x | x |
| 27 | Identify values to present to the customer in meetings, in the proposal, and in the presentation | x | x | x |
| 28 | Define and quantify the values the customer is seeking to achieve | | x | x |
| 29 | Explain the difference between value and price in the proposal | x | x | x |
| 30 | Develop quantified, opportunity-specific value propositions that meet customer expectations | | x | |
| 31 | Drive the scope of the offer to clearly balance value and price | | x | |
| 32 | Lead development of a winning pricing strategy | | | x |
| 33 | Develop a pricing strategy that reflects a "deal-to-win" (rather than "price-to win") approach | | | x |
| *Teaming partner identification* | | | | |

| | | | | |
|---|---|---|---|---|
| 34 | Use analysis tools to determine whether to use internal and/or external partners | x | x | |
| 35 | Help identify suitable internal and/or external partners | x | x | |
| 36 | Recruit internal and/or external partners | | x | |
| 37 | Facilitate negotiations for internal and/or external teaming agreements | | x | |
| *Proposal strategy development* | | | | |
| 38 | Identify multiple analysis tools available to develop a proposal strategy | x | x | |
| 39 | Schedule proposal strategy development | x | x | |
| 40 | Use analysis tools to evaluate customer perception of the organization and the competition | x | x | x |
| 41 | Use analysis tools to identify the positive and negative discriminators of the organization for the opportunity | x | x | x |
| 42 | Develop proposal strategy statements that "ghost" the competition | x | x | x |
| 43 | Assign proposal strategy statements within the writing plan | | x | x |
| 44 | Coach others to develop and use proposal strategy statements | | x | x |
| *Executive summary development* | | | | |
| 45 | Identify the key elements required to developed a customer-focused executive summary | x | | |
| 46 | Use the executive summary as a proposal-briefing tool for others | x | x | x |
| 47 | Lead and collaborate in writing of early executive summary | x | x | x |
| *Content plan development* | | | | |
| 48 | Identify multiple tools and methods available to plan written content for proposals | x | x | x |
| 49 | Use multiple writing planning tools and methods for different sizes and types of proposals | x | | |
| 50 | Explain the benefits and appropriate use of content development plans | x | x | |
| 51 | Lead the development and completion of early content development plans | x | x | x |
| 52 | Approve sections and/or questions that require content planning | | x | x |
| 53 | Use the content planning process to add structure and include reuse material | | x | x |
| 54 | Coach and brief others on using content development plans | | x | x |
| 55 | Approve a content development plan that follows a customer's required proposal structure | | x | x |
| *Requirements identification* | | | | |
| 56 | Identify documented customer requirements | x | x | x |
| 57 | Identify requirements from customer meetings and documents | x | x | x |
| 58 | Idenfity and develop requirements collaboratively with customer or through sales team | | | x |
| *Compliance checklist development* | | | | |
| 59 | Strip complex requirements from documents issued by the customer | x | x | x |
| 60 | Build compliance matrices for both complex and non-complex solutions | x | x | x |
| 61 | Drive the internal process to enable decisionmaking for meeting requirements or being non-compliant | | x | x |
| *Persuasive writing* | | | | |
| 62 | Identify multiple persuasive writing techniques suitable for proposals | x | x | x |
| 63 | Apply principles of persuasion in a proposal setting | x | x | x |
| 64 | Apply distinct persuasive writing techniques for different types of audiences | x | x | x |
| 65 | Explain the benefits of developing persuasive strategies for proposals | x | x | x |
| 66 | Approve chosen persuasive techniques for audiences from diverse cultures | | x | x |
| 67 | Explain the difference between active and passive voice and use each in writing | x | x | x |
| 68 | Explain principles of writing clearly and apply them in writing | x | x | x |
| 69 | Explain the benefits of designing structured documents and apply them in writing | x | x | x |
| *Graphics development* | | | | |
| 70 | Write customer-focused action captions | x | x | x |
| 71 | Validate the effectiveness of a graphic based on an illustration and action caption | x | x | x |
| 72 | Highlight benefits and discriminators within graphics | x | x | x |
| 73 | Explain copyright laws regarding graphic and content use in proposals | x | x | x |
| 74 | Explain basic design principles | x | x | x |
| 75 | Conceptualize and creatively convert ideas and narrative material to visual forms using a consistent process | | x | x |

| | | | | |
|---|---|---|---|---|
| 76 | Plan, coordinate, organize and assign work to meet deadlines for graphic design projects | | x | x |
| 77 | Design an present senior-level presentations using text and graphic elements | | x | x |

## MANAGEMENT

| | | | | |
|---|---|---|---|---|
| *Review management* | | | | |
| 78 | Explain the purpose and benefits of common functional reviews | x | x | x |
| 79 | Organize and participate in common functional reviews | x | x | |
| 80 | Schedule reviews to meet the size and type of opportunity and customer timescales | | x | |
| 81 | Identify and recruit appropriate reviewers | | x | x |
| 82 | Assemble and present information relevant to the review purpose | x | x | x |
| 83 | Lead multiple types of functional reviews | | x | x |
| 84 | Ensure that feedback from reviews is acted upon, monitored, and closed | x | x | x |
| 85 | Use the content development plan and final document reviews to accommodate for a variety of situations | | x | x |
| *Kickoff meeting management* | | | | |
| 86 | Prepare an agenda and documentation for kickoff meetings | x | | |
| 87 | Brief kickoff meeting attendees | x | x | x |
| 88 | Assign tasks to kickoff meeting attendees | | x | x |
| 89 | Use the kickoff meeting to motivate the proposal team | | x | x |
| 90 | Ensure that the proposal team has complete task descriptions | | x | x |
| 91 | Enlist appropriate senior managers to emphasize the importance of a proposal | x | x | x |
| *Risk management* | | | | |
| 92 | Identify proposal development risks | x | | |
| 93 | Help establish a proposal development risk management strategy | x | x | |
| 94 | Obtain management approval of the proposal development risk strategy | | x | x |
| 95 | Implement the proposal development risk management strategy | x | x | x |
| *Report management* | | | | |
| 96 | Schedule and develop reports/presentations for senior management and key stakeholders that show proposal progress and identify any arising issues | | x | x |
| 97 | Negotiate solutions with senior management and key stakeholders to resolve any proposal progress issues identified | | x | x |
| *Production management* | | | | |
| 98 | Plan and schedule the resource, infrastructure and time required for proposal production | x | x | |
| 99 | Manage the process for proposal production | x | x | x |
| 100 | Create templates for document styles, formats and visuals | x | x | x |
| *Lessons learned analysis and management* | | | | |
| 101 | Obtain internal and external feedback on the proposal | x | x | x |
| 102 | Identify systematic proposal process problems and suggest changes | | x | |
| 103 | Drive resolution of systemic proposal process problems | | | x |
| *Process management* | | | | |
| 104 | Explain the key elements of the proposal development process | x | | |
| 105 | Explain the activities required to support the key elements of the proposal development process | x | x | |
| 106 | Adapt processes to promote work in a variety of situations and opportunities | x | x | |
| 107 | Lead and drive process improvement | | x | x |
| *Virtual team management* | | | | |
| 108 | Explain activities that promote team communication | | x | x |
| 109 | Select tools for managing the vitual proposal process | x | x | x |
| 110 | Organize and lead virtual proposal reviews | | x | x |
| 111 | Manage team deadlines | x | x | x |
| 112 | Plan workflow to accommodate multiple regions and time zones | x | x | x |
| 113 | Organise and manage virtual files | x | x | x |
| 114 | Work with team members who are unaccustomed to the virtual team environment | | x | x |

## SALES ORIENTATION

| | | | | |
|---|---|---|---|---|
| *Customer interface management* | | | | |
| 115 | Interface directly with internal clients or external customers | x | x | x |

| | | | | |
|---|---|---|---|---|
| 116 | Manage all communications with internal clients or external customers | | x | x |
| 117 | Discuss all aspects of the proposal with internal clients or external customers | | | x |
| *Opportunity plan development* | | | | |
| 118 | Explain the relationship between the opportunity planning and proposal phases within the business development lifecycle | x | x | |
| 119 | Use the opportunity plan strategies to drive the development of a proposal strategy within the content development plan | x | x | x |
| *Winning strategy development* | | | | |
| 120 | Work with others and manage the process to facilitate development of a win strategy | | x | x |
| 121 | Use output from multiple analysis tools to develop an early win strategy | | x | x |
| 122 | Review and adapt win strategies to meet changing circumstances | | x | x |
| 123 | Sell the early win strategy internally and to others involved with the opportunity | | x | x |
| *Negotiation planning* | | | | |
| 124 | Negotiate for internal resources and/or teaming partner resources | | x | |
| 125 | Apply different negotiation techniques in different situations | | x | x |
| *Sales participation* | | | | |
| 126 | Explain sales methodologies | x | x | x |
| 127 | Participate in internal client of external customer meetings | | x | x |

**BEHAVIOR AND ATTITUDE**

| | | | | |
|---|---|---|---|---|
| *Communicating with others* | | | | |
| 128 | Use appropriate interpersonal styles and communication methods to clearly convey messages | | x | x |
| 129 | Use a variety of media to engage individuals or groups | | x | x |
| 130 | Correctly interpret messages and respond appropriately | | x | x |
| 131 | Understand a variety of situations' needs and desired benefits. Develop positioning approaches that leverage supportive factors and overcome/minimize barriers | | x | x |
| 132 | Address the needs of key decisionmakers | | | x |
| 133 | Interact with prospective customers in a manner that builds effective relationships | | x | x |
| *Quality orientation* | | | | |
| 134 | Accurately check processes and tasks | | x | x |
| 135 | Identify and take corrective action where necessary | | x | x |
| *Building strategic relationsips and a successful team* | | | | |
| 136 | Develop and use strategic relationships | | | x |
| 137 | Develop direction and involve others through collaboration | | x | x |
| *Decisionmaking and delegating responsibility* | | | | |
| 138 | Explain issues and opportunities and the resulting decisions, then delegate implementation of the requires activities and responsibilities | | x | x |
| 139 | Implement decisions/initiate action promptly | | x | x |
| 140 | Include others in the decisionmaking process and ensure buy-in and understanding of decisions | | x | x |
| 141 | Allocate decisionmaking authority and/or task responsibilty to maximize organisation and individual effectiveness | | x | x |

# APPENDIX 3: APMP TRANSLATION FUNNEL

APMP provides a very extensive list of competencies. In order to gather an overview of these competencies, they are bundled together in a more generic terminology which results in a more summarized overview. This appendix shows all APMP competencies and their relation to the more generic terms (Table 34). Besides that, Table 37 counts the amount of times the generic terms are present in Table 34.

*Table 34: Funnelling of APMP competencies*

| | | | |
|---|---|---|---|
| | **INFORMATION RESEARCH AND MANAGEMENT** | | |
| *Information gathering* | | | |
| 1 | Identify gaps in information | Analysing | Control |
| 2 | Help define a plan for information gathering | Planning & organizing | |
| 3 | Own and operate an information-gathering plan | Information gathering | |
| 4 | Use senior-level connections/networks to gather information | Information gathering | Networking |
| 5 | Analyse information gathered from the plan | Analysing | |
| *Knowledge management* | | | |
| 6 | Use tool(s) to add to and manage the knowledge base | Handling procedures & methods | |
| 7 | Use existing internal and external knowledge sources for bids | Information gathering | Networking |
| | **PLANNING** | | |
| *Schedule development* | | | |
| 8 | Use multiple tools and methods to develop a proposal schedule | Handling procedures & methods | Planning & organizing |
| 9 | Assess customer timescales and estimate resources required to execute a proposal | Judgement | |
| 10 | Develop a cost estimate for a routine proposal | Being cost-conscious | |
| 11 | Match internal proposal tasks to specific bids | Connect | |
| 12 | Assess timescale and resource implications of the customer's procurement process, focusing on efficient use of internal resources | Judgement | |
| 13 | Produce cost estimates | Being cost-conscious | |
| 14 | Define a contingency plan within the schedule | Being stress-resistant | Planning & organizing |
| 15 | Approve a proposal schedule | Planning & organizing | |
| 16 | Present a proposal schedule and resourcing requirements internally | Planning & organizing | Communicating |
| 17 | Continuously monitor and adapt a schedule to reflect internal and external changes | Interactive learning | Being flexible |
| | **DEVELOPMENT** | | |
| *Opportunity qualification* | | | |
| 18 | Use multiple qualification tools to provide objective data for an initial opportunity qualification decision | Handling procedures & methods | Proactive |
| 19 | Manage the bid decision process | Deciding | |
| 20 | Use a consistent method/tool to qualify opportunities | Handling procedures & methods | |
| 21 | Assess strategic opportunities that require senior stakeholder engagement and/or other business units and/or external partners | Judgement | Developing vision/strategy |
| 22 | Present data that has been objectively validated using a consistent method/tool at an opportunity qualification meeting | Communicating | Handling procedures & methods |
| 23 | Contribute to continuous qualification decisions | Deciding | Being quality-oriented |
| *Winning price development* | | | |
| 24 | Manage the process to analyse the customer's budget and competitors' price | Analysing | Having environmental awareness |
| 25 | Help to establish an early winning price target | Being cost-conscious | Developing vision/strategy |
| 26 | Lead the development of a sound internal business case for positioning customer expectations | Leadership | |
| 27 | Identify values to present to the customer in meetings, in the proposal, and in the presentation | Being customer-oriented | |
| 28 | Define and quantify the values the customer is seeking to achieve | Being customer-oriented | Analysing |

| | | | | |
|---|---|---|---|---|
| 29 | Explain the difference between value and price in the proposal | Being customer-oriented | Being expressive | Being cost-conscious |
| 30 | Develop quantified, opportunity-specific value propositions that meet customer expectations | Creativity | Being customer-oriented | |
| 31 | Drive the scope of the offer to clearly balance value and price | Being customer-oriented | Being cost-conscious | |
| 32 | Lead development of a winning pricing strategy | Leadership | Being cost-conscious | Developing vision/strategy |
| 33 | Develop a pricing strategy that reflects a "deal-to-win" (rather than "price-to win") approach | Being cost-conscious | | |
| *Teaming partner identification* | | | | |
| 34 | Use analysis tools to determine whether to use internal and/or external partners | Handling procedures & methods | Analysing | |
| 35 | Help identify suitable internal and/or external partners | Collaborating | | |
| 36 | Recruit internal and/or external partners | Team building | Collaborating | |
| 37 | Facilitate negotiations for internal and/or external teaming agreements | Team building | Negotiate | |
| *Proposal strategy development* | | | | |
| 38 | Identify multiple analysis tools available to develop a proposal strategy | Handling procedures & methods | | |
| 39 | Schedule proposal strategy development | Planning & organizing | | |
| 40 | Use analysis tools to evaluate customer perception of the organization and the competition | Handling procedures & methods | Being customer-oriented | Having environmental awareness |
| 41 | Use analysis tools to identify the positive and negative discriminators of the organization for the opportunity | Handling procedures & methods | Being creative | |
| 42 | Develop proposal strategy statements that "ghost" the competition | Developing vision/strategy | Being creative | Innovative |
| 43 | Assign proposal strategy statements within the writing plan | Being expressive | | |
| 44 | Coach others to develop and use proposal strategy statements | Coaching | | |
| *Executive summary development* | | | | |
| 45 | Identify the key elements required to developed a customer-focused executive summary | Being customer-oriented | | |
| 46 | Use the executive summary as a proposal-briefing tool for others | Communicating | | |
| 47 | Lead and collaborate in writing of early executive summary | Leadership | Collaborating | Being expressive |
| *Content plan development* | | | | |
| 48 | Identify multiple tools and methods available to plan written content for proposals | Handling procedures & methods | | |
| 49 | Use multiple writing planning tools and methods for different sizes and types of proposals | Handling procedures & methods | | |
| 50 | Explain the benefits and appropriate use of content development plans | Communicating | | |
| 51 | Lead the development and completion of early content development plans | Leadership | Delegating | |
| 52 | Approve sections and/or questions that require content planning | Deciding | | |
| 53 | Use the content planning process to add structure and include reuse material | Handling procedures & methods | Information gathering | |
| 54 | Coach and brief others on using content development plans | Coaching | Communicating | |
| 55 | Approve a content development plan that follows a customer's required proposal structure | Deciding | Judgement | Being customer-oriented |
| *Requirements identification* | | | | |
| 56 | Identify documented customer requirements | Analysing | Being customer-oriented | |
| 57 | Identify requirements from customer meetings and documents | Analysing | Information gathering | Being customer-oriented |
| 58 | Identify and develop requirements collaboratively with customer or through sales team | Collaborating | Being customer-oriented | |
| *Compliance checklist development* | | | | |
| 59 | Strip complex requirements from documents issued by the customer | Analysing | | |
| 60 | Build compliance matrices for both complex and non-complex solutions | Control | Structuring | |
| 61 | Drive the internal process to enable decision making for meeting requirements or being non-compliant | Influence | | |
| *Persuasive writing* | | | | |
| 62 | Identify multiple persuasive writing techniques suitable for proposals | Handling procedures & methods | | |
| 63 | Apply principles of persuasion in a proposal setting | Being expressive | | |
| 64 | Apply distinct persuasive writing techniques for different types of audiences | Being expressive | | |

| | | | | |
|---|---|---|---|---|
| 65 | Explain the benefits of developing persuasive strategies for proposals | Communicating | | |
| 66 | Approve chosen persuasive techniques for audiences from diverse cultures | Judgement | Deciding | |
| 67 | Explain the difference between active and passive voice and use each in writing | Communicating | Being expressive | |
| 68 | Explain principles of writing clearly and apply them in writing | Communicating | Being expressive | |
| 69 | Explain the benefits of designing structured documents and apply them in writing | Communicating | Being expressive | |
| *Graphics development* | | | | |
| 70 | Write customer-focused action captions | Being expressive | | |
| 71 | Validate the effectiveness of a graphic based on an illustration and action caption | Being quality-oriented | | |
| 72 | Highlight benefits and discriminators within graphics | Being creative | | |
| 73 | Explain copyright laws regarding graphic and content use in proposals | Communicating | | |
| 74 | Explain basic design principles | Being creative | Communicating | |
| 75 | Conceptualize and creatively convert ideas and narrative material to visual forms using a consistent process | Being creative | Handling procedures & methods | |
| 76 | Plan, coordinate, organize and assign work to meet deadlines for graphic design projects | Planning & organizing | Delegating | |
| 77 | Design an present senior-level presentations using text and graphic elements | Being creative | Communicating | Being expressive |

MANAGEMENT

| | | | | |
|---|---|---|---|---|
| *Review management* | | | | |
| 78 | Explain the purpose and benefits of common functional reviews | Communicating | | |
| 79 | Organize and participate in common functional reviews | Planning & organizing | Being critical | |
| 80 | Schedule reviews to meet the size and type of opportunity and customer timescales | Planning & organizing | Being customer-oriented | |
| 81 | Identify and recruit appropriate reviewers | Networking | Motivate | |
| 82 | Assemble and present information relevant to the review purpose | Communicating | | |
| 83 | Lead multiple types of functional reviews | Leadership | | |
| 84 | Ensure that feedback from reviews is acted upon, monitored, and closed | Interactive learning | | |
| 85 | Use the content development plan and final document reviews to accommodate for a variety of situations | Handling procedures & methods | | |
| *Kick-off meeting management* | | | | |
| 86 | Prepare an agenda and documentation for kick-offs meetings | Planning & organizing | Proactive | |
| 87 | Brief kick-offs meeting attendees | Communicating | | |
| 88 | Assign tasks to kick-off meeting attendees | Delegating | | |
| 89 | Use the kick off meeting to motivate the proposal team | Motivate | | |
| 90 | Ensure that the proposal team has complete task descriptions | Control | | |
| 91 | Enlist appropriate senior managers to emphasize the importance of a proposal | Motivate | | |
| *Risk management* | | | | |
| 92 | Identify proposal development risks | Analysing | | |
| 93 | Help establish a proposal development risk management strategy | Developing vision/strategy | | |
| 94 | Obtain management approval of the proposal development risk strategy | Influence | | |
| 95 | Implement the proposal development risk management strategy | Handling procedures & methods | | |
| *Report management* | | | | |
| 96 | Schedule and develop reports/presentations for senior management and key stakeholders that show proposal progress and identify any arising issues | Planning & organizing | Communicating | |
| 97 | Negotiate solutions with senior management and key stakeholders to resolve any proposal progress issues identified | Negotiate | Influence | Show tact |
| *Production management* | | | | |
| 98 | Plan and schedule the resource, infrastructure and time required for proposal production | Planning & organizing | | |
| 99 | Manage the process for proposal production | Take responsibility | | |
| 100 | Create templates for document styles, formats and visuals | Structuring | | |
| *Lessons learned analysis and management* | | | | |
| 101 | Obtain internal and external feedback on the proposal | Interactive learning | | |
| 102 | Identify systematic proposal process problems and suggest changes | Analysing | | |
| 103 | Drive resolution of systemic proposal process problems | Motivate | | |
| *Process management* | | | | |

| | | | |
|---|---|---|---|
| 104 | Explain the key elements of the proposal development process | Communicating | |
| 105 | Explain the activities required to support the key elements of the proposal development process | Communicating | |
| 106 | Adapt processes to promote work in a variety of situations and opportunities | Being flexible | |
| 107 | Lead and drive process improvement | Innovate | |
| *Virtual team management* | | | |
| 108 | Explain activities that promote team communication | Communicating | |
| 109 | Select tools for managing the virtual proposal process | Handling procedures & methods | |
| 110 | Organize and lead virtual proposal reviews | Planning & organizing | Leadership |
| 111 | Manage team deadlines | Being stress-resistant | Take responsibility |
| 112 | Plan workflow to accommodate multiple regions and time zones | Planning & organizing | |
| 113 | Organise and manage virtual files | Planning & organizing | |
| 114 | Work with team members who are unaccustomed to the virtual team environment | Collaborating | Coaching |
| | SALES ORIENTATION | | |
| *Customer interface management* | | | |
| 115 | Interface directly with internal clients or external customers | Being customer-oriented | |
| 116 | Manage all communications with internal clients or external customers | Being customer-oriented | |
| 117 | Discuss all aspects of the proposal with internal clients or external customers | Being customer-oriented | Communicating |
| *Opportunity plan development* | | | |
| 118 | Explain the relationship between the opportunity planning and proposal phases within the business development lifecycle | Communicating | |
| 119 | Use the opportunity plan strategies to drive the development of a proposal strategy within the content development plan | Developing vision/strategy | |
| *Winning strategy development* | | | |
| 120 | Work with others and manage the process to facilitate development of a win strategy | Collaborating | Developing vision/strategy |
| 121 | Use output from multiple analysis tools to develop an early win strategy | Developing vision/strategy | |
| 122 | Review and adapt win strategies to meet changing circumstances | Interactive learning | |
| 123 | Sell the early win strategy internally and to others involved with the opportunity | Influence | |
| *Negotiation planning* | | | |
| 124 | Negotiate for internal resources and/or teaming partner resources | Team building | Negotiate |
| 125 | Apply different negotiation techniques in different situations | Negotiate | |
| *Sales participation* | | | |
| 126 | Explain sales methodologies | Communicating | |
| 127 | Participate in internal client of external customer meetings | Being customer-oriented | |
| | BEHAVIOR AND ATTITUDE | | |
| *Communicating with others* | | | |
| 128 | Use appropriate interpersonal styles and communication methods to clearly convey messages | Communicating | |
| 129 | Use a variety of media to engage individuals or groups | Communicating | Influence |
| 130 | Correctly interpret messages and respond appropriately | Communicating | Show sensitivity |
| 131 | Understand a variety of situations' needs and desired benefits. Develop positioning approaches that leverage supportive factors and overcome/minimize barriers | Interactive learning | |
| 132 | Address the needs of key decisionmakers | Show sensitivity | Being customer-oriented |
| 133 | Interact with prospective customers in a manner that builds effective relationships | Communicating | Show sensitivity |
| *Quality orientation* | | | |
| 134 | Accurately check processes and tasks | Being quality-oriented | Control |
| 135 | Identify and take corrective action where necessary | Analysing | Being quality-oriented Being flexible |
| *Building strategic relationships and a successful team* | | | |
| 136 | Develop and use strategic relationships | Networking | |
| 137 | Develop direction and involve others through collaboration | Developing vision/strategy | Collaborating |
| *Decision-making and delegating responsibility* | | | |
| 138 | Explain issues and opportunities and the resulting decisions, then delegate implementation of the required activities and responsibilities | Communicating | Delegating |
| 139 | Implement decisions/initiate action promptly | Deciding | |

| | | | |
|---|---|---|---|
| 140 | Include others in the decision making process and ensure buy-in and understanding of decisions | **Collaborating** | **Communicating** |
| 141 | Allocate decision making authority and/or task responsibility to maximize organisation and individual effectiveness | **Take responsibility** | |

*Table 35: Number of times generic terms are linked to APMP competencies*

| Competency | # |
|---|---|
| Communicating | 28 |
| Handling procedures & methods | 17 |
| Being customer-oriented | 17 |
| Planning & organizing | 15 |
| Analysing | 11 |
| Being expressive | 10 |
| Developing vision/strategy | 9 |
| Collaborating | 8 |
| Being creative | 7 |
| Being cost-conscious | 7 |
| Leadership | 6 |
| Deciding | 6 |
| Interactive learning | 5 |
| Influence | 5 |
| Information gathering | 5 |
| Judgement | 5 |
| Control | 4 |
| Delegating | 4 |
| Motivate | 4 |
| Being quality-oriented | 4 |
| Negotiate | 4 |
| Networking | 4 |

| Competency | # |
|---|---|
| Take responsibility | 3 |
| Show sensitivity | 3 |
| Team building | 3 |
| Coach | 3 |
| Being stress-resistant | 2 |
| Proactive | 2 |
| Innovate | 2 |
| Having environmental awareness | 2 |
| Structuring | 2 |
| Show tact | 1 |
| Connect | 1 |
| Flexible | 0 |
| Handle conflict | 0 |
| Sociable | 0 |
| Self-management | 0 |
| Working with programs | 0 |
| ICT usage & design | 0 |
| Manage networks | 0 |
| Handling tools & materials | 0 |
| Technical functional design | 0 |
| Spatial design | 0 |

# APPENDIX 4:
# APMP COMPETENCIES LINKED TO TENDER MANAGEMENT TASKS

*Table 36: APMP competencies linked to tender management tasks*

| | **APMP COMPETENCIES** | **TASKS FOR TENDER MANAGEMENT** | | | |
|---|---|---|---|---|---|
| | **INFORMATION RESEARCH AND MANAGEMENT** | | | | |
| *Information gathering* | | | | | |
| 1 | Identify gaps in information | **2.11** | Identify missing information for a complete plan | | |
| 2 | Help define a plan for information gathering | **2.3** | Acquire information from experts | | |
| 3 | Own and operate an information-gathering plan | **2.3** | Acquire information from experts | **3.2** | Collect information from experts |
| 4 | Use senior-level connections/networks to gather information | **2.3** | Acquire information from experts | **3.2** | Collect information from experts |
| 5 | Analyse information gathered from the plan | **1.2** | Analyse the procurement guideline | | |
| *Knowledge management* | | | | | |
| 6 | Use tool(s) to add to and manage the knowledge base | **2.2** | Set up a document management protocol | | |
| 7 | Use existing internal and external knowledge sources for bids | **2.3** | Acquire information from experts | **3.2** | Collect information from experts |
| | **PLANNING** | | | | |
| *Schedule development* | | | | | |
| 8 | Use multiple tools and methods to develop a proposal schedule | **1.5** | Make a preliminary tender planning | **1.6** | Make a final tender planning |
| 9 | Assess customer timescales and estimate resources required to execute a proposal | **1.5** | Make a preliminary tender planning | **1.6** | Make a final tender planning |
| 10 | Develop a cost estimate for a routine proposal | **1.3** | Determine tender budget | | |
| 11 | Match internal proposal tasks to specific bids | | | | |
| 12 | Assess timescale and resource implications of the customer's procurement process, focusing on efficient use of internal resources | **1.5** | Make a preliminary tender planning | **1.6** | Make a final tender planning |
| 13 | Produce cost estimates | **1.3** | Determine tender budget | **4.1** | Set offer price |
| 14 | Define a contingency plan within the schedule | **1.6** | Make a final tender planning | | |
| 15 | Approve a proposal schedule | **1.6** | Make a final tender planning | | |
| 16 | Present a proposal schedule and resourcing requirements internally | **1.5** | Make a preliminary tender planning | **1.6** | Make a final tender planning |
| 17 | Continuously monitor and adapt a schedule to reflect internal and external changes | **2.11** | Identify missing information for a complete plan | | |
| | **DEVELOPMENT** | | | | |
| *Opportunity qualification* | | | | | |
| 18 | Use multiple qualification tools to provide objective data for an initial opportunity qualification decision | **1.1** | Make the bid/no bid decision | | |
| 19 | Manage the bid decision process | **1.1** | Make the bid/no bid decision | | |
| 20 | Use a consistent method/tool to qualify opportunities | **1.1** | Make the bid/no bid decision | | |
| 21 | Assess strategic opportunities that require senior stakeholder engagement and/or other business units and/or external partners | | | | |
| 22 | Present data that has been objectively validated using a consistent method/tool at an opportunity qualification meeting | **1.1** | Make the bid/no bid decision | | |
| 23 | Contribute to continuous qualification decisions | **1.1** | Make the bid/no bid decision | | |
| *Winning price development* | | | | | |
| 24 | Manage the process to analyse the customer's budget and competitors' price | **1.3** | Determine tender budget | **4.1** | Set offer price |
| 25 | Help to establish an early winning price target | | | | |
| 26 | Lead the development of a sound internal business case for positioning customer expectations | **1.9** | Create commitment among the team members | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | Identify values to present to the customer in meetings, in the proposal, and in the presentation | **1.2** | Analyse procurement guideline | **3.6** | Ensure unique, added value in the plan | **3.8** | Check whether the EMAT is sufficiently answered | **5.3** | Prepare presentation / interview | **5.4** | Give presentation / interview |
| 28 | Define and quantify the values the customer is seeking to achieve | **3.6** | Ensure unique, added value in the plan | **3.8** | Check whether the EMAT is sufficiently answered | **4.4** | Ensure an answer to the customer demand | **1.10** | Determine right tender strategy | | |
| 29 | Explain the difference between value and price in the proposal | **3.6** | Ensure unique, added value in the plan | | | | | | | | |
| 30 | Develop quantified, opportunity-specific value propositions that meet customer expectations | **3.6** | Ensure unique, added value in the plan | **4.4** | Ensure an answer to the customer demand | **4.7** | Check for sufficient project specificity | | | | |
| 31 | Drive the scope of the offer to clearly balance value and price | **1.7** | Determine and capture the scope of the project | | | | | | | | |
| 32 | Lead development of a winning pricing strategy | **1.10** | Determine the right tender strategy | **4.1** | Set offer price | | | | | | |
| 33 | Develop a pricing strategy that reflects a "deal-to-win" (rather than "price-to win") approach | | | | | | | | | | |
| *Teaming partner identification* | | | | | | | | | | | |
| 34 | Use analysis tools to determine whether to use internal and/or external partners | | | | | | | | | | |
| 35 | Help identify suitable internal and/or external partners | **1.4** | Compose tender team | | | | | | | | |
| 36 | Recruit internal and/or external partners | **1.4** | Compose tender team | | | | | | | | |
| 37 | Facilitate negotiations for internal and/or external teaming agreements | **1.4** | Compose tender team | **1.9** | Create commitment among the team members | | | | | | |
| *Proposal strategy development* | | | | | | | | | | | |
| 38 | Identify multiple analysis tools available to develop a proposal strategy | **1.10** | Determine the right tender strategy | | | | | | | | |
| 39 | Schedule proposal strategy development | **1.10** | Determine the right tender strategy | | | | | | | | |
| 40 | Use analysis tools to evaluate customer perception of the organization and the competition | **1.10** | Determine the right tender strategy | | | | | | | | |
| 41 | Use analysis tools to identify the positive and negative discriminators of the organization for the opportunity | **1.10** | Determine the right tender strategy | **1.1** | Make bid/no bid decision | | | | | | |
| 42 | Develop proposal strategy statements that "ghost" the competition | **1.10** | Determine the right tender strategy | | | | | | | | |
| 43 | Assign proposal strategy statements within the writing plan | **1.10** | Determine the right tender strategy | | | | | | | | |
| 44 | Coach others to develop and use proposal strategy statements | **2.8** | Evaluate tender strategy so far | | | | | | | | |
| *Executive summary development* | | | | | | | | | | | |
| 45 | Identify the key elements required to developed a customer-focused executive summary | | | | | | | | | | |
| 46 | Use the executive summary as a proposal-briefing tool for others | | | | | | | | | | |
| 47 | Lead and collaborate in writing of early executive summary | **2.5** | Start to fill in the plan (writing) | | | | | | | | |
| *Content plan development* | | | | | | | | | | | |
| 48 | Identify multiple tools and methods available to plan written content for proposals | **1.6** | Make final tender planning | | | | | | | | |
| 49 | Use multiple writing planning tools and methods for different sizes and types of proposals | **1.5** | Make a preliminary tender planning | | | | | | | | |
| 50 | Explain the benefits and appropriate use of content development plans | | | | | | | | | | |
| 51 | Lead the development and completion of early content development plans | **2.5** | Start to fill in the plan (writing) | **2.4** | Determine the structure for the plan | | | | | | |
| 52 | Approve sections and/or questions that require content planning | **2.5** | Start to fill in the plan (writing) | | | | | | | | |
| 53 | Use the content planning process to add structure and include reuse material | **2.5** | Start to fill in the plan (writing) | **2.4** | Determine the structure for the plan | | | | | | |
| 54 | Coach and brief others on using content development plans | | | | | | | | | | |
| 55 | Approve a content development plan that follows a customer's required proposal structure | **2.5** | Start to fill in the plan (writing) | **2.4** | Determine the structure for the plan | | | | | | |
| *Requirements identification* | | | | | | | | | | | |
| 56 | Identify documented customer requirements | **1.2** | Analyse the procurement guideline | **4.8** | Check compliance with customer requirements | **4.4** | Ensure an answer to the customer demand | | | | |
| 57 | Identify requirements from customer meetings and documents | | | **4.8** | Check compliance with customer requirements | **4.4** | Ensure an answer to the customer demand | | | | |
| 58 | Idenfity and develop requirements collaboratively with customer or through sales team | **1.2** | Analyse the procurement guideline | **4.4** | Ensure an answer to the customer demand | | | | | | |
| *Compliance checklist development* | | | | | | | | | | | |
| 59 | Strip complex requirements from documents issued by the customer | **1.2** | Analyse the procurement guideline | | | | | | | | |
| 60 | Build compliance matrices for both complex and non-complex solutions | **1.2** | Analyse the procurement guideline | | | | | | | | |
| 61 | Drive the internal process to enable decision making for meeting requirements or being non-compliant | **4.4** | Ensure an answer to the customer demand | | | | | | | | |
| *Persuasive writing* | | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 62 | Identify multiple persuasive writing techniques suitable for proposals | **2.5** | Start to fill in the plan (writing) | **3.3** | Write tender proposal | **4.6** | Ensure an active writing style in the proposal | **3.7** | Write everything down in a SMART way |
| 63 | Apply principles of persuasion in a proposal setting | **2.5** | Start to fill in the plan (writing) | **3.3** | Write tender proposal | **4.6** | Ensure an active writing style in the proposal | **3.7** | Write everything down in a SMART way |
| 64 | Apply distinct persuasive writing techniques for different types of audiences | **2.5** | Start to fill in the plan (writing) | **3.3** | Write tender proposal | **4.6** | Ensure an active writing style in the proposal | **3.7** | Write everything down in a SMART way |
| 65 | Explain the benefits of developing persuasive strategies for proposals | **2.5** | Start to fill in the plan (writing) | **3.3** | Write tender proposal | **4.6** | Ensure an active writing style in the proposal | | |
| 66 | Approve chosen persuasive techniques for audiences from diverse cultures | | | | | | | | |
| 67 | Explain the difference between active and passive voice and use each in writing | **4.6** | Ensure an active writing style in the proposal | | | | | | |
| 68 | Explain principles of writing clearly and apply them in writing | **2.5** | Start to fill in the plan (writing) | **3.3** | Write tender proposal | **3.7** | Write everything down in a SMART way | **4.5** | Check spelling |
| 69 | Explain the benefits of designing structured documents and apply them in writing | **2.5** | Start to fill in the plan (writing) | **3.3** | Write tender proposal | **4.3** | Make the tender offer consistent | | |
| *Graphics development* | | | | | | | | | |
| 70 | Write customer-focused action captions | | | | | | | | |
| 71 | Validate the effectiveness of a graphic based on an illustration and action caption | | | | | | | | |
| 72 | Highlight benefits and discriminators within graphics | **3.1** | Organise the production of images | | | | | | |
| 73 | Explain copyright laws regarding graphic and content use in proposals | | | | | | | | |
| 74 | Explain basic design principles | **3.1** | Organise the production of images | | | | | | |
| 75 | Conceptualize and creatively convert ideas and narrative material to visual forms using a consistent process | **3.1** | Organise the production of images | | | | | | |
| 76 | Plan, coordinate, organize and assign work to meet deadlines for graphic design projects | **3.1** | Organise the production of images | **5.1** | Organise transfer of the offer towards the layout / production team | | | | |
| 77 | Design and present senior-level presentations using text and graphic elements | **3.1** | Organise the production of images | **5.3** | Prepare presentation / interview | **5.4** | Give presentation / interview | | |

**MANAGEMENT**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Review management* | | | | | | | | | |
| 78 | Explain the purpose and benefits of common functional reviews | **3.4** | Organise peer review by specialists | | | | | | |
| 79 | Organize and participate in common functional reviews | **3.4** | Organise peer review by specialists | **2.10** | Evaluate quality of information so far | | | | |
| 80 | Schedule reviews to meet the size and type of opportunity and customer timescales | **3.4** | Organise peer review by specialists | | | | | | |
| 81 | Identify and recruit appropriate reviewers | **3.4** | Organise peer review by specialists | | | | | | |
| 82 | Assemble and present information relevant to the review purpose | **3.4** | Organise peer review by specialists | | | | | | |
| 83 | Lead multiple types of functional reviews | **3.4** | Organise peer review by specialists | | | | | | |
| 84 | Ensure that feedback from reviews is acted upon, monitored, and closed | **4.2** | Incorporate information from peer reviews | | | | | | |
| 85 | Use the content development plan and final document reviews to accommodate for a variety of situations | | | | | | | | |
| *Kick-off meeting management* | | | | | | | | | |
| 86 | Prepare an agenda and documentation for kick off meetings | **1.5** | Make a preliminary tender planning | | | | | | |
| 87 | Brief kick off meeting attendees | | | | | | | | |
| 88 | Assign tasks to kick off meeting attendees | **1.8** | Assign responsibilities & writing tasks | | | | | | |
| 89 | Use the kick off meeting to motivate the proposal team | **1.9** | Create commitment among the team members | | | | | | |
| 90 | Ensure that the proposal team has complete task descriptions | **1.8** | Assign responsibilities & writing tasks | | | | | | |
| 91 | Enlist appropriate senior managers to emphasize the importance of a proposal | **1.9** | Create commitment among the team members | **2.6** | Create commitment among the team members | | | | |
| *Risk management* | | | | | | | | | |
| 92 | Identify proposal development risks | **2.1** | Identify risks | | | | | | |
| 93 | Help establish a proposal development risk management strategy | **2.1** | Identify risks | | | | | | |
| 94 | Obtain management approval of the proposal development risk strategy | | | | | | | | |
| 95 | Implement the proposal development risk management strategy | | | | | | | | |
| *Report management* | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 96 | Schedule and develop reports/presentations for senior management and key stakeholders that show proposal progress and identify any arising issues | **2.6** | Create commitment among the team members | | |
| 97 | Negotiate solutions with senior management and key stakeholders to resolve any proposal progress issues identified | | | | |
| *Production management* | | | | | |
| 98 | Plan and schedule the resource, infrastructure and time required for proposal production | **1.5** | Make a preliminary tender planning | **1.6** | Make final tender planning |
| 99 | Manage the process for proposal production | **5.1** | Organise transfer of the offer towards the layout / production team | | |
| 100 | Create templates for document styles, formats and visuals | **5.1** | Organise transfer of the offer towards the layout / production team | **3.1** | Organise the production of images |
| *Lessons learned analysis and management* | | | | | |
| 101 | Obtain internal and external feedback on the proposal | **3.4** | Organise peer review by specialists | **4.2** | Incorporate information from peer reviews |
| 102 | Identify systematic proposal process problems and suggest changes | | | | |
| 103 | Drive resolution of systemic proposal process problems | | | | |
| *Process management* | | | | | |
| 104 | Explain the key elements of the proposal development process | **1.8** | Assign responsibilities & writing tasks | | |
| 105 | Explain the activities required to support the key elements of the proposal development process | **1.8** | Assign responsibilities & writing tasks | | |
| 106 | Adapt processes to promote work in a variety of situations and opportunities | | | | |
| 107 | Lead and drive process improvement | | | | |
| *Virtual team management* | | | | | |
| 108 | Explain activities that promote team communication | | | | |
| 109 | Select tools for managing the virtual proposal process | | | | |
| 110 | Organize and lead virtual proposal reviews | **3.4** | Organise peer review by specialists | | |
| 111 | Manage team deadlines | **5.2** | Submit the offer on time | | |
| 112 | Plan workflow to accommodate multiple regions and time zones | | | | |
| 113 | Organise and manage virtual files | **2.2** | Set up a document management protocol | | |
| 114 | Work with team members who are unaccustomed to the virtual team environment | | | | |

**SALES ORIENTATION**

| | | | |
|---|---|---|---|
| *Customer interface management* | | | |
| 115 | Interface directly with internal clients or external customers | | |
| 116 | Manage all communications with internal clients or external customers | | |
| 117 | Discuss all aspects of the proposal with internal clients or external customers | **1.7** | Determine and capture the scope of the project |
| *Opportunity plan development* | | | |
| 118 | Explain the relationship between the opportunity planning and proposal phases within the business development lifecycle | | |
| 119 | Use the opportunity plan strategies to drive the development of a proposal strategy within the content development plan | | |
| *Winning strategy development* | | | |
| 120 | Work with others and manage the process to facilitate development of a win strategy | **1.10** | Determine the right tender strategy |
| 121 | Use output from multiple analysis tools to develop an early win strategy | **1.10** | Determine the right tender strategy |
| 122 | Review and adapt win strategies to meet changing circumstances | **2.8** | Evaluate the tender strategy so far |
| 123 | Sell the early win strategy internally and to others involved with the opportunity | **2.8** | Evaluate the tender strategy so far |
| *Negotiation planning* | | | |
| 124 | Negotiate for internal resources and/or teaming partner resources | **1.4** | Compose tender team |
| 125 | Apply different negotiation techniques in different situations | | |
| *Sales participation* | | | |
| 126 | Explain sales methodologies | | |
| 127 | Participate in internal client of external customer meetings | | |

**BEHAVIOR AND ATTITUDE**

| | | | | | |
|---|---|---|---|---|---|
| *Communicating with others* | | | | | |
| 128 | Use appropriate interpersonal styles and communication methods to clearly convey messages | **1.9** | Create commitment among team members | **2.6** | Create commitment among team members |
| 129 | Use a variety of media to engage individuals or groups | **1.9** | Create commitment among team members | **2.6** | Create commitment among team members |
| 130 | Correctly interpret messages and respond appropriately | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 131 | Understand a variety of situations' needs and desired benefits. Develop positioning approaches that leverage supportive factors and overcome/minimize barriers | | | | | | | | | | | | |
| 132 | Address the needs of key decisionmakers | **4.8** | Check compliance with customer requirements | **4.4** | Ensure an answer to the customer demand | **3.8** | Check whether EMAT is sufficiently answered | | | | | | |
| 133 | Interact with prospective customers in a manner that builds effective relationships | **3.8** | Check whether EMAT is sufficiently answered | | | | | | | | | | |
| *Quality orientation* | | | | | | | | | | | | | |
| 134 | Accurately check processes and tasks | | | | | | | | | | | | |
| 135 | Identify and take corrective action where necessary | **2.7** | Monitor the tender budget | **2.8** | Evaluate the tender strategy so far | **2.9** | Evaluate the identified risks | **2.10** | Evaluate the quality of information so far | **2.11** | Identify missing information for a complete plan | **3.5** | Monitor tender budget | **3.9** | Add measures |
| *Building strategic relationships and a successful team* | | | | | | | | | | | | | |
| 136 | Develop and use strategic relationships | **1.4** | Compose tender team | | | | | | | | | | |
| 137 | Develop direction and involve others through collaboration | **3.2** | Collect information from experts | | | | | | | | | | |
| *Decision-making and delegating responsibility* | | | | | | | | | | | | | |
| 138 | Explain issues and opportunities and the resulting decisions, then delegate implementation of the required activities and responsibilities | **1.8** | Assign responsibilities & writing tasks | | | | | | | | | | |
| 139 | Implement decisions/initiate action promptly | | | | | | | | | | | | |
| 140 | Include others in the decision making process and ensure buy-in and understanding of decisions | **1.9** | Create commitment among team members | **2.6** | Create commitment among team members | | | | | | | | |
| 141 | Allocate decision making authority and/or task responsibility to maximize organisation and individual effectiveness | **1.8** | Assign responsibilities & writing tasks | | | | | | | | | | |

# APPENDIX 5: TASKS LINKED TO COMPETENCIES

Based on the linking between the APMP competencies and tasks for tender management (section 4.4.1) an overview of the tender management tasks and their corresponding competencies was established.

| | | **FNV COMPETENCIES** |
|---|---|---|
| PHASE 1 | | |
| 1.1 | Make the bid/no bid decision | Handling procedures & methods, Proactive, Deciding, Handling procedures & methods, Communicating, Handling procedures & methods, Deciding, Being quality-oriented, Handling procedures & methods, Being creative |
| 1.2 | Analyse the procurement guideline | Analysing, Analysing, Being customer-oriented, Collaborating, Being customer-oriented, Control, Structuring, Being customer-oriented, Analysing |
| 1.3 | Determine tender budget | Being cost-conscious, Analysing, Having environmental awareness, Being cost-conscious |
| 1.4 | Compose tender team | Collaborating, Team building, Collaborating, Team building, Negotiate, Team Building, Negotiate, Networking |
| 1.5 | Make a preliminary tender planning | Handling procedures & methods, Planning & organizing, Planning & organizing, Proactive, Judgement, Planning & organizing, Communicating, Handling procedures & methods, Planning & organizing |
| 1.6 | Make a final tender planning | Being stress-resistant, Planning & organizing, Planning & organizing, Planning & organizing, Communicating, Planning & organizing, Judgement, Judgement, Handling procedures & methods, Planning & organizing, Handling procedures & methods |
| 1.7 | Determine and capture the scope of the project | Being customer-oriented, Being cost-conscious, Being customer-oriented, Communicating |
| 1.8 | Assign responsibilities & writing tasks | Delegating, Control, Take responsibility, Communicating, Communicating, Communicating, Delegating |
| 1.9 | Create commitment among the team members | Motivate, Motivate, Communicating, Communicating, Influence, Collaborating, Communicating, Leadership, team building, Negotiate |
| 1.10 | Determine the right tender strategy | Being customer-oriented, Analysing, Handling procedures & methods, Planning & organizing, Handling procedures & methods, Being customer-oriented, Having environmental awareness, Handling procedures & methods, Being creative, Developing vision/strategy, Being creative, Being expressive, Leadership, Being cost-conscious, Developing vision/strategy, Interactive learning, Influence |
| PHASE 2 | | |
| 2.1 | Identify risks (e.g. by means of a risk session) | Analysing, Developing vision/strategy |
| 2.2 | Set up a document management protocol | Handling procedures & methods, Planning & organizing, Planning & organizing, Information gathering |
| 2.3 | Acquire information from experts | Information gathering, Networking, Information gathering, Networking, Developing vision/strategy, Collaborating |
| 2.4 | Determine the structure for the plan | Leadership, Delegating, Handling procedures & methods, Information gathering, Deciding, Judgement, Being customer-oriented, Deciding, Judgement, Being customer-oriented |
| 2.5 | Start to fill in the plan (writing) | Leadership, Collaborating, Being expressive, Leadership, Delegating, Deciding, Handling procedures & methods, Deciding, Judgement, Being customer-oriented, Handling procedures & methods, Being expressive, Being expressive, Communicating, Communicating, Being expressive |
| 2.6 | Create commitment among the team members | Communicating, Communicating, Influence, Collaborating, Communicating, Motivate, Planning & organizing, Communicating |
| 2.7 | Monitor the tender budget | Analysing, Being quality-oriented, Being flexible, Being cost-conscious |
| 2.8 | Evaluate the tender strategy so far | Coaching, Analysing, Being quality-oriented, Being flexible, Interactive learning |
| 2.9 | Evaluate the identified risks | Analysing, Being quality-oriented, Being flexible |
| 2.10 | Evaluate the quality of information so far | Planning & organizing, Being critical, Analysing, Being quality-oriented, Being flexible |

| | | |
|---|---|---|
| 2.11 | Identify missing information for a complete plan | Analysing, Control, Interactive learning, Being flexible, Analysing, Being quality-oriented, Being flexible |

PHASE 3

| | | |
|---|---|---|
| 3.1 | Organise the production of images | Being creative, Being creative, Communicating, Being creative, Handling procedures & methods, Planning & organizing, Delegating, Being creative, Communicating, Structuring |
| 3.2 | Collect information from experts | Information gathering, Networking, Information gathering, Networking, Developing vision/strategy, Collaborating, Information gathering |
| 3.3 | Write tender proposal | Communicating, Delegating, Being expressive, Being expressive, Handling procedures & methods, Communicating, Communicating, Being expressive |
| 3.4 | Organise peer review by specialists | Communicating, Planning & organizing, Being critical, Planning & organizing, Being customer-oriented, Network, Motivate, Communicating, Leadership, interactive learning, Planning & organizing, Leadership |
| 3.5 | Monitor the tender budget | Analysing, Being quality-oriented, Being flexible, Being cost-conscious |
| 3.6 | Ensure unique, added value in the plan | Being customer-oriented, Being expressive, Being cost-conscious, Being creative, Being customer-oriented, Being customer-oriented, Being customer-oriented, Analysing |
| 3.7 | Write everything down in a SMART way | Handling procedures & methods, Being expressive, Being expressive, Communicating, Being expressive |
| 3.8 | Check whether the EMAT is sufficiently answered | Show sensitivity, Communicating, Show sensitivity, Being customer-oriented, Being customer-oriented, analysing |
| 3.9 | Add measures | Analysing, Being quality-oriented, Being flexible, |

PHASE 4

| | | |
|---|---|---|
| 4.1 | Set offer price | Being cost-conscious, Leadership, Being cost-conscious, Developing vision/strategy, Analysing, Having environmental awareness |
| 4.2 | Incorporate information from peer reviews | Interactive learning, Interactive learning |
| 4.3 | Make the tender offer consistent | Communicating, Being expressive, Being quality-oriented |
| 4.4 | Ensure an answer to the customer demand | Being creative, Being customer-oriented, Being customer-oriented, Analysing, Analysing, being customer-oriented, analysing, information gathering, being customer-oriented, collaborating, being customer-oriented, Show sensitivity |
| 4.5 | Check spelling | Communicating, Being expressive, Being quality-oriented |
| 4.6 | Ensure an active writing style in the proposal | Being expressive, Being expressive, Communicating, Communicating, Being expressive, Handling procedures & methods |
| 4.7 | Check for sufficient project specificity | Being creative, Being customer-oriented |
| 4.8 | Check compliance with customer requirements | Show sensitivity, Being customer-oriented, Analysing, Being customer-oriented, Analysing, Information gathering, Being customer-oriented |

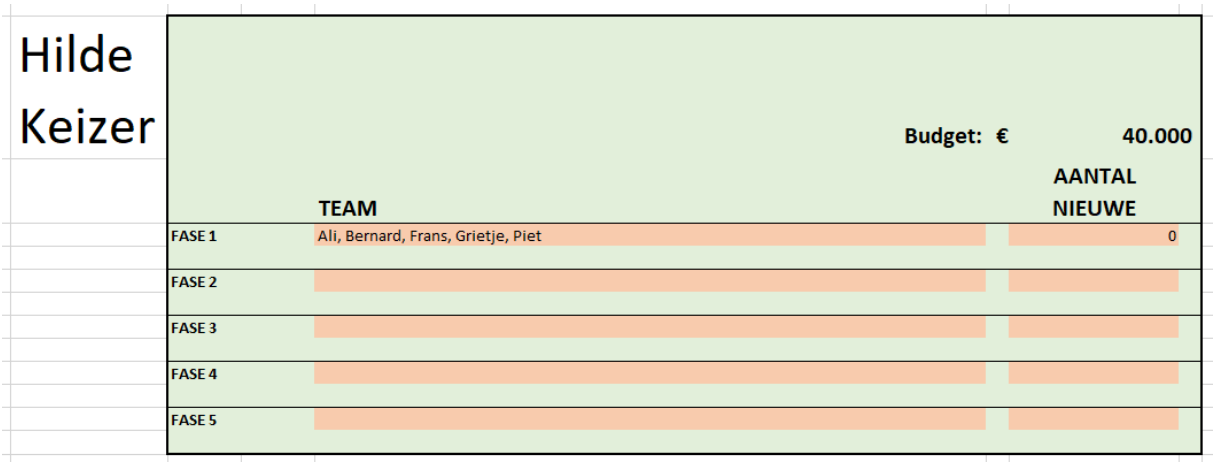
PHASE 5

| | | |
|---|---|---|
| 5.1 | Organise transfer of the offer towards the layout / production team | Take responsibility, Structuring, Planning & organizing |
| 5.2 | Submit the offer on time | Being stress-resistant, Take responsibility |
| 5.3 | Prepare presentation / interviews | Being creative, Communicating, Being expressive, Being customer-oriented |
| 5.4 | Give presentation / interview | Being creative, Communicating, Being expressive, Being customer-oriented |

# APPENDIX 6: SCORE FORM COMPETENDER

For the operationalization of CompeTender an almost automated score form was developed in Excel. This appendix will provide insight in the functioning of this form.

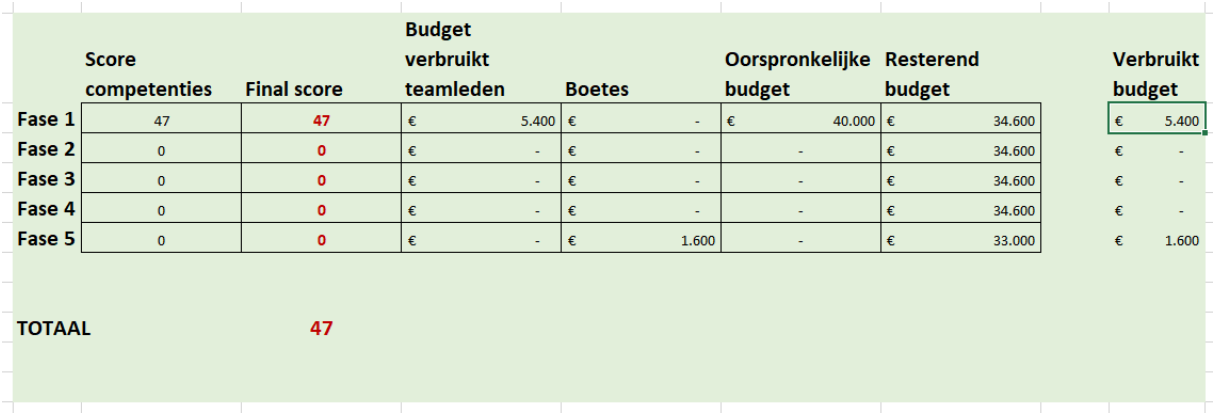
The answers from every player are collected in an online excel form by means of Google Forms and copy-pasted into an offline excel which generates the scores and provides feedback on the usage of budget.



| Hilde Keizer | | | Budget: € 40.000 |
|---|---|---|---|
| | | TEAM | AANTAL NIEUWE |
| | FASE 1 | Ali, Bernard, Frans, Grietje, Piet | 0 |
| | FASE 2 | | |
| | FASE 3 | | |
| | FASE 4 | | |
| | FASE 5 | | |

*Figure 25: The first tab of the score form in which the answers of a player can be copy-pasted*

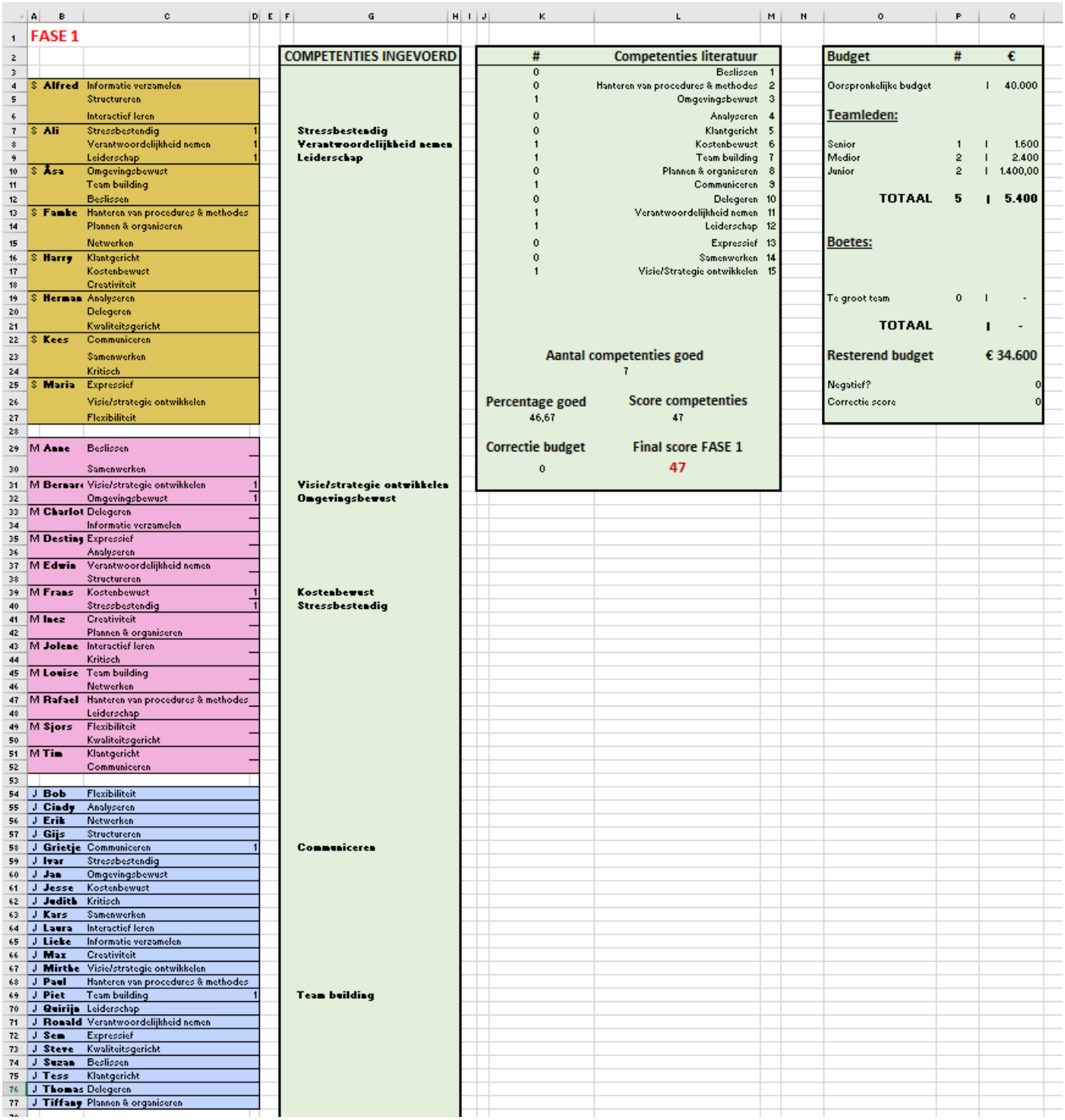
Figure 25 shows the first tab of the score form. All orange boxes need to be filled in by the game leader while the game is played. The information for the 'Team' column can easily be copy-pasted from the online answers. The amount of new team members introduced in that particular phase needs to be added manually. Based on these answers, for every phase a score and feedback on the budget appears in the second tab.



| | Score competenties | Final score | Budget verbruikt teamleden | Boetes | Oorspronkelijke budget | Resterend budget | Verbruikt budget |
|---|---|---|---|---|---|---|---|
| Fase 1 | 47 | 47 | € 5.400 | € - | € 40.000 | € 34.600 | € 5.400 |
| Fase 2 | 0 | 0 | € - | € - | - | € 34.600 | € - |
| Fase 3 | 0 | 0 | € - | € - | - | € 34.600 | € - |
| Fase 4 | 0 | 0 | € - | € - | - | € 34.600 | € - |
| Fase 5 | 0 | 0 | € - | € 1.600 | - | € 33.000 | € 1.600 |
| TOTAAL | | 47 | | | | | |

*Figure 26: Overview of the scores and usage of budget for each phase*

Figure 26 shows the second tab of the score form. The first column (score competenties) shows the score which is retrieved purely based on the overlapping competencies with competencies found in literature for that particular phase. The second column, in red, shows the final score for each phase including corrections for budget overruns. Then, the final two columns are most interesting as they reflect the used budget for that phase ('Verbruikt budget') and the remaining budget for the next phases ('Resterend budget').
These values are retrieved from the following five tabs and their origin will be explained based on the score generation from phase one. The values for every phase are calculated in separate sheets.



FASE 1

| | | | |
|---|---|---|---|
| $ | Alfred | Informatie verzamelen | |
| | | Structureren | |
| | | Interactief leren | |
| $ | Ali | Stressbestendig | 1 |
| | | Verantwoordelijkheid nemen | 1 |
| | | Leiderschap | 1 |
| $ | Åsa | Omgevingsbewust | |
| | | Team building | |
| | | Beslissen | |
| $ | Famke | Hanteren van procedures & methodes | |
| | | Plannen & organiseren | |
| | | Netwerken | |
| $ | Harry | Klantgericht | |
| | | Kostenbewust | |
| | | Creativiteit | |
| $ | Herman | Analyseren | |
| | | Delegeren | |
| | | Kwaliteitsgericht | |
| $ | Kees | Communiceren | |
| | | Samenwerken | |
| | | Kritisch | |
| $ | Maria | Expressief | |
| | | Visie/strategie ontwikkelen | |
| | | Flexibiliteit | |
| M | Anne | Beslissen | |
| | | Samenwerken | |
| M | Bernard | Visie/strategie ontwikkelen | 1 |
| | | Omgevingsbewust | 1 |
| M | Charlot | Delegeren | |
| | | Informatie verzamelen | |
| M | Destiny | Expressief | |
| | | Analyseren | |
| M | Edwin | Verantwoordelijkheid nemen | |
| | | Structureren | |
| M | Frans | Kostenbewust | 1 |
| | | Stressbestendig | 1 |
| M | Inez | Creativiteit | |
| | | Plannen & organiseren | |
| M | Jolene | Interactief leren | |
| | | Kritisch | |
| M | Louise | Team building | |
| | | Netwerken | |
| M | Rafael | Hanteren van procedures & methodes | |
| | | Leiderschap | |
| M | Sjors | Flexibiliteit | |
| | | Kwaliteitsgericht | |
| M | Tim | Klantgericht | |
| | | Communiceren | |
| J | Bob | Flexibiliteit | |
| J | Cindy | Analyseren | |
| J | Erik | Netwerken | |
| J | Gijs | Structureren | |
| J | Grietje | Communiceren | 1 |
| J | Ivar | Stressbestendig | |
| J | Jan | Omgevingsbewust | |
| J | Jesse | Kostenbewust | |
| J | Judith | Kritisch | |
| J | Kars | Samenwerken | |
| J | Laura | Interactief leren | |
| J | Lieke | Informatie verzamelen | |
| J | Max | Creativiteit | |
| J | Mirthe | Visie/strategie ontwikkelen | |
| J | Paul | Hanteren van procedures & methodes | |
| J | Piet | Team building | 1 |
| J | Quirijn | Leiderschap | |
| J | Ronald | Verantwoordelijkheid nemen | |
| J | Sem | Expressief | |
| J | Steve | Kwaliteitsgericht | |
| J | Suzan | Beslissen | |
| J | Tess | Klantgericht | |
| J | Thomas | Delegeren | |
| J | Tiffany | Plannen & organiseren | |

| COMPETENTIES INGEVOERD |
|---|
| Stressbestendig |
| Verantwoordelijkheid nemen |
| Leiderschap |
| Visie/strategie ontwikkelen |
| Omgevingsbewust |
| Kostenbewust |
| Stressbestendig |
| Communiceren |
| Team building |

| # | Competenties literatuur | |
|---|---|---|
| 0 | Beslissen | 1 |
| 0 | Hanteren van procedures & methodes | 2 |
| 1 | Omgevingsbewust | 3 |
| 0 | Analyseren | 4 |
| 0 | Klantgericht | 5 |
| 1 | Kostenbewust | 6 |
| 1 | Team building | 7 |
| 0 | Plannen & organiseren | 8 |
| 1 | Communiceren | 9 |
| 0 | Delegeren | 10 |
| 1 | Verantwoordelijkheid nemen | 11 |
| 1 | Leiderschap | 12 |
| 0 | Expressief | 13 |
| 0 | Samenwerken | 14 |
| 1 | Visie/Strategie ontwikkelen | 15 |

Aantal competenties goed: 7

| Percentage goed | Score competenties |
|---|---|
| 46,67 | 47 |
| **Correctie budget** | **Final score FASE 1** |
| 0 | 47 |

| Budget | # | € |
|---|---|---|
| Oorspronkelijke budget | | 40.000 |
| **Teamleden:** | | |
| Senior | 1 | 1.600 |
| Medior | 2 | 2.400 |
| Junior | 2 | 1.400,00 |
| TOTAAL | 5 | 5.400 |
| **Boetes:** | | |
| Te groot team | 0 | - |
| TOTAAL | | - |
| Resterend budget | | € 34.600 |
| Negatief? | | 0 |
| Correctie score | | 0 |

*Figure 27: Overview of score and cost generation per phase*

Figure 27 shows the overview of the score and cost generation of phase 1. Once the team members are added in the first tab (see Figure 25), column D automatically counts whether a name from column B appears in that list. Once a name from column B appears, column D counts this. If column D contains a number larger than zero (>0), the word from column C in the corresponding row appears in column G. Column G contains all competencies that are present in the team of the player of CompeTender for that particular phase.

Based on this information, a score can be generated. The score is based on the percentage of overlap with competencies found in literature for that particular phase. Column K counts the amount of competencies that are both present in literature and in the team that was handed in by the player. However, in this game there is no benefit in having the same competency multiple times. Therefore cell L24 ('Aantal competenties goed') counts the amount of competencies in column K that score >0. The score for this particular phase is based on the percentage of overlap between the present

competencies and the competencies from literature, and is displayed in cell L27. The score is completed with an adjustment is one overruns his or her budget. An overrun in budget is displayed in cell Q25 (‘Negatief?’) and will result in a negative score (cell K30, ‘Correctie budget’). The final score for this phase, including optional budget corrections, is displayed in cell L30.

The budget section (column O, P and Q) automatically counts the number of senior, medior and junior people present in the team and translates that into costs. Finally, several fines are introduced during the game (team too large, no presence of mandatory roles). Fines are automatically added in cell P16 – P19.

# APPENDIX 7: DESIGN GAME ELEMENTS

This appendix contains all elements that were designed in order to play CompeTender.


*Figure 28: Team member cards senior & medior*

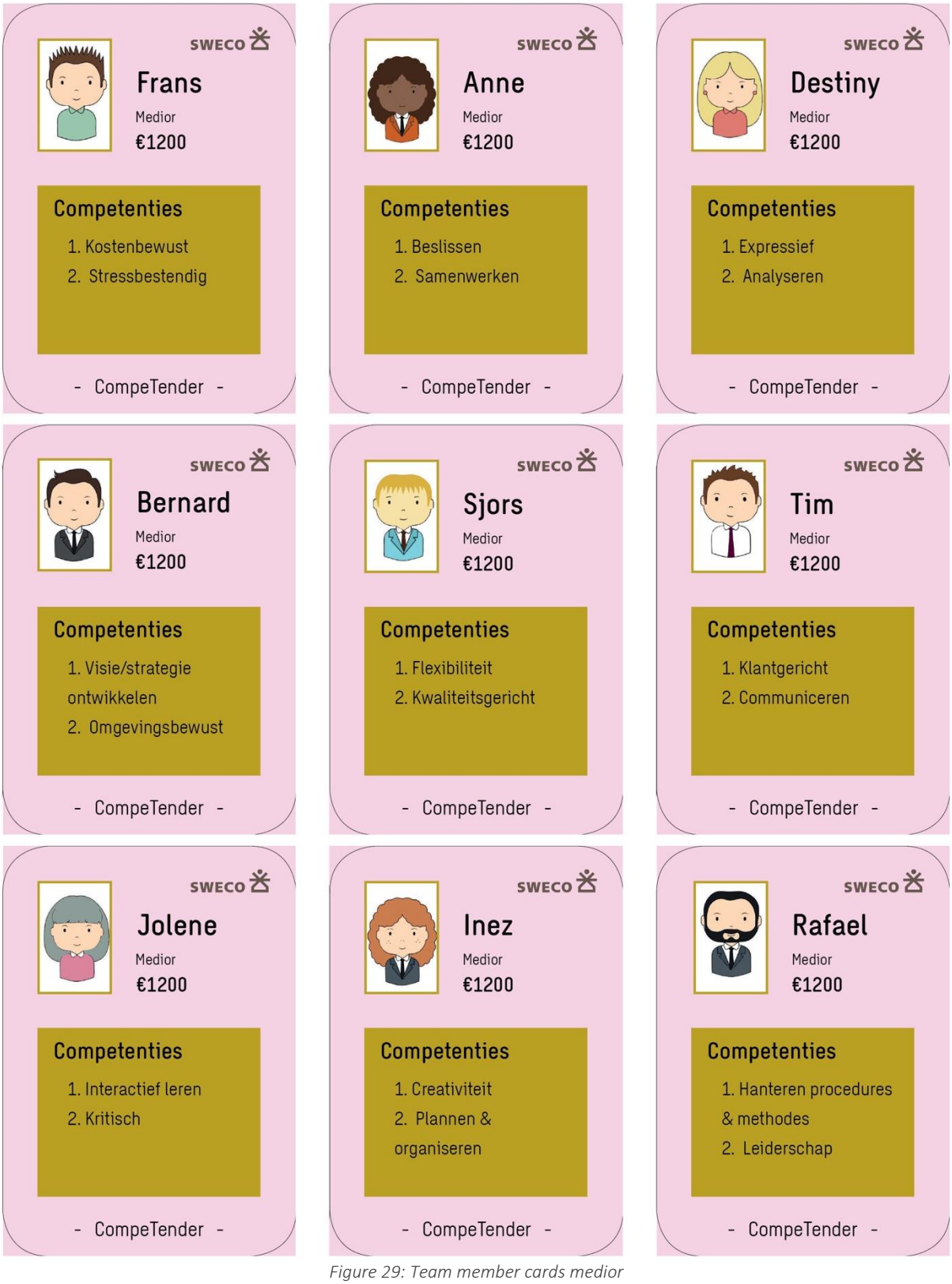



*Figure 29: Team member cards medior*

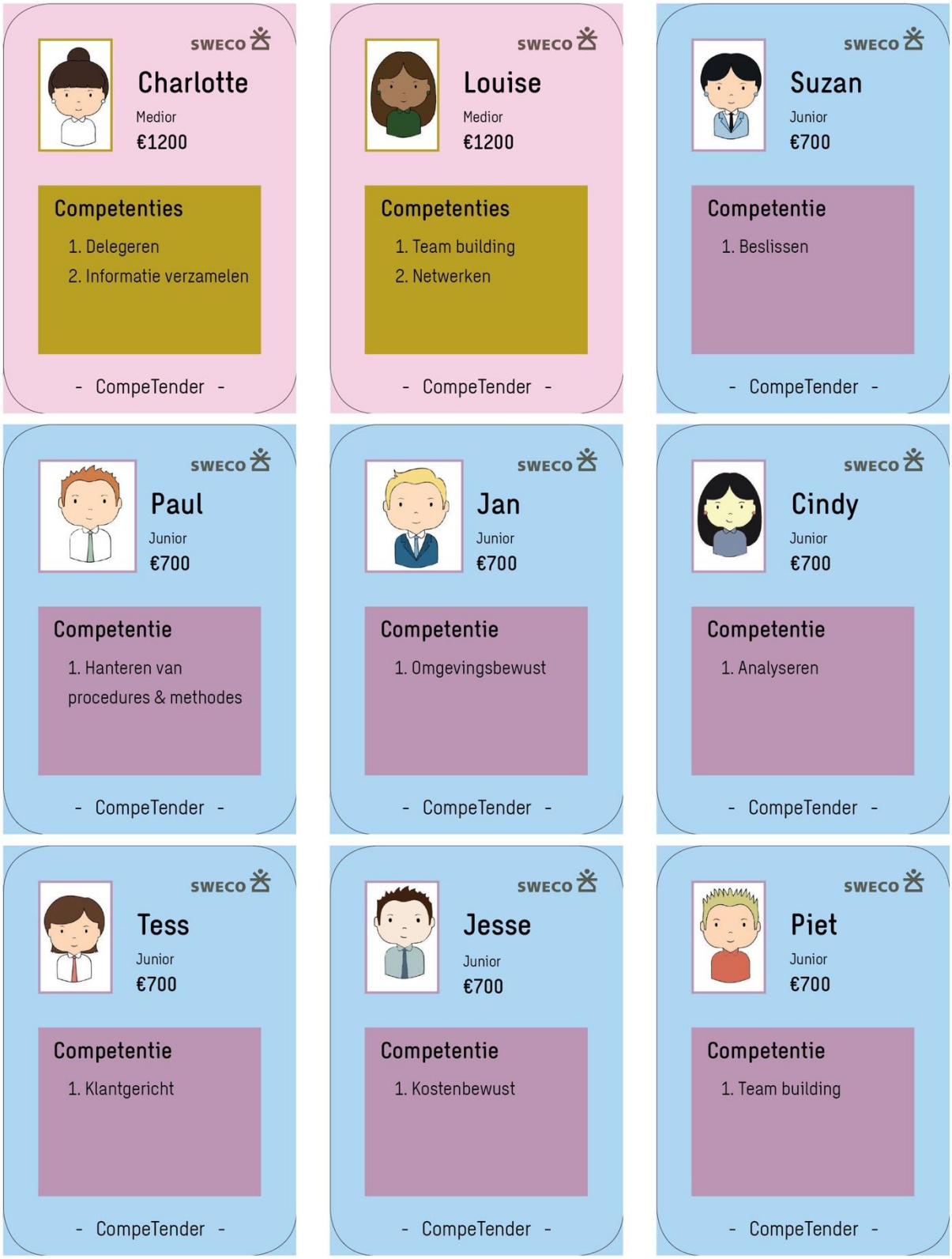



*Figure 30: Team member cards medior & junior*


*Figure 31: Team member cards junior*

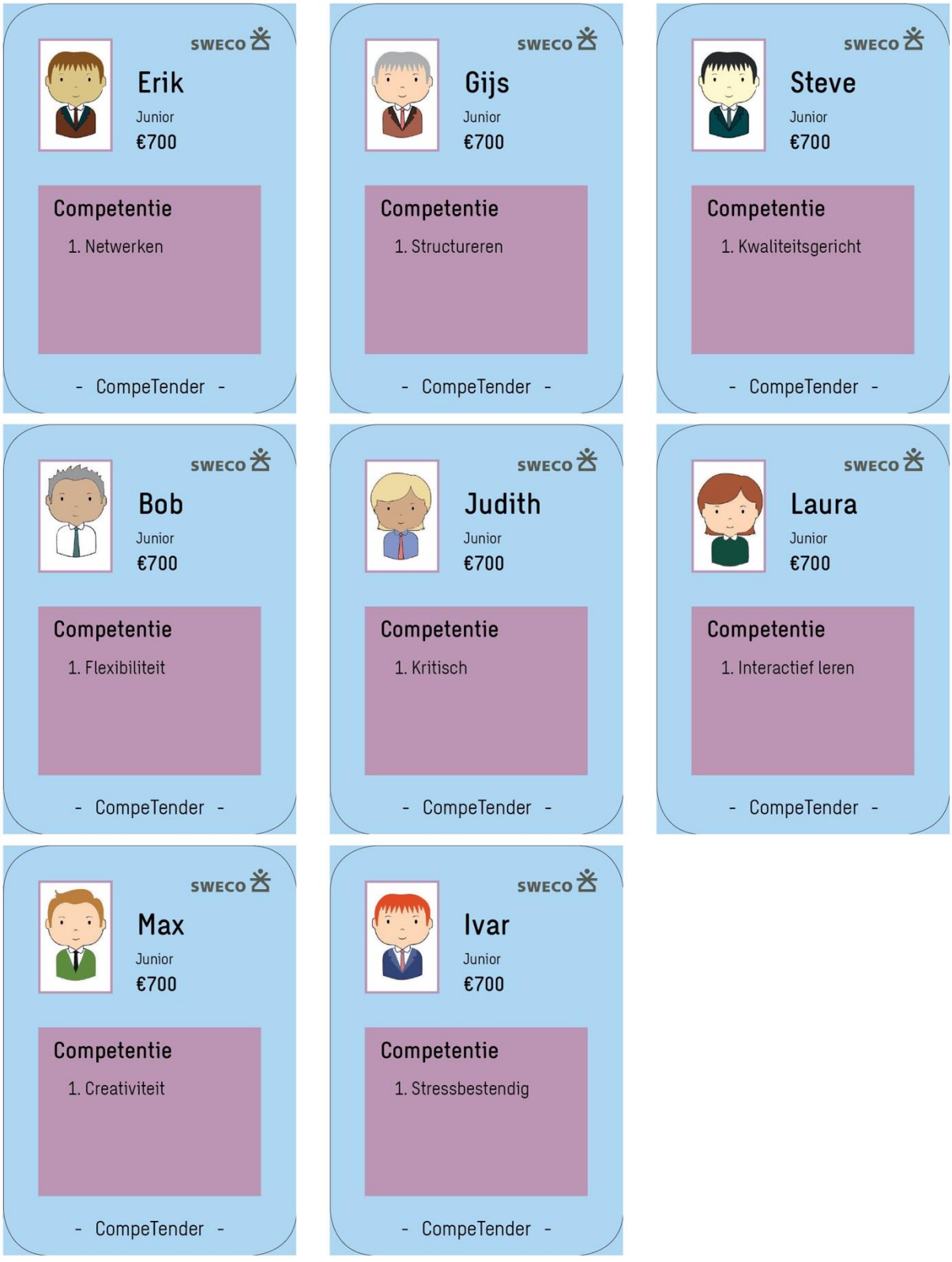



*Figure 32: Team member cards junior*

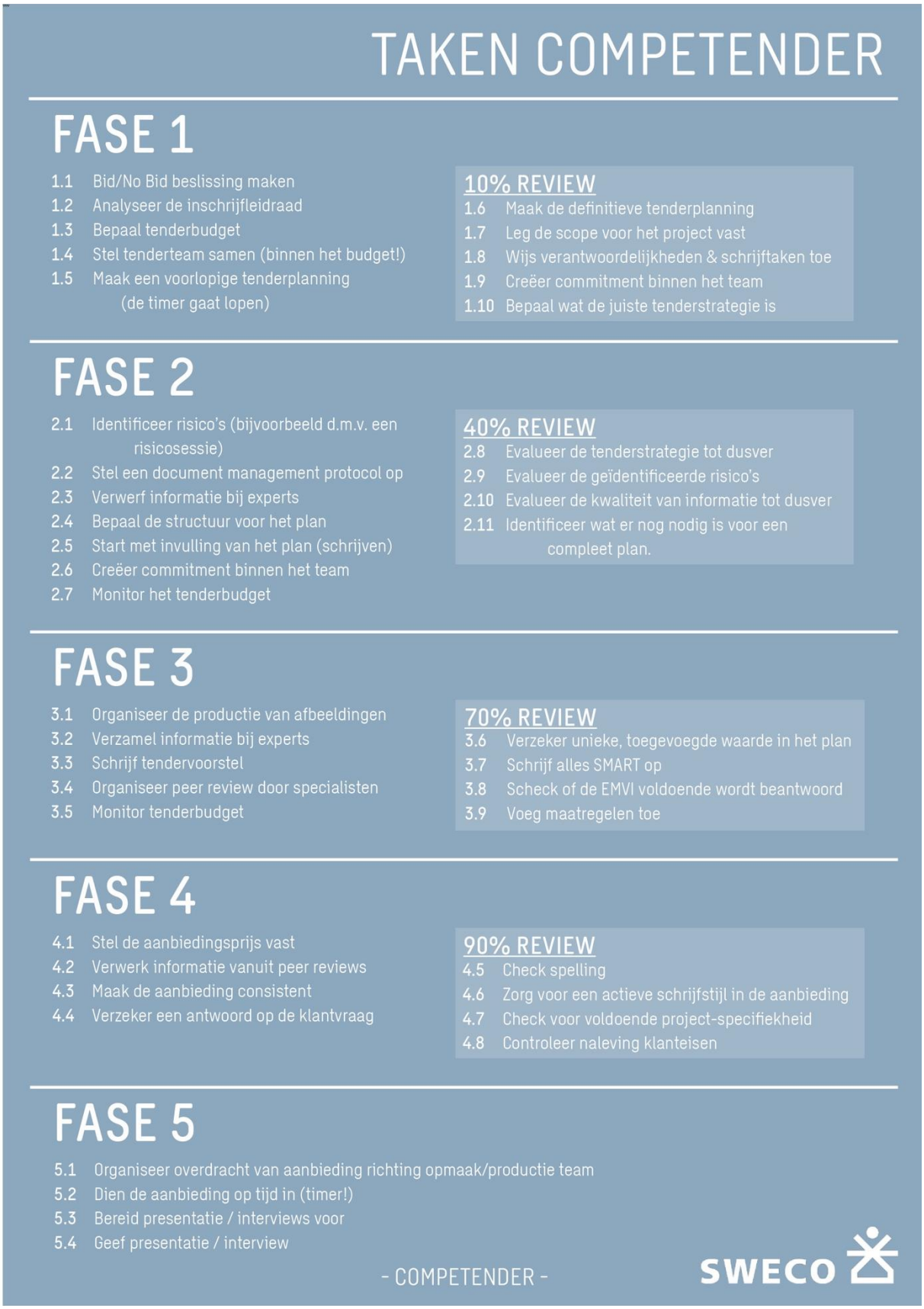



*Figure 33: Task overview poster CompeTender*

TAKEN KAART 1

## FASE 1

*Een vliegende start..*

Om fase 1 succesvol af te sluiten dienen de volgende taken uitgevoerd te worden:

- Bid/No Bid beslissing maken
- Analyseer de inschrijfleidraad
- Bepaal het tenderbudget
- Stel tenderteam samen (budget!)
- Maak een voorlopige tenderplanning (zandloper gaat lopen)

### 10% review

**Kick-off meeting**

- Maak definitieve tenderplanning
- Leg scope voor project vast
- Wijs verantwoordelijkheden & schrijftaken toe
- Creëer commitment
- Bepaal tenderstrategie

- CompeTender - SWECO

TAKEN KAART 2

## FASE 2

*Bronnen ontsluiten*

Om fase 2 succesvol af te sluiten dienen de volgende taken uitgevoerd te worden:

- Identificeer risico's (bijvoorbeeld d.m.v. risicosessie)
- Stel een document management protocol op
- Verwerf informatie bij experts
- Bepaal structuur voor plan
- Start met invulling van plan (schrijven)
- Creëer commitment
- Monitor tenderbudget

### 40% review

- Evalueer strategie tot dusver
- Evalueer geïdentificeerde risico's
- Evalueer kwaliteit van informatie tot dusver
- Identificeer wat er nog nodig is

- CompeTender - SWECO

TAKEN KAART 3

## FASE 3

*Halfway there...*

Om fase 3 succesvol af te sluiten dienen de volgende taken uitgevoerd te worden:

- Organiseer productie van afbeeldingen
- Verzamel informatie
- Schrijf tendervoorstel
- Organiseer peer review door specialisten
- Monitor tenderbudget

### 70% review

- Verzeker unieke, toegevoegde waarde in het plan
- Schrijf alles SMART op
- Check of EMVI voldoende wordt beantwoord
- Voeg maatregelen toe

- CompeTender - SWECO

TAKEN KAART 4

## FASE 4

*Puntjes op de i*

Om fase 4 succesvol af te sluiten dienen de volgende taken uitgevoerd te worden:

- Stel de aanbiedingsprijs vast
- Verwerk informatie vanuit peer reviews
- Maak de aanbieding consistent
- Verzeker een antwoord op de klantvraag in de aanbieding

### 90% review

- Check spelling
- Zorg voor een actieve schrijfstijl in de aanbieding
- Check voor voldoende project-specifiekheid
- Controleer naleving klanteisen

- CompeTender - SWECO

*Figure 34: Task cards phase 1 to 4*

TAKEN KAART 5

## FASE 5

*Final touch*

Om fase 5 succesvol af te sluiten dienen de volgende taken uitgevoerd te worden:

- Organiseer overdracht van aanbieding richting opmaak/productie team
- Dien aanbieding op tijd in (zandloper!)
- Bereid presentatie / interviews voor
- Geef presentatie / interview

- CompeTender - SWECO

PROJECT TYPE KAART

## TENDEREN VOOR EEN RAAMCONTRACT

OMSCHRIJVING OPDRACHT:

Een provincie is voor een nieuw raamcontract op zoek naar een ingenieursbureau. In het raamcontract worden infrastructuur en wegen gerelateerde advieswerkzaamheden uitgevraagd. De provincie heeft als doelstelling vijf partijen te contracteren. Het raamcontract heeft een looptijd van vier jaar met daarbij een optie tot twee keer één jaar verlenging.

SPECIFICATIE EMVI:

- **SAMENWERKING (2 pagina's) - 30%**
- **DUURZAAMHEID & INNOVATIE (2 pagina's) - 20%**
  Dit is een beleidsdoelstelling van de provincie, dus zij zien in het raamcontract graag terug wat een ingenieursbureau bijdraagt aan het duurzame karakter van de projecten.
- **CASUS (5 pagina's) - 50%**
  Omschrijf hoe de planning behaald gaat worden, omschrijf hoe de gewenste kwaliteit behaald wordt, benoem de top vijf geïdentificeerde risico's en passende beheersmaatregelen

SPECIFICATIE BUDGET & PLANNING:

| | |
|---|---|
| Beschikbare tijd: | 8 weken |
| Tender budget: | € 40.000,- |

- CompeTender - SWECO

*Figure 35: Task card phase 5 & Project type card framework agreement*

PROJECT TYPE KAART

# TENDEREN VOOR INGENIEURSDIENSTEN

## OMSCHRIJVING OPDRACHT:

Rijkswaterstaat is van plan om de A100 te verbreden van 2x2 rijbanen naar 2x3 rijstroken. Dit plan is reeds vastgesteld in het tracébesluit. Rijkswaterstaat is op zoek naar een ingenieursbureau die het referentieontwerp verder kan uitwerken, het contract (Design & Construct) gaat opstellen en de aanbesteding gaat begeleiden.

## SPECIFICATIE EMVI:

1. **PLANNING / AANPAK (6 pagina's + planning A0 formaat) - € 800.000,-**
   Hoe gaat het ingenieursbureau het proces inrichten om te komen tot een succesvolle aanbesteding?
2. **TECHNISCHE DESKUNDIGHEID (4 pagina's) - € 600.000,-**
   Omschrijving van het projectteam met daarbij vermelding van de relevante ervaringen en benodigde kennis van de sleutelfunctionarissen
3. **RISICO'S (4 pagina's) - € 300.000,-**
   Identificeer de top vijf opdrachtgeversrisico's en ga in op de passende beheersmaatregelen

## SPECIFICATIE BUDGET & PLANNING:

| | |
|---|---|
| Omzet Sweco: | € 1.000.000,- |
| Beschikbare tijd: | 8 weken |
| Tender budget: | € 40.000,- |

- CompeTender -

SWECO

PROJECT TYPE KAART

# TENDEREN VOOR AANNEMERSDIENSTEN

## OMSCHRIJVING OPDRACHT:

Gemeente X wil groot onderhoud plegen op de Dorpsstraat. De deklaag van het asfalt moet vervangen worden, er moeten nieuwe parkeervakken gerealiseerd worden en er moet een vrijliggend fietspad worden gecreëerd. De gemeente is op zoek naar een aannemer die dat gaat realiseren met zo min mogelijk hinder voor de omgeving en op een duurzame wijze. Sweco mag voor de aannemer het volledige tenderteam verzorgen.

## SPECIFICATIE EMVI:

1. **MINDER HINDER (2 pagina's + 2 bijlages A3 formaat) - € 800.000,-**
   a. Duur van de afsluitingen
   b. Minimaliseren van de hinder voor de omgeving
2. **DUURZAME REALISATIE (2 pagina's + 1 bijlage A3 formaat) - € 400.000,-**
   Wat gaat de aannemer doen om het project zo duurzaam mogelijk uit te voeren? Hiervoor hanteert de gemeente twee speerpunten waarop ingegaan moet worden:
   - CO2 besparing
   - Hergebruik van materialen

## SPECIFICATIE BUDGET & PLANNING:

| | |
|---|---|
| Beschikbare tijd: | 8 weken |
| Tender budget: | € 40.000,- |

- CompeTender -

SWECO

*Figure 36: Project type cards engineering services & contractor services*

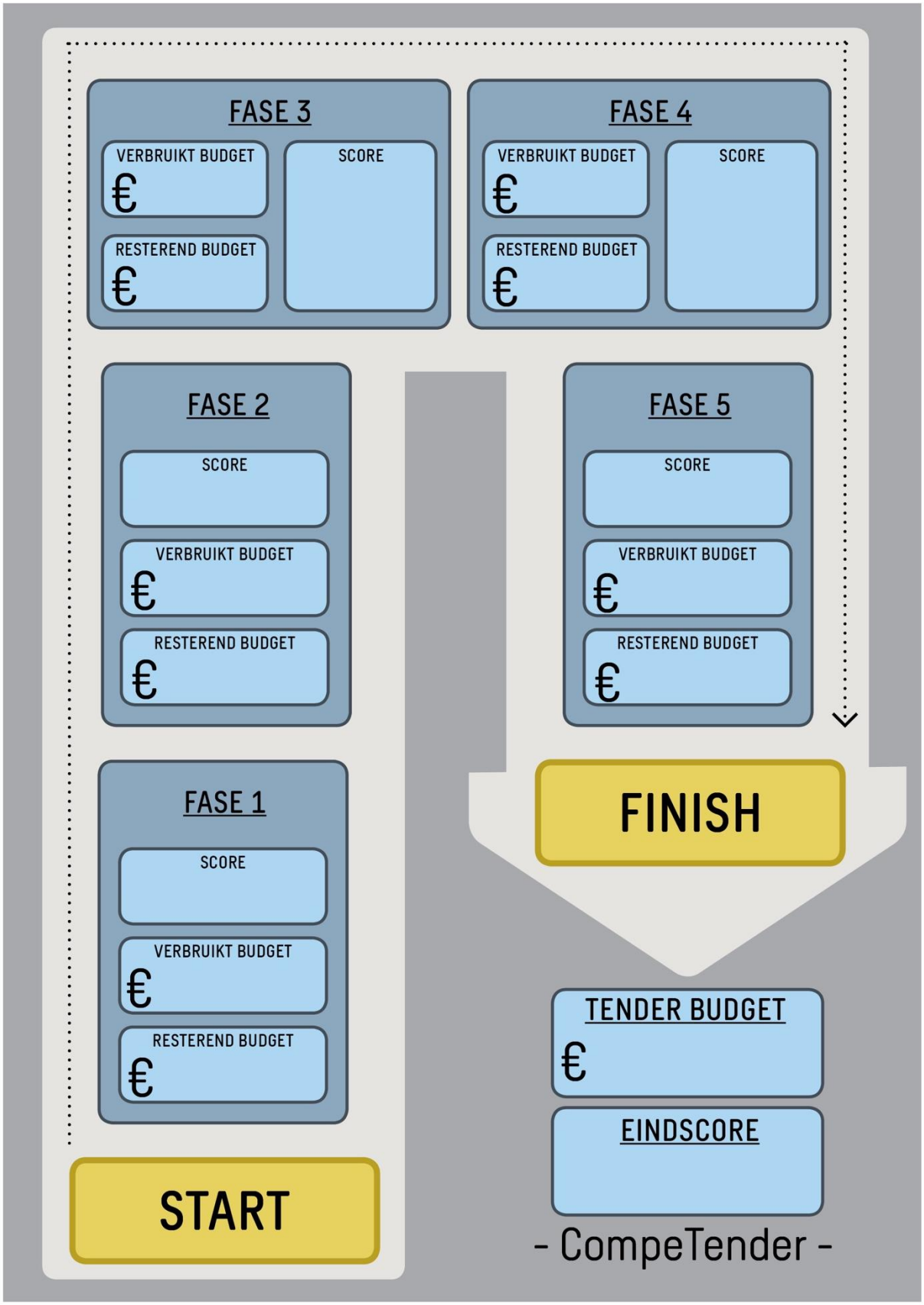



*Figure 37: CompeTender game board*

# APPENDIX 8: ADDITIONAL ELEMENTS FOR PLAYER EXPERIENCE IMPROVEMENT

This appendix contains all additional elements that were designed for CompeTender in order to enhance player experience.

*Table 37: Possession of competencies by team members*

| NAAM | PRIJS | COMPETENTIE 1 | COMPETENTIE 2 | COMPETENTIE 3 | OPMERKING |
|---|---|---|---|---|---|
| **Alfred** | € 1.600 | Informatie verzamelen | Structureren | Interactief leren | Bid/No bid beslissing maken & mag het plan indienen |
| **Ali** | € 1.600 | Stressbestendig | Verantwoordelijkheid nemen | Leiderschap | Bid/No bid beslissing maken & mag het plan indienen |
| **Åsa** | € 1.600 | Omgevingsbewust | Team building | Beslissen | Bid/No bid beslissing maken & mag het plan indienen |
| **Famke** | € 1.600 | Hanteren procedures & methodes | Plannen & organiseren | Netwerken | Bid/No bid beslissing maken & mag het plan indienen |
| **Harry** | € 1.600 | Klantgericht | Kostenbewust | Creativiteit | Bid/No bid beslissing maken & mag het plan indienen |
| **Herman** | € 1.600 | Analyseren | Delegeren | Kwaliteitsgericht | Bid/No bid beslissing maken & mag het plan indienen |
| **Kees** | € 1.600 | Communiceren | Samenwerken | Kritisch | Bid/No bid beslissing maken & mag het plan indienen |
| **Maria** | € 1.600 | Expressief | Visie/strategie ontwikkelen | Flexibiliteit | Bid/No bid beslissing maken & mag het plan indienen |
| **Anne** | € 1.200 | Beslissen | Samenwerken | | |
| **Bernard** | € 1.200 | Visie/strategie ontwikkelen | Omgevingsbewust | | |
| **Charlotte** | € 1.200 | Delegeren | Informatie verzamelen | | |
| **Destiny** | € 1.200 | Expressief | Analyseren | | |
| **Edwin** | € 1.200 | Verantwoordelijkheid nemen | Structureren | | |
| **Frans** | € 1.200 | Kostenbewust | Stressbestendig | | |
| **Inez** | € 1.200 | Creativiteit | Plannen & organiseren | | |
| **Jolene** | € 1.200 | Interactief leren | Kritisch | | |
| **Louise** | € 1.200 | Team building | Netwerken | | |
| **Rafael** | € 1.200 | Hanteren procedures & methodes | Leiderschap | | |
| **Sjors** | € 1.200 | Flexibiliteit | Kwaliteitsgericht | | |
| **Tim** | € 1.200 | Klantgericht | Communiceren | | |
| **Bob** | € 700 | Flexibiliteit | **Mirthe** | € 700 | Visie/strategie bepalen |
| **Cindy** | € 700 | Analyseren | **Max** | € 700 | Creativiteit |
| **Erik** | € 700 | Netwerken | **Paul** | € 700 | Hanteren van procedures & methodes |
| **Gijs** | € 700 | Structureren | **Piet** | € 700 | Team building |
| **Grietje** | € 700 | Communiceren | **Quirijn** | € 700 | Leiderschap |
| **Ivar** | € 700 | Stressbestendig | **Ronald** | € 700 | Verantwoordelijkheid nemen |
| **Jan** | € 700 | Omgevingsbewust | **Sem** | € 700 | Expressief |
| **Jesse** | € 700 | Kostenbewust | **Steve** | € 700 | Kwaliteitsgericht |
| **Judith** | € 700 | Kritisch | **Suzan** | € 700 | Beslissen |
| **Kars** | € 700 | Samenwerken | **Tess** | € 700 | Klantgericht |
| **Laura** | € 700 | Interactief leren | **Thomas** | € 700 | Delegeren |
| **Lieke** | € 700 | Informatie verzamelen | **Tiffany** | € 700 | Plannen & organiseren |

*Table 38: Competency allocation on team member cards*

| COMPETENTIE | NAAM SENIOR | NAAM MEDIOR | NAAM JUNIOR |
|---|---|---|---|
| Analyseren | Herman | Destiny | Cindy |
| Beslissen | Åsa | Anne | Suzan |
| Communiceren | Kees | Tim | Grietje |
| Creativiteit | Harry | Inez | Max |
| Delegeren | Herman | Charlotte | Thomas |
| Expressief | Maria | Destiny | Sem |
| Flexibiliteit | Maria | Sjors | Bob |
| Hanteren procedures & methodes | Famke | Rafael | Paul |
| Informatie verzamelen | Alfred | Charlotte | Lieke |
| Interactief leren | Alfred | Jolene | Laura |
| Klantgericht | Harry | Tim | Tess |
| Kostenbewust | Harry | Frans | Jesse |
| Kritisch | Kees | Jolene | Judith |
| Kwaliteitsgericht | Herman | Sjors | Steve |
| Leiderschap | Ali | Rafael | Quirijn |
| Netwerken | Famke | Louise | Erik |
| Omgevingsbewust | Åsa | Bernard | Jan |
| Plannen & organiseren | Famke | Inez | Tiffany |
| Samenwerken | Kees | Anne | Kars |
| Stressbestendig | Ali | Frans | Ivar |
| Structureren | Alfred | Edwin | Gijs |
| Team building | Åsa | Louise | Piet |
| Verantwoordelijkheid nemen | Ali | Edwin | Ronald |
| Visie/Strategie ontwikkelen | Maria | Bernard | Mirthe |

# APPENDIX 9: DEFINITION COMPETENCIES

This appendix will elaborate on the definition of the various competencies involved with tender management according to literature. The definition is based on the definition FNV (2018) uses, however they are adjusted according to their suitability for the game CompeTender.

| Competentie | Omschrijving |
|---|---|
| Analyseren | Probleem kunnen ontleden in deelproblemen, samenhang tussen verschillende zaken herkennen en beschrijven |
| Beslissen | Richting geven aan bewegingen binnen vakgebied, keuzes kunnen dan wel moeten maken |
| Communiceren | Communicatiestijl af kunnen stemmen op doelgroep & behoefte van de ander, verbinden met een ander door middel van (verbale) communicatie |
| Creativiteit | Oplossingen en voorstellen op originele en oorspronkelijke wijze formuleren en vormgeven, patronen en figuren ontwerpen, personen, situaties of gebeurtenissen op kunstzinnige wijze uitbeelden |
| Delegeren | Clusteren van taken en deze overdragen, afspraken maken over targets, effectief gebruik maken competenties en beschikbaarheid van anderen |
| Expressief | Enthousiasme uitstralen, objecten, ruime of tekst zodanig vormgeven dat dit gevoelens uitdrukt, zichzelf kunnen uitten op papier. |
| Flexibiliteit | Veranderen van gedragsstijl om zo een doel te bereiken, kunnen omgaan met veranderingen, aanpassen aan veranderde randvoorwaarden |
| Hanteren procedures & methodes | Methodische en gestructureerde aanpak van problemen, eventueel door gebruik van meerdere methodes, afwijking op geldende procedures en methodes aangeven. Kennis van bestaan en gebruik van methodes/procedures. |
| Informatie verzamelen | Inzicht in deugdelijkheid en relevantie van informatiebronnen |
| Interactief leren | Openstaan voor feedback, voorbeeldgedrag. Kennis/Inzichten vergaren door middel van feedback en dit vervolgens effectief inzetten |
| Klantgericht | Anticiperen op wensen van klanten en deze vertalen in nieuwe producten of diensten. Kennis van klanten en hun wensen/waarden |
| Kostenbewust | Kennis van waarde van geld, meerwaarde, het verschil tussen prijs en waarde. In denken en doen gericht op optimaal gebruik van tijd, geld en andere middelen. |
| Kritisch | Oordelend en analyserend kijken naar producten/processen/personen en aangeven waar eventuele verbeterpunten zich bevinden. |
| Kwaliteitsgericht | Hoge eisen stellen aan kwaliteit en adequaat faciliteren, voorbeeldgedrag vertonen waarin voortdurend streven naar verbetering van prestaties zichtbaar is |
| Leiderschap | Targets bepalen en richting geven aan wijze waarop ze behaald kunnen worden, professionals aansturen, strategische doelen formuleren, bepalen op welke wijze te behalen resultaten gestimuleerd worden. |
| Netwerken | Leggen van contacten waar men voordeel uit kan behalen, het weten te ontsluiten van (specifieke) kennis of kunde door middel van een netwerk |

| | |
|---|---|
| Omgevingsbewust | Kennis van maatschappelijke en politieke ontwikkelingen effectief in weten te zetten voor functie/organisatie. Ook kennis van de markt en de trends die hierbinnen zichtbaar zijn. |
| Plannen & organiseren | Prioriteiten en subdoelen stellen voor grote effectiviteit, bepalen van benodigde acties, tijd en middelen om vooropgestelde doelen te realiseren |
| Samenwerken | Inzetten voor gezamenlijk resultaat & belang, benaderen van relaties om kwaliteit dienstverlening te verhogen |
| Stressbestendig | Effectief en efficiënt blijven werken in onzekere situaties, bewust blijven van consequenties |
| Structureren | Een logische volgorde en opbouw aanbrengen in informatiestukken en deze richting anderen weten over te brengen |
| Team building | Initiëren van ontwikkeling van gemeenschappelijke doelstellingen en uitgangspunten, onderlinge betrokkenheid teamleden vergroten met als gevolg verbeterde onderlinge samenwerking |
| Verantwoordelijkheid nemen | Staan voor keuzes/handelingen en daarop aangesproken kunnen worden. Ook het alloceren van verantwoordelijkheden binnen een organisatie of team. |
| Visie/Strategie ontwikkelen | Doelstellingen formuleren voor lange termijn, richting geven aan bewegingen binnen vakgebied. |

# APPENDIX 10: COMPETENDER PRESENTATION FOR TENDER PROFESSIONALS

SWECO
TUDelft

## CompeTender
Speluitleg

COMPETENDER SPELUITLEG 1 2018-06-27

SWECO
TUDelft

### INTRODUCTIE

**Hilde Keizer**
Master *'Construction Management & Engineering (CME)'* aan TU Delft

Afstudeeronderzoek naar competenties voor tendermanagement binnen een ingenieursbureau

COMPETENDER SPELUITLEG 2 2018-06-27

SWECO
TUDelft

### COMPETENDER – WAAROM?

**Doel:**

*Inzicht geven in de competenties die tijdens het uitvoeren van tendermanagement worden ingezet. Daarnaast kijk ik of er onderscheid gemaakt kan worden tussen verschillende projecttypes.*

COMPETENDER SPELUITLEG 3 2018-06-27

SWECO
TUDelft

### COMPETENDER – HOE?

Tenderteam samenstellen op basis van de benodigde competenties voor het uitvoeren van de verschillende taken in verschillende fases van de tender.

COMPETENDER SPELUITLEG 4 2018-06-27

SWECO
TUDelft

### COMPETENDER - SPELONDERDELEN

CompeTender bestaat uit de volgende spelonderdelen:
- Bord
- Project type kaarten (*"Aanbestedingsleidraad"*)
- Team kaarten
- Taken kaarten
- Antwoordformulier
- Extra

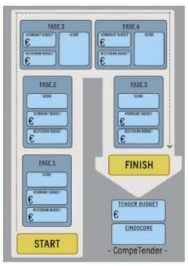
COMPETENDER SPELUITLEG 5 2018-06-27

SWECO
TUDelft

### BORD

Bord bestaat uit 5 fases.
Score & budget worden op het bord bijgehouden.

Na iedere fase wordt score & budget door mij geregistreerd.




COMPETENDER SPELUITLEG 6 2018-06-27

SWECO
TUDelft

### PROJECT TYPE KAARTEN

Er kan voor drie verschillende project types getenderd worden: Raamcontract, Ingenieursdiensten en Aannemersdiensten.


COMPETENDER SPELUITLEG 7 2018-06-27

SWECO
TUDelft

### TEAM KAARTEN

Teams kunnen samengesteld worden op basis van competenties. Er zijn drie prijsniveaus:

| | |
|---|---|
| - Senior | €1600 |
| - Medior | €1200 |
| - Junior | €700 |


COMPETENDER SPELUITLEG 8 2018-06-27

## TAKEN KAARTEN

CompeTender bestaat uit 5 fases, gedurende elke fase moeten verschillende taken worden uitgevoerd.

**LET OP! Houd bij het samenstellen van je team de komende taken (zie poster) in je achterhoofd!**




## ANTWOORDFORMULIER


Online antwoordformulier
Geef na iedere ronde a.u.b. aan **waarom** je bepaalde teamleden kiest.

Scores & budget bijhouden op spelbord
Teamleden bijhouden op hulpformulier.



## EXTRA'S

Er zijn een aantal extra's toegevoegd om het spelgemak te vergroten:
- Lijst met definities van competenties
- Lijst met overzicht van locatie van competenties
- Lijst met overzicht team kaarten en bijbehorende competenties.
- Papieren antwoordformulier



## COMPETENDER - SPELREGELS

| | |
|---|---|
| **Tijd** | **40 minuten** |
| **Budget** | **€40.000,-** |
| **Team** | **Liefst < 9 personen** |
| > 8 personen | €1000 boete |
| Wisselen | €300 / nieuw teamlid |
| Fase 1 & 5 | Senior rol verplicht aanwezig |



## COMPETENDER - SPELREGELS

Na iedere fase wordt door de spelleider de balans opgemaakt:
- Welke personen zijn er ingezet?
- Waarom?
- Scores worden vergaard a.d.h.v. excel.



VEEL SPELPLEZIER
& MAY THE BEST TEAM WIN!

# APPENDIX 11: ANOVA ANALYSIS OF MEAN VALUES

This appendix contains the dataset that was used for the ANOVA analysis and the calculation in chapter 5. Besides that, the tables with the calculation of the variance values are also included.

*Table 39: : Dataset ANOVA analysis - mean values from the amount of competencies*

| DATASET | | | | | | |
|---|---|---|---|---|---|---|
| | PHASE 1 | PHASE 2 | PHASE 3 | PHASE 4 | PHASE 5 | |
| Competencies | # | # | # | # | # | |
| PLAYER | | | | | | |
| 1 | 8 | 9 | 13 | 13 | 12 | |
| 2 | 7 | 19 | 14 | 17 | 10 | |
| 3 | 11 | 13 | 14 | 12 | 9 | |
| 4 | | | | | | |
| 5 | 9 | 17 | 20 | 10 | 9 | |
| 6 | 11 | 13 | 10 | 6 | 4 | |
| 7 | 17 | 23 | 16 | 14 | 6 | |
| 8 | 12 | 11 | 12 | 16 | 13 | |
| 9 | 14 | 11 | 16 | 10 | 9 | |
| 10 | 14 | 14 | 14 | 14 | 15 | |
| 11 | 8 | 9 | 7 | 12 | 8 | |
| 12 | 15 | 11 | 13 | 13 | 13 | |
| 13 | 15 | 15 | 12 | 13 | 13 | |
| 14 | 9 | 8 | 6 | 11 | 12 | |
| 15 | 13 | 14 | 12 | 12 | 13 | |
| 16 | 20 | 14 | 11 | 11 | 7 | |
| 17 | 10 | 8 | 9 | 5 | 5 | |
| 18 | 10 | 12 | 10 | 8 | 12 | |
| 19 | 9 | 6 | 12 | 10 | 11 | |
| 20 | 13 | 13 | 16 | 14 | 11 | |
| 21 | 15 | 12 | 6 | 12 | 13 | |
| 22 | 13 | 16 | 13 | 12 | 4 | |
| 23 | 10 | 11 | 13 | 9 | 7 | |
| 24 | 8 | 10 | 11 | 11 | 9 | |
| 25 | 11 | 10 | 11 | 9 | 8 | |
| 26 | 12 | 14 | 15 | 9 | 9 | |
| 27 | 19 | 18 | 14 | 10 | 6 | |
| 28 | 6 | 9 | 9 | 7 | 7 | |
| 29 | 9 | 13 | 11 | 14 | 8 | |
| 30 | 14 | 8 | 12 | 15 | 11 | |
| 31 | 9 | 6 | 9 | 9 | 4 | |
| 32 | 12 | 12 | 12 | 6 | 13 | |
| 33 | 14 | 11 | 11 | 11 | 13 | |
| 34 | 10 | 12 | 12 | 15 | 12 | |
| | | | | | | ALL PHASES |
| SUM | 387 | 402 | 396 | 370 | 316 | 1871 |
| AVERAGE (MEAN) | 11,727 | 12,182 | 12,000 | 11,212 | 9,576 | 11,339 |

The next section will elaborate on the calculation part of the ANOVA analysis.

The **between-groups variance** is calculated as follows (see also Table 40):

$$\hat{\sigma}^2 = \frac{\sum n_j(\bar{x}_j - \bar{\bar{x}})^2}{k-1}$$

Where:

$n_j$ = number of items in sample *j*.
$\bar{x}_j$ = mean value of sample *j*.
$\bar{\bar{x}}$ = mean value of all the values of all samples.
$k$ = the number of samples.

$$\hat{\sigma}^2 = \frac{\sum 33 * \left(\bar{x}_j - \bar{\bar{x}}\right)^2}{5-1}$$

$$\hat{\sigma}^2 = \frac{33 * [(11{,}727 - 11{,}339)^2 + (12{,}182 - 11{,}339)^2 + (12 - 11{,}339)^2 + (22{,}212 - 11{,}339)^2 + (9{,}576 - 11{,}339)^2]}{4}$$

$$\hat{\sigma}^2 = \frac{33 * 4{,}423}{4}$$

$$\boldsymbol{\hat{\sigma}^2 = 36{,}491}$$

*Table 40: Calculation of 'between-groups variance'*

| BETWEEN GROUPS VARIANCE | | | |
|---|---|---|---|
| $\mu_1$ | 11,727 | | |
| $\mu_2$ | 12,182 | | |
| $\mu_3$ | 12,000 | | |
| $\mu_4$ | 11,212 | | |
| $\mu_5$ | 9,576 | | |
| $\mu_n$ | 11,339 | | |
| | | | $(\mu_j - \mu_n)^2$ |
| $\mu_1 - \mu_n$ | 0,388 | > | 0,150 |
| $\mu_2 - \mu_n$ | 0,842 | > | 0,710 |
| $\mu_3 - \mu_n$ | 0,661 | > | 0,436 |
| $\mu_4 - \mu_n$ | -0,127 | > | 0,016 |
| $\mu_5 - \mu_n$ | -1,764 | > | 3,110 |
| | | SUM | 4,423 |
| | | * 33 | 145,964 |
| | k | 5 | |
| | k-1 | 4 | |
| Variance between groups | | | 36,491 |

The **within-groups variance** is calculated the following way (see also Table 41):

$$\hat{\sigma}^2 = \sum \frac{(n_j - 1)}{(n_T - k)} S_j^2$$

Where:

$n_T = \sum n_j$ = Total number of items in all samples of the dataset

$S_j^2 = \frac{\sum(x - \overline{x_j})^2}{n-1}$ = Sample variance

$$S_1^2 = \frac{\sum(x - \overline{x_1})^2}{33 - 1} = \frac{354{,}545}{32} = 11{,}0795$$

$$S_2^2 = \frac{\sum(x - \overline{x_2})^2}{33 - 1} = \frac{434{,}909}{32} = 13{,}5909$$

$$S_3^2 = \frac{\sum(x - \overline{x_3})^2}{33 - 1} = \frac{278}{32} = 8{,}6875$$

$$S_4^2 = \frac{\sum(x - \overline{x_4})^2}{33 - 1} = \frac{275{,}515}{32} = 8{,}6098$$

$$S_5^2 = \frac{\sum(x - \overline{x_5})^2}{33 - 1} = \frac{310{,}061}{32} = 9{,}6894$$

$$\frac{(n_j - 1)}{(n_T - k)} = \frac{33 - 1}{(5 * 33) - 5} = \frac{32}{160} = 0{,}2$$

With these values, the within-groups variance can be calculated:

$$\hat{\sigma}^2 = \sum \frac{(n_j - 1)}{(n_T - k)} S_j^2$$

$$\hat{\sigma}^2 = 0{,}2 * \sum S_j^2$$

$$\hat{\sigma}^2 = 0{,}2 * (11{,}0795 + 13{,}5909 + 8{,}6875 + 8{,}6098 + 9{,}6894)$$

$$\hat{\sigma}^2 = 0{,}2 * 51{,}657$$

$$\boldsymbol{\hat{\sigma}^2 = 10{,}331}$$

*Table 41: Calculation of the within-groups variance*

| WITHIN GROUP VARIANCE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| PHASE 1 $x-\mu_1$ | PHASE 2 $x-\mu_2$ | PHASE 3 $x-\mu_3$ | PHASE 4 $x-\mu_4$ | PHASE 5 $x-\mu_5$ | $(x_1-\mu_1)^2$ | $(x_2-\mu_2)^2$ | $(x_3-\mu_3)^2$ | $(x_4-\mu_4)^2$ | $(x_5-\mu_5)^2$ |
| -3,727 | -3,182 | 1,000 | 1,788 | 2,424 | 13,893 | 10,124 | 1,000 | 3,197 | 5,877 |
| -4,727 | 6,818 | 2,000 | 5,788 | 0,424 | 22,347 | 46,488 | 4,000 | 33,500 | 0,180 |
| -0,727 | 0,818 | 2,000 | 0,788 | -0,576 | 0,529 | 0,669 | 4,000 | 0,621 | 0,331 |
| | | | | | | | | | |
| -2,727 | 4,818 | 8,000 | -1,212 | -0,576 | 7,438 | 23,215 | 64,000 | 1,469 | 0,331 |
| -0,727 | 0,818 | -2,000 | -5,212 | -5,576 | 0,529 | 0,669 | 4,000 | 27,166 | 31,089 |
| 5,273 | 10,818 | 4,000 | 2,788 | -3,576 | 27,802 | 117,033 | 16,000 | 7,772 | 12,786 |
| 0,273 | -1,182 | 0,000 | 4,788 | 3,424 | 0,074 | 1,397 | 0,000 | 22,924 | 11,725 |
| 2,273 | -1,182 | 4,000 | -1,212 | -0,576 | 5,165 | 1,397 | 16,000 | 1,469 | 0,331 |
| 2,273 | 1,818 | 2,000 | 2,788 | 5,424 | 5,165 | 3,306 | 4,000 | 7,772 | 29,422 |
| -3,727 | -3,182 | -5,000 | 0,788 | -1,576 | 13,893 | 10,124 | 25,000 | 0,621 | 2,483 |
| 3,273 | -1,182 | 1,000 | 1,788 | 3,424 | 10,711 | 1,397 | 1,000 | 3,197 | 11,725 |
| 3,273 | 2,818 | 0,000 | 1,788 | 3,424 | 10,711 | 7,942 | 0,000 | 3,197 | 11,725 |
| -2,727 | -4,182 | -6,000 | -0,212 | 2,424 | 7,438 | 17,488 | 36,000 | 0,045 | 5,877 |
| 1,273 | 1,818 | 0,000 | 0,788 | 3,424 | 1,620 | 3,306 | 0,000 | 0,621 | 11,725 |
| 8,273 | 1,818 | -1,000 | -0,212 | -2,576 | 68,438 | 3,306 | 1,000 | 0,045 | 6,635 |
| -1,727 | -4,182 | -3,000 | -6,212 | -4,576 | 2,983 | 17,488 | 9,000 | 38,590 | 20,938 |
| -1,727 | -0,182 | -2,000 | -3,212 | 2,424 | 2,983 | 0,033 | 4,000 | 10,318 | 5,877 |
| -2,727 | -6,182 | 0,000 | -1,212 | 1,424 | 7,438 | 38,215 | 0,000 | 1,469 | 2,028 |
| 1,273 | 0,818 | 4,000 | 2,788 | 1,424 | 1,620 | 0,669 | 16,000 | 7,772 | 2,028 |
| 3,273 | -0,182 | -6,000 | 0,788 | 3,424 | 10,711 | 0,033 | 36,000 | 0,621 | 11,725 |
| 1,273 | 3,818 | 1,000 | 0,788 | -5,576 | 1,620 | 14,579 | 1,000 | 0,621 | 31,089 |
| -1,727 | -1,182 | 1,000 | -2,212 | -2,576 | 2,983 | 1,397 | 1,000 | 4,893 | 6,635 |
| -3,727 | -2,182 | -1,000 | -0,212 | -0,576 | 13,893 | 4,760 | 1,000 | 0,045 | 0,331 |
| -0,727 | -2,182 | -1,000 | -2,212 | -1,576 | 0,529 | 4,760 | 1,000 | 4,893 | 2,483 |
| 0,273 | 1,818 | 3,000 | -2,212 | -0,576 | 0,074 | 3,306 | 9,000 | 4,893 | 0,331 |
| 7,273 | 5,818 | 2,000 | -1,212 | -3,576 | 52,893 | 33,851 | 4,000 | 1,469 | 12,786 |
| -5,727 | -3,182 | -3,000 | -4,212 | -2,576 | 32,802 | 10,124 | 9,000 | 17,742 | 6,635 |
| -2,727 | 0,818 | -1,000 | 2,788 | -1,576 | 7,438 | 0,669 | 1,000 | 7,772 | 2,483 |
| 2,273 | -4,182 | 0,000 | 3,788 | 1,424 | 5,165 | 17,488 | 0,000 | 14,348 | 2,028 |
| -2,727 | -6,182 | -3,000 | -2,212 | -5,576 | 7,438 | 38,215 | 9,000 | 4,893 | 31,089 |
| 0,273 | -0,182 | 0,000 | -5,212 | 3,424 | 0,074 | 0,033 | 0,000 | 27,166 | 11,725 |
| 2,273 | -1,182 | -1,000 | -0,212 | 3,424 | 5,165 | 1,397 | 1,000 | 0,045 | 11,725 |
| -1,727 | -0,182 | 0,000 | 3,788 | 2,424 | 2,983 | 0,033 | 0,000 | 14,348 | 5,877 |
| | | | | SUM | 354,545 | 434,909 | 278,000 | 275,515 | 310,061 |

| | | $S1^2$ | $S2^2$ | $S3^2$ | $S4^2$ | $S5^2$ | SUM |
|---|---|---|---|---|---|---|---|
| n-1 | 32 | 11,0795 | 13,5909 | 8,6875 | 8,6098 | 9,6894 | 51,657 |

$$\frac{Nj-1}{Nt-k} \quad 33\text{-}1/(5*33)\text{-}5 \quad 0{,}200$$

| Within group variance | 10,331 |
|---|---|

Now the between-groups variance and within-groups variance are known, the F-value for the ANOVA analysis can be determined, as

$$F = \frac{between-groups\ estimated\ variance}{within-groups\ estimated\ variance}$$

$$\boldsymbol{F = \frac{36,491}{10,331} = 3,532}$$

*Table 42: Calculation of F-value*

| F | |
|---|---|
| *F=between/within* | |
| Variance between groups | 36,491 |
| Within group variance | 10,331 |
| F | 3,532 |

Usually, F-values > 1 point out that the $H_0$ should be rejected (Fellows & Liu, 2015). In order to check whether this assumption holds, $F_{calc}$ needs to be compared with $F_{tab}$, as it is the case that when $F_{calc} < F_{tab}$ $H_0$ should not be rejected. In order to be able to compare $F_{calc}$ with $F_{tab}$, first $F_{tab}$ needs to be determined. For the determination, we make use of a F-table with a right tail probability of α = 0,05. Based on the dataset, the degrees of freedom in the numerator ($d_{f1}$) and the degrees of freedom in the denominator ($d_{f2}$) need to be calculated.

$$d_{f1} = (k - 1) = 5 - 1 = 4$$

$$d_{f2} = (n_T - k) = 165 - 5 = 160$$

The values resulting from the F-table with a right tail probability of α = 0,05 around the values $d_{f1}$ = 4 and $d_{f2}$ = 160 are shown in the table below:

*Table 43: F-table for α = 0,05*

| $d_{f2}$ \ $d_{f1}$ | 3 | 4 | 5 |
|---|---|---|---|
| 60 | *2,7581* | *2,5252* | *2,3683* |
| 120 | *2,6802* | *2,4472* | *2,2899* |
| ∞ | *2,6049* | *2,3719* | *2,2141* |

Table 43 shows that as $d_{f1}$ increases, the value of $F_{tab}$ decreases. The same goes for the value of $d_{f2}$. As the calculated value of $d_{f2}$ is 160 and this value is not present in the table, it is necessary to make an assumption about the $F_{tab}$-value for $d_{f1}$=4 and $d_{f2}$=160. The blue cells give an indication for this $F_{tab}$-value, which is likely to be between [2,319 ; 2,4472], as 120 < 160 ($d_{f2}$) < ∞.

Therefore $F_{calc} > F_{tab}$ , as 3,532 > [2,319 ; 2,4472], which implies that $H_0$ should be rejected. This means that there is case of a significant difference between the mean values of the amount of competencies for each phase, and these cannot be considered similar.

# APPENDIX 12: RANKING COMPETENDER RESULTS

This appendix contains the overview of the ranking of competencies as a result from the CompeTender data analysis for both all separate phases of the game and the overall result. The ranking is based on the number of times a certain competency is present in a certain phase, ranging from high to low presence.

As can be seen in Table 44, every competency has colour marking which corresponds to the allocated competency category. Besides that, after every ranking two rows of percentages are shown. The first row (% TOTAL) shows the relative presence of each competency when compared to the total amount of competencies that was used by all players during the CompeTender sessions (which was 2018). The second row (% PHASE) shows the relative presence for that competency when considering the total amount of competencies that was used during that particular phase (which differs per phase, as concluded in paragraph 5.2.5).

*Table 44: Ranking CompeTender results including category allocation for competencies*

| | ALL PHASES | % | |
|---|---|---|---|
| | Competency | TOTAL | PHASE |
| 1 | Being creative | 6,9% | 6,9% |
| 2 | Having environmental awareness | 5,7% | 5,7% |
| 3 | Planning & organizing | 5,7% | 5,7% |
| 4 | Analysing | 5,4% | 5,4% |
| 5 | Being cost-conscious | 5,4% | 5,4% |
| 6 | Being customer-oriented | 5,2% | 5,2% |
| 7 | Communicating | 4,5% | 4,5% |
| 8 | Being critical | 4,5% | 4,5% |
| 9 | Deciding | 4,4% | 4,4% |
| 10 | Being quality-oriented | 4,3% | 4,3% |
| 11 | Take responsibility | 4,3% | 4,3% |
| 12 | Leadership | 4,2% | 4,2% |
| 13 | Structuring | 4,0% | 4,0% |
| 14 | Information gathering | 4,0% | 4,0% |
| 15 | Team building | 4,0% | 4,0% |
| 16 | Being expressive | 3,9% | 3,9% |
| 17 | Handling procedures & methods | 3,8% | 3,8% |
| 18 | Being stress-resistant | 3,5% | 3,5% |
| 19 | Developing vision/strategy | 3,4% | 3,4% |
| 20 | Collaborating | 3,3% | 3,3% |
| 21 | Delegating | 2,7% | 2,7% |
| 22 | Being flexible | 2,5% | 2,5% |
| 23 | Interactive learning | 2,2% | 2,2% |
| 24 | Networking | 2,2% | 2,2% |
| | | 100% | 100% |

| | PHASE 1 | % | |
|---|---|---|---|
| | Competency | TOTAL | PHASE |
| 1 | Having environmental awareness | 1,9% | 9,0% |
| 2 | Deciding | 1,7% | 8,0% |
| 3 | Team building | 1,7% | 8,0% |
| 4 | Being creative | 1,3% | 6,5% |
| 5 | Planning & organizing | 1,3% | 6,5% |
| 6 | Analysing | 1,3% | 6,2% |
| 7 | Developing vision/strategy | 1,1% | 5,2% |
| 8 | Being cost-conscious | 1,0% | 4,9% |
| 9 | Leadership | 1,0% | 4,7% |
| 10 | Take responsibility | 0,9% | 4,1% |
| 11 | Handling procedures & methods | 0,7% | 3,6% |
| 12 | Being customer-oriented | 0,7% | 3,4% |
| 13 | Information gathering | 0,6% | 3,1% |
| 14 | Structuring | 0,6% | 3,1% |
| 15 | Collaborating | 0,6% | 2,8% |
| 16 | Being critical | 0,6% | 2,8% |
| 17 | Delegating | 0,6% | 2,8% |
| 18 | Being expressive | 0,6% | 2,8% |
| 19 | Being stress-resistant | 0,6% | 2,8% |
| 20 | Networking | 0,5% | 2,6% |
| 21 | Communicating | 0,5% | 2,3% |
| 22 | Being quality-oriented | 0,4% | 1,8% |
| 23 | Interactive learning | 0,3% | 1,6% |
| 24 | Being flexible | 0,3% | 1,3% |
| | | 20,7% | 100% |

| | PHASE 2 | % | |
|---|---|---|---|
| | Competency | TOTAL | PHASE |
| 1 | Analysing | 1,5% | 7,0% |
| 2 | Being creative | 1,3% | 6,0% |
| 3 | Planning & organizing | 1,3% | 6,0% |
| 4 | Information gathering | 1,2% | 5,7% |
| 5 | Structuring | 1,2% | 5,5% |
| 6 | Having environmental awareness | 1,1% | 5,2% |
| 7 | Being cost-conscious | 1,0% | 4,7% |
| 8 | Being customer-oriented | 1,0% | 4,7% |
| 9 | Developing vision/strategy | 1,0% | 4,7% |
| 10 | Handling procedures & methods | 1,0% | 4,5% |
| 11 | Being expressive | 0,9% | 4,2% |
| 12 | Leadership | 0,9% | 4,0% |
| 13 | Take responsibility | 0,9% | 4,0% |
| 14 | Communicating | 0,8% | 3,7% |
| 15 | Being quality-oriented | 0,8% | 3,7% |
| 16 | Collaborating | 0,7% | 3,5% |
| 17 | Networking | 0,7% | 3,5% |
| 18 | Being critical | 0,7% | 3,2% |
| 19 | Delegating | 0,7% | 3,2% |
| 20 | Deciding | 0,6% | 3,0% |
| 21 | Team building | 0,6% | 3,0% |
| 22 | Interactive learning | 0,5% | 2,5% |
| 23 | Being flexible | 0,5% | 2,2% |
| 24 | Being stress-resistant | 0,5% | 2,2% |
| | | 21,5% | 100% |

Also, every phase is accommodated of a division of grey-tones on the left side. This greyscale provides an indication of the importance of each competency for every phase. This scale and the corresponding bold lines which divide the competencies into three sections were determined as follows:

- The most important competencies for each phase. These are the competencies which have a %PHASE corresponding to 4,2% or higher. The value of 4,2% is determined on basis of the fact that there are in total 24 competencies, which have to divide 100% ( 100/24 = 4,1667 ≈ 4,2 ).
- The competencies which are of medium importance to the compilation of a competency-based profile for tender management professionals. The range for this section lies between the %PHASE values of 2,8% and 4,2%. The value of 2,8% is determined the following way: 100/(1,5*24) = 100/36 = 2,778 ≈ 2,8.
- These competencies are least important for the compilation of a tender management profile for the corresponding phase. The relative presence for these competencies ranges from 0% to <2,8%.
-

A. Personal competencies
B. Social competencies
C. Organizational competencies
E. Technical competencies
F. Artistic competencies
G. Data handling competencies

| | PHASE 3 | % | |
|---|---|---|---|
| | Competency | TOTAL | PHASE |
| 1 | Being creative | 1,7% | 7,8% |
| 2 | Planning & organizing | 1,3% | 6,3% |
| 3 | Information gathering | 1,3% | 6,1% |
| 4 | Being customer-oriented | 1,2% | 5,8% |
| 5 | Analysing | 1,2% | 5,6% |
| 6 | Being cost-conscious | 1,1% | 5,3% |
| 7 | Structuring | 1,1% | 5,1% |
| 8 | Communicating | 1,0% | 4,8% |
| 9 | Having environmental awareness | 1,0% | 4,8% |
| 10 | Being critical | 1,0% | 4,5% |
| 11 | Being quality-oriented | 1,0% | 4,5% |
| 12 | Being expressive | 0,9% | 4,3% |
| 13 | Handling procedures & methods | 0,9% | 4,0% |
| 14 | Take responsibility | 0,9% | 4,0% |
| 15 | Leadership | 0,8% | 3,8% |
| 16 | Collaborating | 0,6% | 3,0% |
| 17 | Being stress-resistant | 0,6% | 3,0% |
| 18 | Developing vision/strategy | 0,6% | 3,0% |
| 19 | Delegating | 0,6% | 2,8% |
| 20 | Being flexible | 0,5% | 2,5% |
| 21 | Interactive learning | 0,5% | 2,5% |
| 22 | Deciding | 0,5% | 2,3% |
| 23 | Networking | 0,4% | 2,0% |
| 24 | Team building | 0,4% | 2,0% |
| | | 21,2% | 100% |

| | PHASE 4 | % | |
|---|---|---|---|
| | Competency | TOTAL | PHASE |
| 1 | Being cost-conscious | 1,4% | 7,0% |
| 2 | Being creative | 1,4% | 7,0% |
| 3 | Being critical | 1,3% | 6,5% |
| 4 | Being customer-oriented | 1,2% | 6,2% |
| 5 | Being quality-oriented | 1,2% | 6,2% |
| 6 | Communicating | 1,1% | 5,7% |
| 7 | Having environmental awareness | 1,0% | 4,9% |
| 8 | Planning & organizing | 0,9% | 4,6% |
| 9 | Analysing | 0,9% | 4,3% |
| 10 | Leadership | 0,9% | 4,3% |
| 11 | Being stress-resistant | 0,9% | 4,3% |
| 12 | Deciding | 0,8% | 4,1% |
| 13 | Being expressive | 0,8% | 4,1% |
| 14 | Take responsibility | 0,8% | 4,1% |
| 15 | Collaborating | 0,7% | 3,5% |
| 16 | Being flexible | 0,7% | 3,5% |
| 17 | Handling procedures & methods | 0,6% | 3,0% |
| 18 | Structuring | 0,6% | 3,0% |
| 19 | Team building | 0,6% | 3,0% |
| 20 | Information gathering | 0,5% | 2,7% |
| 21 | Interactive learning | 0,5% | 2,7% |
| 22 | Delegating | 0,4% | 2,2% |
| 23 | Developing vision/strategy | 0,4% | 2,2% |
| 24 | Networking | 0,2% | 1,1% |
| | | 19,8% | 100% |

| | PHASE 5 | % | |
|---|---|---|---|
| | Competency | TOTAL | PHASE |
| 1 | Being creative | 1,3% | 7,6% |
| 2 | Communicating | 1,1% | 6,3% |
| 3 | Being customer-oriented | 1,0% | 6,0% |
| 4 | Being critical | 1,0% | 5,7% |
| 5 | Being quality-oriented | 1,0% | 5,7% |
| 6 | Being stress-resistant | 0,9% | 5,4% |
| 7 | Take responsibility | 0,9% | 5,4% |
| 8 | Being cost-conscious | 0,9% | 5,1% |
| 9 | Deciding | 0,9% | 5,1% |
| 10 | Planning & organizing | 0,8% | 4,7% |
| 11 | Having environmental awareness | 0,7% | 4,4% |
| 12 | Leadership | 0,7% | 4,4% |
| 13 | Being expressive | 0,7% | 4,1% |
| 14 | Collaborating | 0,6% | 3,8% |
| 15 | Handling procedures & methods | 0,6% | 3,8% |
| 16 | Team building | 0,6% | 3,8% |
| 17 | Analysing | 0,6% | 3,5% |
| 18 | Structuring | 0,5% | 3,2% |
| 19 | Being flexible | 0,5% | 2,8% |
| 20 | Delegating | 0,4% | 2,5% |
| 21 | Interactive learning | 0,3% | 1,9% |
| 22 | Information gathering | 0,3% | 1,6% |
| 23 | Networking | 0,3% | 1,6% |
| 24 | Developing vision/strategy | 0,3% | 1,6% |
| | | 16,9% | 100% |

# APPENDIX 13: QUALITATIVE DATA COMPETENDER

This appendix contains the qualitative data gathered through all playrounds of CompeTender. There are two types of qualitative data, which is marked with colours corresponding to the competency category that it refers to. First, an overview of all CompeTender sessions and the corresponding participants will be given in Table 45. After that, the remarks from participants will be discussed. These remarks are divided into two categories, shown in Table 46 and freely translated. The first section of 'Remarks' deals with general remarks, which consists of things noticed by the game leader and remarks of the players on the tendering process as it is currently perceived. The second section answers the question whether or not the player used the project type card in his/her choice for team members and whether or not they make a distinction in the choice for competencies when it comes to a different project type. The third and final section of this table, 'Remarks PT', deals with the remarks players specifically have on the project type and competencies regarding this topic.

The third table, Table 47, shows all justification on the compiled teams for CompeTender retrieved through the online answer form of the game. The participants was asked to elaborate a little bit on their team compilation and to provide insight in why certain team members were chosen, whether they linked certain competencies to certain tasks and so on.

*Table 45: Overview of CompeTender gaming sessions*

| Session | Date | Player(s) |
|---|---|---|
| 1 | 13-8-2018 | 4, 17 |
| 2 | 14-8-2018 | 12, 30, 32 |
| 3 | 15-8-2018 | 33 |
| 4 | 15-8-2018 | 8 |
| 5 | 15-8-2018 | 19, 28, 34 |
| 6 | 22-8-2018 | 18, 21, 29 |
| 7 | 22-8-2018 | 16, 22, 27 |
| 8 | 23-8-2018 | 24, 25, 31 |
| 9 | 27-8-2018 | 3 |
| 10 | 28-8-2018 | 5, 26 |
| 11 | 28-8-2018 | 11 |
| 12 | 28-8-2018 | 13 |
| 13 | 30-8-2018 | 1, 14 |
| 14 | 31-8-2018 | 7 |
| 15 | 3-9-2018 | 9 |
| 16 | 4-9-2018 | 20 |
| 17 | 5-9-2018 | 6, 23 |
| 18 | 7-9-2018 | 10, 15 |
| 19 | 10-9-2018 | 2 |

The colour allocation is as follows:

- A. Personal competencies
- B. Social competencies
- C. Organizational competencies
- E. Technical competencies
- F. Artistic competencies
- G. Data handling competencies & competencies

*Table 46: Remarks from CompeTender participants*

| Round | Date | Player(s) | Remarks | Used PT? | | Remarks PT |
|---|---|---|---|---|---|---|
| | | | | No | Yes | |
| 1 | 13-8-2018 | **4, 17** | Both players search for team members who can deliver technical content. 4 Aims to keep team as constant as possible, to prevent loss of knowledge. | 4, 17 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 14-8-2018 | **12, 30, 32** | In first instance all players are quite careful while spending their budget. | 12, 31 | 30 | 30: Creativity is highly valued in a tender for construction services. This is due to the fact that within a construction company money plays a big deal. The margins on construction works are low, so therefore a constructor is always searching for inventive and creative solutions which can save time and money. 30 also states that within a construction company, in the end it is the result that counts and the municipality (client in this case) wants certainty. |
| 3 | 15-8-2018 | **33** | At first it is important to stick to the essence of competencies for tender management. As the game progresses, one can always spend more money if possible. In practice, you often work with a small team, keep a const ant core of people involved with the tender. Most of the time, the team compilation is not based on competencies, but people tend to look to who they already know within the organization and who they like to work with. At last, in 'real life' it is not common to have team members drop out and then re-enter again if they are not necessary for one or more phases. | 33 | | 33 believed that for both the framework agreement, engineering services and contractor services the same competencies are involved. This is due to the fact that the process is generic. |
| 4 | 15-8-2018 | **8** | In the last phase it is very important to have sufficient competencies in the field of expression and planning & organizing. 8 believes that taking responsibility is not a competency on its own, but that this comes within other competencies like leadership and delegating. | 8 | | |
| 5 | 15-8-2018 | **19, 28, 34** | 28 states that the only thing that in the end matters is carefulness when handing in the documents. Accuracy when it comes to the demands of the client makes or breaks the tender. Often the requirements stated in the guidelines do not match with the criteria stated on TenderNed (online hand in tool for tenders). Also creativity is very important. The tender manager should be very decisive at certain points. | 19, 18, 34 | | |
| 6 | 22-8-2018 | **18, 21, 29** | | 18 | 21, 29 | 21: there is case of a fictional case study, and it is considered while playing the game. However, it did not influence the choices. 29: Considered the project type while compiling the core of his team (which he aimed to remain constant over all phases). However, for the rest of the team, the tasks are considered to be decisive. 18: Tasks are the same for every project type, so the PT did not influence the choices for competencies. |
| 7 | 22-8-2018 | **16, 22, 27** | Something that might influence the data is the fact that people aim to keep their team constant over the phases. 22: as junior are the cheapest roles, the choices are also more flexible. | 22 | 16, 27 | |
| 8 | 23-8-2018 | **24, 25, 31** | The wifi was not working during this round, so therefore everybody had to hand in their answers analogously. This changed the dynamics of the game a little bit, as every player now started compiling the teams for the complete process before handing in the teams one by one. This could result in either people overthinking their teams and playing the game too strategic (as people want to remain within budget) on the other hand, players now consider the whole tender process as one and base their decisions on that knowledge. | 24, 31 | 25 | 25: for this project type (Constructor services) innovating is key. Therefore, creativity is very important and should always be included. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 9 | 27-8-2018 | **3** | 3 looks very closely into the definitions of the competencies as he want to be sure to interpret them right. 3 tries to keep his senior and medior team members as constant as possible, and shifts with junior team members as they are the most flexible ones (they only have one competency to keep in mind). After finishing he states that he has the feeling that he's missing creativity and structuring. He also states that the internal process should be very clear in order to understand the client demand. | | 3 | 3: the project type can influence the competencies as it is important who exactly the client is. Based on knowledge of the client, one can deciding whether or not certain competencies can provide the party with an advantage. When tendering for for example RWS or ProRail, the people judging the tender proposals are often not known. |
| 10 | 28-8-2018 | **5, 26** | 5 tries to stick to the process she is familiar with while tendering. One of the implications of this strategy is that she starts off with a small team. 26 searches for a senior and a medior that contain competencies which remain constant throughout the entire process. 26 uses the junior roles to switch competencies between the phases. In phase five it is most important to have team members who are creative and expressive. | 5 | 26 | 26 states that when tendering for contractor services, environmental awareness and decisiveness are very important. |
| 11 | 28-8-2018 | **11** | Key elements in the strategy of 11 are: one person has to be very strict and make sure to keep up with everything. Someone else needs to control everything, so that quality is ensured. 11 especially values to work creatively and expressive. To identify risks a structures person is necessary. | | 11 | Analysis of the client demand is most important in the first phase. After a thorough analysis, it is known what competencies should be highly valued by the client. When tendering for contractor services, the win fee is very important. A contractor always wants the work done faster and with less costs, so therefore you search for creative, out of the box options. When tendering for engineering services it's often about the employees you're offering in a team. Therefore, within this project type there's a large need for expressive people who have a large network within the organisation and are able to emphasize distinctive value of the offer. |
| 12 | 28-8-2018 | **13** | Very important is knowledge of the client in the first phase. Besides that, the strategy should be on point as this serves as a base for the offer. Therefore a critical view and analytical abilities should be present in the team. The first phase is the most important phase of a tender. | 13 | | |
| 13 | 30-8-2018 | **1, 14** | 1 emphasizes that the first phase is very important and that often people tend to rush in this phase, while according to him it is very important to first think before you act. He states that a lot of money is basically burned due to ill-considered decisions from the first phase. 14 shuffles his team every round, so therefore his teams really reflect the competencies he wants to have present | 14 | 1 | 1 kept the PT card in mind, which results in a large emphasis on the customer in the first three phases. |
| 14 | 31-8-2018 | **7** | During the Bid/no bid decision it is very important to gather knowledge on the other parties that were selected to bid, who are the competitors and do we have capacity during that period (planning & networking). 7 makes up a strategy which evolves around as less complexity as possible. 7 calculates that with 5 phases, 700euro per person he can deploy 10 junior team members per phase. 7 states that he likes to have a writer present in his team who doesn't need a lot of information. An independent person who is critical on the information when he/she gathers it. | | 7 | When tendering for contractor services you have to collaborate with another party (the contractor). Therefore, customer orientation is very important and cost-consciousness is also of great importance. In the end it is always the client (constructor and client) who needs to pay. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | 3-9-2018 | **9** | 9 states that his experiences with tendering are always quite stress-full, so therefore being stress-resistant is an important competency. 9 decides first to take a look at the competencies he wants to have in his team for every phase, and only after completing the entire tender process make up different teams. In the beginning you need a lot of structure due to the in-flow of information, while at the and criticism is highly valued. He states that the WBP from Sweco is very organised and a delimited process. However, in real life the phases are all mixed up. Gathering information can be difficult, because people love to tell about their work and then you get overloaded with information. Then it is hard to make sure your text won't become really tough to read. | 9 | | Collaboration is not present in his teams, as he states that you simply assume that when tendering for engineering services and you only have to collaborate with your direct colleagues, this should be a matter of course. However, when tendering for contractor services, you have to collaborate with external people, so then this competency is of great value. |
| 16 | 4-9-2018 | **20** | 20 first checks all competencies that he wants to have present in every phase. Based on this information, he makes up his teams. He states that a critical, accurate look on the tender documents is vital to the tender success. | | 20 | In a framework agreement environmental awareness is very important due to the plans for the environment. For contractor services, being customer oriented is important. Both towards the client and the contractor. When tendering for a contractor one has to bear in mind that the organisation is different than when tendering internally. Therefore, good communication is essential. Also, the link between whatever you are doing, and what that's going to cost is important. This is part of your responsibility as an external party. |
| 17 | 5-9-2018 | **6, 23** | 6 and 23 take very long to analyse the tender process and decide which competencies they want to have present. 23 starts after this analysis with checking the competencies that he wants to have present while performing tender management for all activities. He states that the PT does not influence his decisions, as the tasks are generic for all PTs. | | | |
| 18 | 7-9-2018 | **10, 15** | 15 states that now price determination is only present in phase four, but that this is something that should be considered throughout the entire process. | 10, 15 | | |
| 19 | 10-9-2018 | **2** | | | 2 | Contractor services are execution oriented, and therefore very practical. Time and planning are very important, another influence is money. Every project needs to be as cheap as possible. For a framework agreement, the competencies should more or less be similar to competencies for engineering services. This is due to the fact that engineering services follow from a framework agreement. However, in a framework agreement the emphasis is more on the process, collaboration and responsibilities, while for engineering services the actual engineering becomes more important. |

*Table 47: Justification for team compilation CompeTender*

| Round | Player | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 |
|---|---|---|---|---|---|---|
| 1 | **4** | gezonde mix van competenties in deze fase en de volgende | Gericht op risico's, structuur en kosten | Meer richting EMVI-plan en productie toewerken | Budget opmaken :-) | |
| | **17** | Start met aannemer, out of de box kunnen denken voor EMVI, planning en Creativiteit, Inez, Aannemers verwachten flexibiliteit in een kort tenderproces Bob, Asa voor de team building en Beslissingen, Harry en JEsse voor de kosten, belangrijke drive aannemer | Kwaliteit en structuur toegevoegd en leiderschap voor deze fase | Brede inzet nodig in deze fase? | goedkoop Judith inzetten om te controleren of de antwoord op de klantvraag is gegeven. Harry voor de kosten en de efficiëntie en Lieke on informatie te verzamelen en te | Ivar, voor de laatste stress momenten |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | verwerken uit de review | |
| 2 | **12** | Samenwerken en verzamelen is belangrijk | Vooral even wat kosten snijden (1e ronde vrij duur) | Sjors is flexibel en kwalitatief goed, dus goede eigenschappen voor later in de tender | kosten belangrijk | Geen ruimte meer, prima mensen dit. |
| | **30** | totaal beeld teamrollen | minder deelneemrs | ok | Asa en Steve er bij | winning bid |
| | **32** | Osa, bid/no bid beslissing, teambuilding en beslissen<br>Mirthe, bepalen visie/goedkoop<br>Kees, samenwerken, critisch<br>Quirijn, Leider om het proces te regelen/motiveren<br>Inez, plannen en organiseren, creatief voor de visie<br>Edwin, verantwoordelijkheid, structureert het proces. | Mirthe, visie/goedkoop<br>Quirijn, Leiderschap<br>Edwin, verwantwoordelijkheid/ structuur<br>Inez, creatief en organisatorisch,<br>Charlotte, info ophalen<br>Kees, kritisch,<br>Tes, klantgericht | quirijn, leiderschap<br>Kees, kritisch en samenwerking<br>Tess, klantkennis<br>Charlotte, Info verzamelen<br>Inez, creatief/plannen<br>Edwin, verantwoordelijkheid, structuur<br>Cindy, analyseren | Kees, kritisch<br>Quirijn, leider,<br>Cindy, analyse,<br>Edwin structuur | Suzan, beslissen,<br>Quirijn, leider,<br>Frans, kosten/stres<br>Kees, kritisch,<br>Harry, kosten<br>Edwin, structuur |
| 3 | **33** | Ali: leiderschap, stressbestendig, verantwoordelijk = nodig voor TM in hele proces<br><br>Inez: creatief proces en inplannen tender<br><br>Bernard: visie en strategie nodig in deze fase<br><br>Junioren: in deze fase info verzamelen, analyseren, structureren en al even kijken naar kosten | TM: hele proces gelijk<br><br>Destiny: ingezet voor schrijven, blijft sparren met Bernard<br><br>Steve: kwaliteitsgericht voor review<br><br>Andere junioren: nog steeds nodig | Judith toegevoegd vanwege kritisch blik (SMART review), Max vanwege creativiteit (afbeeldingen), Tim: vanwege communiceren | Jesse toegevoegd ivm kostenbewustheid | plannen en organiseren toegevoegd voor overdracht |
| 4 | **8** | Go-no ga door Asa, verder competenties afdekken en alvast rekening houden met volgende fases (wissel voorkomen) | fit op competenties gemaakt met zo min mogelijk wissels, Maria toegevoegd v.w. visie/strategie en schijven (expressief) | Continuiteit gematcht met benodigde competenties, Lieke terug v.w. info verz. en Frans erbij voor kostenbewust/monitor tenderbudget, en alvast handig voor volg fase stressbestendig | Asa er weer bij v.w. besluit, en lichte wijz. t.b.v. ben. comp. | Compententies gematcht, Asa er weer uit (geen besl. nodig), sjors sem en seve erbij v.w. expressie en kwaliteit |
| 5 | **19** | ntb | ntb | ntb | ntb | ntb |
| | **28** | Kosten Baten Analyse >> advisering erover richting BE >> en go/no go door BE heeft gaan andere personen nodig | strategie obv risico's opzetten en de structuur van het plan uitwerken | allemaal leuke mensen, die heel blij zijn met hun teamspirit = winnend | klein team, deskundig en gericht op de klantvraag | stressbestendigheid en accuraat voor de prijs en de laatste formaliteiten |
| | **34** | Competenties zoals benodigd | f | Nagenoeg zelfde competenties benodigd | d | j |
| 6 | **18** | Asa - combi van beslissen en teambuilding<br>Harry - duur maar wel waardevol om meteen tot kern van aanbieding te komen door klantkennis/kostenbewust en creativiteit<br>Destiny moet de uitvraag analyseren en goed over kunnen brengen (expressief)<br>Tiffany - moet de hele bende organiseren want dat gaat de rest niet doen | Gijs - Structuur moet vanaf deze fase goed aangebracht worden<br>Lieke - Info ophalen bij experts | Judith toegevoegd om kritische blik op smart en emvi toe te voegen.<br>Destiny moet gaan visualiseren/ beelden maken<br>Asa even niet nodig: er moeten meters gemaakt worden op basis van het plan uit de vorige fase. | Grietje om te zorgen dat de teksten goed aansluiten voor klantvraag<br>Frans om de stress een beetje in goede banen te leiden. | Paul om op tijd in te dienen<br>Max voor creativiteit in de presentatie |

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| | | Mirthe - visie ontbreekt en is essentieel in fase 1 | | | | |
| | **21** | drie medioren: meerdere competenties bij 1 persoon. | minider mensen gekozen. structuur, communicatie en kosten behouden bij jr/med | communiceren, organiseren, structureren en creativiteit | Met name kritisch heel belangrijk. | Geen tijd |
| | **29** | Asa, gemachtigd; Herman;analyseren ; Inez: plannen&organiseren en creativiteit; Ronald, verantwoordelijkheid nemen | Edwin ; structuren en verantwoordelijkheid nemen Tim: Klantgericht en communiceren (beide ook voor risico-analyse) Lieke ; informatie verzamelen; jan (omgevingsbewust, omgeving is grote bron van risico's) | handhaven team fase 3 | Asa terug voor bepaling prijs, team kan verder wat kleiner; Judith voor check op spelling (kritisch) | Herman /Inez als kern voor afronding /overdracht en Asa voor reflectie op voorbereiding interview |
| 7 | **16** | OSa, omdat het moet famke, plannen en organiseren harry, kostenbewust en creatief herman, delegereen en analysereren maria, visi/strategie Charlotte, info verzamelen/delegeren quirijn, goedkoop.leider | famke louise, plannen/netwerken Harry, alles Herman, delegeren/analyseren/kwaliteit Charlotte, info ophalen quirijn, leider structuur en verantwoordelijkheid | anne, beslissen/samenwerke Herman, analyseren, delegeren, kwaliteit Joline, kritisch bob, flexibel Wuirijn,leider sem expressief, jesse, kostenbewust | Hetzelfde | Charlotte, delegeren Herman, kwaliteit anne, beslissen |
| | **22** | Goed team voor visie en strategie. Schrijver meteen aangehaakt. | Lijkt me verstandig, mix van competenties | Zelfde team doorzetten | Kleiner team naar het einde toe. Vooral kritisch, niet teveel nieuwe | Hetzelfde team |
| | **27** | Breed spectrum aan competenties verdeeld over meerdere mensen. goede basis over het project. | Doorkijk naar fase 3 | Team afbouwen, focus op kwaliteit en volgende fases | Focus op huidige, nieuwe fase en vermindering kosten | voldoende voor afronding? |
| 8 | **24** | | | | | |
| | **25** | | | | | |
| | **31** | | | | | |
| 9 | **3** | Asa is verplicht. Herman kan delegeren (senior, moet niet te veel zelf doen), Frans kan letten op de kosten voor de hele tender, Louise kan netwerken en kent de juiste personen binnen Sweco en TIffany kan goedkoop alles plannen en organiseren. | Ali voor de leiderschap (mist ik net), Paul voor de interne procedures (Daar hebben we er wat van bij Sweco!), Lieke om informatie binnen te halen, Herman doet hele project mee., Frans let op de centen en kan tegen druk, en tiffany blijft organsieren. | Tim en Jan omdat deze competenties overeenkomen met de fase. | Jolene omdat ze kritisch is en openstaat voor feedback | Tiffany om op tijd in te leveren. Max om een mooie presentatie te maken. |
| 10 | **5** | Met een klein team analyseren we de uitvraag en leggen we de scope vast. Juist doordat we met slechts 4 mensen zijn, houden we het budget laag en kunnen we snel beslissingen nemen en de tenderstrategie bepalen. Ali wordt de projectleider van het project, dus het is belangrijk dat hij vanaf fase 1 al aangehaakt is. | In fase 1 is het team bepaald en voor elk EMVI-criterium hebben we een rolhouder aangewezen. Vanwege de hoogte van de te behalen score heb ik gekozen voor een seniors of mediors: Famke voor criterium 1; Kees voor criterium 2 en Destiny voor criterium 3 | Ik introduceer Max voor de creatieve productie van afbeeldingen. Daarnaast laat ik Jolene reviewen vanwege haar kritische competentie. Tiffany blijf ik behouden om Bernard te ondersteunen. | De reviewer en toekomstige teamleden (behalve projectmanager) heb ik niet meer nodig in deze fase. Door met een klein team te sparren over de opgehaalde informatie, komen we beter te weten of we echt de klantvraag raken. Asa als tendermanager neemt hierin de beslissingen. | Tiffany heeft zo goed haar best gedaan om alles te plannen dat zij niet meer nodig is. Voor iedereen is de deadline zeer duidelijk. Max behouden we nog voor de finale opmaak. Bernard gaat met Ali de presentatie voorbereiden. En Asa dient het winnende plan in. |
| | **26** | Uitgebalanceerd team met competenties die ik in de volgende fasen ook nodig heb. Kan de junioren makkelijk vervangen omdat de nadruk van de benodigde | Meer nadruk om communicatie dan in fase 1, ook analytisch vermogen toegevoegd. | alleen samenwerken toegevoegd | Minder mensen in deze fase, asa overbodig | Kritisch maar goed |

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| | | overall competenties in de senioren zit. | | | | |
| 11 | **11** | Snelle scan van inschrijvingsvereisten; eisen waaraan moet worden voldaan, strategie voor het maximaal scoren op EMVI vereisten. Destiny en Inez voor het analyseren van Minder Hinder het optimaliseren van de scores en de doorvertaling naar de maatregelen in het Plan van Aanpak; Lieke voor het structureren van de informatie en het opdelen van beschikbare informatie naar Werkpakketten. Maria start de opzet voor het Plan van Aanpak welke items in het plan komen en analyseerd hoe de duurzaamheidscomponent wordt benut. Daarnaast maakt Maria de tenderplanning en de begroting | Rafael neemt de taak van Risicomanager opzich; Harry start met de invulling van het plan & bepaald structuur van het plan; Maria creëerd commitment bij team en directie en schrijft; Inez monitoord budget; Max haalt informatie op bij de experts; Lieke stelt een document management protocol op; | Inez organiseert peer review & monitoord tenderbudget; Harry schrijft tendervoorstel; Lieke organiseert afbeeldingen; Max verzameld informatie | Harry stelt de aanbiedingsprijs vast en controleerd naleving klanteisen; Inez verwerkt de informatie uit de peerreviews; Maria verzekerd antwoord op klantvraag, check op voldoende project-specifiek; Lieke maakt de aanbieding consistent; Kees zorgt voor een actieve schrijfstijl en checkt spelling | Kees organiseerd de overdracht van aanbieding richting opmaak/productie; Inez dient de aanbieding op tijd in; Maria bereidt de presentatie en interviews voor en geeft de presentatie |
| 12 | **13** | Bernard: Visie/strategie<br>Famke: Hanteren procedures, plannen<br>Harry: Klantgericht, kostenbewust<br>Gijs: Structureren<br>Kees: Kritisch<br>Anne: Beslissen<br>Cindy: Analyseren | Herman: Analyseren, Kwaliteitsgericht<br>Famke: Procedures, Plannen<br>Harry: Klantgericht, kostenbewust, creativiteit<br>Kees: Communiceren, samenwerken, kritisch<br>Alfred: Informatie verzamelen, structureren | Alfred: Info verzamelen, structureren<br>Kees: Communiceren, samenwerken en kritisch!<br>Herman: Analyseren en kwaliteitsgeric<br>Harry: Klantgerich, kostenbewust, creativiteit | Zelfde als vorige fase en Suzan om te beslissen | Zelfde als vorige fase |
| 13 | **1** | Klantfocus, beslissen en draagvlak creëeren is in deze GO/No go fase het belangrijkste. Daarnaast is het doorgronden van de uitvraag (analyseren) door iemand dit expressief een goede combinatie om de uitvraag en scope goed te inventariseren. | Het gaat hier op het plan / de strategie en inregelen van expert / informatie, noodzakelijk kennis/expertise aanhaken. Creativiteit en visie is een pijler voor verdere uitwerking. | Start uitwerking staat hier centraal, waarbij plannen, informatie verzamelen (prijzen) en invoeren van kritisch meekijken, naar mijn mening belangrijk wordt. | In deze fasen komen alle comp. wel voor | Geen toelichting. |
| | **14** | Gemiddeld is 8000 per fase beschikbaar, maar je wilt in de 1e fase niet meteen veel budget besteden omdat mogelijk een no-go besluit volgt. Belangrijk in de eerste fase is 1: een analytisch vermogen voor analyse uitvraag, 2: sturend kunnen zijn door team neer te zetten en 3: creativiteit aanroepen voor bepaling strategie. | vooral netwerken en zoeken naar informatie | vooral produceren<br><br>- Info verzamelen<br>- Team building<br>- Netwerken<br>- Creativiteit<br>- Procedures & methodes<br>- Plannen & organiseren | sterk in afronding<br><br>- Team building<br>- Beslissen<br>- Kritisch<br>- Omgevingsbewust<br>- Procedures & methodes<br>- Expressief<br>- Analyseren<br>- Structureren<br>- Communiceren<br>- Stressbestendig<br>- Kostenbewust | presenteren vraagt andere competenties<br><br>- Expressief<br>- Analyseren<br>- Omgevingsbewus<br>- Communcieren<br>- Samenwerken<br>- Kritisch<br>- Team building<br>- Netwerken<br>- creativiteit<br>- Kwaliteitsgericht<br>- Klantgericht<br>- Delegeren |
| 14 | **7** | Competenties zoals benodigd | x | x | x | x |
| 15 | **9** | Topteam | x | x | Geldprobleem | Afronding |

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| 16 | **20** | gericht op competenties over de mensen verdeeld | Diversiteit in het team | vullen van de tekortkomingen | Afbouw van teamgrootte | afronding procedure en creatief in presentatie |
| 17 | **6** | Analyseren, beslissen, hanteren, kostenbewust, kritisch, netwerken, plannen en rganiseren, samenwerken en structureren en teambuilding zijn belangrijk | analyseren, beslissen, hanteren, informatieverzameen, interactief, kostenbewust, krotisch, kwaliteitgericht, trsuctureren | Hanteren, interactief leren, kostenbewust, krotisch, kwaliteitsgericht, structureren | creatief, expresseif, klantgericht, kostenbeust, | creatief, expressief, klantgericht |
| | **23** | Stabiel team met een leider beslisser en bepaler strategie | Creativiteit, kosten deskundige en alle andere benodigde competenties om een zo goed mogelijke strategie te bepalen | kleiner team voor de laatste lootjes met de benodigde competenties | Iemand voor mooie opmaak toegevoegd om een uitnodigend document voor de OG te maken | Suzan toegevoegd als beslisser om de documenten te versturen |
| 18 | **10** | Asa, beslissen, alfred, informatie, desitny analyseren, kees kritisch, ali leiderschap | Dest analysren, asa beslissen, kees kritisch, ali leiderschap, alfred informatie verzamelen. | D analyeren, Asa beslissen, alio, ledierschap, alfred informatie verzamelen, kees kritisch. | sjors voor kwaliteit, asa beslissen, alfred voor leren, kees samen werken, famke pr0cedure | asa beslissen, kees kritisch, kaltieit sjoers, kosten jesse, ali stressbestendig. |
| | **15** | stress | x | stress | stress | Winner! |
| 19 | **2** | In de begin fase gaat het om een beslissing te nemen op basis van inschrijfleidraad , dan planen en organiseren en een team samenstellen. Hier is ook leiderachap nodig en verantwoording nemen. | Het team moet nu staan. En de creativiteit moet nu naar voren komen alsmede de inhoud. Onderscheidend vermogen en klantkennis | x | . | . |