Tender Performance

A Case-Study of a Contractor's EMVI Tender Performance in the Dutch Infrastructure Sector

Colophon

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Executive summary

A tender is a procedure whereby buyers seek to buy a product or service that is issued on the basis of weighing factors. The procedure enables buyers to gain better insight in the market conditions considering quantitative and qualitative factors.

This thesis is a case-study of a relatively novel tender award mechanism used by RWS, called 'EMVI: Economic Most Advantages Tender. EMVI is a method used in the award of RWS' procurement; not only considering price but also the value of (quantified) qualitative factors such as public focus, sustainable development, and project management. By incorporating incentives aside lowest price, RWS tries to guide bidders to make the best possible offer.

Facing EMVI tenders, many contractors seem to have a difficult time analysing the tender dynamics and making clear choices about different criteria, values and wishes. The aim of this research is therefore to show tender dynamics that affect the performance when facing EMVI, analyse contractor's current performance when facing EMVI, and to enable contractors to consistently redevelop their tender strategy when facing EMVI. For my thesis I have looked at Van Oord Dredging and Marine Contractors b.v. This is a worldwide oriented Dutch dredging company.

I find analysing EMVI-based data an opportunity for scholars, because they can help RWS and contractors gain insights in developing a more focused business strategy, eventually enabling contractors to become more successful in winning EMVI-based tenders presumably with better price-quality ratios.

Based on the Dutch construction landscape, this has led me to develop the following initial research question: How can a contractor's EMVI-based data be used to develop more successful EMVI tender strategy? More specifically: 'How can VON's EMVI-based data be interpreted and processed to gain insights on how to redevelop their EMVI tender strategy?'.

Chapter 2 presents the literature study of the Dutch construction sector's theoretical background and the EMVI-award mechanism. This is the first step of the thesis' deductive research phase. Chapter 3 elaborates on the data collection from the EMVI-based data made available by VON. The data will be interpreted and presented in the data collection and data preparation plan. This chapter functions as a transition from the deductive towards the thesis' inductive research phase. Chapter 4 presents the data modelling of the EMVI-based data. At the end of the chapter the data modelling results are shown.

Chapter 5 concludes with the insights on how the EMVI-based data of VON can be interpreted to gain insights and redevelop VON's current tender strategy. At the end of this chapter some practical recommendations are made on how VON's EMVI-based data can be used to develop a more successful EMVI tender strategy.

The analysis in this thesis shows that the EMVI-award mechanism is not fully exploited by VON in a consistent beneficial manner. Analysing qualitative factors require a different mind-set than required by quantitative factors. When the core business activities of VON keep revolving around generating a competitive subscription price only, the gap between the quality needs of RWS and quality offers of VON will only increase due to the lack (or, lag) of proper analytical focus by VON.

Voorwoord

Voor u ligt mijn Masterthesis *'Tender Performance: A Case-Study of a Contractor's EMVI Tender Performance in the Dutch Infrastructure Sector'*. Deze Masterthesis is geschreven in het kader van afstuderen aan de opleiding Construction Management & Engineering aan de Technische Universiteit van Eindhoven. Het onderzoek voor deze Masterthesis is uitgevoerd bij Van Oord Dredging & Marine Contractors, een grote speler in de wereld van baggeren en waterbouw en bekend van de palmeilanden, de kunstmatige schiereilanden voor de kust van Dubai.

In overleg met mijn afstudeerbegeleider dhr. Ing. M.C. Vos (Marco) heb ik mezelf, in combinatie met een passende onderzoeksvraag, verdiept in de gunningsuitslagen van Nederlandse infra projecten waarop Van Oord heeft geboden. Het onderzoek was vrij complex maar ik heb toch manieren gevonden om tot nieuwe inzichten te komen die mijn vragen konden beantwoorden.

Het afstudeertraject zelf heeft een bijzondere weg afgelegd. Van maart 2012 tot en met november 2012 ben ik onder begeleiding van Marco, dhr. Prof. Dr. Ir. W.F. Schaefer en dhr. Dr. Ir. E.G.J. Blokhuis bij Van Oord op locatie bezig geweest met het schrijven van mijn Masterthesis. Helaas, door omstandigheden kon ik hier pas in de zomer van 2015 een vervolg aan geven. Ondanks deze vertraging heb ik mijn Masterthesis aan het begin van 2017 toch weten te finaliseren.

Voor het afronden van mijn Masterthesis wil graag mijn TU/e-afstudeercomité, bestaande uit dhr. Prof. Dr. B. de Vries, mevr. Dr. Q. Han en mevr. Dr. G. Dane bedanken voor de begeleiding. Daarnaast wil ik ook Van Oord Area Nederland en met name Marco bedanken voor het sparren, de goede gesprekken, het fijne begeleiden en vooral zijn waardering voor mijn onderzoek benadering.

Tevens wil ik mijn vriendin en oud TU/e student, Ir. Marleen Lodder en goede vriend Drs. Roebin Lijnis Huffenreuter bedanken voor de motiverende woorden en de morele steun tijdens het schrijven van mijn Masterthesis en de tijd die ze voor mij hebben vrijgemaakt om het werk te reviewen.

Tot slot wil ik mijn ouders bedanken voor hun wijsheid en vertrouwen wat er mede voor heeft gezorgd dat ik mijn Mastertheses tot een goed einde heb weten te brengen.

Ramon Godschalk

Den Haag, 24 april 2016

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1 Introduction

A tender is a procedure whereby buyers seek to buy a product or service that is issued on the basis of weighing factors. The procedure enables buyers to gain better insight in the market conditions considering quantitative and qualitative factors. In case of a single buyer, the buyer has market power over terms of offer to its sellers, much like a monopolist can determine the price in a monopoly. A market situation which is characterized by the presence of only one buyer - a so-called 'monopsonist' - and multiple sellers is called a 'monopsony' (Robinson, 1933). A prime example of a monopsony is the total property development of national infrastructure, including road network, high- and railways, sewer- and pipeline networks, and ports (ibid.). The Dutch infrastructure sector shows a similar situation: Rijkswaterstaat (RWS) is the only buyer and there are multiple sellers in the form of contractors.

This thesis is a case-study of a relatively novel tender award mechanism used by RWS, called 'EMVI: *Economisch Meest Voordelige Inschrijving'* (English: Economic Most Advantages Tender). EMVI is a method used in the award of RWS' procurement; not only considering price but also the value of (quantified) qualitative factors such as public focus, sustainable development, and project management. By incorporating incentives aside lowest price, RWS tries to guide bidders to make the best possible offer. For achieving the best results, during the procurement process the criteria should not be adjusted, the values should not be pushed nor wishes removed, added or changed. To make changes at a late stage in the procedure is detrimental to its success. For success, the factors should be formulated early in the procedure, in concrete and unambiguous terms. However, in practice, to do this consistently turns out much harder to do than was initially expected by RWS when introducing the EMVI tender procedure.

1.1 Aim of the research

Facing EMVI tenders, many contractors seem to have a difficult time analysing the tender dynamics and making clear choices about different criteria, values and wishes. The aim of this research is therefore:

1. To show tender dynamics that affect the performance when facing EMVI;

2. To analyse contractor's current performance when facing EMVI;

3. To enable contractors to consistently redevelop their tender strategy when facing EMVI.

1.2   Dutch construction landscape

The construction sector has an annual turnover of €70 billion. This indicates that the sector - with its subdivisions in civil engineering, commercial construction and housing - is an extensive Dutch industry with substantial economic interests. The sector shows a strong conservative bias; many traditional Dutch contractors are adverse to market changes and economic innovations. Going back 200 years, the 'traditional construction process' is based on lowest-subscription price which is well-known and conducted in the Netherlands today. This model separates two phases of design and construction; the task of the client is to prepare the project by designing the object that need to be realized. This is the 'design phase'. At the end of the design phase the preparation will be translated to a set of prescribed specifications. These prescribed specifications describe exactly what a contractor must do to realize the object as designed by the client. The realization of the object occurs in the 'construction phase'. The payment of the contractor is based on the realized amounts of factors as prescribed in the specifications and deductible amounts of the bid.

Primary advantages of the old model are the lowest possible subscription price for requirements as requested by the client, and the distribution of responsibilities between client and contractor are 'logically' and clearly distributed. The traditional construction process also has some clear disadvantages, namely that most of the risks and responsibilities - such as project preparation, designing, permit management and project supervision - are allocated by the client, and the contractor is not stimulated to merge design and construction into one optimally integrated package.

1.2.1   A turning point

In September 2001 Zembla, a Dutch news program, broadcasted an item about the Dutch construction sector highlighting (illegal) price agreements and other irregularities in projects which were procured by the government. Due to the political commotion after the broadcast the Dutch government decided to start a parliamentary inquiry into the "*bouwfraude*" (English: construction fraud) aiming to identify the nature and structure of irregularities found in several large scale construction projects. After the parliamentary inquiry presented its conclusion in 2002, which was that construction fraud was part and parcel in the Netherlands, changes in the Dutch construction industry were inevitable. The task for setting the changes in motion and creating more transparency, innovation and better price- quality ratios, was allocated to *Regieraad Bouw* (English: Building Management Council). This council was established in 2004 and assisted by the innovation program of *PSIBouw* (English: Process and System Innovation in Construction

Industry). This innovation program collected all the knowledge and experience from both construction practice and science to contribute various innovations in infrastructure projects. On 1 January 2010 *RegieraadBouw* and *PSIBouw* decided to collaborate under *VernieuwingBouw* (English: Renewing Construction Industry).

During the years *RegieraadBouw* has become a strong network within the construction industry with clients, stakeholders, knowledge and educational institutions. These parties work together to accelerate the renovation of the building sector, thereby creating a higher social value.

At the 1st of March 2015 the board of *RegieraadBouw* decided to combine their expertise with *Bouw Campus* (English: Construction Campus). *Bouw Campus* is a network of parties that create innovative solutions to issues of life, living and working and connects parties of the entire construction industry. More than 120 companies, government agencies and research institutes are already attached to *Bouw Campus*. The goal is to accelerate the innovation with inspiring practical examples and best practices.

1.3 Value based developments

The results of the parliamentary inquiry had pervasive effects on the traditional construction process. The most notable change was the shift of roles between RWS and contractor. Because RWS started to allocate increasing amounts of risks and responsibilities (activities) to the contractor, the contractor was nudged to incorporate responsibilities and activities into one integrated package. This organizational principle is called 'integrated management'. The last few years several types of construction contracts have been developed covering specific aspects of such integrated packages.

During the developments clients and contractors were not only looking for new opportunities for offering integrated packages alone, in addition to the lowest subscription price competition, they were also looking for other award mechanisms based on additional value. Therefore a modern, widely and increasingly applied value-based award mechanism is developed, namely EMVI. This award mechanism is initiated by RWS to optimize the construction process and contribute to the price- quality ratio by appreciating (quantified) qualitative factors.

1.3.1 Philosophy of EMVI

The lowest price award mechanism is based on the minimum effort to meet the expected deliverables of the client, whereby price is the only competing factor. This minimal effort only includes tendering- and construction output. Other activities - which are normally not added to the expected deliverables - will not

be compensated by the client. This conflict-creating 'bidding ethos' often results into a disposition to compete, with a passive attitude of the contractor resulting from focusing solely on opportunities to create extra activities on the expected deliverables (Manual EMVI Rijkswaterstaat, 2011).

The philosophy behind the EMVI-award mechanism is that contractors are able to earn extra value as a result of good anticipation on the expectations of the client, in broad terms of public orientation, sustainability and project management. EMVI was intended to stimulate contractors to generate extra value parallel to the core activities, because with EMVI - so it was believed anyway - the contractor could achieve a stronger position in competition based on additional quality aspects. Whether this really was the case only experience could tell.

1.3.2   *Implementation of EMVI*

In 2005 the first experience with the new award mechanism came after introduction of the first EMVI-manual *Gunnen op meerwaarde* by RWS (2005). Under supervision of CROW (Centre for Regulatory and Research in Civil- and Traffic Engineering), *PSIBouw* (2007) introduced a similar mechanism in '*Gunnen op waarde: hoe doe je dat?'* (English: Awarding based on value: how do you do it?). Since both philosophies contain similarities, RWS, CROW and *PSIBouw* decided to join forces and create a standard manual for the Dutch construction industry. After several adjustments in subsequent manuals, the EMVI-Manual in 2011 reached an advanced status in the sector. Currently RWS awards as many projects as possible based on EMVI, intending to obtain the right value for money for procured products and services (Handleiding EMVI Rijkswaterstaat, 2011).

On 1 April 2013, the government introduced a new rule which required the authorities to award their European projects based on EMVI. Now, award mechanisms based on lowest subscription price are only allowed when the contracting authorities can present an adequate motivation (article 2.114 from De Nieuwe Europese Aanbestedingen). This clearly shows the shifting tender culture in the Dutch construction sector going from solely lowest bid to prefer EMVI tenders.

1.3.3   EMVI in practice

The EMVI methodology used by RWS is based on price correction. This means that the subscription price of the contractor will be reduced with the obtained value of quality (Manual EMVI Rijkswaterstaat, 2011). The contractor has to present two deliverables:

- Subscription price, which is the lowest possible price based on the minimum effort to meet the deliverables required by RWS;

- EMVI-plan, in which the contractor describes how he is going to deal with the quality criteria as set by RWS and how to ensure them during the project. The model with EMVI-criteria that RWS currently uses is added in *annex 1a*.

Due to the quantitative nature of subscription prices it is easy to make a sequential distinction between subscription prices. The qualitative nature of an EMVI-plan is less easy to assess. In most cases it requires a specialized EMVI-plan assessment team. This team is trained to rate and monetise the values of the quality criteria as described by the contractor. The EMVI-result spreadsheet is added in *annex 1b*.

The given rate by the assessment team is between 1 and 10, whereby:

- Rate 1, 2, 3, 4 and 5 represent proportionally decreasing penalty rates with notional charges on the subscription price;

- Rate 6 represents a neutral rate with no charges or discount on the subscription price;

- Rate 7, 8, 9 and 10 represent proportionally increasing discounts on the subscription price.

This means that the actual, decisive subscription price depends on the influence of the monetized value as result of positive rates (10-7), a neutral rate (6) or negative rates (5-1), in anticipation of RWS' expectations.

The monetized value is called the 'notional discount' on the subscription price. The actual decisive subscription price is called the 'notional subscription price'; this is the subscription price minus the notional discount. This implies that if a contractor does not have the lowest subscription price at first, the contractor can still become awarded after settling the notional discount with the subscription price. Settling the notional discount with the subscription price can result in the lowest, decisive and thus winning notional subscription price, in other words, the economic most advantageous tender.

The price-quality ratio depends on how much notional discount (the EMVI-share) RWS deploys on the EMVI-criteria, which is determined by the balance between the maximum achievable value of quality and the budget. Regardless of the dominating aspect (price or quality), the lowest settled notional subscription price is regarded as the most advantages tender. This means that EMVI is no guarantee for best price to quality bids, but can result in suboptimal price-quality ratios. In theory, EMVI can lead to too expensive or poor quality projects for RWS as well as contractors. This is a downside of the new bidding method.

1.3.4 EMVI issues

An alarming report of *PSIBouw* (2007) concluded that not only the quantification of criteria's value but the concept of value itself causes serious problems in the construction sector. The conflict between quantity and quality caused by the EMVI-award mechanism arises when the requested value requires interpretation; i.e. human judgement. The concept of quality is usually associated with economic variables which implies both objective and subjective judgements, thereby rendering the accuracy of quantifying qualities in terms of monetary value highly questionable.

Although legal-based interpretations or specialized assessment teams can lead to standardized and accepted ways of forecasting and rating quality's value, these methodologies are still not one hundred per cent reliable, mainly because of the interference of interpretation; the quality judgement of team A is not always the same as that of team B. This is the case even in cases concerning the same quality criteria, the same project, the same conditions and even the same assessment instructions. In turn, this suggests that quantification by allocating numbers or scores to an interpretation of quality - giving a level of expectations in relation to a measurement of appreciation - remains a matter of choosing between different interpretations all along. As a student of engineering, conscious of the importance of cost and quality, I find this fact problematic.

1.4 Problem definition

For defining the problem I have looked at Van Oord Dredging and Marine Contractors b.v. This is a worldwide oriented Dutch dredging company. Around 2009, a subdivision of the company, Van Oord Area Netherlands (VON), decided to expand their scope, no longer only focussing on Dutch coast activities but also on domestic infrastructure. Despite initiatives of RWS, CROW, *RegieraadBouw* and *PSIBouw* to improve the tender award mechanism via EMVI, VON still felt uncomfortable with the obstacles that arose after the implementation of the new award mechanism, especially its influence on overall tender dynamics and VON's tender performance.

The problem definition is as follows:

> *The assessment of an EMVI-plan has uncertain effects on the establishment of the decisive notional subscription price, resulting in unintended effects on the tender performance of the contractor.*

Since EMVI-based tenders have become mainstream policy and contractors wish to maintain their competitive market position, they need to develop novel business strategies. During the past years that RWS has applied EMVI-based tenders this led to a vast amount of new data ready for analysis.

1.4.1 Research question

I find analysing EMVI-based data an opportunity for scholars, because they can help RWS and contractors gain insights in developing a more focused business strategy, eventually enabling contractors to become more successful in winning EMVI-based tenders presumably with better price-quality ratios.

Based on the Dutch construction landscape, this leads to the following initial research question:

> *Initial research question: How can a contractor's EMVI-based data be used to develop more successful EMVI tender strategy?*

The meaning of 'be used' is not specific enough to provide a satisfying answer. The following refinement leads to the first specification step:

> *Specification step 1: How can a contractor's EMVI-based data be interpreted and processed to develop a more successful EMVI tender strategy?*

Also the meaning of 'successful' is not specific enough, and needs some refinement. This leads to the second specification step:

> ***Specification step 2: How can a contractor's EMVI-based data be interpreted and processed to <u>gain insights on how to redevelop their</u> EMVI tender strategy?***

Due to the organizationally limitations of the thesis it is virtually impossible for one researcher to analyse the EMVI-based data of all the contractors in the Dutch construction industry. Besides, the sensitivity of the data makes it very difficult to gain access to all of it. For this reason, this thesis only focuses on EMVI-based data of one contractor, namely VON. This leads to the final research question:

> ***Final research question: How can VON's EMVI-based data be interpreted and processed to gain insights on how to redevelop their EMVI tender strategy?***

1.4.2   The research goal

The final research questions leads to the research goal:

> ***Research goal: see whether the answer to my research question could, in theory, help increase VON's tender performance of EMVI-based tenders by retargeting their EMVI tender strategy.***

1.5   Research approach

This paragraph concerns the methodological approach which is served to accomplish the thesis step by step. The applied research can be characterized as a case study which is based on a large amount of data. The research schedule is shown in figure 1-1.
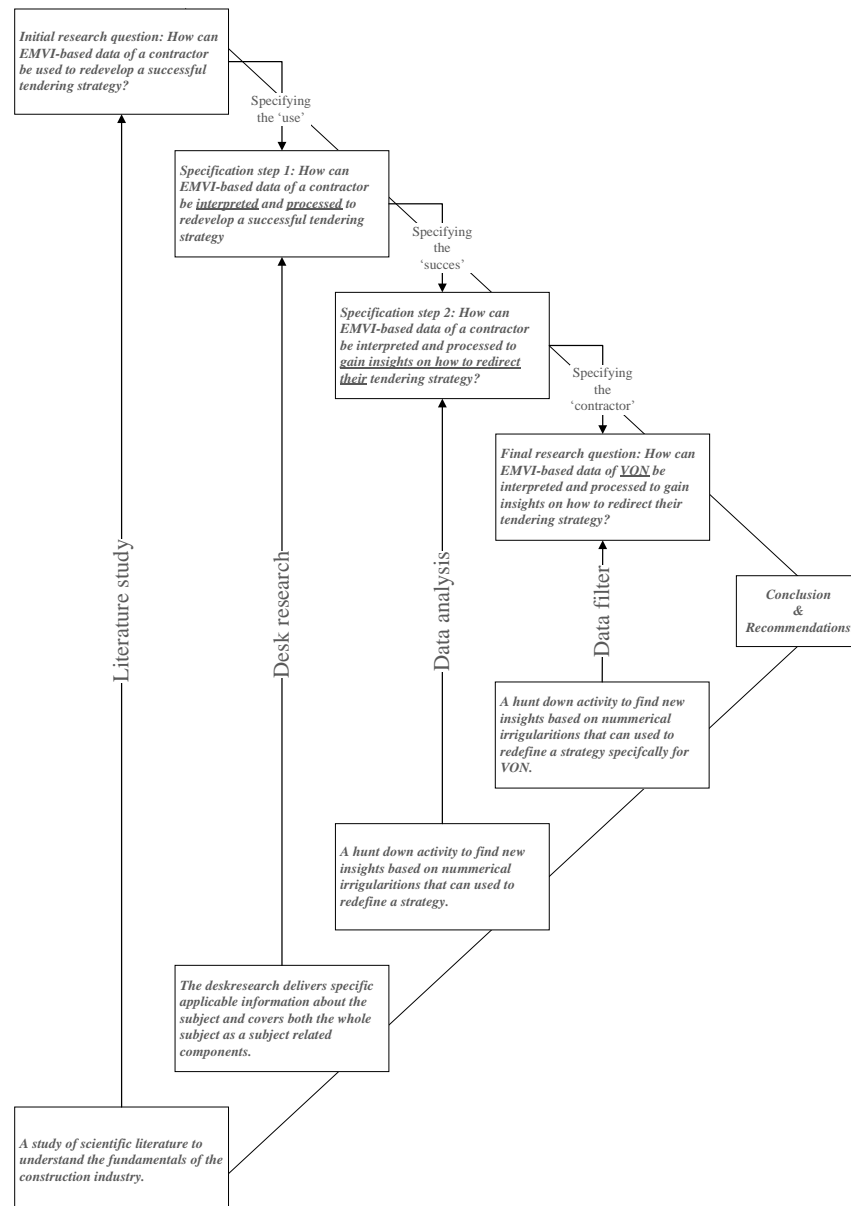
Figure 1-1: Research approach

1.5.1   Research boundaries

For practical reasons such as the different value aspects of the client, the often unequal experience in judgement (i.e. value perceptions) and the different ways of EMVI-judgement protocols (i.e. different evaluation statistics), the used data is strictly based on award results between RWS as the client and VON as the contractor.

1.5.2   Results versus methodology

It is important to note that the results are specifically based on data which is gathered at VON. The methodology as used to process the data is still generic and not bounded or customized to VON as organisation. The methodology could be applied at any contractor who subscribed for projects with EMVI-based award mechanism.

1.6   Reading guide

After the introduction, chapter 2 presents the literature study of the Dutch construction sector's theoretical background and the EMVI-award mechanism. This is the first step of the thesis' deductive research phase. Chapter 3 elaborates on the data collection from the EMVI-based data made available by VON. The data will be interpreted and presented in the data collection and data preparation plan. This chapter functions as a transition from the deductive towards the thesis' inductive research phase. Chapter 4 presents the data modelling of the EMVI-based data. At the end of the chapter the data modelling results are shown. Chapter 5 concludes with the insights on how the EMVI-based data of VON can be interpreted to gain insights and redevelop VON's current tender strategy. At the end of this chapter some practical recommendations are made on how VON's EMVI-based data can be used to develop a more successful EMVI tender strategy. The reading guide is visualized in figure 1-2:
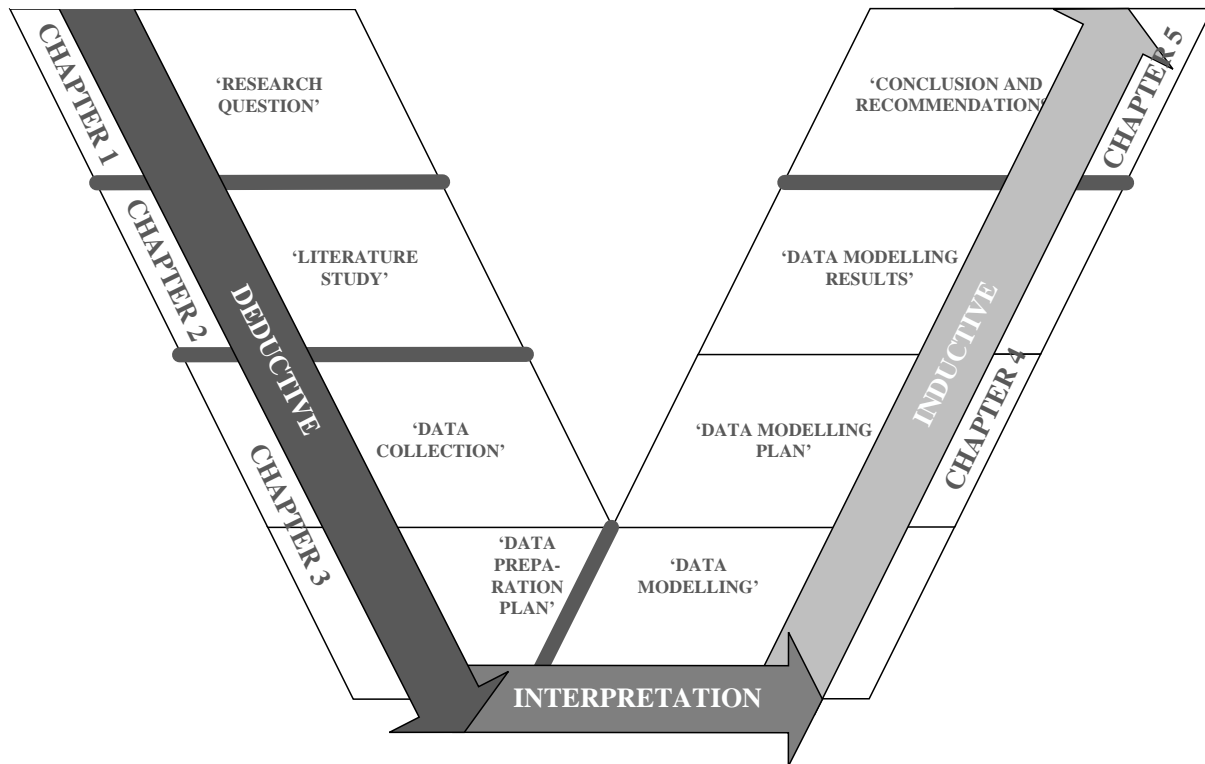
Figure 1-2: Reading guide

2 Theoretical background

This chapter presents the literature study on the theoretical background of the construction industry and the EMVI-award mechanism. This is the first step of the deductive research phase driven by the initial research question:

How can a contractor's EMVI-based data be used to redevelop a more successful tendering strategy?

Despite recognition that ethical practices are vital for obtaining optimal benefits from the construction industry, and ensuring a smooth functioning of its workings (Adnan, Hashim, Yusuwan& Ahmad, 2011), *Transparency International* (2005) and *Fraud Survey* (2009) classify the construction industry as the most fraudulent industry worldwide. Vee and Skitmore (2003, in Adnan et al., 2011) distinguish four general types of unethical practices: unfair conduct, conflict of interest, collusion and fraud, and bribery. Chan A.P.C., Chan D.W.M., Fan, Lam & Yeung (2006) describe the antagonistic culture of construction industry as a very competitive and risky business with comparatively high costs. They find that the construction industry is an industry with a short-term focus on their private business and less focus on long-term competitive market advantages; mainly because contractors lowest bid and unrealistically compressed delivery programmes are often inherent to each other. This is poignant to Adnan et al. (2011) who convincingly argue that the construction industry plays an important role as major economic contributor, being crucial to the overall development of a country in terms of gross domestic product (GDP) and infrastructure.

2.1 Shortcomings

The *Construction Industry Review Committee* (CIRC) (2001, in Chan et al., 2006) link the competitive nature with conflicting objectives of participants and increasing penalty clauses by clients, to the number of shortcomings in the construction industry. I assume these shortcomings to be caused by bad project preparation, unrealistic planning, inadequate communication and taking risks. Often responsibilities are overshadowed by the prevalence of the multi-layered subcontracting and poor supervision (Chan et. al., 2006). Construction projects are typically awarded through a competitive tender process and usually the lowest bid gets the job (Cheung, Thomas, Wong & Suen, 2003). This selection mechanism is heavily

contested by CIRC (2001, in Cheung et al., 2003), because it is not providing quality services and works, which has resulted in substandard workmanship and a 'quick-buck' attitude among contractors (Chan et al., 2006). Ironically, this is exactly what EMVI was meant to counter-act.

2.1.1   Role of the government

The past decade showed steady improving project quality and performance through closer process integration and supply chain management (Simmonds and Clark, 1999, in Beach, Webster & Campell, 2005). This development has similarities with the CIRC (2001, in Chan et. al., 2006), which suggests that the construction industry needs a newly developed culture focusing on producing better value for customers. The CIRC stands for an integrated approach to achieve the best outcomes instead of suboptimal ones. I think these improvements are of great concern to practitioners as well as academics (Beach et al., 2005) in order to upgrade the conventional competences to a higher level. Adnan et al. (2011) suggest that also professional institutions and government agencies are crucial in minimizing ethical lapses in the construction industry. They refer to the Malayan Construction Industry Development Board (CIDB) which launched the 'Construction Industry Master Plan' in 2004 and the 'Code of Ethics' in 2007 for contractors who demand honesty and integrity in performing responsibilities, compliance to laws and regulations, respect for individuals and society, and realizing the importance of quality, skills, health, safety and environmental preservation.

2.2   Dutch construction industry

The last decade a number of measures - known as integrated contracting - has been heralded as the solution to persistent problems in the Dutch construction industry (Dreschler, 2009). One reason for integrated contracting is to stimulate suppliers to adopt innovative solutions. These innovative solutions can lead to bids with a lower price, more value, or even both. Due to the dominance of the lowest price award mechanism not all possibilities of integrated contracting are utilised (ibid.). This inefficiency of effective integrated contracting has led to the addition of the EMVI award mechanism to current practices; which significantly increases the chances of getting bids with a better value to price ratio.

However, the *Economisch Instituut voor de Bouwnijverheid* (EIB) (July, 2012) finds that the average transaction costs for tenders based on the EMVI award mechanism are 84% higher than in case of tenders based on lowest price award. Besides that, the EIB also finds that bigger Dutch construction companies generate higher transaction costs than small and midsized competitors, even when the project size is the same. The EIB suggests that the dissimilarity hinges on the relationship between calculation costs and

other costs, increasing along company size because bigger companies have more extra costs, while smaller companies concentrate their calculation activities instead, which provides a higher quoting efficiency. The relative transactions costs are lower for bigger projects and do not depend on the type of client. The EIB shows that offers for governmental projects are considerably higher than average. In addition, it is noted that the government often chooses for contracts with the EMVI award criteria, which require additional time to process in comparison to normal contracts based on lowest bid selection mechanism.

Despite the higher costs, the EIB argues that adding value by innovative contracts provide potential opportunities for contractors, but only when the share of lowest price bid becomes smaller than the share of EMVI bids. In the latter case an economic scrimp by the government is seen as a worst case scenario which will affect contractors business. The EIB shows that the share of EMVI for government projects stabilized on 43% over the period 2009-2011. The share of EMVI based tenders in the categories 'provinces' and 'others' raised from respectively 11% to 17% and 37% up to 45%. The 'municipality' and 'organisation of water management' show a share of EMVI in their tenders to 13% and 15%.

2.2.1 Changing situations

The EIB (July, 2012) concludes that changing situations with new types of construction contracts will lead to shifting roles and positions in the market, and collaboration with partners to realize contractors' full potential opportunities. Specialists already are opting for more partnering and collaboration inside the organisation, with extra attention for factors like durability and environmental interests. Such factors become more important, making specialists start to regard themselves as 'cures' to achieve more EMVI-benefits; especially when the size of projects are increasing. The first two points for improvement, according to the EIB, are relations with clients and partnerships with specialists or other more experienced contractors. Obstacles for improvements are predetermined manners of execution by the client thereby limiting alternative opportunities and deleting unappreciated proposals because of fear for increasing development costs and high risks. Douma & Schreuder (1998, in Beach et al., 2005) point out that specialists could become more powerful than contractors when creating more advantage from learning about applying their specialisation. This is accompanied by the driving forces behind the rise of service outsourcing (Lojo 1997 in Olivia & Kallenberg, 2003) a proper reason to downsize and create more flexible firms with specific definitions of core competencies with increasing technological complexity leading to higher levels of specialization.

2.2.2   *Collaboration*

The current form of collaboration is based on collaboration inside the company and collaboration in-between the chain. Several studies (Construction industry Review Committee, 2001; Bayliss, 2002; Black, Akintoye & Fitegerald, 1999; Construction Industry Institute, 1989, in Cheung et al., 2003) argue that the main reason for partnering is providing benefits to the contracting parties, including cost effectiveness, work efficiency, opportunities for innovation, equitable risk sharing and less confrontation. And beside of that Agung Wibowo, Astana & Rusdi (2017) states that good relationships with business partners can facilitate collaboration because it counteracts fragmentation in between the chain. However the EIB (2012) finds that modern integrated contracts in combination with increasing project sizes are an obstacle for the participation of small- and midsized contractors. This development will lead to situations in which companies are reorienting on collaboration with other parties.

One can make a distinction between long-term (strategic) partnering and short-term (project) partnering (Barlow & Jashapara, 1998). On the one hand, several other studies (Barlow & Jashapara 1998; European Construction Institute, 1997; Hamza, Djebarnu & Hibberd, 1999; Love, Irani& Cheng, 2002, in Beach et al., 2005) find that strategic partnerships include several projects and seek benefits for the long-term, while on the other hand, project partnerships focus on short-term benefits. The *Construction Industry Institute* (CII) (1991, in Beach et al., 2005) defines strategic partnering as 'a long term co-operation between two or more organisations committed to achieving more specific business objectives by maximising the effectiveness of each participant's resources'. Alliances are also a form of (strategic) partnership whereby organisations innovate, access new markets, overcome local market restrictions, raise entry barriers and share risks for mutual benefits (Stanek, 2004; in Beach et al., 2005).

There are numerous definitions of partnering in the literature. Chan et al. (2006) use the widely cited definition, which is also developed by the CII (1991, in Chan et al., 2006):

> *'A long-term commitment between two or more organizations for the purposes of achieving specific business objects by maximizing the effectiveness of each participant resources. This requires changing traditional relationships to a shared culture without regard to organizational boundaries. The relationship is based on trust, dedication to common goals, and an understanding of each other's individual expectations and values'.*

The EIB (2012) distinguishes between defensive and offensive partnering. For example; sharing risks could be seen a defensive partnering - which is currently the dominant strategy of contractors - and

accessing new markets by partnering - which is characteristic for the specialist - could be seen as an offensive partnering factor. Beside these factors, the concept of partnering is a generic term for management approaches that align project goals (Bayliss 2002; in Cheung et al., 2003). These goals are meant to improve relationships among contracting parties, either in single project partnerships or in long-term strategic alliances (Cheung et al., 2003). This requires the construction industry to change, as it is typically an industry dominated by short-term views on business interests and less attention for long-term competitiveness (see also Chan et al., 2006).

2.3   Communication

Lack of communication is a major potential obstacle for prosperous partnerships, therefore equal and open communication is a primary strategic weapon in countering problems (Chan et al., 2006) Black, Akintoye & Fitzgerald (1999, in Cheung et al., 2003) suggest that effective communication is an essential factor for success in partnering. Also other scholars (Black et al. (2002) and Scott (2001) with Haksever, Demir & Giran 2001, in Beach et al., 2005) identify effective communication as a crucial point for improvement. In addition, non-compromising tendering processes, poor perceptions of partnering processes, lack of knowledge as opposite force for having insufficient partnering circumstances, and a non-triggered open communication are other major points for improvement (Cheung et al., 2003).

The traditional contracting system is one which tries to express the liabilities of the client and contractor in contractual terms (ibid.). One of the major drawbacks on efficiency in the construction industry is lack of cooperation in these terms. Cheung et al. base their identification on sampled literature from Black et al. (2002, in Beach et al., 2005) who find that commitment is a critical element of successful partnering with organisations who rate partnering commitment higher than organisations without partnering commitment experiences.) Incompetence is a main source of mistrust and most costly of all causes of mistrust (Whitney, 1999; in Cheung et al., 2003). The negative impact which arises when supervising and inspecting persons who lack the necessary knowledge and skills, instead of helping or correcting them (Cheung et al., 2003). Inadequately trained work forces impair the industry's ability to adopt new technologies and to cope with new challenges (Chan et. al., 2006). In addition, negative impacts on the workforce can lead to problems in a way employers and consultants start to think that whatever caused these problems to crop up on site is the result of the incompetence of the contractor. The lack of appreciation of a system is also a source of mistrust and, I think we must realize at this point that a chain is as strong as its weakest link.

2.3.1   A strategy approach

Agung Wibowo, Astana & Rusdi (2017) state that there are many factors that influence the construction bidding strategy which indicates that the relation between bidding strategy and project performance is very complex. Contractors have to consider this very carefully. According to Babaeian Jelodar, Wing Yiu, & Wilkinson (2016) the bidding strategy nowadays is defined as a management skill of using all available (physical and financial) resources, to offer a comprehensive and competitive bidding with the aim to win the competition and provide maximum project performance.

In extension to Lojo (1997 in Olivia & Kallenberg, 2003) in paragraph 2.2.1 - who quote pressure as a reason for increasing technological complexity and higher specialization - Olivia (2001 in Olivia & Kallenberg, 2003) describes the lack of complementarities between manufacturing and service capabilities as a problem which leads to erosion of quality. Olivia & Kallenberg (2003) expect that the transition will follow the continuum as modelled in the product-service continuum - shown in Figure 2-1 and which in turn will lead to new types of organizations with unique service orientations.
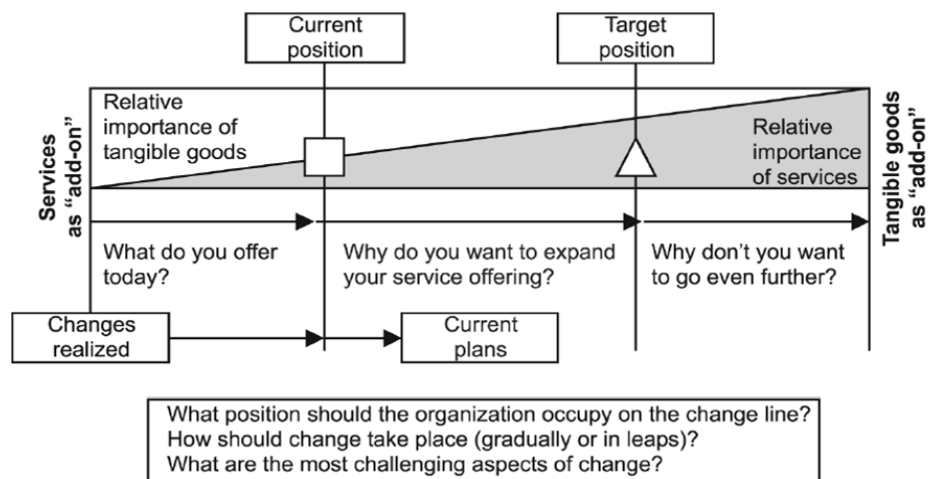
Figure 2-1: The service-continuum by Olivia & Kallenberg (2003)

2.3.2 Value Disciplines

The changing organisational environment, the strategic link to organisational effectiveness and competitiveness are based on meeting and exceeding the needs and expectations of customers (Potgieter & Roodt, 2004). Three value disciplines can be distinguished (Treacy & Wiersma, 1993):

1. Operational Excellence;

2. Customer Intimacy;

3. Product Leadership.

Many researchers (Treacy & Wiersma, 1993; French, 1995; Gubman, 1995; Zemke, 1993, in Potgieter & Roodt, 2004) regard 'Operational Excellence' as a value discipline that is providing customers with reliable products or services at competitive prices, delivered with minimal difficulty or inconvenience. Traecy & Wiersma (1993) describe the term more in detail as a specific strategy approach to the production and delivery of products and services in order to become a leader in price and convenience. These companies are indefatigable in seeking ways to minimize overhead costs, to eliminate intermediate production steps to reduce transaction and other additional costs, along optimizing business processes across functional and organizational boundaries. They focus predominantly on delivering products and services to customers at competitive prices with minimal inconvenience. And, because they build their entire business around these goals, they do not look or operate like other companies based on other value disciplines.

The difference between 'Operational Excellence' and 'Customer Intimacy' is that the main focus of the first is based on processes and systems, while the second is based on relationship management. 'Customer Intimacy' is a discipline that is precisely segmenting and targeting markets by tailoring offers to match the demands of certain niches. Operations based on this value discipline are less lean and efficient than operations based on 'Operational Excellence', which seems to explain the increasing transaction costs; up to 84% (EIB, 2012). 'Customer Intimacy' is a process of continuously tailoring and shaping products and services to fit an increasingly fine definition of the customer. This can be expensive, but the idea that 'Customer Intimate' companies are willing to invest in building customer loyalty in the longer term. For these companies the value of customer lifetime is more important than a single transaction. Staff in 'Customer Intimate' companies will do almost anything to make sure that each customer gets exactly what he or she really wants.

'Product Leadership' is a discipline that is offering customers leading-edge products and services that consistently enhance the customer's use or application of the product. Thereby trying to make their rivals' goods obsolete. This value discipline is fed by innovation, through research and development. Companies that pursue 'Product Leadership' strive to produce a continuous stream of state-of-the-art products and services. Besides being creative and commercial, such companies have to cope with problems stemming from their own products. Therefore they must relentlessly pursue new solutions to problems of the latest customer-based innovations.

2.4   Company culture

The core capabilities of each of the three value disciplines - as described in *subparagraph 2.3.2 -* are presented in *annex2*. The ten key people strategies (A-J) are based on a model which is developed by Gubman (1995, in Potgieter & Roodt, 2004). Potgieter & Roodt (2004) suggest that the value discipline as described is basis for establishing a unique organisational culture. A review of the literature about organizational culture (Du Toit, 2003; Petkoon 2003; Smith, 2003, in Potgieter & Roodt, 2004) concludes that the construction of an organizational culture is one of the most controversial areas of academic inquiry in the broader field of organizational studies, mainly because the organizational culture is characterized by competing definitions, epistemologies and research paradigms.

Controversies about organizational performance are a concern of virtually all aspects of this construct (Erwee, Lynch, Millitt, Smith & Roodt, 2001 in Potgieter & Roodt, 2004). Despite the different opinions, Schein (1985, in Potgieter & Roodt, 2004) defined a widely accepted definition of culture:

> *'A pattern of basic assumptions – invented, discovered or developed by a given group as it learns to cope with its problems of external adaptation and internal integration – that has worked well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems'*

The organisation most probably will fail when an organisation does not succeed in developing and establishing a supportive culture. Therefore an actively and consciously managed alignment between the process of strategic intent and the desired organizational culture is needed. This implies that managers should know the key characteristics that they want to foster and grow (Potgieter & Roodt, 2004).

2.5   Towards interpretation and processing a contractor's EMVI-based data

The literature review leads to some basic assumptions on how the EMVI-based data of a contractor can be interpreted and processed. Which will be elaborated further in the following chapter.

3 Data collection

This chapter presents the data collection of the EMVI-based data gathered at VON. The data is interpreted and presented in the data collection plan, which is based on the literature study. This chapter functions as a transition from the deductive towards the inductive research phase. It answers the specification step 1 of the final research question:

> *Specification step 1: How can a contractor's EMVI-based data be <u>interpreted</u> and <u>processed to</u> redevelop a more successful EMVI tender strategy?*

3.1 Data preparation plan

In a tender process the main goal for each contractor is, of course, getting the project. After all, successful tender performance is a critical condition for business continuity. If the bid (the notional subscription price) is not sufficient to win the project, the contractor may well repack its offer and try to win another tender. This 'repacking' is a conventional method characterizing the Dutch construction industry.

During the years, VON has been - without consciously being aware if it - gathering EMVI-based data that allows the research to become more tangible; substantiated by the tender results. This data source contains a collection of 24 tender announcements from RWS in the period 2009-2013, which are analysed in this thesis to show VON theist EMVI tender performance. The tender results contain the basic data as shown in Table 3-1.

#	Basis
1	The year of the tender
2	Client
3	The pool of subscribing contractors inclusive VON
4	The subscription prices
5	The notional discounts
6	The notional subscription prices

Table 3-1: Basic data

The nature of the basic data in Table 3-1 is much too 'raw' to analyse directly and thus need to be refined in a step-by-step preparation plan following the next 4 stages:

- Stage 1: Extracting entities (paragraph 3.1.1);

- Stage 2: Extracting variables (paragraph 3.1.2);

- Stage 3: Encoding the variables (paragraph 3.1.3);

- Stage 4: Filling the dataset (paragraph 3.1.4).

3.1.1   *Stage 1: Extracting entities*

The entities in table 3-2 represent substantive parts of the tender announcements from RWS in the period 2009-2013.

#	Basis	Stage 1: Extracting entities
1	The year of the tender	Year
2	Client	Client division
		Project-ID
3	The pool of subscribing contractors inclusive VON	Contractor
		Enrolment
4	The subscription prices	Subscription price
		Ranking subscription price
		Financial size of project
5	The notional discounts	Notional discount
		Ranking notional discount
6	The notional subscription prices	Notional subscription price
		Ranking notional subscription price

Table 3-2: Extracting research entities in stage 1

3.1.2   Stage 2: Extracting variables

The data value of the entity is called a 'variable'. This is a unit with a different value every time. The variables for entities as; 'Year', 'Client division', 'Contractor', 'Enrolment' and the 'Financial size of project' are already framed and prepared. Variables of other entities are indicated as '[variable]' because the range of their numerical nature.

#	Data basis	Stage 1: Define entities	Stage 2: Extracting variables
1	The year of the tender	Year	2009
			2010
			2011
			2012
2	Client	Client division	RWS Landelijke Diensten (rural services)
			RWS RegionaleDiensten (regional services)
			RWS Projectdirecties (project managements)
		Project-ID	[ID]
3	The pool of subscribing contractors inclusive VON	Contractor	Competitors
			VON
		Enrolment	Independent
			Collaboration
4	The subscription prices	Subscription price	[SP] (Subscription price)
		Ranking subscription price	[RSP] (ranking subscription price whereby rank 1 = lowest SP)
		Financial size of project	Small sized project
			Medium sized project
			Large sized project
5	The notional discounts	Notional discount	[ND] (notional discount)
		Ranking notional discount	[RND] (ranking notional discount) whereby rank 1 = highest ND
6	The notional subscription prices	Notional subscription price	[NSP] (notional subscription price)
		Ranking notional subscription price	[RSP] (ranking notional subscription price) whereby rank 1 = lowest NSP

Table 3-3: Extracting research variables in stage 2

3.1.3   Stage 3: Encoding the variables

The variables in Table 3-3 are not ready for use yet, therefore they need to be encoded according to the encoding schedule in Table 3-4.

#	Data basis	Stage 1: Define entities	Stage 2: Extracting variables	Stage 3: Encoding the variables	Label
1	The year of the tender	Year	2009	1	Year
			2010	2	
			2011	3	
			2012	4	
2	Client	Client division	RWS LandelijkeDiensten	1	C.d..
			RWS RegionaleDiensten	2	
			RWS Projectdirecties	3	
		Project-ID	[ID]	[#]	ID
3	The pool of subscribing contractors inclusive VON	Contractor	Competitors	1	Cont.
			VON	2	
		Enrolment	Independent	1	Enr.
			Collaboration	2	
4	The subscription prices	Subscription price	[SP] (Subscription Price)	[€]	SP
		Ranking subscription price	[RSP] (ranking subscription price) whereby rank 1 = lowest SP	[1….n]	RSP
		Financial size of project	Small sized project <15	1	Size
			Medium sized project 15-150	2	
			Large sized project >150	3	
5	The notional discounts	Notional discount	[ND] (notional discount)	[€]	ND
		Ranking notional discount	[RND] (ranking notional discount) whereby rank 1 = highest ND	[1…n]	RND
6	The notional subscription prices	Notional subscription price	[NSP] (notional subscription price)	[€]	NSP
		Ranking notional subscription price	[RNSP] (ranking notional subscription price) whereby rank 1 = lowest NSP	[1…n]	RNSP

Table 3-4: Encoded variables in stage 3

3.1.4   Stage 4: Filling the dataset

When the encoding protocol in Table 3-4 of stage 3 is finished, the tender results can be allocated to the labels in the dataset as shown in Table 3-5.

	Year	ID	C.d.	Con.	Enr.	Size	SP	RSP	ND	RND	NSP	RNSP
1	2009	31008400	3	1	1	1	3800000	1	275000	7	4075000	1
2	2009	31008400	3	1	1	1	7531000	2	-865000	2	6666000	2
3	2009	31008400	3	1	2	1	7931000	3	-805000	3	7126000	3
4	2009	31008400	3	1	1	1	8600000	4	425000	8	9025000	4
5	2009	31008400	3	1	1	1	9145000	5	215000	6	9360000	5
6	2009	31008400	3	1	1	1	11750000	7	-1625000	1	10125000	6
7	2009	31008400	3	2	2	1	11000000	6	-240000	5	10760000	7
8	2009	31008400	3	1	1	1	11758000	8	-550000	4	11208000	8
9	2009	31010529	2	2	1	1	9190000	1	-3000000	1	6190000	1
10	2009	31010529	2	1	1	1	9685000	2	-1593750	3	8091250	2
11	2009	31010529	2	1	1	1	10448000	4	-2156250	2	8291750	3
12	2009	31010529	2	1	2	1	10398000	3	-1312500	4	9085500	4
13	2009	31010529	2	1	1	1	15640000	5	-1312500	5	14327500	5
14	2009	31019150	2	1	2	1	4230000	1	-92500	3	4137500	1
15	2009	31019150	2	1	2	1	4383000	2	-97500	2	4285500	2
16	2009	31019150	2	1	1	1	4684000	3	-92500	4	4591500	3
17	2009	31019150	2	1	2	1	4900000	4	-87500	5	4812500	4
18	2009	31019150	2	1	2	1	5000000	5	-105000	1	4895000	5
19	2009	31019150	2	1	1	1	5036000	6	-32500	6	5003500	6
20	2009	31019150	2	1	1	1	5344000	7	1250	7	5345250	7
21	2009	31019150	2	2	1	1	6453000	8	8750	8	6461750	8
22	2009	31019480	2	1	1	1	8549000	1	-1050000	1	7499000	1
23	2009	31019480	2	1	1	1	9236000	2	-600000	3	8636000	2
24	2009	31019480	2	1	1	1	12750000	3	-1000000	2	11750000	3
25	2009	31019480	2	2	1	1	13955000	4	-600000	4	13355000	4
26	2009	31019480	2	1	1	1	18723000	5	-450000	5	18273000	5
27	2011	31022703	2	1	2	2	61454000	3	-16250000	2	45204000	1
28	2011	31022703	2	1	2	2	58644000	1	-12500000	3	46144000	2
29	2011	31022703	2	1	2	2	61178000	2	-1250000	6	59928000	3
30	2011	31022703	2	1	1	2	86600000	7	-22500000	1	64100000	4
31	2011	31022703	2	2	2	2	77500000	6	-11250000	4	66250000	5
32	2011	31022703	2	1	1	2	76378000	4	-10000000	5	66378000	6
33	2011	31022703	2	1	2	2	76635000	5	2500000	7	79135000	7
34	2009	31024123	2	1	1	1	13700000	1	-4981250	1	8718750	1
35	2009	31024123	2	2	2	1	16285000	2	-4106250	2	12178750	2
36	2009	31024123	2	1	1	1	29370260	3	-425000	3	28945260	3

37	2010	31024841	2	1	1	1	9756000	1	-87500	2	9668500	1
38	2010	31024841	2	1	1	1	10277895	2	-25000	3	10252895	2
39	2010	31024841	2	1	1	1	12395000	3	0	5	12395000	3
40	2010	31024841	2	2	1	1	13290000	4	-100000	1	13190000	4
41	2010	31024841	2	1	1	1	14250000	5	-25000	4	14225000	5
42	2009	31028974	2	1	1	1	10000	1	7500	2	17500	1
43	2009	31028974	2	1	1	1	60000	2	40000	5	100000	2
44	2009	31028974	2	1	1	1	265000	4	-42500	1	222500	3
45	2009	31028974	2	2	1	1	200000	3	50000	6	250000	4
46	2009	31028974	2	1	2	1	289000	5	12500	3	301500	5
47	2009	31028974	2	1	1	1	313000	6	25000	4	338000	6
48	2010	31031715	2	2	1	1	1570000	1	-287500	2	1282500	1
49	2010	31031715	2	1	1	1	1621000	2	-212500	4	1408500	2
50	2010	31031715	2	1	1	1	1950000	3	-187500	5	1762500	3
51	2010	31031715	2	1	1	1	2700000	4	-237500	3	2462500	4
52	2010	31031715	2	1	2	1	2898000	5	-162500	7	2735500	5
53	2010	31031715	2	1	1	1	3918000	6	-375000	1	3543000	6
54	2010	31031715	2	1	1	1	7300000	7	-187500	6	7112500	7
55	2010	31031954	2	1	2	1	4888000	1	-150350	1	4737650	1
56	2010	31031954	2	1	2	1	4900000	2	-110695	2	4789305	2
57	2010	31031954	2	1	2	1	4975000	3	40912	6	5015912	3
58	2010	31031954	2	1	2	1	5083000	4	6625	3	5089625	4
59	2010	31031954	2	2	2	1	5607000	5	37812	5	5644812	5
60	2010	31031954	2	1	2	1	5650000	6	35500	4	5685500	6
61	2010	31031954	2	1	1	1	8350000	7	632712	7	8982712	7
62	2010	31032036	2	1	2	1	1101000	1	-181250	1	919750	1
63	2010	31032036	2	1	2	1	1104000	2	-137500	3	966500	2
64	2010	31032036	2	1	2	1	1172742	3	-106250	4	1066492	3
65	2010	31032036	2	1	1	1	1560000	5	-181250	2	1378750	4
66	2010	31032036	2	2	2	1	1524000	4	-50000	5	1474000	5
67	2011	31032271	3	1	2	2	78200000	1	-24333333	1	53866667	1
68	2011	31032271	3	1	2	2	89500000	3	-21333333	3	68166667	2
69	2011	31032271	3	2	2	2	87900000	2	-18666666	5	69233334	3
70	2011	31032271	3	1	2	2	101500000	4	-22666666	2	78833334	4
71	2011	31032271	3	1	2	2	117820000	5	-21000000	4	96820000	5
72	2011	31035845	3	1	1	1	12339000	1	-8968750	1	3370250	1
73	2011	31035845	3	1	2	1	14940000	2	-2562500	3	12377500	2
74	2011	31035845	3	1	1	1	19000000	5	-3587500	2	15412500	3
75	2011	31035845	3	2	2	1	15300000	3	1537500	4	16837500	4
76	2011	31035845	3	1	1	1	16800000	4	3843750	5	20643750	5
77	2011	31035845	3	1	2	1	19950000	6	5637500	6	25587500	6
78	2011	31037993	2	1	2	1	3193000	1	-437500	2	2755500	1

79	2011	31037993	2	2	1	1	5965000	2	-312500	3	5652500	2
80	2011	31037993	2	1	2	1	7564500	3	-462500	1	7102000	3
81	2010	31038096	2	1	1	1	2985000	1	-262500	3	2722500	1
82	2010	31038096	2	1	2	1	3880000	3	-575000	1	3305000	2
83	2010	31038096	2	2	2	1	3445000	2	-137500	4	3307500	3
84	2010	31038096	2	1	1	1	6260000	5	-550000	2	5710000	4
85	2010	31038096	2	1	1	1	6100000	4	25000	5	6125000	5
86	2010	31056501	2	1	2	1	16900000	3	-2690000	2	14210000	1
87	2010	31056501	2	2	1	1	16573000	2	-2017500	3	14555500	2
88	2010	31056501	2	1	1	1	14848000	1	672500	5	15520500	3
89	2010	31056501	2	1	2	1	16900000	4	1345000	6	18245000	4
90	2010	31056501	2	1	2	1	23568000	6	-2017500	4	21550500	5
91	2010	31056501	2	1	2	1	26440000	7	-4707500	1	21732500	6
92	2010	31056501	2	1	2	1	20967000	5	2690000	7	23657000	7
93	2012	31043416	2	1	2	2	43435000	2	-6437500	3	36997500	1
94	2012	31043416	2	1	2	2	43420790	1	-4625000	5	38795790	2
95	2012	31043416	2	1	2	2	44324500	3	-5250000	4	39074500	3
96	2012	31043416	2	1	2	2	51624000	5	-9875000	1	41749000	4
97	2012	31043416	2	2	2	2	49759000	4	-3250000	6	46509000	5
98	2012	31043416	2	1	1	2	61100000	7	-7500000	2	53600000	6
99	2012	31043416	2	1	1	2	55677000	6	-1125000	7	54552000	7
100	2012	31009073	2	1	1	2	49822000	1	-9116100	2	40705900	1
101	2012	31009073	2	1	1	2	57162000	4	-12233100	1	44928900	2
102	2012	31009073	2	2	2	2	53318000	2	-7776350	5	45541650	3
103	2012	31009073	2	1	2	2	54980000	3	-8583372	3	46396628	4
104	2012	31009073	2	1	2	2	61394000	5	-8444700	4	52949300	5
105	2012	31009073	2	1	1	2	68160000	6	-7408000	6	60752000	6
106	2012	31031527	2	1	1	1	6595000	2	-4060350	1	2534650	1
107	2012	31031527	2	1	1	1	6500000	1	-3345000	2	3155000	2
108	2012	31031527	2	2	1	1	9114000	3	-1748420	3	7365580	3
109	2012	31051429	3	1	2	2	49950000	1	-11375000	2	38575000	1
110	2012	31051429	3	2	1	2	58522000	2	-18000000	1	40522000	2
111	2012	31051429	3	1	2	2	81000000	3	-2875000	3	78125000	3
112	2012	310532431	2	1	2	2	15415670	1	-11295305	3	4120365	1
113	2012	310532431	2	2	2	2	16521146	2	-11056207	4	5464939	2
114	2012	310532431	2	1	1	2	21400800	4	-12729924	2	8670876	3
115	2012	310532431	2	1	1	2	19482000	3	-10587960	5	8894040	4
116	2012	310532431	2	1	1	2	26980535	5	-16162184	1	10818352	5
117	2012	310532432	2	1	2	2	21759855	1	-16157697	2	5602159	1
118	2012	310532432	2	2	2	2	21936500	2	-14976345	4	6960155	2
119	2012	310532432	2	1	1	2	25035080	3	-15331092	3	9703988	3
120	2012	310532432	2	1	1	2	25960000	4	-14133800	5	11826200	4

121	2012	310532432	2	1	1	2	32938211	5	-20182252	1	12755960	5
122	2012	31018372	1	1	2	2	125955000	1	-68559141	2	57395859	1
123	2012	31018372	1	1	2	2	130875000	2	-71340666	1	59534334	2
124	2012	31018372	1	1	2	2	137700000	3	-59065128	5	78634872	3
125	2012	31018372	1	2	2	2	147695000	5	-66219782	3	81475218	4
126	2012	31018372	1	1	1	2	147499000	4	-61939685	4	85559315	5
127	2012	31051095	2	1	1	1	6432000	1	-2317960	1	4114040	1
128	2012	31051095	2	2	1	1	6992000	3	-1334760	3	5657240	2
129	2012	31051095	2	1	2	1	8000000	6	-1990000	2	6010000	3
130	2012	31051095	2	1	1	1	7800000	5	-1234000	4	6566000	4
131	2012	31051095	2	1	1	1	7000000	4	290000	5	7290000	5
132	2012	31051095	2	1	2	1	6722000	2	798340	6	7520340	6

Table 3-5: Data set based on the announcements from RWS in the period 2009-2013

4 Data modelling

In this chapter the data modelling of the EMVI tender data is explained and the data modelling results are presented, all in order to answer the final research question:

> *How can VON's EMVI-based data be interpreted and processed to gain insights on how to redevelop their EMVI tender strategy?*

Based on the dataset of Table 3-5 in paragraph 3.1.4 the next analyses are executed:

- The ranking analyses to analyse the average ranking results of VON compared to the competitor (paragraph 4.1);

- The price analyses to analyse the financially based trends and mutual irregularities between VON and competitor (paragraph 4.2);

- A hybrid ranking-price analysis to visualize the differences between VON top 3 and VON top >3 (paragraph 4.3).

Follow up analysis:

- SWOT-confrontation analysis is based on results from ranking and price analysis (paragraph 4.4).

4.1   Ranking analysis

The ranking analysis is not only focusing on the tender results displaying first rank for the lowest subscription price, the highest notional discount, and the lowest notional subscription price, but also the 'less interesting' ranking positions such as rank 2, 3 ... nth. The ranking analysis, serves to analyse the initial average rank for subscription price, notional discount and notional subscription price. The average rank is the result of the sum of the rankings divided by total the amount of subscribing contractors (VON and competitor together) whereby:

- A low(er) ranking result than average is indicated as 'better than average';

- A high(er) ranking result than average is indicated as 'less better than average'.

For example: *'Ranking result 3,0 is more favourable than ranking result 3,5'*.

To understand the ranking analysis, imagine the situation in which there is a pool of 5 subscribing contractors. Also imagine that these contractors perform (theoretically) equally good. Than the individual chance to win the project is 1/5th for each contractor. The average ranking for each subscribing contractor will result in 3 because rank 1 + rank 2 + rank 3 + rank 4 + rank 5 = 15 as the total sum of the ranking. When we divide the total sum of the ranking by the amount of subscribers which was 5, than the average rank for each subscribing contractor results in 15 / 3 = 3. See also Figure 4-1.
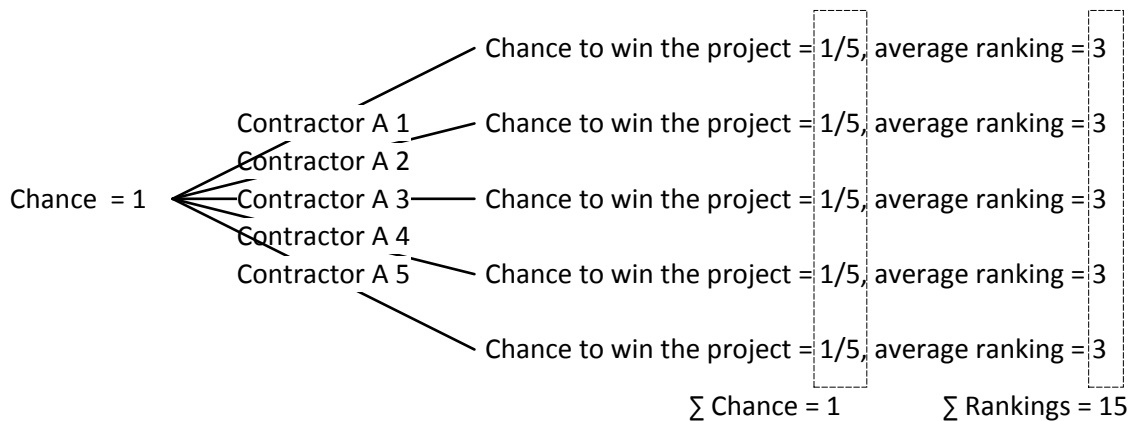

Figure 4-1: Ranking analysis: Chance of winning a project in a pool of 5 equally good subscribing contractors

To go a step further; an individual average ranking of 3,5 for a contractor in a pool of subscribing contractors who perform equally good is only possible in case of 6 subscribing contractors. Because rank

1 + rank 2 + rank 3 + rank 4 + rank 5 + rank 6 = 21 as the total sum of the rankings. When we divide this total sum of the rankings by the amount of subscribers, which is 6, than the average rank for the subscribing contractor results in 3,5.

Now, if one of the contractor's average sticks on an average ranking of 3,5 while there are still 5 subscribing contractors in the pool, than the individual performance and thus the chance to win the project is not equally distributed anymore. If we integrate ranking 3,5 into the pool of 5 subscribing contractors as done in Figure 4-2 we see that the increase of the ranking of contractor B 5 decreases the rankings of other competing subscribing contractors. This figure shows that:

- The average ranking for this pool of subscribing contractors is 3 (because 15 / 5 = 3);

- Contractors A 1-4 (A 1, A 2, A 3 and A 4) perform 'better than average' because their average rank is < 3 or more specifically 2,9;

- Contractor B 5 performs 'less better than average' because the average of contractor B 5 is > 3 or more specifically 3,5.
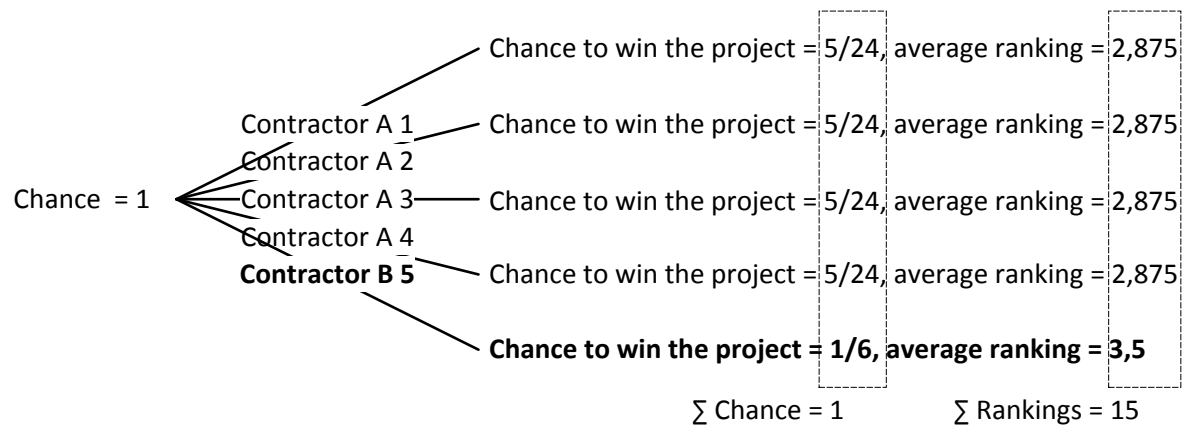
Figure 4-2: Ranking analysis: Chance of winning a project in a pool of 5 not equally good subscribing contractors

If we compare these rankings than we can conclude that after 24 tenders, contractor A 1-4 (with 5/24th chance to win a project) do win 5 projects and the contractor B 5 (with 1/6th chance to win a project) wins 4 projects. This indicates that the level of performance of contractor B 5 is 80% of contractor A 1-4. In other words; contractor B 5 makes 20% more tender 'efforts' than contractor A 1-4. Besides the extra tender efforts created by contractor B 5, contractor B 5 misses also 20% of the project profits. In fact, this is distributed over contractors A 1-4.

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With the ranking analysis it is possible to make the performing results more tangible. New insights could be used as input by adjusting the performing strategy of the contractor. Especially in the context of financial interests by limiting loses.

4.1.1   Ranking analysis: Modelling plan

The first ranking analysis determines the rankings in the data set of Table 3-5. This result is the starting point for the 4-fold follow-up ranking analysis which is based on data modelling filters. These filters are specifying the results related to the subscribing conditions. Therefore a first data filter separates the results of the starting point into ranking results for VON versus competitors. A second data modelling filter separates the ranking results from the first data filter into the type of enrolment. A third data filter separates the results of the second data filter into the project size. A fourth data filter separates the ranking results of data filter 1 directly to the project size. Summarized:

- Data filter **1** separates the ranking results of the **starting point** between VON and the competitor;

- Data filter **2** separates the ranking results of modelling filter **1** between independent and collaborating;

- Data filter **3** separates the ranking results of data modelling filter **2** between small and medium sized projects;

- Data filter **4 directly** separates the ranking results of data modelling filter **1** between small and medium sized projects.

Depending on the filter one has to take into account that the data reference changes by the subscribing condition and that also the reference is adapted to the right condition. For example; the dataset collection as reference for data filter 1 is not equal to the data-set section as reference for filter 3, because small and medium sized projects are both concerning their specific section of the total collection. Therefore:

- Ranking results from data modelling filter **1**, **2** and **4** are to compare with the reference ranking results as given in the **starting point**;

- Ranking results from data modelling filter **3** are to compare with the reference results as given in **filter 3**.

A detailed overview of the modelling plan with data filters is displayed in Table 4-1.

Starting point	**Overall average ranking VON & competitor**							
This result is the reference for filter 1, 2 and 4	*[Result]*							
Filter 1	**Only VON**				**Only competitor**			
Subscription price	*[Result]*				*[Result]*			
Notional discount	*[Result]*				*[Result]*			
Notional subscription price	*[Result]*				*[Result]*			
Filter 2	**Only independent**		**Only collaborating**		**Only independent**		**Only collaborating**	
Subscription price	*[Result]*		*[Result]*		*[Result]*		*[Result]*	
Notional discount	*[Result]*		*[Result]*		*[Result]*		*[Result]*	
Notional subscription price	*[Result]*		*[Result]*		*[Result]*		*[Result]*	
Filter 3	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**
This result is the reference result for filter 3	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*
Subscription price	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*
Notional discount	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*
Notional subscription price	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*	*[Result]*
Filter 4	**Only VON**				**Only competitor**			
	Only small		**Only medium**		**Only small**		**Only medium**	
Subscription price	*[Result]*		*[Result]*		*[Result]*		*[Result]*	
Notional discount	*[Result]*		*[Result]*		*[Result]*		*[Result]*	
Notional subscription price	*[Result]*		*[Result]*		*[Result]*		*[Result]*	

Table 4-1: Ranking analysis: Modelling plan

4.1.2   Ranking analysis: Results

The ranking results in Table 4-2 show that the average ranking for the subscription price, notional discount and notional subscription price for filter 1 are for each 3,4. This reference is the result of the sum of all the rankings divided by the amount of subscribers (132 subscribers, as shown in the data set in Table 3-5).

Starting point	Overall average ranking VON & competitor							
This result is the reference for filter 1, 2 and 4	*3,4*							
Filter 1	**Only VON**				**Only competitor**			
Subscription price	3,3				3,5			
Notional discount	3,8				3,4			
Notional subscription price	3,5				3,4			
Filter 2	**Only independent**		**Only collaborating**		**Only independent**		**Only collaborating**	
Subscription price	3,0		3,5		3,8		3,1	
Notional discount	3,2		4,3		3,5		3,2	
Notional subscription price	3,0		3,8		3,7		3,1	
Filter 3	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**
This result is the reference result for filter 3	*3,5*	*3,3*	*3,5*	*3,3*	*3,5*	*3,3*	*3,5*	*3,3*
Subscription price	3,1	2,0	3,7	3,3	3,6	3,5	4,5	2,6
Notional discount	3,4	1,0	4,2	4,4	3,6	3,3	3,2	3,1
Notional subscription price	3,1	2,0	4,3	3,4	3,5	3,5	4,4	2,7
Filter 4	**Only VON**				**Only competitor**			
	Only small		**Only medium**		**Only small**		**Only medium**	
Subscription price	3,3		3,1		3,5		3,4	
Notional discount	3,7		4,0		3,5		3,2	
Notional subscription price	3,6		3,3		3,5		3,3	

Table 4-2: Ranking analysis: Results

4.1.2.1   Ranking analysis: Results filter 1

Table 4-3 is a collapsed version of Table 4-2 and shows the results for filter 1.

Starting point	Overall average ranking VON & competitor						
This result is the reference for filter 1, 2 and 4	*3,4*						
Filter 1	**Only VON**				**Only competitor**		
Subscription price	3,3				3,5		
Notional discount	3,8				3,4		
Notional subscription price	3,5				3,4		
Filter 2	**Only independent**		**Only collaborating**		**Only independent**		**Only collaborating**	
Filter 3	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**
Filter 4	**Only VON**				**Only competitor**		
	Only small		**Only medium**		**Only small**		**Only medium**

Table 4-3: Ranking analysis: Results filter 1

Based on the reference ranking (3,4) for subscription price, notional discount and notional subscription price, as starting point for filter 1, this filter shows that VON has a lower ranking for subscription price (3,3) than the ranking for the subscription price for the competitor (3,5). However, the competitor has a marginal lower ranking for the notional subscription price (3,4). This is caused by the higher rank for notional discount of VON (3,8) that is compensated with the ranking for the notional discount of the competitor (3,4).

The ranking for the notional subscription price of VON (3,5) is marginal higher than the ranking for subscription price (3,3).The ranking for the notional subscription price of the competitor (3,4) is marginal lower than the ranking for subscription price (3,5).

4.1.2.2   Ranking analysis: Results filter 2

Table 4-4 is a collapsed version of Table 4-2 and shows the results for filter 2.

Starting point	Overall average ranking VON & competitor						
This result is the reference for filter 1, 2 and 4	*3,4*						
Filter 1	**Only VON**				**Only competitor**		
Filter 2	**Only independent**		**Only collaborating**		**Only independent**		**Only collaborating**
Subscription price	3,0		3,5		3,8		3,1
Notional discount	3,2		4,3		3,5		3,2
Notional subscription price	3,0		3,8		3,7		3,1
Filter 3	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**
Filter 4	**Only VON**				**Only competitor**		
	Only small		**Only medium**		**Only small**		**Only medium**

Table 4-4: Ranking analysis: Results filter 2

The results based on the type of enrolment, as shown under filter 2, show the distributed results of VON and the competitor concerning independent and collaborating subscribers. The ranking for subscription price of VON-independent (3,0) is significant lower than the reference ranking (3,4) and the ranking for subscription price of VON-collaborating (3,5). However VON-independent does not benefit the notional discount (3,2), because it did not increase the ranking for the notional subscription price (3,0) which is equal to the ranking for the subscription price (3,0). The ranking for notional discount of VON-collaborating (4,3) is significantly higher than the ranking for subscription price (3,5) which increased the ranking for notional subscription price (3,8).

The results concerning the type of enrolment shows that VON-independent has more favourable rankings than VON-collaborating, while independent competitors have less favourable rankings than collaborating competitors. The most unfavourable ranking of VON is allocated by VON-collaborating and concerns the ranking for notional discount (4,3). The most unfavourable ranking of the competitor is allocated by independent competitors and concerns the subscription price (3,8).

Both rankings for the notional subscription price of VON-independent and VON-collaborating (respectively 3,0 and 3,8) are equal to and higher than the rankings for subscription prices (respectively 3,0 and 3,5).The ranking for the notional subscription prices of independent and collaborating competitors (respectively 3,7 and 3,1) are lower than and equal to the ranking for subscription price (3,8 and 3,1).

4.1.2.3   Ranking analysis: Results filter 3

Table 4-5 is a collapsed version of Table 4-2 and shows the results for filter 3.

Starting point	Overall average ranking VON & competitor							
Filter 1	Only VON				Only competitor			
Filter 2	Only independent		Only collaborating		Only independent		Only collaborating	
Filter 3	Only small	Only medium	Only small	Only medium	Only small	Only medium	Only small	Only medium
This result is the reference result for filter 3	*3,5*	*3,3*	*3,5*	*3,3*	*3,5*	*3,3*	*3,5*	*3,3*
Subscription price	3,1	2,0	3,7	3,3	3,6	3,5	4,5	2,6
Notional discount	3,4	1,0	4,2	4,4	3,6	3,3	3,2	3,1
Notional subscription price	3,1	2,0	4,3	3,4	3,5	3,5	4,4	2,7
Filter 4	Only VON				Only competitor			
	Only small		Only medium		Only small		Only medium	

Table 4-5: Ranking analysis: Results filter 3

VON-independent in medium sized projects shows that the average ranking of the subscription price of VON-independent (2,0) is significantly lower than the average rank for the subscription price of VON-collaborating (3,7). The ranking result indicates a very positive result. However, because this case concerns only one VON-independent subscription in medium sized projects, this result will not be discussed here.

The rankings for the notional subscription price of VON-independent in small and medium sized projects and VON-collaborating in similar sized projects (respectively 3,1, 2,0, 4,3 and 3,4) are equal to or higher than the rankings for subscription prices (respectively 3,1, 2,0, 3,7 and 3,3).The rankings for the notional subscription prices of independent competitors in small and medium sized projects and collaborating competitors in similar sized projects (respectively 3,5, 3,5, 4,4 and 2,7) are equal to or lower than the rankings for subscription prices (respectively 3,6, 3,5, 4,5 and 2,6).

4.1.2.4   Ranking analysis: Results filter 4

Table 4-6 is a collapsed version of Table 4-2 and shows the results for filter 4.

Starting point	Overall average ranking VON & competitor							
This result is the reference for filter 1, 2 and 4	*3,4*							
Filter 1	**Only VON**				**Only competitor**			
Filter 2	**Only independent**		**Only collaborating**		**Only independent**		**Only collaborating**	
Filter 3	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**	**Only small**	**Only medium**
Filter 4	**Only VON**				**Only competitor**			
	Only small		**Only medium**		**Only small**		**Only medium**	
Subscription price	3,3		3,1		3,5		3,4	
Notional discount	3,7		4,0		3,5		3,2	
Notional subscription price	3,6		3,3		3,5		3,3	

Table 4-6: Ranking analysis: Results filter 4

Filter 4 shows in general that VON does have a marginally lower ranking for the subscription prices than the competitors, but a higher ranking for the notional discount. The ranking for the notional subscription price of the competitor is marginally lower than the ranking for the subscription price of the competitor. The ranking for the notional subscription price of the VON is higher than the ranking for the subscription price. I assume that this is likely caused by the quality of the EMVI plans of VON which are not sufficient to hold or lower the ranking for the subscription price.

4.2   Price analysis

As I know the figures from the ranking analysis, I can visualise the bottlenecks below. When all the subscription prices on x are projected against the same subscription prices on y then a straight 1 on 1 base line emerges which means x is equal to y as shown in Figure 4-3
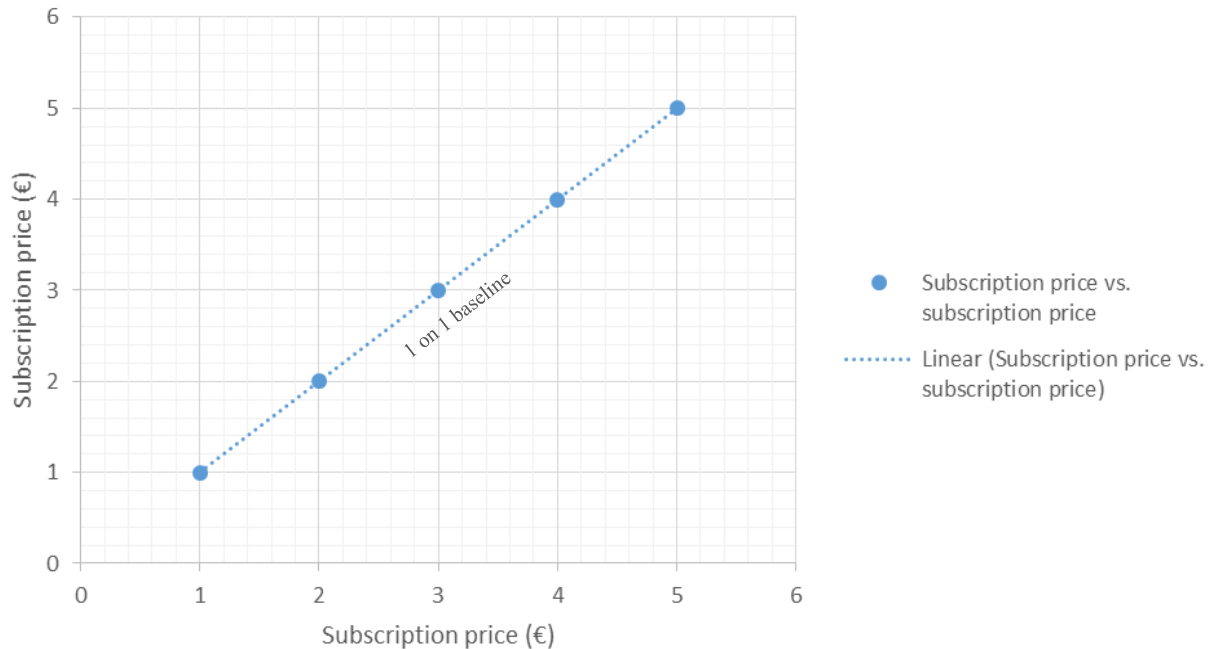

Figure 4-3: Example: Subscription price versus subscription price

If one value on the x-axis changes it affects the mathematical nature of the base line in the graph (steepness of the line and location on the graph). This happens when all the subscription prices on y are projected against the corresponding notional subscription prices on x, as shown in Figure 4-4. Because the shifted base line is not 1 on 1 anymore, this line is labelled the 'actual trend' line.
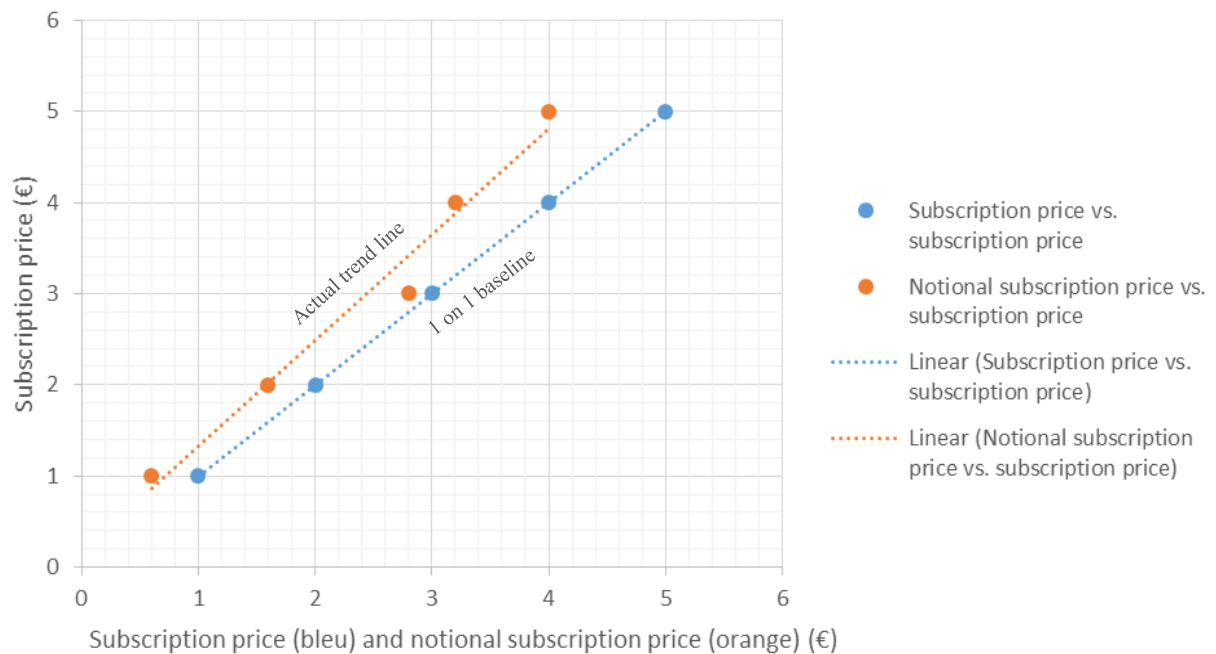
Figure 4-4: Example: 1 on 1 baseline versus actual trend line

The shift of the actual trend line in the graph as the result of the notional discount on the subscription price on x, is reflected as a gap between the 1 on 1 baseline and the actual trend line as illustrated in Figure 4-5. The location of the gap between the 1 on 1 base line and the actual trend line can be allocated in the 'notional discount area' above the 1 on 1 base line or in de 'notional charge area' below the 1 on 1 base line. The trend line as shown in Figure 4-5 is allocated in the notional discount area above the 1 on 1 base line.
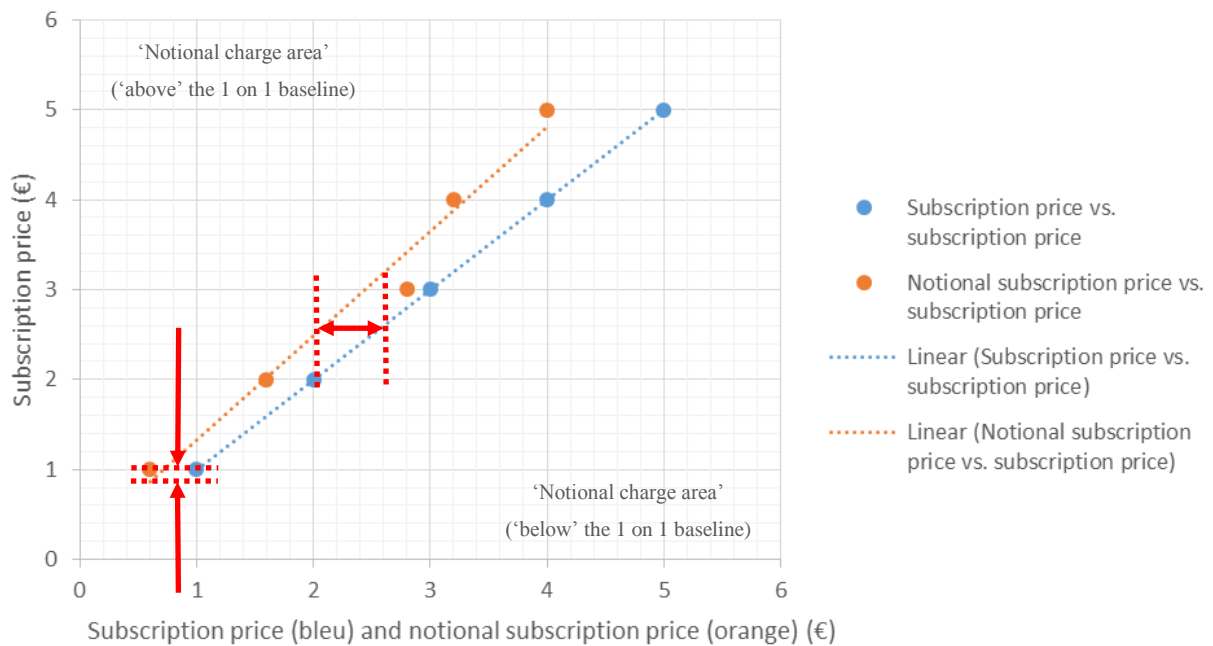
Figure 4-5: Example: Location of the gap between the 1 on 1 baseline and the actual trend line

The actual trend line in the scatter plot as shown in Figure 4-6 is based on the data-set as generated in Paragraph 3.1.4 and represent all the subscription prices on x versus the notional subscription prices on y.

The actual trend line is R-squared (R^2). This type of trend line is the optimal line between the results of all the notional subscription prices on x versus the corresponding subscription prices on y. The R² coefficient approximates the actual data, indicating that when all of the values correspond to the actual values then R² = 1. When $R^2 \geq 0,6$ then the correlation can be considered as plausible; the R^2 of 0,9022 of the trend line in equation 4-6 is an accurate result of the notional discount on the subscription price increasing along the financial size of the project.
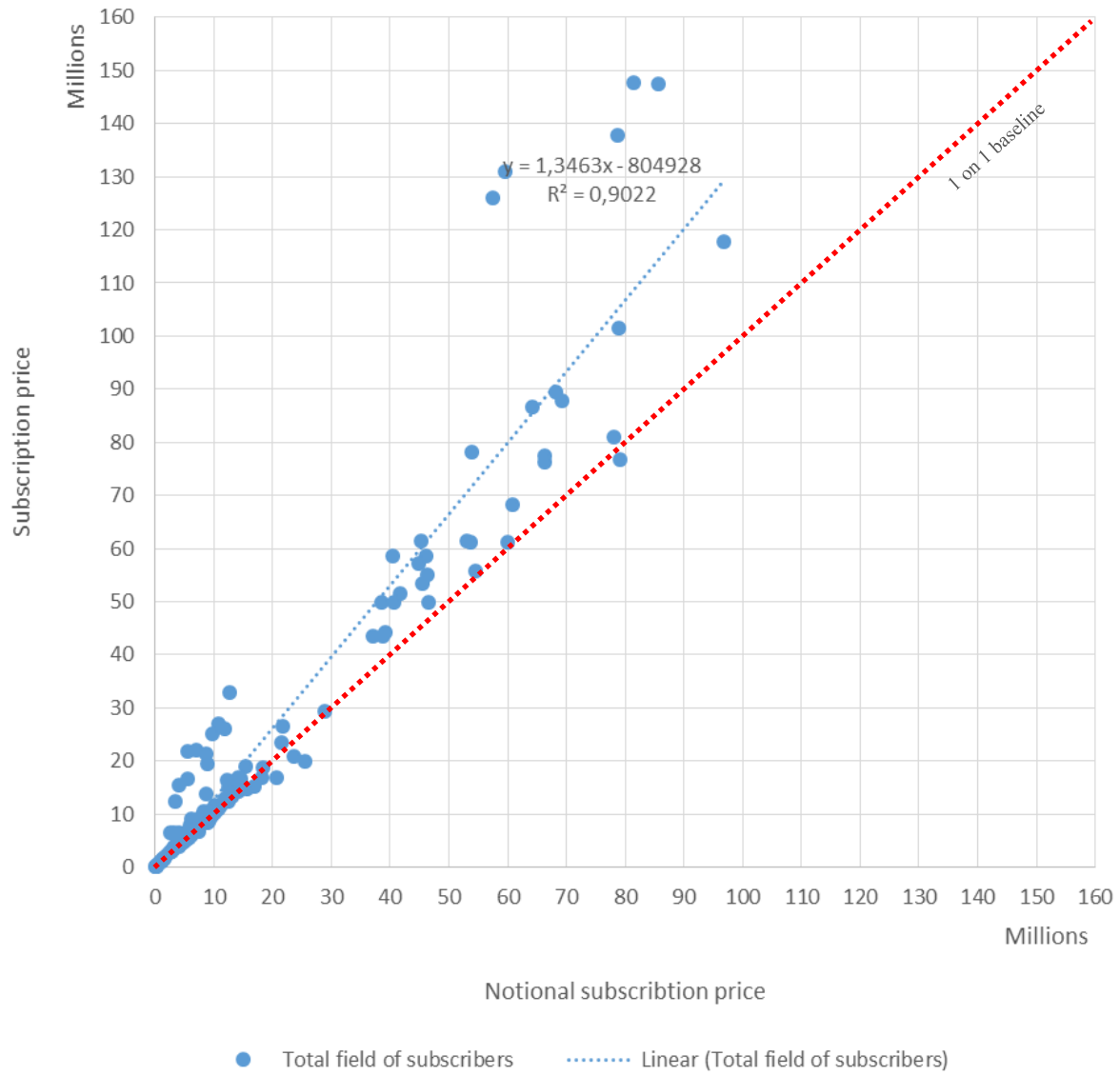
Figure 4-6: The scatter plot: Notional subscription prince on x versus the subscription price on y

The general formula for the actual trend line (i.e. straight line in the graph) is 'y = ax +b' whereby the slope of the line is represented by ax, whereby ax = Δy / Δx. Since the notional subscription prices on x are projected against the corresponding subscription prices on y, the slope (ax) leads to the next interpretations:

- A slope >1x means that the notional subscription price tends to be lower than the subscription price, so the actual trend line also tends to move in or towards the notional discount area with the factor of the slope on each y (subscription price) for each x (notional subscription price);

- A slope equal to 1x means that the notional subscription price is equal to the subscription price, so there is no notional discount or notional charge involved on the subscription price that increases with the factor of the slope on each x;

- A slope <1x means that the notional subscription price tends to be higher than the subscription price, so the actual trend tends also tends to move in or towards the notional charge area with the factor of the slope on each y (subscription price) for each x (notional subscription price).

The intersection of the trend line with the y-axis on the graph is represented by b (from y = ax + b). It actually says how much the trend line vertically has shifted. In this case it is the shifted point of the smallest subscription price on y corresponding with the smallest notional subscription price on x. This leads to the following interpretations:

- A positive b means an initial notional discount on the subscription price in the notional discount area of the graph;

- No b means that there is even no initial notional discount as well as notional charge on the subscription price. The intersection with the y-axis is equal to the intersection with the y-axis of the 1 on 1 baseline;

- A negative b means an initial notional charge on the subscription price in the notional charge area of the graph.

The equation for the actual trend line Figure 4-6 is $y = 1,3463x – 804928$ which shows that:

- The actual trend line tends to move to the notional discount area and the notional subscription price tend to be lower than the subscription price because the notional discount increases with the factor of the slope $(1,3463x)$ on each y (subscription price) for each x (notional subscription price);

- The negative b (-804928) shifted the intersection of the actual trend line with the y-axis downwards into notional charge area of the graph.

The reason to assume that a slope >1x means that the notional subscription price tends to be lower than the subscription price is because of the presence of the initial notional charge on the subscription price. It depends on the steepness of the slope and the initial notional charge whether the trend line will intersect the 1 on 1 base line. The intersection between two or more actual trend lines is present where two or more actual trend lines share a same x,y-coordinate.

If one equates $y = 1,3463x – 804928$ with $y = x$ (equation for the 1 on 1 base line) we find a corresponding x,y-coordinate at (2.340.425, 2.340.425). This is the point where the actual trend line intersects the base line and continues in the notional discount area with the factor of the slope on each y (subscription price) for each x (notional subscription price).

The importance of calculating the intersection of the actual trend line between VON and the competing contractor is to determine the moment when the actual trend line of VON and the actual trend line of the competitor indicate that VON is in a better position. This intersection, or break-even point, concerns the relation between the subscription price against the notional discount according the financial size of the project, and objectifies the 'switch' between an unfavourable or a preferred favourable 'performance zone' where the balance between subscription price, notional discount and the size of the project indicate tender potentials or not.

Thus, if VON and the competing contractor are both characterized by an unfavourable scenario, it is still possible to determine the point where VON is at least less unfavourable than the contractor in order to benefit from this information.

4.2.1   Price analysis: Data modelling plan

Based on the mathematical nature of the actual trend as explained in the previous paragraphs, the next 4 scenarios are interpreted as follows:

1. When the slope is >1x combined with a positive initial discount this indicates that the contractor has high tender potentials in the full range of the notional discount area;

2. When the slope is >1x combined with a negative initial discount this indicates that the contractor has low tender potentials in the front range of the notional discount area, but high performance potentials in the upper range of the notional discount area;

3. When the slope is <1x combined with a positive initial discount this indicates that the contractor has high tender potentials in the front range of the notional discount area but low performance potentials in the upper range of the notional discount area;

4. When the slope is <1x combined with a negative initial discount this indicates that the contractor sticks in the full range of the notional charge area.

4.2.1.1   Price analysis: Data modelling filters

The data filters are meant to compare the results specified to the subscribing conditions. These conditions are determined by the next data filters:

- Data filter **1** separates the price results in small sized projects between VON-independent and VON-collaborating compared to the competitors;

- Data filter **2** separates the price results in medium sized projects of VON-collaborating compared to the competitors.

The data filters for the price analysis are less detailed as used for the ranking analysis because VON is competing against the actual trend line of the total market with all kinds of competitors and not only against independent or collaborating competitors. The usefulness of the price analysis is to understand the actual trend line in relation to the ranking analysis.

4.2.2 Price analysis: Results

4.2.2.1 Price analysis: Results filter 1

Figure 4-7 shows the actual trend lines of VON-independent, VON-collaborating and the competitors in small sized projects. The points outside the area of small sized projects are caused by subscribing contractors in the same tender pool who subscribe with a subscription price exceeding €15.000.000,-.
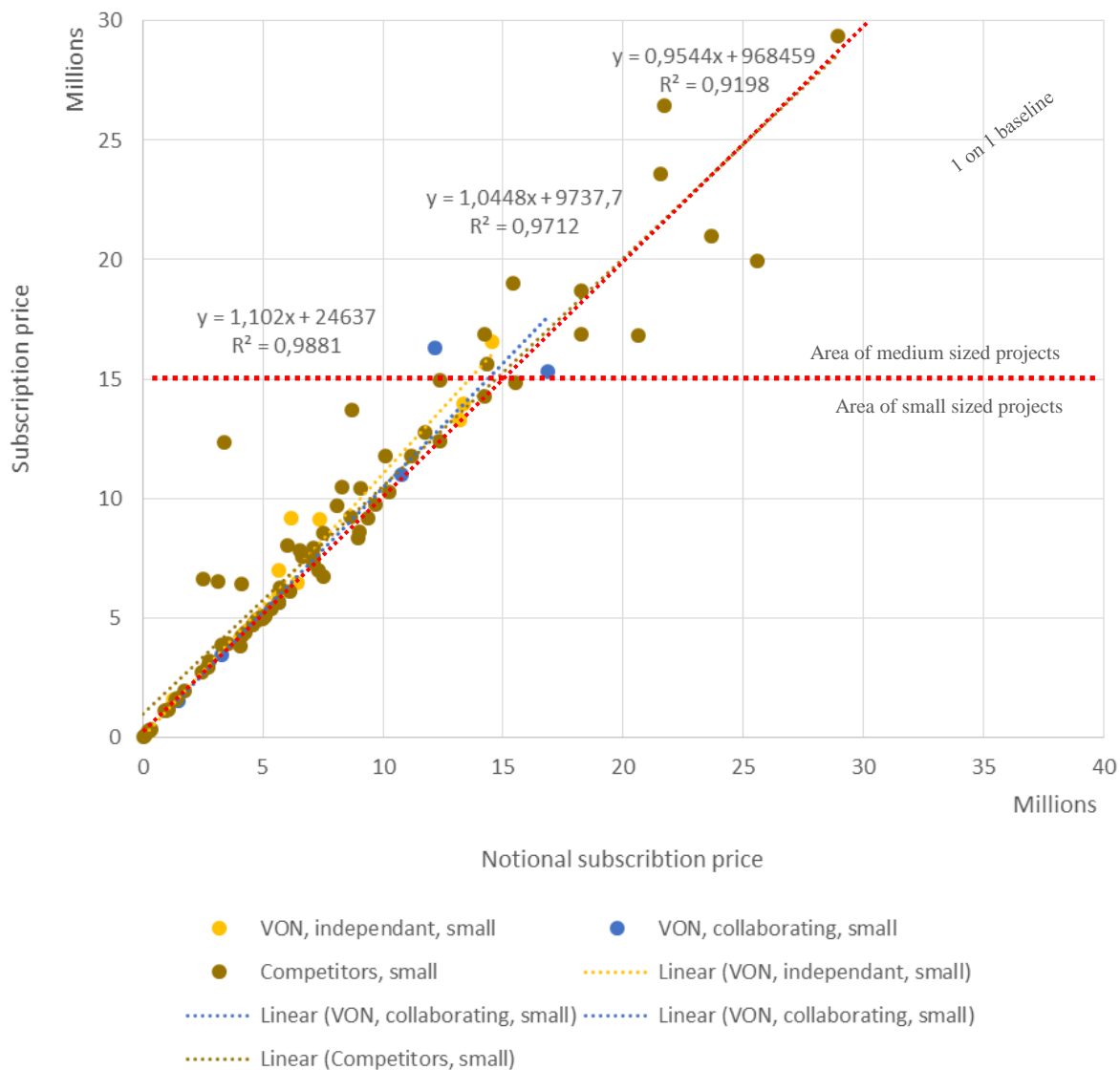

Figure 4-7: The scatter plot: VON-independent/collaborating in small sized projects compared with the competitor

The actual trend lines in the scatter plot as shown in Figure 4-7 indicate the next scenarios:

- VON-independent indicates scenario 1 → slope (ax):1,102x (>1x), shift (b): €24.637,- (initial notional discount) → high tender potentials in the full range the notional discount area;

- VON-collaborating indicates scenario 1 → slope (ax): = 1,0448x (>1x), shift (b): €9.737,- (initial notional discount) → high tender potentials in the full range the notional discount area;

- The competitor indicates scenario 3 → slope (ax): = 0,9544x (<1x), shift (b): €968.459,- (initial notional discount) → high tender potentials in the front range of the notional discount area but low performance potentials in the upper range of the notional discount area.

The initial notional discount of VON is a fraction of the initial notional discount of the competitor. However, the slope of the actual trend line of VON-independent and VON-collaborating is >1x. The slope of the actual trend line for the competitors is <1x.

4.2.2.1.1   Price analysis: Intersections in filter 1

Based on the equations of the actual trend lines the next intersections are calculated:

- The intersection of the corresponding notional subscription price on x versus the subscription price on y between VON-independent-small and competitors-small intersects at coordinate (6.394.458, 7.071.330) in favour of VON;

- The intersection of the corresponding notional subscription price on x versus the subscription price on y between VON-collaborating-small with competitors-small intersects at coordinate (10.605.321,11.090.177) in favour of VON.

This means that the performance zone for VON-independent-small starts at a subscription price of €7.071.330,- with an indicated notional subscription price of €6.394.458,- and a notional discount of €676.872,-. The performance zone for VON-collaborating-small starts at a subscription price of €11.090.177,- with an indicated notional subscription price of €10.605.321,- and a notional discount of €484.856,-. Summary reports of the results are given in table 4-7 and 4-8.

The scatter plot in Figure 4-8 zoomed in on the intersections between the actual trend lines of VON and the contractors. The intersections are marked with a circle and traced to the x,y-coordinate that correspond with calculated intersections.
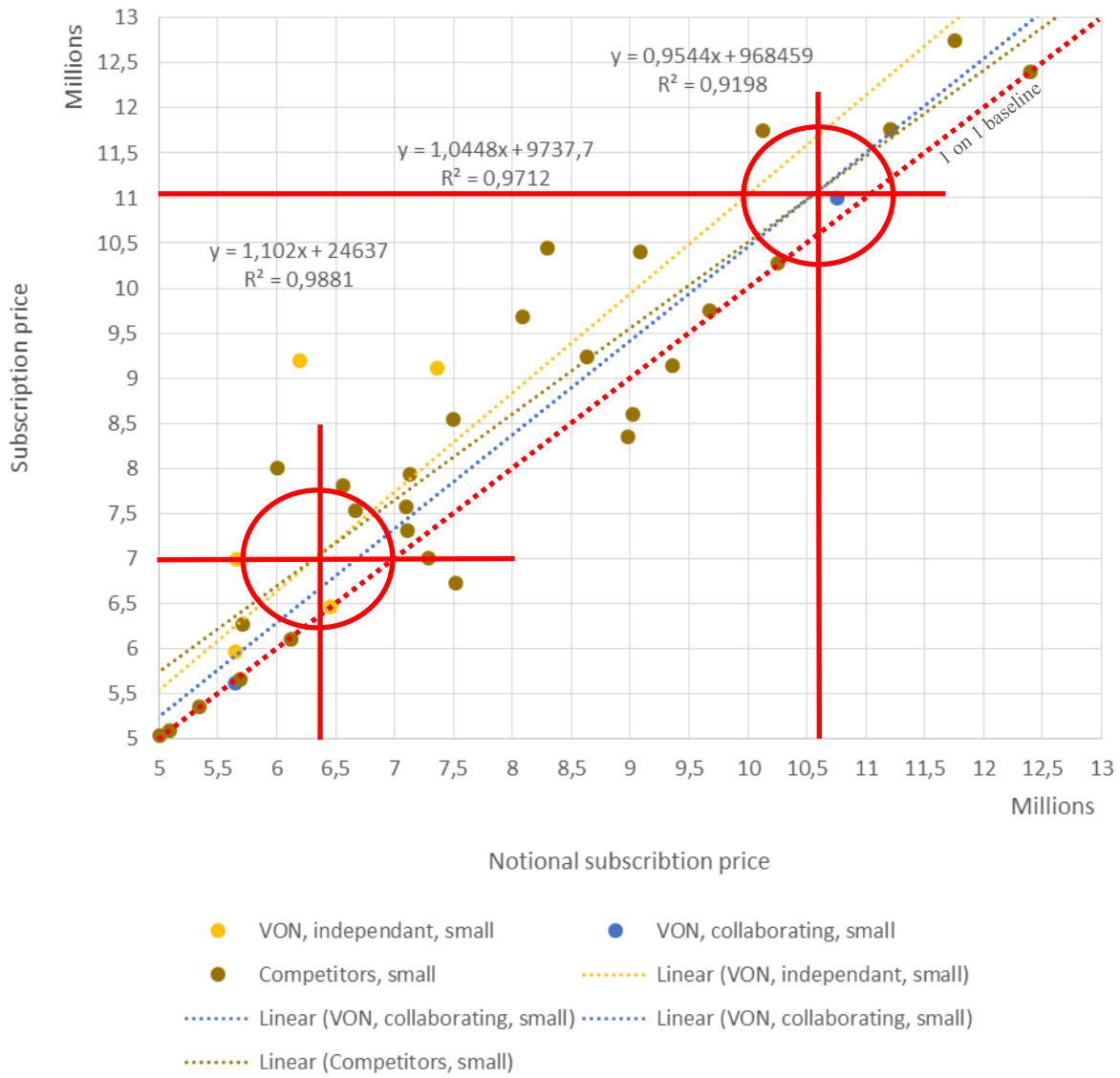
Figure 4-8: The scatter plot: Performance zones VON-independent/collaborating in small sized projects

Summary Report	VON-independent-small
Indicated scenario	Scenario 1 → slope >1x, initial notional discount→ high tender potentials in the full range the notional discount area.
Performance zone (subscription price)	>€7.000.000,-
Notional discount on subscription price	€600.000,-
Notional subscription price	€6.400.000,-
Percentage of subscription price	9%
No-go zone (subscription price)	<€7.000.000,-

Table 4-7: Summary report VON-independent-small

Summary Report	VON-collaborating-small
Indicated scenario	Scenario 1 → slope >1x, initial notional discount→ high tender potentials in the full range the notional discount area.
Performance zone (subscription price)	>€11.000.000,-
Notional discount on subscription price	€400.000,-
Notional subscription price	€10.600.000,-
Percentage of subscription price	4%
No-go zone (subscription price)	<€11.000.000,-

Table 4-8: Summary report VON-collaborating-small

4.2.2.2   Price analysis: Results filter 2

The scatter plot contains the following annotations:

$y = 1{,}1993x + 8E{+}06$
$R^2 = 0{,}7439$

$y = 1{,}4004x + 128803$
$R^2 = 0{,}9435$

1 on 1 baseline

Area of medium sized projects

Area of small sized projects

Axis labels: Millions (vertical), Subscription price (vertical), Notional subscribtion price (horizontal), Millions (horizontal)

Legend:
- VON, collaborating, medium
- Competitors, medium
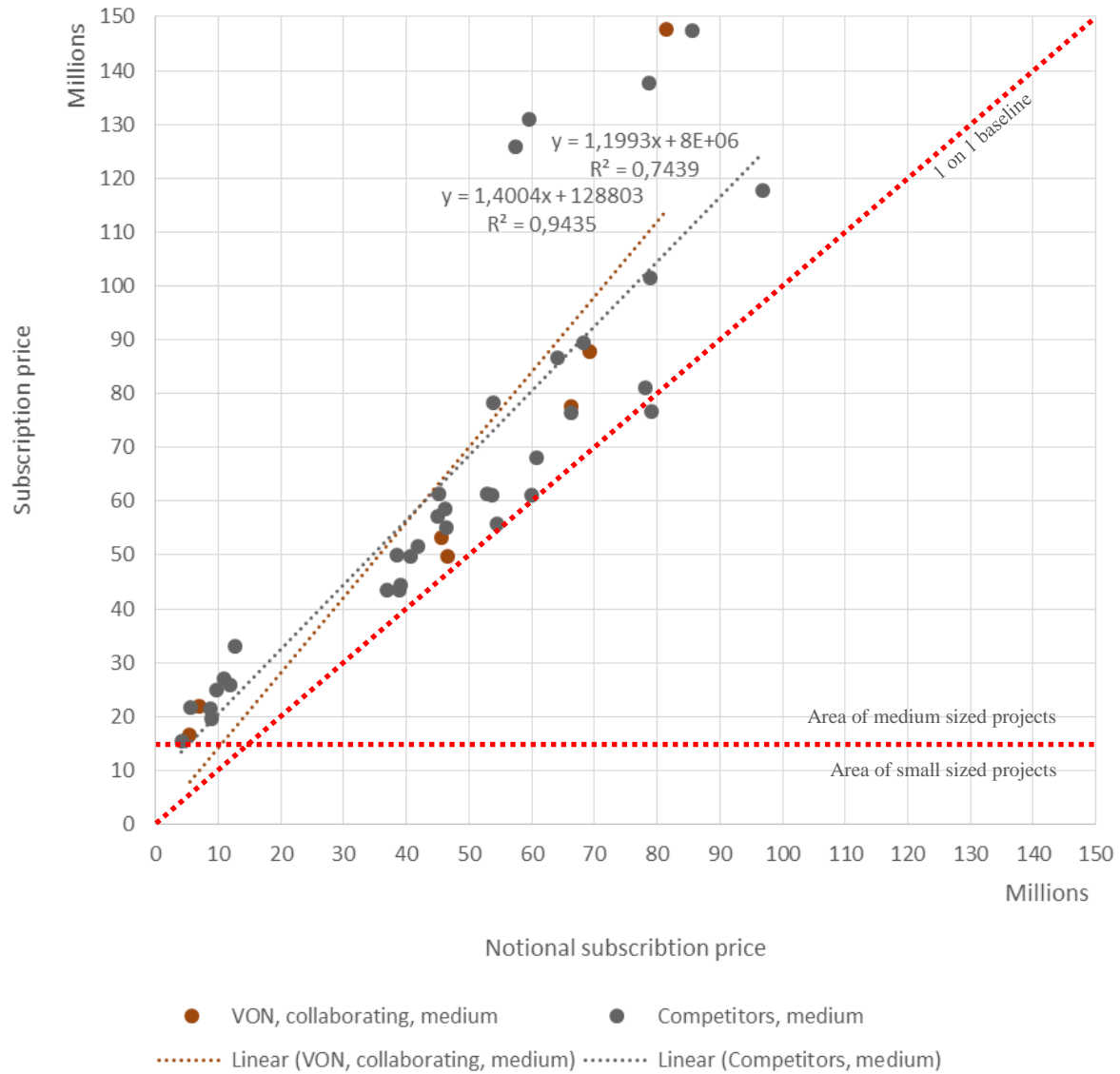- Linear (VON, collaborating, medium)
- Linear (Competitors, medium)

Figure 4-9: The scatter plot: VON-collaborating in medium sized projects compared with the competitor

The actual trend lines as shown in the scatter plot of Figure 4-9 indicate the next scenarios:

- VON-collaborating indicates scenario 1 → slope (ax): = 1,4004x (>1x), shift (b): €128.803,-
  (initial notional discount) → high tender potentials in the full range the notional discount area;

- The competitor indicates scenario 1 → slope (ax): = 1,1993x (>1x), shift (b): €8.400.000,- (initial
  notional discount) → high tender potentials in the full range the notional discount area.

The initial notional discount of VON is a fraction of the initial notional discount of the competitor. However, the slope of the actual trend line of VON-independent is much steeper than the actual trend line of the competitor.

4.2.2.2.1   Price analysis: Intersections in filter 2

Based on the equations of the actual trend lines the next intersection is calculated:

- The intersection of the notional subscription price on x versus the subscription price on y between
  VON-collaborating-medium and competitors-medium is at coordinate (41.129.771,57.726.935).

This means that the performance zone for VON-collaborating-medium starts at a subscription price of €57.726.935,- with an indicated notional subscription price of €41.129.771,- and a notional discount of €16.597.164,-. Summary report of the results is given in table 4-9.

Graph 4-8 zoomed in on the intersections between the actual trend lines of VON and the contractors. The intersections are marked with a circle and traced to the x,y-coordinate that correspondent with calculated intersections.
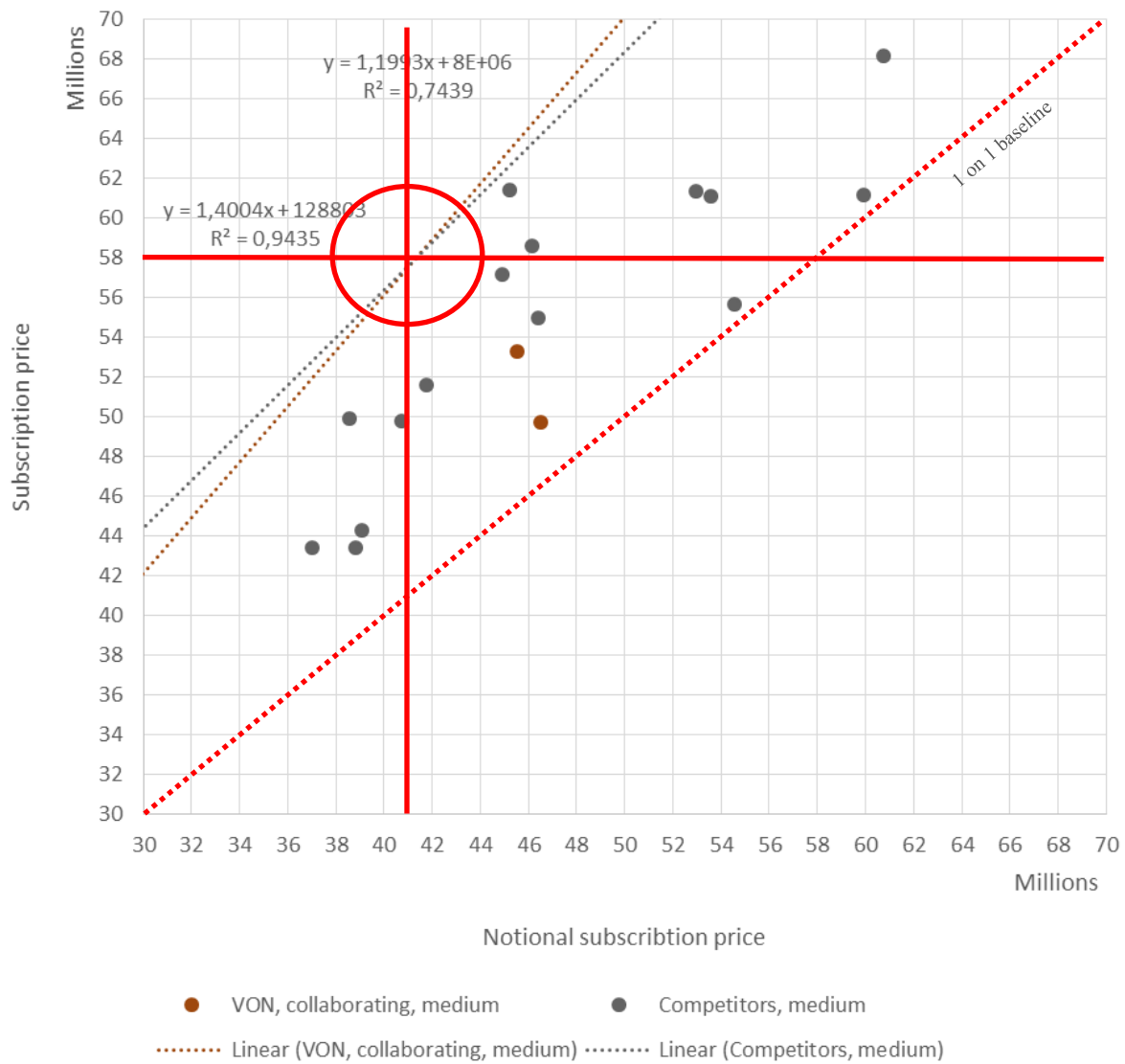
Figure 4-10: The scatter plot: Performance zones VON in medium sized projects

In the scatter plot:

- y = 1,1993x + 8E+06, R² = 0,7439
- y = 1,4004x + 128803, R² = 0,9435
- 1 on 1 baseline

Legend:
- VON, collaborating, medium
- Competitors, medium
- Linear (VON, collaborating, medium)
- Linear (Competitors, medium)

Axes: Subscription price (Millions) vs Notional subscribtion price (Millions)

Summary Report	VON-collaborating-medium
Indicated scenario	Scenario 1 → slope >1x, initial notional discount→ high tender potentials in the full range the notional discount area.
Performance zone (subscription price)	>€58.000.000,-
Notional discount on subscription price	€17.000.000,-
Notional subscription price	€41.000.000
Percentage of subscription price	30%
No-go zone (subscription price)	<€58.000.000

4.3 Hybrid ranking- price analysis

This hybrid ranking-price analysis combines the ranking results and the financial trends to visualize the differences between VON top 3 and VON top >3. The scatterplot in Figure 4-11 is the result of VON top 3 versus VON top >3.

- VON top 3 indicates scenario 1 → slope (ax) = 1,2328x (>1x), shift (b): €2.000.000,- (initial notional discount) → high tender potentials in the full range the notional discount area;

- VON top >3 indicates scenario 2 → slope (ax): = 1,1417x (>1x), shift (b): -€904.139,- (initial notional discount) → low tender potentials in the front range the notional discount area but high performance potentials in the upper range of the notional discount area.
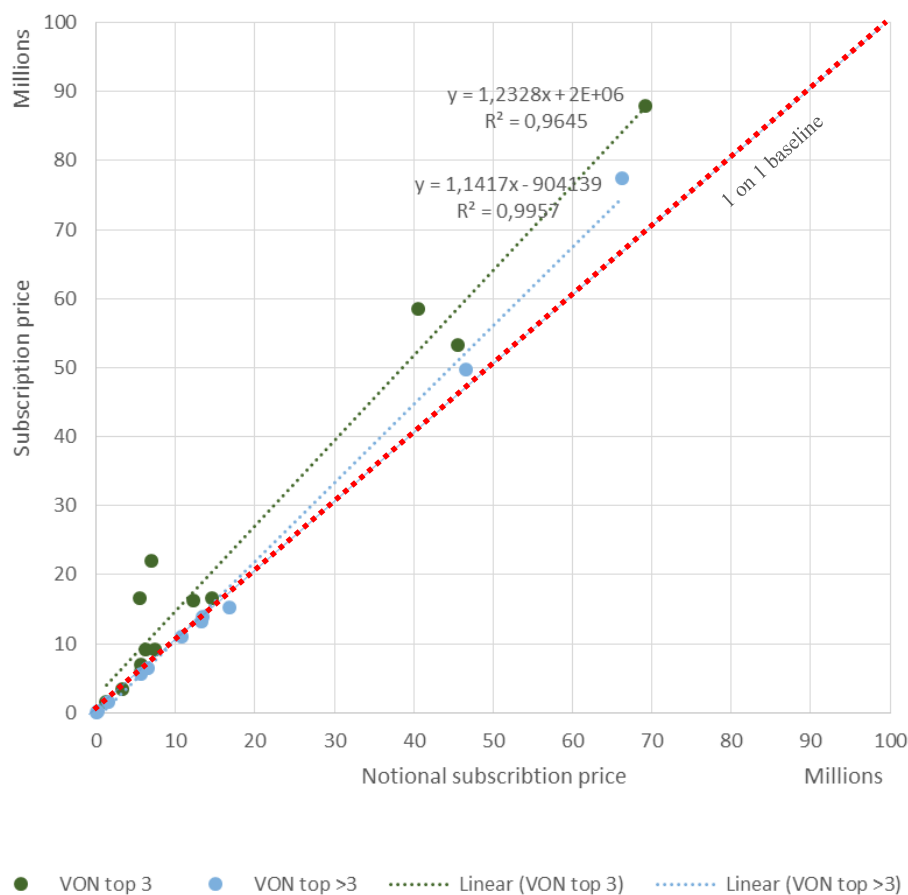

Figure 4-11: VON top 3 ranking versus VON top >3

4.4 SWOT-confrontation matrix

The SWOT analysis - which stands for the factors as Strengths, Weakness, Opportunities and Threats - is a widely used tool in business to determine the strategy of a company. An application of the SWOT-analysis is the confrontation matrix. This type of SWOT-analysis supports to find a strategy that fits the input of the SWOT-analysis. The SWOT-analysis is performed following the next steps:

1) Select the Strengths, Weaknesses, Opportunities and Threats of the company;

2) Combine the SWOT-terms;

3) Determine the preferred strategy.

4.4.1   Step 1: Select the Strengths, Weaknesses, Opportunities and Threats of VON

The internal strengths and weaknesses of the company are based on results from the ranking- and price analysis in paragraph 4.1 and paragraph 4.2. The external opportunities and threats of the company are based on findings of the theoretical background in chapter 2.

For strengths (internal):

- **Subscription price (price estimating)** – This strength is based on all the rankings for subscription prices for VON that are frequently better than average.

- **VON-independent** – This strength is based on the performance zone and the actual trend line for VON-independent-small (Figure 4-8) that shows that the actual trend line of VON-independent-small is frequently better than the actual trend line of VON-collaborating-small;

- **Project size >€7.000.000,-** – This strength is based on the performance zone for VON-independent-small (Figure 4-8) with high performance potentials in the upper area of the notional discount area;

For weaknesses (internal):

- **Notional discount (EMVI-share)** – This weakness is based on all the rankings for notional discount that are frequently less better than average.

- **VON-collaborating** – This weakness is based on the performance zone and the actual trend line for VON-collaborating-small (Figure 4-8) that shows that the actual trend line of VON-collaborating is frequently less better than the actual trend line of VON-independent;

- **Project size <€7.000.000,-** – This weaknesses is based on the performance zone for VON-independent-small (Figure 4 8) with low tender potentials in the front range of the notional discount area.

For opportunities (external):

- **Strategic partnership** – Alliances are also a form of (strategic) partnership whereby organizations innovate, access new markets, overcome local market restrictions, raise entry barriers and share risks for mutual benefits (Stanek, 2004; in Beach et al., 2005). Several studies (Construction industry Review Committee, 2001; Bayliss, 2002; Black, Akintoye & Fitegerald, 1999; Construction Industry Institute, 1989, in Cheung et al., 2003) argue that the main reason for partnering is providing benefits to the contracting parties, including cost effectiveness, work efficiency, opportunities for innovation, equitable risk sharing and less confrontation;

- **Peoples competences (Human Resources)** – The CIRC stands for an integrated approach to achieve the best outcomes. These improvements are of great concern to practitioners as well as academics (Beach et al., 2005). Inadequately trained workforces impair the industry's ability to adopt new technologies' and to cope with new challenges (Chan et. al., 2006);

- **Larger and extended projects** – The EIB (2012) finds that modern integrated contracts in combination with increasing project sizes are an obstacle for the participation of small- and midsized contractors. The EIB expects that this development will lead to situations in which companies are reorienting on collaboration with other parties. The current form of collaboration is based on collaboration inside the company and collaboration in-between the chain.

For threats (external):

- **EMVI-skilled competitors** – Specialists are already started to regard themselves as 'cures' to achieve more EMVI-benefits; especially when the size of projects are increasing. Douma & Schreuder (1998, in Beach et al., 2005) point out that specialists could become more powerful than contractors when creating more advantage from learning about applying their specialization;

- **Increasing EMVI-share by client** – The EIB argues that adding value by innovative contracts provide potential opportunities for contractors, but only when the share of lowest price bid becomes smaller than the share of EMVI bids. The EIB shows that the share of EMVI for government projects stabilized on 43% over the period 2009-2011. The share of EMVI based tenders in the categories 'provinces' and 'others' raised from respectively 11% to 17% and 37% up to 45%. The 'municipality' and 'organization of water management' show a share of EMVI in their tenders to 13% and 15%;

- **Dynamic service orientation by client** – The EIB (July, 2012) suggests that changing situations with new types of construction contracts will lead to shifting roles and positions in the market, and collaboration with partners to realize contractors' full potential opportunities.

4.4.2 Step 2: Combine the SWOT-terms

The next questions are strategic questions based on strengths and weaknesses combined with opportunities and threats. These will help by determine the preferred strategy in step 4:

- Strengths-Opportunities Actions:

  - *Strategy question 1: How can VON use their strengths to leverage opportunities?*

    VON can act as an 'entry partner' for small or mid-sized partners to join large integrated projects who bring in cost effectiveness, work efficiency, opportunities for innovation and equitable risk sharing.

- *Strategy question 2: What new strengths will this opportunity give to VON?*

  When more small and medium sized contractors see VON as a partner to enter large(r) integrated projects, VON can build up privileges to select the best partner to collaborate with.

▪ Strengths-Threats Actions:

- *Strategy question 1: How can VON counteract or minimize the threats with their strengths?*

  For VON-independent it is important to focus on projects with a minimum expected subscription price of €7.000.000,- or more. For VON-collaborating it is important to focus on projects with a minimum expected subscription price of €11.000.000,- or more.

- *Strategy question 2: What new strengths does VON need to build in order to counter these threats?*

  To counter threats VON must act like a smaller and more flexible contractor with a higher level of specialization.

▪ Weaknesses-Opportunities Actions:

- *Strategy question 1: How can VON reduce or eliminate their weaknesses by leveraging these opportunities?*

  VON will reduce their weaknesses by hiring specialists, train employees and contract strategic partnerships that compensate the skills that VON does not have.

- *Strategy question 2: What opportunity does VON need to introduce to take away the weaknesses?*

  Stimulate people's competences so that they can cope with new challenges. It is also the task of the human resource business unit of the company to monitor and control the distribution of the specialisms.

- Weaknesses-Threats Actions:

  - *Strategy question 1: How can VON reduce their weaknesses when dealing with these threats?*

    For VON-independent it is important to ignore projects till a maximum expected subscription price of €7.000.000,-. For VON-collaborating it is important to ignore projects till a maximum expected subscription price of €11.000.000,-.

  - *Strategy question 2: What weaknesses must VON strengthen to reduce these threats?*

    To protect against competitors VON must improve their EMVI-plans.

4.4.3   Step 3: Determine the preferred strategic

The preferred strategy is based on the relations between strengths, weaknesses, opportunities and threats. If there is a relation between these SWOT-elements then this is indicated with '+'. If there is no convincing relationship between the SWOT-elements then this is indicated with '-'. A strong relation is indicated with respectively '++' and '- -'. Everything in the middle is left blank.

Note: The indication is based on a personal interpretation.

The result with the relations is given in the SWOT-confrontation matrix in Table 4-9.

		Opportunities			Threats			Subtotals	Totals
		Strategic partnership	Peoples competences (Human Resources)	Larger and extended projects	EMVI-skilled competitors	Increasing EMVI-share by client	Dynamic service orientation by client		
Strengths	Subscription price (price estimating)			+		++		3	11
	VON-independent			+	+			2	
	Project size>€7.000.000,-	+		++	+	+	+	6	
Weaknesses	Notional discount (EMVI-share)		++	++		++	++	8	20
	VON-collaborating	++	++	+	+	+	+	8	
	Project size <€7.000.000,-	+				+	++	4	
	Subtotals	4	4	7	3	7	6		
	Totals	15			16				

The words GROW, DEFEND, REINFORCE, and MOVE BACK appear overlaid on the four quadrants of the matrix.

Table 4-9: SWOT-confrontation matrix

The confrontation matrix steers on one of the next strategy options:

1) **Grow** – The growth strategy is based on opportunities and strengths. These are external factors on which the organization can respond on it with their strengths → This is a preferred strategy when the total sum of indicators in sections 'grow' and 'reinforcement' is dominating;

2) **Defend** – The defence strategy is based on threats and strengths. These are external factors which the organization can defend itself by its strengths → This is a preferred strategy when the total sum of indicators in sections 'grow' and 'defend' is dominating;

3) **Reinforce** – The improvement strategy is based on opportunities and weaknesses. These are external factors outside the organization can reinforce itself working on the weaknesses → This is a preferred strategy when the total sum of indicators in sections 'reinforce' and 'move back' is dominating;

4) **Move back** – The retraction / change strategy is based on threats and vulnerabilities. These are external factors which the organization must defend but the weaknesses are unable to do → This

is a preferred strategy when the total sum of indicators in sections 'defend' and 'move back' is dominating.

Based on the highest sum of indicators in sections 'reinforce' and 'move back', the SWOT-confrontation matrix in table 4-9 suggests to 'reinforce' (20) the tender strategy. These are external factors outside the organization that can reinforce the strategy of VON by working on the weaknesses.

5 Conclusions and recommendations

Based on the findings of previous chapters, this final chapter combines the different insights in order to conclude how the EMVI-based data of VON can be interpreted to gain insights and redevelop the tender strategy of VON. At the end of this chapter the recommendations will be presented on how VON's EMVI-based data can be used to develop more successful tendering strategies.

> *How can VON's EMVI-based data be interpreted and processed to gain insights on how to redevelop their EMVI tender strategy?*

5.1 Conclusions based on EMVI-data analysis of VON

5.1.1 Based on the ranking analysis

Remarkably, the findings show that VON does not benefit from the notional discount on the subscription price to differentiate with the decisive notional subscription price. The competitor does. The notional discount on VON's subscription price compared to the competitor is less beneficial than the notional discount on the subscription price of the competitor. This means that, however VON has a notional discount on the subscription price, VON is still passed by the competitors. This is an indirect notional charge on the subscription price.

The findings show that VON is a moderate performing contractor, VON-independent performs significantly better than the average competitor. The indication of being a moderate performing contractor is caused by the results of VON-collaborating which impedes the general performance of VON as a contractor. This is exactly the opposite of the competitor's situation whereby the collaborating competitors do have better tender performance results compared to independent competitors.

The weight of the notional discount on the subscription price of VON-independent in small sized projects is too small to have a distinctive influence on the notional subscription price. In contrast to VON-independent, the weight of the notional discount on the subscription price of VON-collaborating in small sized projects affects the notional subscription price.

5.1.2 Based on the price analysis

As shown in paragraph 4.2.2.1, VON is a scenario 1 contractor with an initial notional discount on the subscription price that proportionally increases with the size of the subscription price. But there are some nuances to be made:

- Projects up to a subscription price around €7.000.000,- are potentially not suitable for VON, because in this area competitors generate more notional discounts on their competitive subscription prices;

- Projects in the area of a subscription price between €7.000.000,- and €11.000.000,- are potentially suitable for VON-independent but not for VON-collaborating. In this area VON-independent can compete with its subscription price in combination with a 'sufficient' notional discount;

- Projects up to a subscription price around €11.000.000,- are potentially not suitable for VON-collaborating because the subscription price is not competitive enough, even with the obtained notional discount on the subscription price;

- Projects up to a subscription price of €58.000.000,- are potentially not suitable for VON-collaborating. In first instance, because the actual trend line in the scatter plot Figure 4-9 gives a R^2 of 0,74 for the competitor and a R^2 of 0,94 for VON-collaborating. Here it seems that the results of the competitors contain some outlying data that disturb the correlation between the notional subscription prices versus the corresponding subscription prices.

5.1.3 Based on the hybrid ranking- price analysis

VON's top 3 serves as a scenario 1 contractor with an initial notional discount on the subscription price that proportionally increases with the size of the subscription price. VON's top >3 serves as a scenario 2 contractor with a negative initial discount on the subscription price. The big difference between VON top 3 and VON top >3 is the low tender potential of VON top >3 in the front range of the notional discount area.

5.2 SWOT-conclusions based on EMVI-based data analysis outcomes of VON

The SWOT-confrontation matrix supports the assumption that VON needs to reinforce the tender strategy by increasing its tender performance. This suggests that VON must work on its tender weaknesses and find a way to cope with competitive threats to take advantage of overlooked opportunities.

5.3 Recommendations on how VON can interpret and process the EMVI-based data to redirect their tendering strategy

5.3.1 Embrace EMVI-based tenders

Assuming that the applied business strategy of a contractor finds its origin in the expectations and aspirations of its broader sector, it is possible that the current tender strategy of VON does not meet the expectations of RWS considering EMVI-based tenders.

The analysis in this thesis shows that the EMVI-award mechanism is not fully exploited by VON in a consistent beneficial manner. Analysing qualitative factors require a different mind-set than required by quantitative factors. When the core business activities of VON keep revolving around generating a competitive subscription price only, the gap between the quality needs of RWS and quality offers of VON will only increase due to the lack (or, lag) of proper analytical focus by VON.

To ensure the up to date functioning of VON, while satisfying the expectations of RWS, VON must continuously stay aware of its tender strategy. Shifting interests of RWS overtime forces every contractor to accept and perform new kinds of activities, get other competences and 'unusual' responsibilities to adapt to the novel tender mechanism. Otherwise it will be very difficult to increase tender performance while connecting with the expectations of RWS. To cope with these changes, the business strategy should be both concerned with an operational excellence strategy as well as a customer intimacy strategy.

The findings in this thesis suggest splitting up the department into two sub-departments which both are able to successfully fulfil different expectations of RWS. The split would result in:

1. A primary project office which primarily focuses on operational excellence core competences as estimating and engineering;

2. A secondary project office which primarily focuses on customer intimacy competences as service- and quality aspects within projects.

The idea behind splitting up the business offices is to develop an independently controlled, quality oriented service sub-department that is able to translate the quality expectations of RWS and use them to enrich the offered core competences of VON and increase its tender performance.

5.3.2 Select long term partners

Traditionally most of the cooperation in the Dutch construction industry is based on collaboration with a short-term vision, in which the degree of the defensive attitude is determined by the scope of the legal framework. Due to the short-term and narrow scope of this type of cooperation, such cooperation is not always a success factor. Therefore, from a strategic point of view it is beneficial to choose solid partners for long term collaboration with an equal, (offensive) attitude towards quantity and quality aspects.

5.3.3 Implement the tender decision tree procedure

Using a TDT-procedure (Tender Decision Tree procedure) is beneficial to tender performance. The TDT-procedure in Figure 5-1 is inspired on the elements of the SWOT-confrontation matrix as shown in Table 4-9 of paragraph 4.4. It can be used as a supporting tool for decision-making on to subscribe or not to a project offered by RWS.

Before using the TDT-procedure it is recommended that VON performs a quick scan (based on reference projects) to determine:

- A (raw) estimation of the subscription price of the project;

- The expected form of subscription.

The estimated subscription price can be used to determine whether the project is located within the performance zone(s) of VON. We know that the optimal performance zone of VON-independent starts at

an expected subscription price of €7.000.000,- and that the optimal performance zone of VON-collaboration starts at a subscription price of €11.000.000,-.

The TDT-procedure in figure 5-1 recommends VON-collaborating to subscribe (with a long-term strategic partner, as recommended earlier) under the first condition that the estimated subscription price is >11.000.000,-. When the estimated subscription price is between € 7000.000,- and € 11.000.000,- then the TDT-procedure recommends to subscribe as independent. When the estimated subscription price is < € 7000.000,- then the TDT-procedure recommenders not to subscribe.
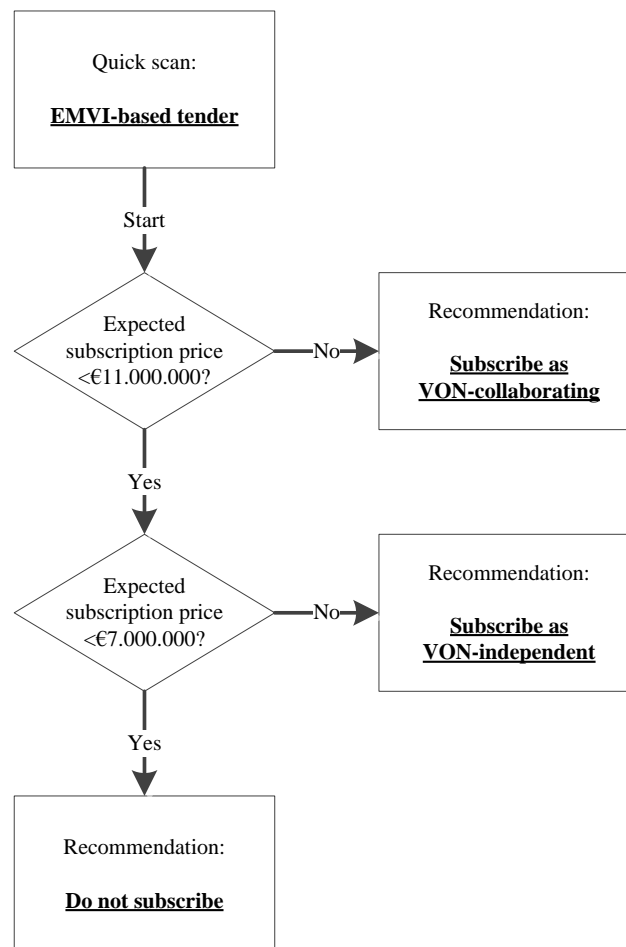

Figure 5-1: TDT-procedure

5.4 Recommendations on how contractors can use EMVI-based data to redevelop a successful tendering strategy

This sub paragraph provides the recommendations drawn from the analyses in previous chapters and which partly answer the initial research question of this thesis:

> *How can a contractor's EMVI-based data be used to redevelop more successful EMVI tender strategy?*

To do exactly the same as I did in this thesis, I recommend the contractor to follow the next SIPOD-flowcharts:

- Data collection procedure (Figure 5-2);

- Data modelling procedure (part 1 in Figure 5-3 and part 2 in Figure 5-4).

The SIPOD-flowchart stands for 'Source', 'Input', 'Process step', 'Output' and 'Destination' and is a standardized procedure that covers all the activities of chapter 3 and 4 to come to the redevelopment of the tender strategy.

Each process step refers to an activity that is executed in a chapter or paragraph of this thesis. So the user has an example how to execute the activity given by the process step.

The input that is needed to follow the process steps is also given even as the output of the process steps. The source or destination refers to the place where the input comes from or where the output is going to. If there is no source or destination given than the in- and output is only for procedural use. For example; the final output of the data collection procedure is input for the data modelling procedure.

DATA COLLECTION PROCEDURE

| Source | Input | Proces step | Output | Destination |

Start

Client → Tender results from client → Step 1: **Collect data** (subpar. 3.1) → Raw Data set

Raw data set → Step 2: **Extract entities** (subpar. 3.1.1) → Entities

Entities / Raw data set → Step 3: **Extract and encode the variables** (subpar. 3.1.2 and subpar. 3.1.3) → Labeled data variables / Encoding protocol

Encoded Variables / Encoding protocol → Step 4: **Complete the dataset** (subpar. 3.1.4) → Operational data set → **Data modeling procedure**

End

Figure 5-2: Data collection procedure

DATA MODELLING PROCEDURE

| Source | Input | Proces step | Output | Destination |

Start

Data collection procedure → Operational data set → Step 1: **Prepare the ranking analysis** (par. 4.1.1) → Modeling plan ranking analysis

Modeling plan ranking analysis → Step 2: **Perform the ranking analysis** (par. 4.1.2) → Results ranking analysis

Operational data set → Step 3: **Prepare the price analysis** (par. 4.2.1) → Modelling plan price analysis

Modelling plan price analysis → Step 4: **Perform the price analysis** (par. 4.2.1) → Results price analysis

Results ranking analysis / Results price analysis → Step 5: **Prepare the SWOT-analysis** (subpar. 4.4.1) → Strengts / Weaknesses / Opportunities / Threaths
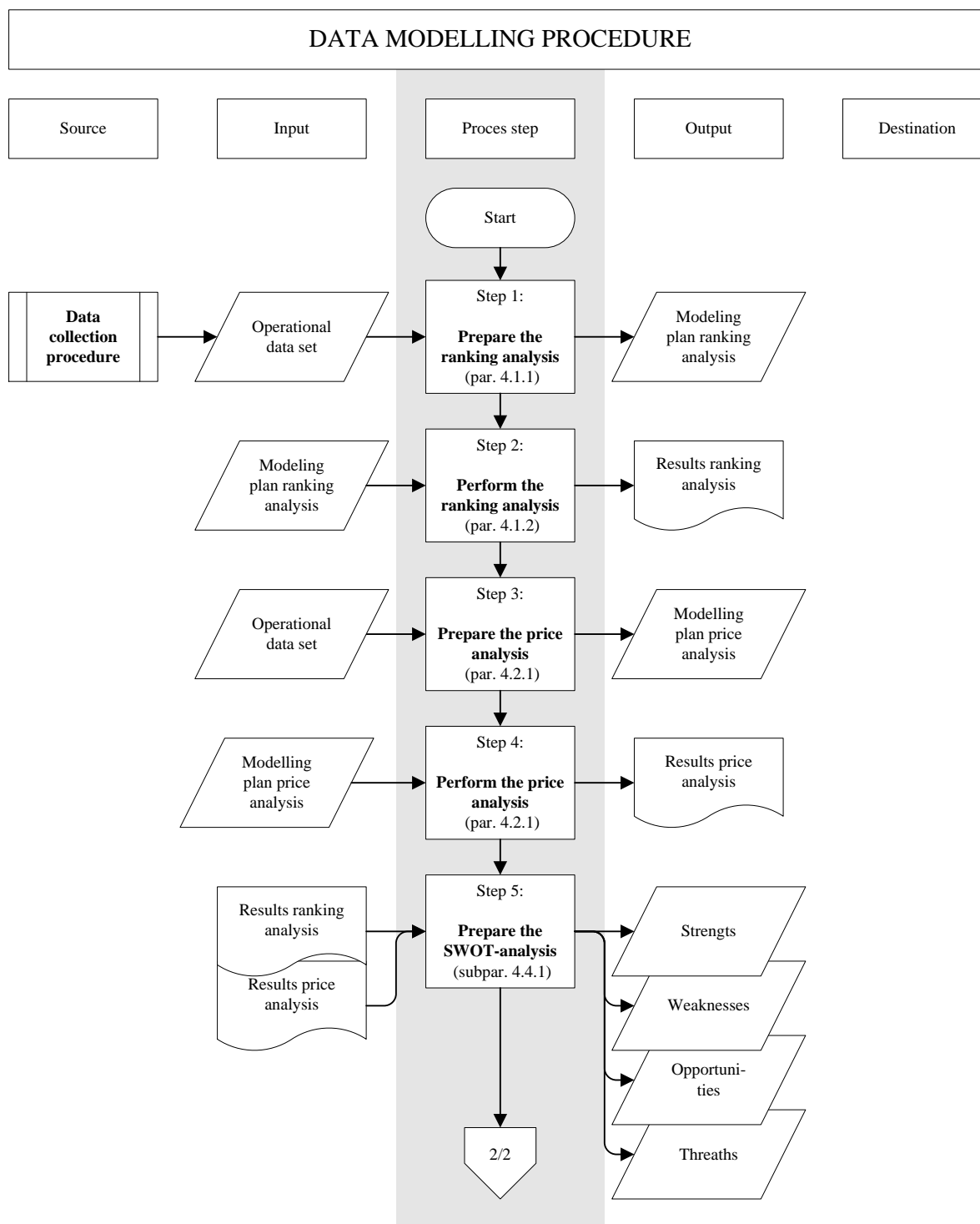
2/2

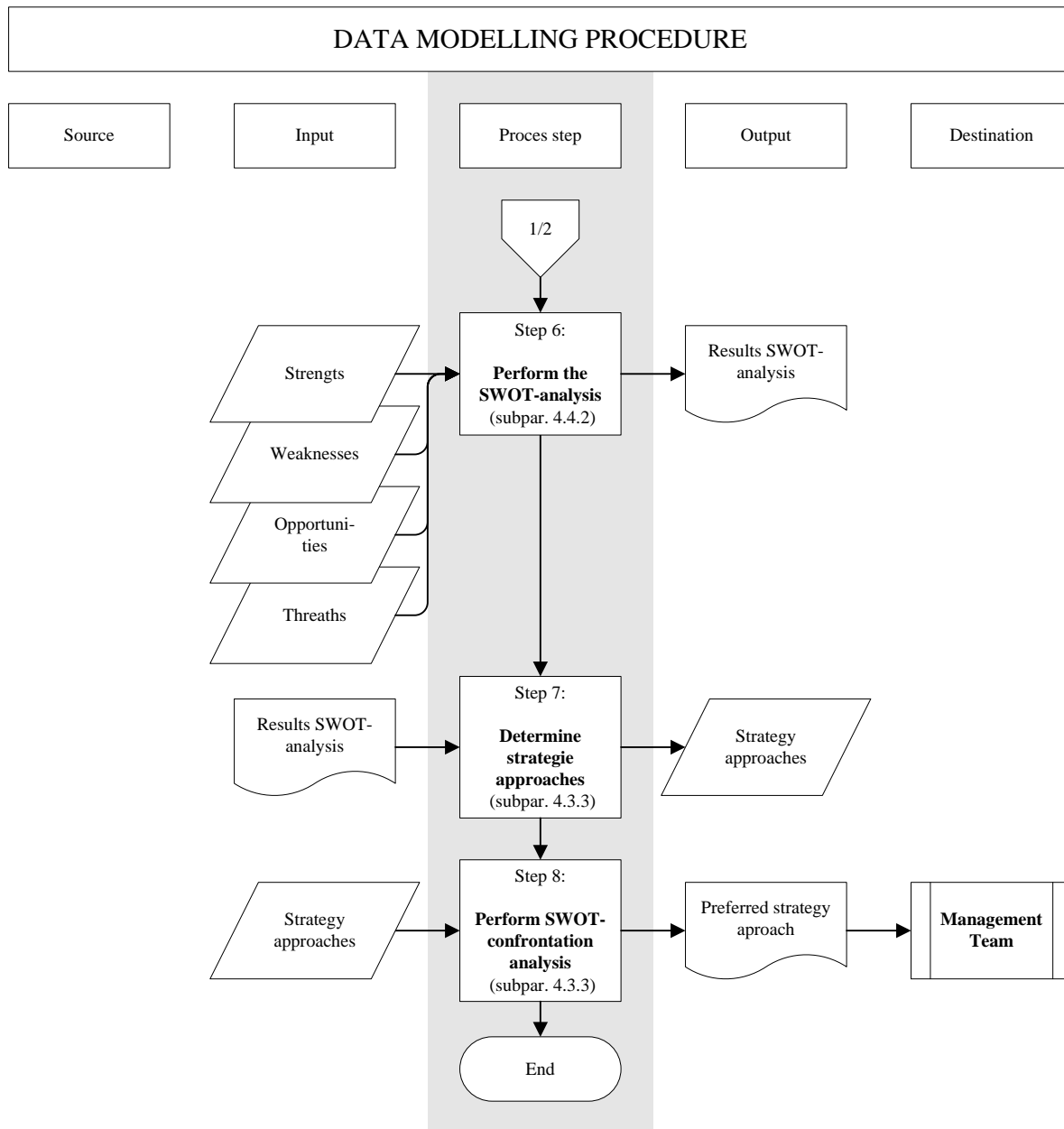**Figure 5-3: Data modelling procedure (1 of 2)**

Figure 5-4: Data modelling procedure (2 of 2)

5.5   Recommendations for further research

To enrich the potential of this research I recommend the next research developments:

1. Analyse contractors core competences ('waterworks', 'road construction', 'sand supplementation', 'coastal' work etc.) in order to find out the activity comfort zone of the contractor;

2. Extend research on individual EMVI-criteria. For example a returning criteria that is used most and the notional discount that is represented by that criteria;

3. Define the relation between people's competences and success related to EMVI-based tenders. What is the difference between people who are responsible for top 3 and top >3?

4. Develop a strategy to integrate the results of previous points into a high detailed sophisticated Tender Decision Tree.

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7   Appendix

Annex 1a: EMVI-model by Rijkswaterstaat

Bijlage 1 EMVI-model RWS Tabel EMVI-criteria project ....

Criterium	Subcriterium	Aandachtspunten	Doelstelling Opdrachtgever
1 .... (kwaliteitscriterium)	1.1	....	....
	1.2	....	....
2 .... (kwaliteitscriterium)	2.1	....	....
	2.2	....	....
3 .... (kwaliteitscriterium)	3.1	....	....
	3.2	....	....
	3.3	....	....
4 .... (prestatiecriterium)	....		

< onder de tabel: ruimte voor bondige toelichting op een criterium/subcriterium/aandachtspunten uit de tabel EMVI-criteria >

7.1 Annex 1b: EMVI-spreadsheet

Rekenblad EMVI

Criterium	Subcriterium	Maximale kwaliteitswaarde (€)	Beoordelings-cijfer	Behaalde kwaliteitswaarde (€)	Totalen (€)
1. .... (kwaliteitscriterium)	1.1	....			
	1.2	....			
2. .... (kwaliteitscriterium)	2.1	....			
	2.2	....			
3. .... (kwaliteitscriterium)	3.1	....			
	3.2	....			
	3.3	....			

Kwaliteitswaarde kwaliteitscriterium 1 t/m 3

Kwaliteitswaarde prestatiecriterium 4 .... : ☒ prestatie-eenheden à € $\bar{y}$ / prestatie-eenheid

Totale kwaliteitswaarde

Inschrijvingsprijs

Fictieve inschrijvingsprijs   (Inschrijvingsprijs minus Totale kwaliteitswaarde)

Geel gemarkeerd: ingevuld bij de uitvraag
Grijs gemarkeerd: invullen nadat de beoordelingscijfers zijn vastgesteld

Toelichting op het rekenblad EMVI

Er wordt onderscheid gemaakt tussen kwaliteitscriteria en prestatiecriteria. Bij een prestatiecriterium wordt direct, dus zonder kwaliteitsbeoordeling, de behaalde kwaliteitswaarde berekend via vermenigvuldiging van het in de inschrijving opgenomen aantal prestatie-eenheden met de waarde per prestatie-eenheid. Bij kwaliteitscriteria is dat niet mogelijk en wordt de behaalde kwaliteitswaarde verkregen via een beoordelingscijfer.

7.2 Annex 2: Key people strategies in the value disciplines by Potgieter and Roodt (2006)

	Operational excellence	Product leadership	Customer Intimacy

Core Organisational Capability	Providing reliable products or services at competitive prices and delivered with minimal difficulty and inconvenience.	Providing leading edge products and services, consistently enhancing the use of the product/service - making rivals' goods obsolete.	Segmenting and targeting markets precisely, and tailoring offerings to match exactly the demands of those niches. Customer sensitivity and flexibility.
	Dimensions		
A: Personal Strategy	Emphasize motivation and corporate spirit. Build teams that deliver cost-effective value, and high quality, user-friendly products and services.	Provide a comfortable, positive, creative environment. Provide basic needs. Remove them from HR policies and management concerns. Do not differentiate between people.	'Satisfied employees satisfy customers'. Rely on values to shape culture and messages. Promote relationship building as priority.
B: Organising	Teams: Project, process, product or customer based. Knowledge is shared. Best practice applications.	Product groupings based on creative structure - team or individual. Separate sales and creation functions.	Customer needs driven, but can be individual or team based. Strong focus on relationship building. All individuals constantly selling to customers - improving relations.
C: Personal Procurement	Criteria: Logical, efficient, cost conscious, resourceful, analytical, following procedures, initiating self-growth, short- term focus, systematic, team player, good communicator, detail oriented, problem solver.	Criteria: Courage, innovation, creativity, high technological development, long term focus, future focus, possibility focused, pride in being first in product quality, getting it right.	Criteria: Highly responsive, excellent listening skills, empathetic, consultative, perceptive, flexible values driven. Good communication and technical skills. Able to assess needs. Spontaneous problem-solvers, understand motivation. Long-term relationship focus.
D: Development	Emphasis on methods learning, team behaviours, process management and control, product time and quality control.	Emphasis on technical and creative training. Research skills, product development and team processes.	Emphasis on organisational values, relationship skills, communication skills, planning, knowledge sharing, e.g. new products or services.

E: Achievement	*Measures:* *Hard numbers, results on time, on budget, project completion and quality, cost reduction.* *Peer feedback on team behaviours.*	*Measures:* *Contribution made to new and innovative product/service development.* *Revenues from new products, shipment statistics.*	*Measures:* *Relationship productive behaviours.* *New customers gained, customers retained and lateral selling.*
F: Remuneration	*Strategic approach.* *Pay for performance, individual and team basis, below market base plus incentives.* *Variable incentives based on organisation, unit or team results.* *Profit sharing.*	*Rewards not used as strategic tool, no direct differentiation.* *Rewards kept neutral. Salaries and benefits above market.* *Profit sharing - equal distribution.* *Defined benefit plans.*	*Rewards tied to values.* *Based on behavioural, subjective assessments.* *Profit sharing - individual contribution recognised.* *Broad benefit choices.*
G: Strategy	*Process and systems based.*	*Innovation, research and development based.*	*Relationship management based.*
H: Core Values	*Reliability, accessibility, quality, market leadership.*	*Change sensitivity, creativity, focus on internal value adding.*	*Customer centricity and sensitivity to customer expectations.*
I: Core Abilities	*Consistency in provision, follow up and support.*	*Market leadership and continuous benchmarking.*	*Customer relationship building and retention strategies.*
J: Business Model	*Structured - process driven.* *Functional groupings.*	*Flexible - change sensitive.* *Project team groupings.*	*Flexible - people centred, 'flat' organisation.*