INTEGRAL CONTRACTED ENGINEERING SERVICES

Assessing the governance structure and implications

J.J. (Joeri) Verhoeven

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Preface

This document and underlying research form the last step towards graduating for the Master study 'Civil Engineering and Management' at the University of Twente. The research is carried out at a pilot project of Rijkswaterstaat and Royal HaskoningDHV, in which the engineering services are contracted for the long term and on an integral level. By addressing both organizations, the vision of the public client and private vendor is guaranteed.

The supervision of this research project consists of Marc Jacobs of Rijkswaterstaat, Martien Reniers of Royal HaskoningDHV and Leentje Volker & Hans Boes of the University of Twente, which I all would like to thank for their help during this project.

Next to this, I would like to thank Teun Ruijters for his input as portfoliomanager of RWS, who was involved in setting up this project.

Kind regards,

Joeri Verhoeven
Arnhem, 19-12-2019

Summary

For the project of constructing a resting facility for inland shippers at 'De Bijenwaard' in 'Spijk', Rijkswaterstaat has the mission to work with a small team. Therefore, a lot of the engineering services must be executed by a market player. The intention of this pilot project of RWS is that these tasks will be executed by one market player that is working integral in terms of disciplines as well as project stages, using the Best Value Approach and the IPM method. All project stages must be covered by this market player; from preparation until completion of the construction. Another goal of RWS, apart from working with less own staff, is to make optimal use of the knowledge and output a market player can deliver.

Royal HaskoningDHV won the tender in 2017 and is connected to this project for over 5 years. Due to a new way of working together, different implications can arise. Developments in construction, such as the integral approach or projects and change from classical client/vendor relationship towards an integral team, will be used to place this research in the context of the current situation. This research identifies the main structure and implications while contracting the engineering services for a long period with an engineering firm in the lead.

Outline

This research gives insights into a new way engineering services are contracted to a market organisation. Having a new kind of relationship and therefore governance structure can come with certain implications. Therefore, the main question is:

Which governance factors play a key role in integral contracted engineering services and what are their implications?

To make the research manageable, three sub-questions are drawn:

1. *What is the current situation regarding the delivery methods for engineering services for public clients?*
2. *Which governance criteria are suitable for assessing the relationship in integral contracted engineering services?*
3. *Which key governance factors and implications can be found in practice at the case project?*

To answer these questions, the characteristics of the public client and private vendor are outlined. After this, theories that fit the current methods and developments in the sector are studied. The 'Integrated Project Delivery' approach and Agency/Stewardship theory are in line with these developments, in which the decrease of fragmentation and aligning of goals and incentives play a central role. In addition, project 'DOEN' is studied, since a new way of working together is investigated. After this, the theoretical framework is established to function as a basis for empirical research. For this, the framework of Brinkerhoff (2002), in which the relationship between organisations is measured using criteria, is used. By interviewing both IPM teams (10 Persons), a clear view of the insights from public and private side was obtained. After this, the results were discussed with the respondents in a group session, so that a uniform picture of the situation arose.

Using the results and studied theory, a conclusion was drawn that answers the main question and recommendations are established. In Figure 1, the research outline is visualised.

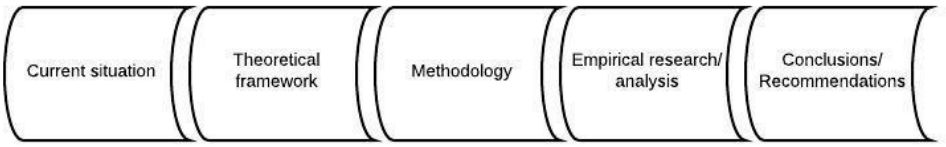

Figure 1: Research outline

Results

The results of the interviews and the group session are summarised per criterion of the theoretical framework.

Mutuality & Equality
The client can get too active and doesn't 'sit on his hands' enough. The vendor, on the contrary, can, in some cases, have a 'wait and see' attitude. Some respondents notice a client/vendor relationship instead of a team relationship; mainly because the client decides and the vendor produces products for the client. A team situation is noticeable since the goals are, for the largest part, aligned

Equality in decision making
Taking decisions is a task of the client. The vendor sometimes strongly confirms his role as an advisor while he rather would like to have more influence, creating more commitment. This would, however, result in a different risk allocation. For the vendor, it can be hard to think in scenarios while the client can have a hard time taking decisions. The vendor obtained a mandate in relation to the contractor in the realisation phase to take certain decisions, which is seen as a good development in the relationship.

Resource exchange
There is inefficiency due to having two IPM teams, both focusing on project steering. In addition, an additional layer exists between the worker and decider in the project. It appears that personal skills play an important role in the relationship and that the organisations and employees should be deployed using their expertise. In addition, managers of the client should be able to let the vendor do his job, while the vendor should take responsibility for the tasks.

Reciprocal accountability
It can be difficult to express desires to each other and to act upon this. Both organisations are however willing to listen to the other. It appears that predictability plays an important role, just as knowing how the other will react. This, in combination with trust, ensures a higher level of reciprocity and will lead to more responsibilities the vendor can take.

Partner representation & participation
It can be hard for the vendor to explain why he should or shouldn't be represented at the project location. Every respondent agrees on the fact that representation

should be based on the workload. The vendor obtained a mandate to decide in relation to the contractor, resulting in more participation. Trust plays a big role in granting this mandate for the client.

Transparency
There is a fairly transparent relationship. It can be hard to know the exact level of transparency that is needed, which can result in double information flows. Some respondents of the vendor argue to use full openness on the budgets and use an alliance structure, others think the situation as it is now is the right one.

Mutual respect
Mutual respect is needed to make the relationship and the project a success. Often this is linked to the relationship with the counter partner, showing a strong human factor. In general, job satisfaction can be noticed whenever the counter partners have respect for each other and each other's role and expertise.

Even benefits
A win-situation arises for the client by having less transactional moments, high quality, a small own team and no longer having monodisciplinary products. For the vendor, a win-situation can be noticed by having a large volume assignment that is attractive for the employees which can be used to obtain experience. It appears that it is hard to describe some services as product or objective and that these can be inaccurate. This can cause contractual changes and accompanying discussions, in which the client bears most of the risk.

Conclusion & recommendations

The conclusion is visualised in the left image of Figure 2. From the empirical research, it appears that having a structure with a double IPM team causes squandering. Next to this, the communication and expectations of the project team are not fully aligned, which is visualised in the double arrow with striped border. This is partly due to the vendor seeing himself as an advisor, and the client as a decision-maker.

In addition, by using Best Value, a purchased Project Management Plan and a Work Breakdown Structure, hard borders of the scope of the engineering firm arise. This means that there is little flexibility without intervention of contractual changes on the interface of scope engineering firm – scope client. This is visualised in the figure as a hard border around the scope of the engineering firm and a solid square as figure.

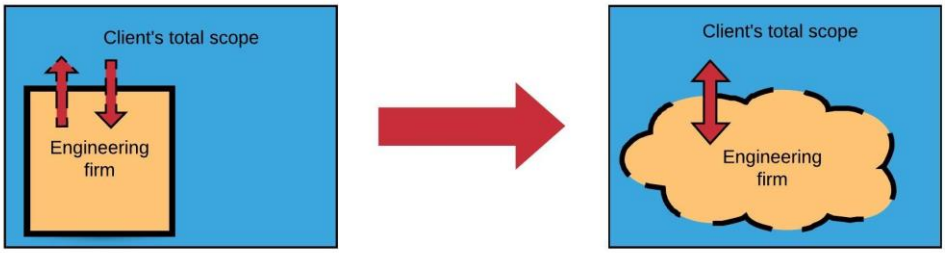

Figure 2: Conclusion & Recommendations

Recommended is to continue executing and researching this way of working together but on a more integral basis. In this way, the capacity problem is dealt with even better.

For such a project to run even smoother, recommended is to not use the structure of a double IPM team. Instead, a clear client and vendor team could be an alternative. Another possibility is to combine the teams of the client and vendor, preventing an intensive consultation structure. In addition, this gives more clarity on the way of communicating and the expectation, as can be seen in the double arrow with hard border in the image on the right in Figure 2.

Next to this, recommended is to not draw the border between the scope of the engineering firm and the scope of the client as hard as was the case in the case project, to help integration to a greater extent. Following the theory of 'Integrated Project Delivery', there should be mutual decision-making and control and shared risks and rewards. In addition, lessons can be learned from project 'DOEN', in which together discussing the uncertainties and ways on how to act are used. This can be done by jointly establishing the Project Management Plan, instead of only by the engineering firm. By doing this together, more focus can lie on reaching the stewardship relationship. In Figure 2, this more extensive integration is visualised by the change from a square towards a more integrated figure.

The challenge for the engineering firm will lie in investigating on how to approach projects more integrally. Pricing is usually based on hours and products instead of a bigger integral project. This should be stimulated by the criteria that are used in the tender phase. In addition, the vendor should be proactive in steering the client in the tender phase to jointly establish plans and discuss uncertainties, so that fewer discussions are needed during the project. In this way, a more integral approach will be noticed resulting in as many actions as possible directly contributing to the result of the project.

For future contracts is is recommended to change the title of the contract. There is a strong focus on jointly executing the project. Therefore, the title should contain aspects of the joint approach and the way the organisations address this project. Titles such as 'Joint commisioning of [harbour 't Spijk]' will probably fit better.

Samenvatting

Voor het project van de 'Aanleg overnachtingshaven Spijk' heeft Rijkswaterstaat de missie om met een klein eigen team te werken. Dit betekend dat veel ingenieursdiensten door de markt moeten worden geleverd. Voor dit pilot project wil RWS dat de ingenieursdiensten door één marktpartij worden uitgevoerd, dat integraal werkt wat betreft disciplines maar ook de project fasen, waarbij de Best Value methode wordt gebruikt en Rijkswaterstaat via de IPM methode werkt. Alle fasen moeten door deze marktpartij worden uitgevoerd, van voorbereiding tot oplevering van het object. Niet alleen moet er met minder eigen mensen gewerkt worden, een aanvullend doel is dat er optimaal gebruik wordt gemaakt van de kennis en kunde van een marktpartij.

Royal HaskoningDHV heeft in 2017 de opdracht gegund gekregen en is voor ruim 5 jaar verbonden aan dit project. Doordat een nieuwe manier van samenwerken wordt onderzocht, kunnen er verschillende implicaties ontstaan. Ontwikkelingen in de bouw, zoals het integraal aanpakken van projecten en verplaatsing van klassieke Opdrachtgever/Opdrachtnemer relatie naar integraal team zullen worden gebruikt om dit onderzoek in de context van de huidige situatie te plaatsen. Dit onderzoek identificeert de belangrijkste structuur en implicaties tijdens de uitbesteding van de ingenieursdiensten voor een lange periode, met een ingenieursbureau in de 'lead'.

Overzicht

Dit onderzoek geeft inzicht in een nieuwe manier waarop ingenieursdiensten zijn uitbesteed aan een marktpartij. Dit ligt in lijn met verschillende ontwikkelingen in de bouwsector. Een nieuwe soort relatie betekend een nieuwe governance structuur en kan zorgen voor verschillende implicaties. De hoofdvraag is dan ook:

Welke governance-factoren spelen een belangrijke rol bij het integraal uitbesteden van ingenieursdiensten en wat zijn de implicaties hiervan?

Om het onderzoek uitvoerbaar te maken, zijn er deelvragen opgesteld;

1. *Hoe ziet de huidige situatie van de projectleveringsmethoden er uit van de ingenieursdiensten voor publieke opdrachtgevers?*
2. *Welke governance-criteria zijn passend om de relatie van het integraal uitbesteden van ingenieursdiensten te beoordelen?*
3. *Welke belangrijke governance factoren en implicaties kunnen worden gevonden in de praktijk bij een case project?*

Om deze vragen te beantwoorden is er allereerst gekeken naar de karakteristieken van een publieke opdrachtgever en ingenieursbureau. Nadat dit onderzocht is, is de theorie welke aansluit bij de huidige methoden en ontwikkelingen in de sector onderzocht. De 'Integrated Project Delivery' en Agency/Stewardschip sluiten hierbij aan, waarbij een vermindering in fragmentatie van het proces en het afstemmen van doelen en stimulansen centraal staat. Ook is project 'DOEN' onderzocht, omdat hier ook op een vernieuwende manier wordt samengewerkt. Hierna is een theoretisch raamwerk worden opgesteld om als basis voor het empirisch

onderzoek te fungeren. Dit bestaat uit een raamwerk van Brinkerhoff (2002) waar de relatie tussen partijen wordt gemeten aan de hand van criteria. Het empirisch onderzoek is uitgevoerd met het theoretisch raamwerk als grondslag. Door beide IPM teams (10 personen) te interviewen ontstond er een duidelijk beeld van de inzichten van de publieke en private kant. Hierna zijn de belangrijkste bevindingen van de interviews in een groepssessie met de managers besproken zodat een eenduidig beeld is ontstaan van de resultaten. Aan de hand van de resultaten en de theorie zoals onderzocht, is een conclusie getrokken welke antwoord geeft op de hoofdvraag en zijn de aanbevelingen opgesteld. In Figure 3 is het onderzoeks-overzicht weergegeven.

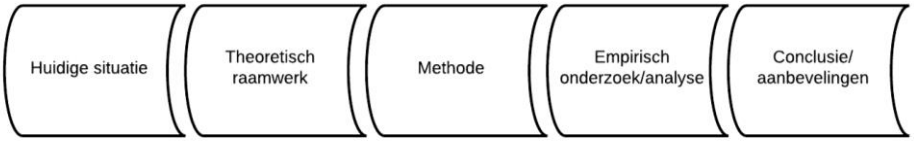

Figure 3: Onderzoeksoverzicht

Bevindingen

De bevindingen van de interviews en groepssessie zijn samengevat per criteria van het theoretisch raamwerk.

Gelijkheid & Gelijkwaardigheid

De opdrachtgever kan te actief zijn en niet genoeg ‘op zijn handen zitten’. De opdrachtnemer daarentegen kan in sommige gevallen een afwachtende houding aannemen. Door sommige respondenten wordt een opdrachtgever/ opdrachtnemer relatie gemerkt in plaats van een team, voornamelijk omdat de opdrachtgever beslist en de opdrachtnemer producten aanlevert. Een team situatie is merkbaar doordat de doelen voor het grootste gedeelte zijn afgestemd.

Gelijkheid in beslissingen maken

Het maken van beslissingen is de taak van de opdrachtgever. Het ingenieursbureau houdt zich soms sterk vast aan het feit dat hij adviseur is, terwijl hij soms meer invloed wil, wat zorgt voor meer commitment. Dit zou echter ook een andere verdeling van risico’s met zich mee brengen. Voor de opdrachtnemer is het soms moeilijk om in scenario’s te denken en voor de opdrachtgever is het lastig om een beslissing te maken. De opdrachtnemer heeft een mandaat richting de aannemer in de uitvoeringsfase om bepaalde beslissingen te nemen, wat als een goede ontwikkeling wordt gezien.

Uitwisselen van middelen

Er is inefficiëntie door het hebben van een dubbel IPM team, beide gefocust op projectsturing. Ook ontstaat er een extra laag tussen degene die het werk uitvoert en de beslismaker. Het blijkt dat persoonlijke skills een belangrijke rol spelen in de relatie en dat de partijen en mensen naar expertise moeten worden ingezet. Ook moeten de managers van de opdrachtgever de opdrachtnemer zijn werk kunnen laten doen, en moet de opdrachtnemer zich verantwoordelijk voelen.

Wederkerige verantwoordelijkheid
Het kan lastig zijn om exacte wensen uit te spreken en hier ook gehoor aan te geven. Er wordt wel geluisterd door beide partijen. Het blijkt dat voorspelbaarheid een belangrijke rol speelt en weten hoe de ander zal reageren. Dit, in combinatie met vertrouwen, zorgt voor een hoger level van wederkerigheid en meer verantwoordelijkheid welke de opdrachtnemer kan nemen.

Partner vertegenwoordiging & participatie
Het is lastig voor de opdrachtnemer om uit te leggen waarom of waarom hij niet aanwezig is op de projectlocatie. De aanwezigheid moet, volgens alle respondenten, gebaseerd zijn op de uit te voeren werkzaamheden. De opdrachtnemer heeft een mandaat gekregen om beslissingen te nemen ten opzichte van de aannemer, wat een grotere participatie betekend. Hierbij speelt vertrouwen een grote rol.

Transparantie
Er is een transparante relatie, alleen geen volledige openheid op de begroting van de opdrachtnemer. Het kan lastig zijn om het benodigde level van transparantie te weten. Hierdoor kunnen er dubbele informatiestromen ontstaan. Er zijn geluiden binnen het projectteam om volledige openheid van begrotingen te geven en een alliantie structuur te gebruiken, andere respondenten vinden de situatie zoals nu de juiste.

Wederzijds respect
Wederzijds respect is nodig om de relatie en het project tot een succes te maken. Vaak is dit gelinkt aan de relatie met de counter partner, wat een sterke menselijke factor laat zien. Er kan over het algemeen werkplezier worden gemerkt als de counter partners respect naar elkaar en elkaars rol en expertise hebben.

Gelijke voordelen
Een win-situatie ontstaat voor de opdrachtgever doordat er minder transactiemomenten zijn, hoge kwaliteit, met een klein eigen team gewerkt kan worden en geen monodisciplinaire producten worden geleverd. Voor de opdrachtnemer is een win-situatie doordat er een grote opdracht is, het attractief is voor de werknemers en ervaring mee op wordt gedaan. Het blijkt lastig om sommige services als product of doelstelling te omschrijven. Dit levert contractuele veranderingen en discussies op, waarbij de klant het meeste risico draagt.

Conclusie & aanbevelingen

De conclusie staat gevisualiseerd in de linker afbeelding van Figure 4. Uit het empirische onderzoek blijkt dat de structuur met dubbele IPM teams voor verspilling zorgt. Daarnaast blijkt dat de communicatie en verwachtingen van beide teams nog niet helemaal op één lijn liggen, wat de dubbele pijlen en gestreepte rand van de pijlen laat zien. Dit komt mede doordat het ingenieursbureau zich vaak als adviseur ziet, en de opdrachtgever als beslis-maker.

Daarnaast zijn er, door gebruik te maken van Best Value, een vooraf ingekocht Project Management Plan en een Work Breakdown Structure, harde grenzen aan

de opdracht van het ingenieursbureau. Dit betekend dat er weinig flexibiliteit zonder tussenkomst van contractuele wijzigingen zit op het raakvlak van scope ingenieursbureau – scope opdrachtgever. Dit staat in de figuur als harde lijn om de opdracht van het ingenieursbureau aangegeven en het figuur zelf als vierkant.

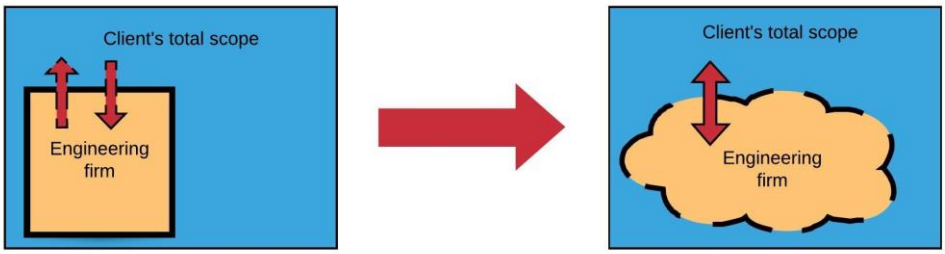

Figure 4: Conclusie & Aanbevelingen

Aanbevolen wordt om door te gaan met het onderzoeken naar deze manier van samenwerken, maar dan op een verder geïntegreerde basis. Op deze manier wordt er invulling gegeven aan het capaciteitsprobleem als initieel geschetst.

Om een dergelijk project nog beter te laten verlopen wordt er aanbevolen om geen gebruik te maken van een dubbele IPM structuur. In plaats hiervan zou een duidelijk opdrachtgevers en opdrachtnemers team een alternatief kunnen zijn. Een andere mogelijkheid is de teams van opdrachtgever en opdrachtnemer te combineren, wat een intensieve overlegstructuur voorkomt. Ook geeft dit duidelijkheid aan de manier van communiceren en de verwachtingen, zoals te zien is aan de dubbele pijl met vaste rand in de rechter afbeelding van Figure 4.

Daarnaast wordt aanbevolen om de grens tussen de scope van het ingenieursbureau en de totale scope van de opdrachtgever niet zo hard te stellen als in het case project, zodat er meer integratie zal plaatsvinden. In lijn met de 'Integrated Project Delivery' theorie, moet er dan sprake zijn van gezamenlijke besluitvorming en beheersing en het delen van risico's en winsten. Ook kan er geleerd worden van project 'DOEN', waarbij het samen bespreken van de onzekerheden en de manier om hier op te reageren wordt gebruikt. Dit kan gedaan worden door in samenspraak het Project Management Plan op te stellen, in plaats van alleen door het ingenieursbureau. Door dit samen te doen kan er ook meer gericht worden op een stewardship-situatie. In Figure 4 is dit gevisualiseerd als de verandering van een vast vierkant naar een meer geintegreerde vorm.

De taak voor het ingenieursbureau is om te onderzoeken hoe projecten meer integraal te benaderen. De prijsvorming is veelal gebaseerd op uren en producten in plaats van een groter project. Dit moet ook gestimuleerd worden middels de criteria in de aanbesteding. Daarnaast moet het ingenieursbureau proactief zijn in het sturen van de klant in de tender fase zodat plannen samen worden opgesteld. Op deze manier kan er op een meer integrale manier gewerkt worden zodat zoveel mogelijk inspanningen bijdragen aan het eindresultaat van het project. Tot slot is het aan te raden om de titel van het contract te veranderen met termen als 'Gezamenlijk opdrachtgeverschap' in plaats van het 'Uitbesteden van diensten', aangezien dit beter de aard van de relatie onderschrijft.

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Definitions

Awarding tender	Tender gunnen
Client	Opdrachtgever
Contractor	Aannemer
Contracted	Gecontracteerde/uitbesteedde
Integral contracted engineering services	Integraal uitbesteedde ingenieursdiensten in een vroeg stadium van een project
IPD	Integrated Project Delivery
RWS	Rijkswaterstaat
RHDHV	Royal HaskoningDHV
Vendor	Verkoper (in dit case project; ingenieursbureau)
WBS	Work Breakdown Structure, hierarchical decomposition of the work to be executed

1. Introduction

The Dutch government made rules for their organization, regarding the hiring of external staff. One of these rules is the standard for total expenditure for hiring external staff. Rijkswaterstaat (RWS) wants to comply with these rules, however, creating an agile organization using fewer flexible employees is extra challenging with these rules. A solution is to work with less of its staff and purchase products from a market party when needed. In this way, RWS can comply with the rules of less external staff, and still stay flexible. To reduce the vulnerability and dependence of the external hire, the core tasks should be executed by own RWS staff (Rijkswaterstaat, 2017).

The revenue model of engineering firms shifts from payment on an hourly basis towards a fixed fee. The pro of this shift is that engineering firms can be involved in projects for a longer-term and on a more integral basis. In this way, they can combine and integrate their knowledge and experiences. This shift comes with some new responsibilities and risks for the engineering firms as well (van Heel & Buijs, 2019)

Relationships between clients and contractors are often criticized for being competitive and adversarial (Eriksson, 2008). In this case, the relationship between the public client and the private engineering firm is researched, when the engineering services are integrally contracted to an engineering firm from the beginning until the completion of a project.

The above-mentioned factors indicate that the relationship between the public client and private contractor, in this case, an engineering firm, is changing. Changing relationships come with uncertainties and therefore will have to be examined to see whether the right way of collaboration is chosen and if adjustments are needed.

Case project

For this research project, the pilot project of 'Integral contracted engineering services' from Rijkswaterstaat and Royal HaskoningDHV is followed closely. The project consists of realizing a rest facility for inland shippers at the river 'Boven Rijn' between the German border and Tiel. This shortage will be solved by constructing a new facility at 'De Bijenwaard' in 't Spijk, a task that is assigned to RWS. This new harbour will have a capacity of approximately 50 berths. The tender for the construction firm is started in June 2019 and will be awarded in April 2020. The planning is to start construction in the summer of 2020 and finish in 2022.

For this project, RWS has the mission to work with a small team of its staff. Therefore, a lot of engineering services must be executed by a market player. RWS intends that these tasks will be executed by one market player that is working integral in terms of disciplines as well as project stages. All project stages must be covered by this market player, from preparation until completion of the construction. Apart from working with less own staff, another goal of RWS is to make optimal use of the knowledge and output that a market player can deliver.

To find a suitable partner for these integral engineering services, RWS put out a tender using 'Best Value Procurement'. After the tender procedure, this contract has been awarded to engineering firm Royal HaskoningDHV (RHDHV). The 'Best Value Procurement' will also be used to tender the 'construction contract.

For this project, the integrated project management (IPM) approach from RWS is used. This approach implies that for each process, a role is established. In total, five processes and therefore five roles can be distinguished (Rijkswaterstaat, n.d.). These roles are also filled in at the side of RHDHV, resulting in 10 key persons for the project. The roles are defined as:

- Project manager
- Contract manager
- Project controller
- Technical manager
- Stakeholder manager

The schedule of this project delivery method can be found in Figure 5.

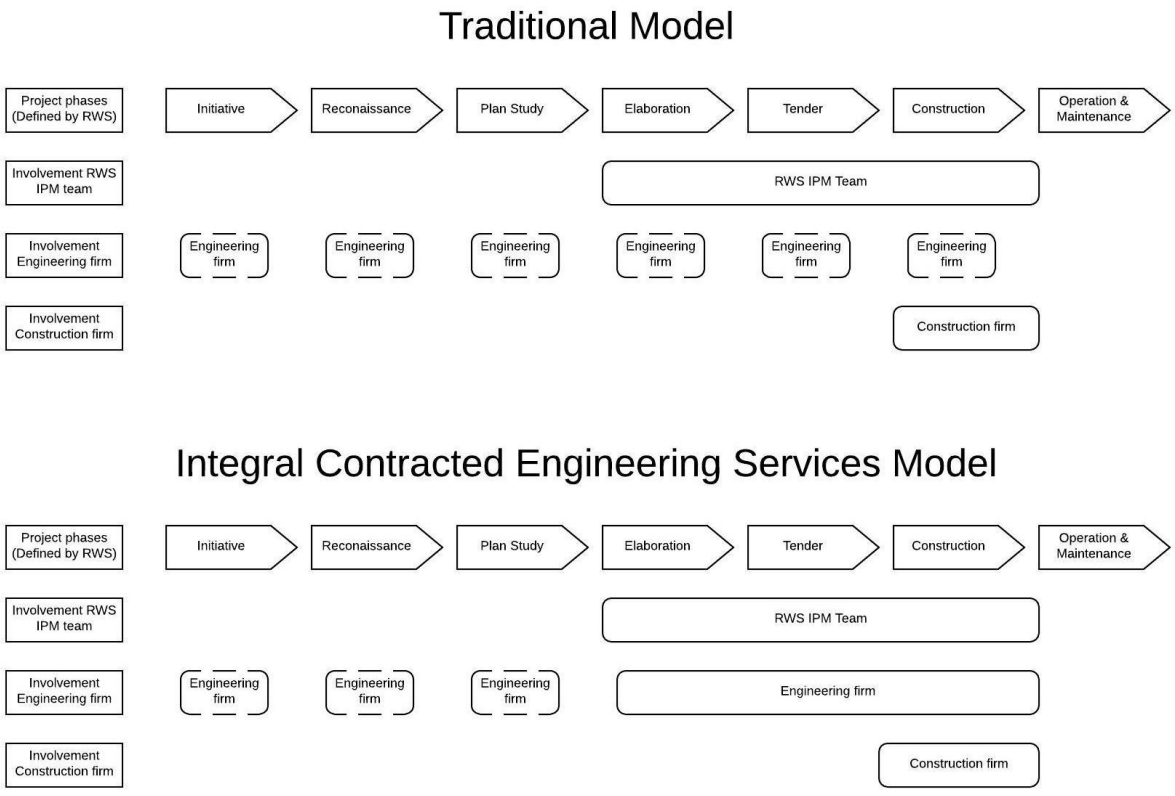

Figure 5: Project delivery method in case project

For such a new project delivery method, some assumptions or choices have to be made upfront. For instance how this model is described in a contract and how tasks are divided so that each engineering firm knows what to offer.

The contract that was established for the case project was a relatively simple contract with only four deliverables (goals) specified for the engineering firm, namely:

1. Obtaining a 'green' Gate3B advice
2. Providing an award-advice
3. Transfer the project to the property manager
4. Obtaining a 'green' gate4

Next to these deliverables, the common processes and methods that RWS uses for their projects should be followed. In addition, a work breakdown structure (WBS) is established to divide the tasks between the RWS and the engineering firm team. In this structure, the division of activities is made very clearly between the RWS team and the team of the engineering firm.

1.1. Problem

The problem that arises is based on a new relationship between public and private organizations. The subject the research focusses on is that engineering services are contracted for a longer period, in an integral way, with an engineering firm in the lead, as can be seen in the model in Figure 5. This new type of relationship can have several pros but gives room for cons as well. The fact that engineering services are normally not contracted for such a long term in an integral way, shifted responsibilities and activities relative to the usual situation are inevitable.

The case project as described in the previous section is executed with such a changed relationship between engineering services and the public. There is not yet a scenario available on how this relationship should work, so this project is classified as a pilot-project. When focussing on the case project, the issue is that the organizations do not know whether this is the right way to work or if it needs some adjustments to gain a better result. One of the reasons for RWS to execute a project in this way is to work with less of their staff. Another reason is to make optimal use of the knowledge and strength a market player has, so they let the engineering firm have the lead. Therefore, it could be possible that some changes regarding the project organizations should be implemented.

The main problem and the problem that plays in the case project have some overlapping characteristics, which makes the case project a valuable source of information for formulating an answer to the questions that originate from the main problem.

In short, the problem is that integral contracting of engineering services in which the engineering services have the lead is a new type of relationship between a public and private party, that isn't very clear yet.

1.2. Objective

The objective of this research is to find an answer to the problem as outlined in the problem statement. This objective results in recommendations and possible improvements regarding the project management of integrated engineering services, that are also usable for the case project and both the Rijkswaterstaat and Royal HaskoningDHV organizations.

The goal is, therefore:

'To identify the governance factors that play a key role in integral contracted engineering services and their implications'

1.3. Research questions

The main question, as well as the sub-questions, are presented in this section. The main question is derived from the objective as stated in section Objective. The sub-questions are derived from the main question, in order to make the research manageable. The main question is:

Which governance factors play a key role in integral contracted engineering services and what are their implications?

The sub-questions are:

1. *What is the current situation regarding the delivery methods for engineering services for public clients?*
2. *Which governance criteria are suitable for assessing the relationship in integral contracted engineering services?*
3. *Which key governance factors can be found in practice at the case project and what is their implication?*

1.4. Scope

The research will be conducted in the PPO (Programma's, Projecten & Onderhoud) division of RWS, located in Arnhem and the business line 'Infrastructure' of Royal HaskoningDHV. Since only one project is carried out in the integral contracted engineering services way, the research will be narrowed down to this project.

Both these organizations have, for this project, a complete IPM team that is working for their internal client. The internal clients from RWS as well as RHDHV and both the IPM teams will be approached to obtain their visions on the integral contracted engineering services. Due to time constraints for this research project, higher (strategic) levels in the organizations are not addressed for this thesis.

Since not all phases of the project are followed during this research, the advice of the situation with a contractor cannot be given. Therefore, the research will be limited to the contractual preparation phase (part of the elaboration in Figure 5) and part of the tender phase. This means that the construction company is not involved during the time the research is conducted. With the construction company involved in the project, a different dynamic will arise in the project.

Next to this, some choices are made by the project team, such as working with the Best Value method and how different subjects are described in, for instance, the contract and the WBS. Based on these choices, the research is carried out. The advice that will follow from this research will partly be based on the choices themselves, partly on how the project works out within these choices. The complete Best Value method is not taken into account nor evaluated in this research however some background research should be performed on this topic since The Best Value method affects the relationship.

1.5. Research outline

The research follows different steps. First, the current situation will be established. After this, the theoretical framework that gives guidance to the methodology will be described. Subsequently, the methodology for the empirical research will be outlined. Thereafter, empirical research and analysis will be performed, finalized with conclusions and recommendations. See Figure 6 for a visualization of these steps.

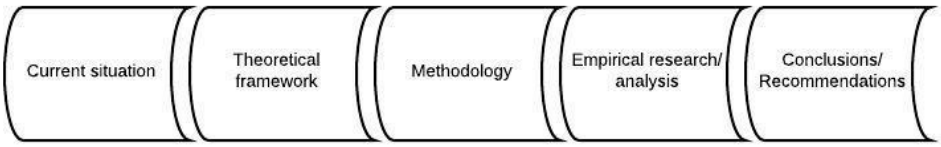

Figure 6: Research outline

1.6. Relevance

The obtained research must be relevant and has to contribute to the existing knowledge in a usable way. The relevance will be described for science in general, the case project and the organizations that are involved in the case project.

Science

In science, a lot of research in civil engineering is done about project management but not a lot can be found on this specific topic, of integral contracted engineering services. Next to this, the relation of public clients with private contractors is a topic that is gaining a lot of attention. In addition, the shift from competitive towards collaborative tenders and relationships is used more and more. This research fits these developments well, especially since it is based on a certain knowledge base and it expands the knowledge by giving substance to the topic of a fairly new relationship form between public and private organizations.

Knowledge in other disciplines and theories regarding relationships is used as a basis for this research, supplemented with results from a case study. By combining these information sources, the answer to the research is based on a broad knowledge base. The answers to this research can, therefore, be used for different public and private parties when they envisage a project with shifted tasks and responsibilities. This makes the research project relevant to multiple stakeholders.

By executing such a case project, information for policymakers comes forward. What are the conditions that work and which themes should be controlled by which organization are questions that need to be answered in order to make a decent

policy about the choice between outsourcing the engineering services or arranging this in-house/in another way. This research project can give guidance to answer these questions.

Case Project

The relevance for the case project 'overnight harbour 't Spijk' can be found in the recommendations that follow from this research and that can be used during the rest of the project. By interviewing the project members, the situation in the case project is determined and by performing a group session, a discussion about the tension fields is started. Knowledge about certain conditions that should be met for a good and efficient relationship and where possible improvements can be found will be extended after this research. In addition, the project team has the opportunity to look back at what they already achieved under which conditions.

Organizations

For the organizations that are involved in the case project, the relevance consists of a couple of factors. First of all, due to the constraint of RWS to work with a smaller team of their own, having insight in an alternative and knowing how to tackle this challenge is an important part that this research can contribute to. For RHDHV, the relevance could be found in knowing how to deal with new tasks that lead from this project and ways the project should be arranged. This experience combined with the recommendations from this research could help RHDHV in future projects for RWS as well as other organizations that want a somewhat similar approach of early integral contracted engineering services.

1.7. Reading guide

This research project is structured as follows: in chapter 2, the characterisation of the engineering services for public clients is outlined. In chapter 3, the theory about project delivery is studied and the theoretical framework is conducted, where research models are described that will be used in this thesis as well. In chapter 4, the methodology of using the knowledge from the characterisation in combination with the theoretical framework is described, resulting in the method for the empirical section of this research. In chapter 5, the results of the empirical section are given and in chapter 6, the conclusion and discussion are given. In chapter 7, the recommendations can be found.

2. Characteristics

In this chapter, the characteristics of the use of engineering services for public clients will be identified. To start, the public client is characterized. After this, the characteristics of the engineering services are outlined and in the last section, the engineering services for a public client are characterized.

2.1. Public client

The conditions that are used by the public client and the behaviour in projects will have to be known to eventually form a conclusion about the relationship between a public client and a private engineering firm.

The public client has a lot of projects to execute and often makes use of the private market to realize the projects. These projects can, for instance, be the outsourcing of ICT for the processes in a ministry or the construction of a new highway. To avoid discrimination, unfair treatment, vague situations, and disproportionality and to make sure that there is enough competition, rules for tendering are established (Rijksoverheid, sd). Whenever a public client has a project that needs to be executed by a market party and the scope exceeds certain limits among which budget, the tender principle must be used. The public client can choose different forms of procurement which could lead to different kinds of relationships with the private organization (Rijksoverheid, sd). In addition, the allocation of risks will be defined in the contracts. According to the 'Marktvisie', the risks will be transferred to the party that is the best in managing that risk. Some risks will, therefore, be at the clients' side, some at the constructors' side.

When the tendering has been completed, the contractor should be checked whether the agreements from the contract are met. This is, in the case of RWS, done by using 'Systeemgerichte Contractbeheersing', SCB. In this way, the contractor manages its quality. RWS can, at their turn, check this way of quality management. In this way, the contractor has the freedom to execute and check himself. The client acts from a distance by checking the quality management system (Rijkswaterstaat, sd).

Not only rules among tendering are established, but the government also has a lot more rules that have to be followed during the execution of projects. When looking at projects for RWS, sometimes a lot of bureaucracy arises. This can result in focussing on contracts instead of relationships. Project 'DOEN' as mentioned before, is launched to see if this bureaucracy can be omitted and the focus can lie at the execution of the project (Project DOEN, 2019).

Another way in which RWS tries to improve their way of working is by having market consultations. In a recent market consultation of 4 July 2019, several market parties pointed out that a contract containing goals or deliverables is preferred over monodisciplinary product contracts. The collaboration in these projects is seen as a desirable situation, even for small orders. One of the key motivators for this way of working is that more integration is desired, especially in the discipline of project controlment. Another advantage among employees is that more job satisfaction can be noticed with the use of integral contracts containing goals, while the use of monodisciplinary product contracts results in a decline of challenge and less affection with the projects (Rijkswaterstaat, 2019).

2.2. Engineering services

The characteristics of the engineering services have to be known in order to find the common ground between literature or other disciplines and the discipline of engineering services.

Professional engineering services play a key role in designing, planning, and making trade-offs in different disciplines such as mining, energy, aviation, chemical, biomedical and infrastructure in a complex and technologically sophisticated world (Gross, 2012). This complex and sophisticated world asks for interdisciplinary team approaches in order to combine the knowledge of specialists from different engineering disciplines to make equipment, systems or large projects (Pillai, 1998). The engineering services combine the knowledge of their employees to execute projects for different parties and generate added value for the clients such as governments, project developers and construction firms. The projects that are executed for the government regularly use the tender principle, at which the engineering firms must compete to win the tender. In this situation, the engineering firm is somewhat comparable to a contractor, where a tender has to be won in order to execute a project. The main difference is that the engineering firm provides a service and delivery in, for instance, advise, documents or managers, and the contractor executes the actual (physical) work.

2.3. Engineering services in public projects

The government typically chooses between two ways of using an engineering firm, either by hiring employees or by asking for products. In the last case, a result or product is purchased without the client asking for a specific capacity. The responsibility of the result lies at the engineering firm in this case. When capacity (employees) is hired from the engineering firm, the responsibility of the result remains at the client's side, the engineering firm only has the obligation to deliver effort. New ways are now investigated, such as integral contracts with the use of deliverables.

Products

Engineering services preferably use the product way of working, so that their employees can work as efficiently as possible, and they have a certain added value in relation to employment agencies. A condition is that the product or service that is asked by the client can be well defined. When this is not the case, hiring may be preferred. (PIANOo, 2019)

For the products, a framework agreement is established, the so-called "SO3". In this agreement, different products and results are described and a selection of engineering firms is a participant. One of the disciplines within the products is the 'monodisciplinary product'. In this case, the public client (e.g. IPM team) asks a single task to an engineering firm, which executes the task and gives the product back to the IPM team. This has to be done for the various disciplines and various stages in a project. A result of this way of working is that integration is only possible by the RWS IPM team, which has the task to integrate the products. This results in a major task for the IPM team and the employees working for the IPM managers. In addition, a lot of transactions are inevitable, due to the different stages and disciplines that are asked separately.

Hourly basis

The other way the engineering firms work for the public client is by getting paid on an hourly basis. A consultant is asked to work in or for the team of RWS for a certain amount of hours and does what is asked to him. The biggest advantage of this way of working is that the consultant can do his job without a predefined result and not having to pay attention to the number of hours he puts in a certain subject. The downside is that the internal knowledge of the engineering firm is not used to a maximum extent.

Best Value

For the case project, the Best Value procurement method is chosen. Next to being the procurement method, this Best Value also affects the working method during the project. This method is relatively new in the Dutch infrastructure sector and not all organizations are familiar with this. Rijkswaterstaat uses the Best Value approach more and more, mostly for engineering services, D&C contracts and performance contracts (Rijkswaterstaat, 2015). In the Best Value approach, the vendor has the 'Lead' so that the vendor is expected to have or attract the expertise that is needed for a project. Transparency in the relationship and providing dominant information are key aspects, just as having key persons in the project.

The result should be that better collaboration and coordination in the supply chain should be established, the vendor could distinguish himself in relation to these competitors, less additional work and delay and higher customer satisfaction (PIANOo, 2019). Another result of using Best Value is that the scope is minimised to do what is strictly needed to achieve the desired result (van de Rijt & Witteveen, 2017).

2.4. Summary characteristics

The current situation at the public client is that a lot of the projects have to be executed, the tender principle is used and that bureaucracy could arise. By having market consultations, the client tries to improve their way of executing projects with the market parties. One way is to use integral contracts using deliverables. The engineering firms work in different disciplines and preferably combine the knowledge of their employees in the project. For public clients, two main delivery methods are possible, either by delivering products that are defined by the public client or by getting paid on an hourly basis and working in the team of the client. A new trend is the integral contracts that use goals or deliverables.

3. Theory

In this section, the integrated project delivery and agency/stewardship theory will be outlined. After this, the theoretical framework that gives guidance for empirical research will be established.

3.1. Theories

Integrated project delivery

A theory that can be linked to the case project of integral contracted engineering services is 'Integrated Project Delivery' (IPD). This approach is gaining popularity among many different organisations involved in the construction process. In IPD, integrated contracts ensure a connection between the different organisations and phases that a construction project has to deal with. This integration however also comes with a shift in responsibilities and risks.

Due to the increased specialization in the construction industry, the construction process became fragmented and a lot of different stakeholders were involved (Kent & Becerik-Gerber, 2010). Among these stakeholders are the client, architects, engineering firms, contractors (and subcontractors) and the user. When all these stakeholders have their separate input in a project, not all value they create is directly beneficial for the project. Integrated project delivery can be defined as an approach that "integrates people, systems, business structures, and practices into a process that collaboratively harness the talents and insights of all project participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction" (AIA California Council, 2007). Whenever this integral approach is executed properly, value that is created by the contributors of the project benefits the project as directly as possible. In relation to traditional delivery methods, the major differences are:

- A multi-party agreement
- Early involvement of key participants
- Collaborative decision making and control
- Shared risk and rewards
- Liability waivers among key participants
- Jointly developed project goals

Agency/stewardship

One of the theories that can give insight into partnerships and the way the vendor acts in relation to the client is the agency/stewardship theory. The agency theory sees the client as a principal and the contractor as an agent.

The agency theory assumes that both these parties are self-interested. When work is delegated from the principal to the agent, the expectation of the principal is that the agent acts in favour of the principal. The interests could, however, differ from each other. In addition, there is an asymmetry in information, which can cause the agent to behave opportunistically. (Potemans, Volker, & Hermans, 2018)

The stewardship theory is the opposite of the agency theory and works with stewards instead of agents. In the stewardship theory, the stewards pursue the collective goals instead of individual goals. Therefore, in this theory, a more collaborative partnership is explained in comparison to the agency theory. (Potemans, Volker, & Hermans, 2018)

According to Snippert et al. (2015), one of the barriers for the transition to a stewardship situation when using Best Value as procurement approach is that the client seeks trust in a classic way, based on the agency theory, with a large focus on preventing opportunistic behavior from the vendor. Another barrier is that the vendor doesn't position the client in their role when this is needed, but delivers the requested work without contradiction. This is a result of the client using control mechanisms but also the vendor doesn't adequately defend his own role.

When looking in the pre-contractual phase, the vendor often tends to deliver the products and details as asked by the client resulting in too excessive and detailed products compared to the initial expectations.

Especially with the new way of working, this relationship could have some new constrains. In addition, the linkage between theory and the case project has to be outlined. Potemans et al. (2018) researched such a single case with the basis of the agency/stewardship theory. The data that Potemans et al. used in their research was collected from documents, observations, and interviews. The results from that research were obtained by comparing the collected data with the agency/stewardship theory. The comparison between theory and data from the project team as done by Potemans et al. is an appropriate way for the methodology of this research project as well.

Project 'DOEN'

A new way of working is already being deployed at project 'DOEN'. This project is focussed on good collaboration between the public and private organizations with a result that is satisfying for the client and a situation where there is honest money for honest work. A part of this project is that work is done that makes sense for the project instead of doing what is always done. The director-general of RWS supported this project with the words:

'All rules may be challenged, except for the law. Think outside of existing frames! Be open-minded, but not naïve'

In addition, they tried to work using the intention of the rules instead of the rules themselves. By constantly asking whether the rules are used in the right way, they obtained to do the right thing for the project. A comment on this is that this shouldn't be exaggerated, sometimes a decision should be made with the best available information at that time, so that progression can be made. By working in this way, different goals are achieved. Among those goals are:

- Satisfied customer and stakeholders
- Smooth transfer to the manager of the object

- Client got value for his money
- Contractor made a profit
- Few changes to the contract
- More joint ownership on the project
- More mutual understanding and equality
- More job satisfaction

3.2. Theoretical Framework

In the theoretical framework, theories that give guidance to the methodology of the research will be described. In addition, the way a relationship can be measured will be explained.

On the specific topic of integral contracted engineering services, there is not a lot known. The relationship of Public clients with private contractors is an often researched subject, whereas the relationship with engineering firms seems to lack in literature. The research to clients and contractors can, however, form a starting point for researching the situation with a public client and engineering firm, due to some overlapping characteristics as 'project delivery' methods and ways the organizations interact with each other.

Since not a lot is known on this specific topic, research on a broad basis of governance criteria will be suitable to help understand the implications that follow from such a new relationship.

When researching these subjects, one of the theories that come up is the 'Agency/Stewardship' theory, describing the way a vendor could act in relation to the client. When there is an agency situation, the vendor focusses on his own interest, with a stewardship situation, the vendor goes for what is best for the project and client.

Snippert, Witteveen, Boes, & Voordijk (2015) propose a framework that compares the Best Value Approach with the Agency/Stewardship theory. Since the case project that is researched uses the Best Value approach, the criteria from this framework are useful in analysing the situation in the case project. See Table 1 for the characteristics of such a relationship.

Table 1: Overview of the Best Value Approach (Snippert, Witteveen, Boes, & Voordijk, 2015)

	Best Value Approach
Model of man	Emphasizes an expert actor whose behavior is ordered in such a manner that ***pro-organizational/pro-project***, collective behavior is realized with a focus on creating a ***win-win*** situation in which validated ***trust*** through past performance information is created with a focus on high performance and creating value.
Central notions	***Goal alignment***: project goals and objectives are set by the client and developed into a scope by the vendor. ***Trust*** is established through performance information. ***Vendor is in the lead*** and involves the client when necessary. ***Management model*** is based on listening, observing and streamlining of the process.

	Theoretical assumptions from information measurement theory and Kashiwagi solution model.
Theoretical concepts	Verified ***trust*** (verified performance) and to a limited extent **personal power**. No ***control.*** No ***decision-making***. ***Expertise*** and ***professionalism***. Minimization of ***communication***. Dominant ***information***. ***Transparency***. ***Risk*** management (risk mitigation). Long term (past **performance** and focus on ***win-win***).

The sections that are bold and in italics indicate criteria that, according to the framework of Snippert et al. (2015), play a role in such a relationship. The 'Model of man', 'Central notions' and 'Theoretical concepts' are taken into account for this research since this gives the key concepts of the criteria in the Best Value Approach. These criteria should be included in the theoretical framework, however, due to a relatively new situation with an engineering firm as a vendor and the integral contracting of the engineering services, there is a possibility that not all aspects are covered. Due to this, the criteria should be validated and possibly supplemented with criteria that play a role in public-private relationships.

Brinkerhoff (2002) proposed such a framework that can be used for assessing the degree of partnership in a public-private relationship. The criteria from this framework can be found in Table 2.

Table 2: Criteria to assess the degree of partnership (Brinkerhoff, 2002)

Criteria
Mutuality and equality (self-determined)
Equality in decision making
Resource exchange
Reciprocal accountability
Transparency
Partner representation & participation
Mutual respect
Even benefits (and drawbacks)

As can be seen in both Table 1 and Table 2, there is an overlap between the criteria. When using the background information of the criteria from Brinkerhoff, a comparison between both frameworks can be drawn, see Table 3.

Table 3: Comparison framework (Brinkerhoff, 2002) and Snippert et al. (2015)

Framework Brinkerhoff	**Framework Snippert et al.**
Mutuality and equality (self-determined)	Goal-alignment
	Role of the expert / Vendor in the lead / Management model
	Control
Equality in decision making	Decision making
Resource exchange/Mutual respect	Expertise and professionalism
Reciprocal accountability	Performance information
Transparency	Communication

	Information
	Transparency
Mutual respect	Trust/Personal power
Even benefits (and drawbacks)	Risk
	Win-Win situation
	Pro-organizational/pro-project
Partner representation & participation	

As can be seen in Table 3, the criteria that Snippert et al. use in their framework can be placed in the framework of Brinkerhoff. Since almost all aspects of Snippert et al. can be placed in the framework of Brinkerhoff, the framework of Brinkerhoff will be used during the research, with the background information of the framework used by Snippert et al.

Framework Brinkerhoff

To assess and improve partnership relationships in public and private parties, Brinkerhoff (2002) proposed a framework. In this framework, different categories with factors that can determine the relationship between partners are established. According to this framework, the degree of partnership should be assessed on a relative scale since desired goals and relationship preferences of partners will vary. The degree of partnership could be assessed by measuring the mutuality in the relationship. Another way to assess the partnership according to Brinkerhoff is the organization's identity, which is based on the parameters of the organizations that are part of the partnership. Due to scope limits, this project will be focused on the relationship between the partners and not on the organizations that are part of the relationship. According to Brinkerhoff (2002), eight criteria can assess the relationship, namely:

- Mutuality and equality (self-determined)
- Equality in decision making
- Resource exchange
- Reciprocal accountability
- Transparency
- Partner representation & participation
- Mutual respect
- Even benefits

In the next section, these criteria will be explained and supplemented with information from other sources.

Mutuality and equality (self-determined)

The mutuality and equality of the partnership should be determined by the project coalition themselves. They have to make agreements on what is defined as mutual and equal for the specific project, dependent on for instance the deployment of resources of the organizations and the role they should take.

The alignment of goals is part of the mutuality and equality in the project. The alignment of the goals was also a topic of interest in 'Project DOEN' (Project DOEN, 2019). The goals within a project could be the same, for instance delivering a project within schedule and budget, however, these goals could also differ per organization that is part of the relationship. Knowing what the project-goals per organization are, can give information about the relationship of those organizations. When organization X has a different goal then organization Y, conflicting interests could arise leading to an adversarial relationship (Voordijk, 2018).

Equality in decision making

The way the decisions are made in the project coalition is a criterion that can indicate the structure and hierarchy within a relationship. The decisions could be made by one organization or in mutual agreement of the project coalition. The structure within the relationship may affect how the organizations work together (Eriksson, 2008). When clear hierarchy is noticeable in the project teams, something can be said about the relationship and the way the project teams collaborate. When the client and contractor work on equal footing, the relationship is based on equality. When one has a higher hierarchy position than the other, the participation and creativity of the organizations could decrease, eventually leading to a higher chance of opportunistic behaviour (Eriksson, 2008).

The decision-making could be skewed when the most powerful partner takes charge or when the less powerful partner confirms to the demands of the other, to not put the future flow of resources at stake (Brinkerhoff, 2002).

Resource exchange

Another criterion is the exchange of resources of both organizations. These resources are not only hard resources or money, but can also include soft resources such as skills, contacts, information and credibility/legitimacy (Brinkerhoff, 2002). Within a partnership, mutual dependence on the organizations and their resources is needed for an equal contribution to the project.

The degree of exchange of resources can, therefore, indicate how the partnership is structured and if both parties have equal dependence on each other, or if the exchange of resources is skewed leading to a change in dependence of each other.

Reciprocal accountability

This criterion implies that each partner takes responsibility regarding the actions he does and is accountable to the other party for these actions. The accountability holds that performance information about the relationship is accessible for the other partner, on a regular basis or on request (Brinkerhoff, 2002).

To assess this criterion, information about how responsible the key persons of an organization feel towards the project and towards the other organization should be gathered. In addition, the partners should know that an action they execute could have consequences for the other organization and they could be held accountable

for that action, and give room to the other and the desires of the other organization.

Transparency

Furthermore, transparency is a criterion that can assess the kind of relationship in a project. In the literature about team integration, cross-sharing of information is given as criteria (Baiden, Price, & Dainty, 2006). This criterion could be assessed with the agency-stewardship theory in mind. When for instance the contractor has information the client doesn't have, that can be beneficial to the contractor, he could withhold this information from the client. In this case, the contractor acts in favour of himself and can be classified as an agent. When all information is shared openly in the project coalition, the contractor acts as a steward and works in favor of the client.

Transparency can also include the financial side of a project, in which the client or contractor could be transparent or could keep certain information to himself. In the criteria 'even benefits', the financial side is explicated.

Partner representation & participation

The partner representation and participation describe that all partners participate according to their agreed role and are represented in discussions, meetings, decision making and other activities (Brinkerhoff, 2002).

The role of the client and the contractor is part of the agreed role and participation as described in this criterion. The client can have an active role as well as a passive role (Voordijk, 2018). When the client has an active role, he monitors the other organization constantly and is very much involved in the process. When the client has a passive role, he operates more in the background. The contractor can act as a steward or an as an agent (Schillemans, 2012). When the contractor acts as a steward, he makes sure to serve collective goals or act in favour of the interest of the principal (client). When the contractor acts as an agent, the contractor also bases his decisions on his own interests which could sometimes be contrary to those of the principal, which could result in an adversarial relationship.

Mutual respect

This criterion is based on respect to the other partner and when there is a lot of mutual respect, the partners recognize each other's 'unique strengths and seeks to efficiently incorporate these into the partnership work' (Brinkerhoff, 2002). When these unique strengths are recognized, the parties use the power of the other party in favour of the project. In addition, the negotiation and agreements between the parties are, when there is mutual respect, made in good faith (Brinkerhoff, 2002).

Trust is an issue that plays a role in mutual respect as well. According to Hedley Smyth (2008), the 'need for an increased level of trust, following from a rallying cry for non-adversarial collaborative project working was investigated under continuous agendas…'. From this, we can conclude that the level of trust has a certain effect on the relationship in a project way of working. The level of trust is a

criterion that is hard to measure and based on a feeling but can be asked to the team participants.

Even benefits

Mutuality and equality include the righteous sharing of benefits and risks. This does not mean that both organizations benefit equal, due to the possible unequal amount of resources that are used to complete a project. The partners have to decide for themselves whether the share of risks and benefits are divided relatively even (Brinkerhoff, 2002).

A part of this criterion that plays an important factor for project success is the allocation of risks and responsibilities (Lam, Wang, Lee, & Tsang, 2007). When two or more organizations conclude a certain relationship, they want to know what the risk in some cases is and where their responsibility lies. In this way, they can manage it appropriately and they can take it into account in the contract price. Often when working in circumstances that are unknown at that moment, as for instance the situation in the soil, the risks and responsibilities must be divided well. The division of risks is an item that gains a lot of attention in the Dutch construction industry lately. Construction companies complain about the unequal risk distribution in which Rijkswaterstaat puts too much risk on the shoulders of the constructors, which leads to an 'unsustainable situation' (Bakker, 2019).

Another part of this criterion is how the possible revenues or losses are divided in a project. The price could be fixed upfront (with possibilities to get paid for additional work) or the price can be determined afterward. Possible good fortunes or disappointments could be divided or are for the account of one organization. This makes a big difference in the kind of relationship and the interests the organizations have during the project. When the revenues or possible losses are equally divided, each party benefits equally (Kent & Becerik-Gerber, 2010). Opportunistic behaviour could arise when the financial interests of the parties are not equivalent to each other.

3.3. Summary Theory

Theories

First, the integral project delivery is discussed. In this theory, the fragmentation in the construction industry is recognized and ways to overcome this fragmentation are given. The major idea is that different parties are involved in an early stage of the project and that they work together in an integral way.

After this, agency/stewardship theory is discussed. In this theory, the relationship between a vendor and a client is described. In the agency situation, a classical client/vendor relationship can be noticed in which the goals and incentives are not aligned, which can result in opportunistic behaviour. In a stewardship situation, the vendor acts as a steward of the client and the goals are aligned. This results in a win-win situation.

Next to these theories, project 'DOEN' is discussed. This project deploys a new way of working together in which all rules may be challenged. The goal is to let the organisations perform 'fair work for fair money' and to have a satisfied client, contractor, and user.

Framework

In the theoretical framework, different theories from various researchers are described and compared. From the comparison between the Best Value approach and the Agency/Stewardship theory Snippert et al. made, several themes can be deducted. When comparing these to the framework Brinkerhoff proposes, the criteria from Brinkerhoff can be seen as suitable for assessing such a new public-private relationship giving a slightly broader view than the comparison of Snippert et al. These criteria will be used as a guideline in the empirical part of this research:

- Mutuality and equality (self-determined)
- Equality in decision making
- Resource exchange
- Reciprocal accountability
- Transparency
- Partner representation & participation
- Mutual respect
- Even benefits

4. Methodology

Before the empirical research can be carried out, a plan must be established. This makes sure the obtained information is gathered and processed in a way that contributes to the result of this research. The research that will be executed is a qualitative research. Theoretical knowledge from the previous phase will be combined with empirical knowledge to formulate an answer to the problem. The researcher was present at the project location of the RWS as well as the RHDHV team so that informal conversations and joining of team meetings were possible.

Due to the fact only one project is executed in the integral contracted way, the empirical part is based on a single case study, as described by Potemans et al. (2018) Documents such as the contract, work-breakdown-structure, and agreements from the teams will be used as background information. Semi-structured interviews with the IPM team members from RWS and RHDHV will be executed to see how the situation in practice works out and what tension fields arise during such a relationship. Both the client and vendor are interviewed to ensure that the findings are valid and not based on the desires and findings of one organisation only. The theoretical framework will give guidance to the content of the interviews and the information that should be obtained during these interviews.

Interviews & analysis

Experiences cannot be asked to persons that are not part of this project due to the lack of experience with this topic, which would make answers less valuable. To ensure validity, the first steps of this research project and the interviews are based on knowledge from literature. Whenever a respondent starts about a certain example or indicates that a relationship between answers/situations is possible, these will be asked as well.

The interviews will be transcribed verbatim and analysed by coding the fragments per subject and comparing these fragments. In this way, topics where there is an agreement or where the opinions differ among the team will become clear. These topics will be used as input for the group discussion.

Group discussion & analysis

After the interview phase, a group discussion will be conducted containing several aspects where either the opinion was strongly aligned or the opinions varied. This step ensures that the respondents get the chance to discuss their point of view, validates the findings in the interviews and possibly result in a desired situation.

The arguments that will be used during the group discussion and a possible outcome will be summarized. This information will be analysed and used in the conclusion.

Conclusion & recommendation

The conclusion will be drawn by comparing the results from the interviews with the results from the group discussion and, where possible, make the connections between the different criteria by performing a cross-case analysis.

After the conclusion is drawn, the results will be discussed with the internal clients (portfolio managers) from RWS as well as RHDHV. In collaboration with these managers, the recommendations will be made. This ensures the recommendations to fit the organisations and increases the applicability of the study. Due to scope limitations, the supervisors of these portfolio managers will not be asked.
The research plan can be seen in Figure 7.

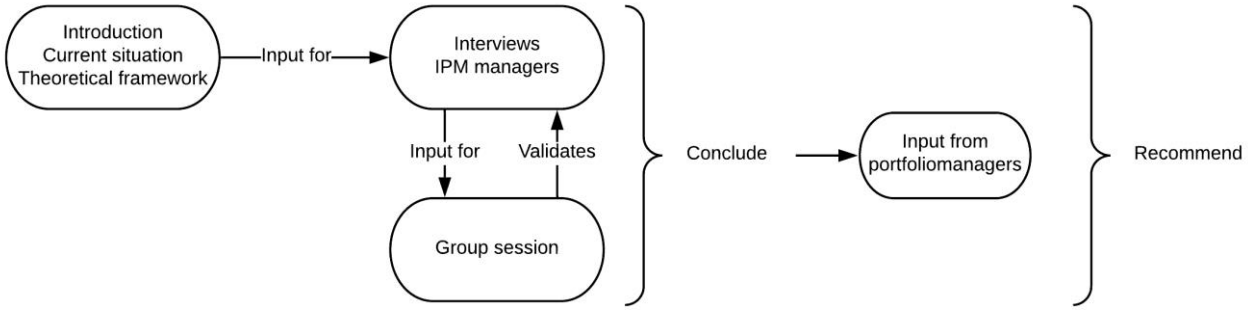

Figure 7: Research method

5. Results & Analysis

In this section, the criteria that are established in the theoretical framework will be used in practice at the case project that is executed by Rijkswaterstaat and Royal HaskoningDHV. Eventually, the analysis of the results will be provided.

5.1. Results

First, the project's key persons of RWS and RHDHV will be interviewed and the answers will be transcribed verbatim and afterward categorised and summarized. In this way, the situation in practice and the implications when using integral contracted engineering services will become clear. These key persons are:

- Project manager
- Contract manager
- Project controller
- Technical manager
- Stakeholder manager

After this, the situation will be discussed by performing a group session with the group of respondents. These answers will be summarized in the same table as the interviews, leaving a comparison between the results from the interview and group session.

The results of the interviews and group session are categorized per criteria. At the end of this section, a summary of the most important implications will be given.

Mutuality & Equality

Interviews

To start, the intended roles of the client and vendor that should be executed are asked, followed by the way both parties give substance to that role.

All respondents agree that the predefined role of the client is to 'Decide, Control, Pay'. The behaviour of the client should be to 'sit on their hands' and let the vendor do the job. It appears that this role is executed well in most cases by this client at this time, however, from time to time, the client gets too active and plans appointments or makes suggestions that should be done by the vendor. According to the respondents, this is partly because 'sitting on your hands' is hard for some of the RWS managers, partly due to the fact that the vendor sometimes has a bit of a 'wait and see' attitude.

The role of the vendor is not as clearly expressed as the role of the client, however, the respondents agree on the role of having the lead in the project and coordinating and giving substance to the workload as assigned to them. Regularly, meeting the requirements of the contract and 'WBS' are mentioned in answering this question. In general, the respondents agree that the role is executed well by the vendor. Sometimes, the vendor is not pro-active enough in having different scenarios in mind or providing enough information for a decision. Part of this can, according to the respondents, be attributed to the fact that the vendor is still an advisor and the

decisions are made by the client. This indicates a classical client/vendor relationship instead of a team relationship.

When talking about the roles and mutuality, often the job satisfaction was mentioned. It appears that, in general, all respondents experience job satisfaction while working on this project in this way. The vendor gets a bit of freedom to execute the work as they think they should, using a team of their own and not 'simply' making products without bonding with the project. The client gets an extensive relationship in which they have to execute a lot less work than usual and has a partner that thinks along.

Another part of this subject is the alignment of goals. It appears that the goal of 'delivery of an object that meets all requirements' is the most important goal for both parties and that, as a result, the 'best for project' situation is guaranteed. In addition, both the client and the vendor know and understand what the goals and incentives of the other organization are, and indicate that this is an important part of having a good relationship between the parties. What can be noticed is that the vendor needs to make a revenue which makes them want to work as efficiently as possible. This is often linked to their presence at the project location. For the vendor, it is hard to explain why they should not always be present. On the other hand, the vendor tries to efficiently use the deployment of RWS and to minimize their presence when possible.

It appears that most respondents have a hard time mentioning the specific objectives of the pilot project. Most respondents did, however, mention some aspects that are part of it.

Group session

The tension between working in a team and having a classical client/contractor relationship is discussed. This discussion was noticeable during the individual interviews.

When proposing the statement 'There is a client/contractor relationship instead of a team relationship by this way of organizing the project', 6 out of 10 agreed and 4 out of 10 disagreed. The disagreements were mostly from the RWS project team, while most respondents of the vendor's team agreed on the fact that a client/contractor relationship is the case.

The argument that a classical client/contractor relationship is noticeable, was that the vendor's task is to deliver products and in some cases think along on a certain level. The argument that a team relationship is a situation, is that both teams work together to achieve a certain goal. This indicates that the project team members assess the situation differently. The common goal is pursued by both organizations and often, in discussions, the 'best for project' situation is pursued in this project.

Equality in decision making

Interviews

The decision making in the project is structured in a way that decisions that have an impact on time and money are made by the client, decisions that are part of the work of the vendor will be made by the vendor.

All respondents agree on the fact that the client has to make the decisions that are related to time and money since the vendor cannot decide on the budget and needs of the client. However, some respondents from the vendor argue that they would want to have more influence in the decision-making process. One of the consequences will be that some risks will be assigned to the vendor, resulting in a need for a different business model. The advantage of more influence is that, as stated by the respondents, more commitment of the vendor will be created and the 'wait and see' attitude that is noticed sometimes will be reduced.

A part that gives some tensions in the relationship is that the vendor has to give advice and the client has to decide. Whenever a decision has certain consequences these will, in most cases, be assigned to the client. In theory, the vendor could advise something that provides additional work for himself, that the client has to pay due to the decision that is made by the client.

Another item that comes up is that decision making is sometimes a slow process in the organization of the client. Partly since not all scenarios and information are known or presented by the vendor, partly because the client's organization isn't as decisive as the vendor's organization.

After the tender phase for the realization contract, a contractor will be chosen. This means that another organization is added to the project and the engineering firm will act as a client of the constructor on behalf of RWS. An issue that was discussed in the project team was that the vendor should have a mandate to legally operate on behalf of the client, to avoid having an extra information layer without a mandate to decide and to prevent a very unequal relationship. How this works out can only be checked during the realization phase but can be seen as a significant change concerning the previous situations.

Group session

When addressing the fact that decisions are taken by the client while the vendor has the 'lead', there arises a discussion in the project team about the levels of decision making and the way the vendor should act. The project team uses the example of a farm, that indicates the boundaries of the task for the vendor. Decisions that can stay within this farm can be made by the vendor himself, decisions about aspects that have an impact on issues outside these boundaries will have to be taken by the client, advised by the vendor. The vendor should use his expertise for decision making, even if that expertise consists of using the expertise of the client or his organization to make that decision.

The conclusion was that the role of the vendor in this project should be to make decisions that are part of their task and else mobilize the client as much as possible to make a decision. The client's role is to not interfere when a decision can be taken within the boundaries of the task of the vendor, and act as a decision-maker whenever a decision is needed.

Next to this, having a legal mandate towards the construction company is seen as a step in the right direction of integrating both teams and not having an additional information layer.

Resource exchange

Interviews

In this project, the resource exchange is organized in such a way that the client finances the project, controls the vendor and decides with a small project team, while the vendor executes most of the work. The client uses his skills for the processes in the own organizations, the vendor uses his skills, network, knowledge, and capacity to execute the workload. This indicates that the exchange is not symmetric and that the expertise of both organizations should be used well in different processes.

When asking about the composition of the project team, all team members of the vendor and most team members of RWS indicate that having two IPM teams give a certain amount of inefficiency, due to an extra information layer and constantly aligning and discussing. In addition, the teams are not very equal relative to each other, due to the fact that a client/vendor relation is noticeable and inequality in decision making is the case. In fact, two project management teams work at one project.

One of the implications of this way of exchanging the resources is that, on some occasions, the person that executes the work is not involved directly in the decision-making process. This means an extra layer is placed between the work that is executed and the decisions that are made, especially when decisions have to be made in the organization of the client.

Another implication is the kind of resource that is used, in terms of employees. It appears that persons and their skills are a very import part of the relationship of such a project. At the beginning of the relationship between RWS and RHDHV, another Stakeholder Manager of RWS was part of the team. This manager had a hard time complying with the role of 'Deciding, Controlling and Paying' and didn't let the vendor do their job, resulting in tensions and escalations.

Group session

For the resource exchange, the structure of having a double IPM team is discussed. Every manager agrees that the double IPM team has a certain amount of squander. As discussed during the interviews, possible solutions could be to reduce the team of the client by merging or redefining roles or to integrate both teams to one. The IPM project management is more or less standard however some changes can be made, by redefining or merging roles.

The changes depend on the choices the client's organization makes and the way the organization is set up. The organization is set up in such a way that all five roles of the IPM model are represented. Having employees that perform multiple roles asks for differently skilled people. According to the RWS managers, first, a lot of

projects similar to these should be executed before the complete organizational structure will be changed.

When both teams are integrated into one, the engineering firm could fill in some roles of the IPM model. This will make the project fit in the organizational set up of the client, while the engineering firm will have more responsibilities.

The managing and personal skills of both the vendor and client play an important role in this project. By the extensive collaboration and in particular between the counter partners, the client's managers should dare to let the vendor do the job while the vendor should feel responsible and do his job properly. Not everyone fits this profile, according to the team.

Reciprocal accountability

Interviews

Due to the long-term relationship and common goals of the client and vendor, reciprocity and acting with each other's interests in mind seems to be important for the success of such a relationship. In the case project, it appears that both parties are willing to listen to the desires of the other organization and act with respect to the interests of the other organizations, however, expressing explicitly what the desires of the organizations are and giving effect to these desires seems to be hard. One of the aspects that could cause this is that the underlying desires of the other organization are not clear.

Another aspect that is important for reciprocity is the predictability in the relationship. Both organizations, and in particular the client, don't want to be surprised during the project. When certain actions are performed or issues arise without the other organization knowing, the reciprocity can be missing.

Group session

At the start of the relationship, it must be explored how the other party reacts to certain issues and what his way of acting will be. The more the project makes progress, the more the organizations know how the other will react.

In this project can be noticed that the client understands the opportunities the vendor sees in this project and tries to give room to the vendor. Eventually, this will also be beneficial for the project and therefore for the client himself. During the group session, some examples of reciprocity came forward and how the project team tries to give substance to this.

This can be noticed in the mandates the vendor obtained from the client or for instance in the way the vendor could organize the information session for the construction candidates. The vendor, on his turn, tries to actively minimize the deployment of the client, since this was one of the incentives for the pilot project.

According to the team, these situations can only be established in this way when the client has trust, doesn't get surprised and notices the work is executed properly by the vendor, while the vendor needs to obtain a revenue from the work and has a proper task that is a good reference to the work he can execute.

Interviews

The organizations have agreed on a fixed day in the week (sometimes one day per two weeks) at which they work on the project location. Due to this blocked day, a lot of activities have to be deployed and sometimes even prepared on that day, resulting in a very full agenda.

When asking the representation and the participation in the relationship it appears that, in general, the client thinks the vendor should sometimes be more present at the project location. At the vendor's side, the most heard opinion is that a lot of time is invested in being together and having meetings. For the vendor, it seems hard to explain why they should be present and why not, because it could look like the vendor is having a hard time obtaining a positive financial result while this does not have to be the case.

As mentioned at the 'equality in decision making' criteria, the vendor obtains a mandate to take decisions in relation to the constructor, on behalf of the client. This indicates that the participation of the vendor in this relationship has increased. The increased participation was also visible in the vendor's participation at the Gate3B review, which is normally executed by the client himself.

Group session

Every manager agrees on the fact that presence should be determined based on the workload for that specific phase and that consultation about this subject ensures the alignment of being present and working on this project at the needed intervals. This is, however, a topic that needs attention throughout the project, due to a difference in interests.

One of the aspects that are new for such a project in terms of participation is that the vendor takes place in the Gate3B review, the review of the client's organization to see whether the tender phase can be started. At the start of the pilot project, this was not the intention, however, during the project, it became more clear that the vendor should participate in the review session. This is a major change relative to the situation without this pilot project and shows the increased participation of the vendor in the project.

Another way the increased participation can be seen is the fact that the vendor now can function as a representative of the client in relation to the constructor. When this wasn't the case, the vendor would have no authorization in relation to the constructor, which makes the vendor function as an extra layer in the process and minimize the added value of the vendor.

The project team indicates that these examples can only be the case if there is confidence that the tasks will be performed adequately. The confidence of the client came by the achieved results and way the vendor and client work together during the project. The managers indicate that it is important to keep working on the relationship and the trust, to ensure a project that continues as smooth as possible.

Transparency

Interviews

For this relationship, the parties agreed on having a very transparent relationship. All information from the client's organization that is useful for the vendor is shared openly. In addition, the vendor tries to show how decisions are prepared and how costs have been accrued. Next to this, the project managers agree that everything that needs to be said can be said. What is sometimes hard for the vendor is to know the exact level of transparency that is needed for the client. The vendor wants to be transparent but not all information needs to be shared for the client to make a decision.

Part of the transparency is the exchange of information. Various respondents agree on the fact that a lot of information is exchanged in the different reports and files, with a possible dual flow of information. Mainly due to the agreements that are made upfront; 'every X time a progress report should be handed over'. At the Gate Review, this was also noticed and the project team is trying to map all information flows and streamline these flows.

Group session

In this project, having transparent discussions about for instance changes to the contract seems to be important. The client wants to know what he buys and for what money, while the vendor should understand what the client wants and what is needed for the project. In addition, the managers agree on the good relationship they have with their counter partner and the need for this relationship as well. It is confirmed that it can be hard to exactly align the needs of the client with the output of the vendor.

Part of the transparency is the information that is exchanged. Not only what kind of information is exchanged but also the amount of information plays a role. The project team agrees that in some cases there are multiple sources for the same kind of information. This is already investigated and in this way, the project team tries to adjust to the current needs of the project. The team is willing to change on this kind of topic.

Mutual respect

Interviews

In such a relationship, where a lot of work is executed by the vendor, the client has a different task than his normal task. When there is a relatively long-term relationship, it appears to be important to have respect towards each other and each other's expertise and role. The client should have respect towards the way of working of the vendor while the vendor should have respect for the needs of the client and the client's own organization.

It appears that the respect towards the counter partner (manager from the other organization with the same role) plays a big role in this relationship. Having a counter partner that shows respect, is reasonable and is willing to give room to the other partner is an important aspect for the success of this relationship. Job

satisfaction can be linked to the relationship with the counter partner, using an example in which a bad relationship ensured constant escalation towards higher management levels and a decrease in job satisfaction. The respect for each other's role and expertise was not present in this situation.

Group session

The managers of the case project agree that having respect for each other and openly communicate is the key to a good relationship between the organizations, however, sometimes it feels uncomfortable to have a discussion based on an emotional level. The discussions are often conducted on a rational basis, which could, as said in the group discussion, lead to an uncomfortable feeling. By working with counter partners, mutual respect is for a considerable part gained in the direct relationship with the partner.

A strong human factor can be noticed when discussing this. This can also be noticed when managers are being replaced by others. The team indicates that the partners should get used to each other and the replacement must fit the own team, project team and be capable of the work of the project. The effect could be that trust and respect for each other and each other's expertise must be gained again.

The managers agree that job satisfaction is in general present by this way of working, the client gets satisfaction when they can closely work together with the vendor and make a good project, while the vendor also gets his satisfaction from working with a team of his own to an integral project. The relationship with the counter partner plays a big role in job satisfaction, based on examples in which this relationship didn't work out well.

Even benefits

Interviews

In this project, the Best Value Approach is used resulting in a plan that is bought by the client from the vendor. In the initial plan, the client benefits from the work that is done by the vendor and his expertise, the vendor made a price for which he thinks he can execute the project. When changes relative to the initial situation and assumptions occur, a request for amendment can be introduced. The initial situation was based on benefits for the client as well as the vendor.

A win-win situation that can be noticed in this project is that the client gets his project executed by one party, which reduces the number of interfaces and gives the vendor a big project in which he can use his expertise. In addition, the quality should go up since the vendor is responsible for his own preparative work during the realisation of the project. With the old way of working in which monodisciplinary products were bought, a lot of transaction costs and interfaces were introduced. One of the incentives for this pilot project was to reduce the number of transactions and with that the transaction costs. Having changes to the contract regularly introduces transaction costs as well. In this project, the team members have an open conversation about those changes, however, sometimes it isn't very clear what the client buys for what price and why a change is a change.

As stated before, a win for the vendor is that he has a project with a large volume for a couple of years, resulting in continuity for the organization. This is also advantageous because miscalculations in one phase can be corrected in another phase. In addition, the organization has an attractive project for their employees in which they can put their expertise.

In this case project, regular changes to the initial contract can be noticed. This is partly due to the provincial zoning plan that was not irrevocable yet, another reason is that it is hard to describe certain parts of the task in products as part of the Work Breakdown Structure, for instance, the Stakeholder management. This results in several assumptions that are made but are very hard to know upfront what the amount of work will be for that discipline.

A logical result of having an engineering services contract and the Best Value Approach is that most risks lies at the client's side. For a client, this can feel like they 'lose' most discussions about requests for amendment, with as a result eventually having to pay extra and changing the contract. This can sometimes feel uncomfortable for the client.

Group session

By using the integral contracting of the engineering services, the monodisciplinary product contracts are not used in this project. The majority of the managers agree that working with monodisciplinary product contracts is not future-proof due to the major (complex) assignment in the construction sector. The argument that the monodisciplinary product contracts can be used is when everything is documented and guided by the client himself very well. When less capacity is available, this documenting and guiding is an aspect that can be avoided by using an integral contract as in the case project. Because single products are part of bigger tasks, the interfaces between the different products are sometimes less clear than with integral products. In addition, discussions arise since the management of these interfaces are not requested by the client but still needed for the project. Next to this, employees often find it unattractive to work on these monodisciplinary products due to the feeling that they only produce products instead of having to think about a bigger project.

Another aspect that is discussed is the number of changes to the contract. The team agrees on the fact that they have relatively many changes to the contract and that this does not benefit the efficiency of the project. For the relationship, the discussion that comes with the changes is not necessarily a bad thing. Sometimes the discussion is needed for a good relationship, they argue. On the other hand, not always positive energy is obtained from having certain discussions. What feels uncomfortable for the client is that the scope is minimized, which is inherent to the use of Best Value. The client buys a plan and during the project, it appears that a better plan is needed, so they have to buy added activities from the vendor. The discussion arises that the client thinks, 'why is the plan not good enough in the beginning?' The vendor reacts with 'you can desire more, but you have to pay more'.

The client argues that maybe better anticipation is needed on the uncertainties in the project before the final plan is established and sold by the vendor. Another argumentation is that the risks upfront should be discussed more extensively, leaving less room for changes to the contract afterward. What also plays a role is that some activities, as for instance Stakeholder management, are hard to describe in a clear-cut package. Because everything is constantly changing and other insights emerge, predefined assumptions may need to be adjusted resulting in changes to the contract.

5.2. Summary results

The aspects that are found during the interviews and group session are summarized in Table 4.

Table 4: Empirical results summarised

Mutuality & Equality	**Interviews:** - Client can get too active and doesn't 'sit on their hands' enough - Vendor can have a 'wait and see' attitude - Client/vendor relationship noticeable instead of team relationship - Same goals are pursued - Hard time mentioning the pilot project goals - Job satisfaction while working on such a project **Group session:** - No consensus on team or vendor/client relationship in the case project - Team situation is experienced due to alignment of goals - Vendor/client situation is experienced due to vendor delivering products and client deciding - Project goal and 'best for project' is pursued
Equality in decision making	**Interviews:** - Decision making lies on client's side - Vendor holds on to 'being advisor' and therefore sometimes lacks thoroughness in decision making process - Vendor would sometimes want more influence, that could create more commitment but will come with different allocation of risks - Sometimes hard for a vendor to think in scenario's and hard for the client to make a decision. - Vendor gets mandate to decide in relation to the constructor **Group session:** - Vendor should decide within own task - Client should decide on items bigger than vendor's task while vendor should advise him and actively helps - Good development that the vendor obtains mandate in relation to the constructor
Resource exchange	**Interviews:** - Inefficiency with double IPM team, both focused on project management - Extra layer between worker and decider - Personal skills to comply to the role are important, both on client's and vendor's side - Using expertise where needed is important; client in decision making and vendor in executing workload + thinking on strategic level **Group session:** - Double IPM team incorporates inefficiency, other ways are more efficient but need to be possible from client's organisation (giving a constrain) - Client needs to let the vendor do the job while the vendor should feel responsible and take responsibility, not everyone is suitable for this way of working
Reciprocal accountability	**Interviews:** - Hard to express the desires explicit and to give effect to these desires - Predictability is an important part in this relationship **Group session:** - Predictability and knowing how the other will react in combination with trust ensures a higher level of reciprocity and more responsibility for the vendor.
Partner representation & participation	**Interviews:** - (Lack of) representation of vendor at project location hard to explain for vendor - Vendor obtains mandate to decide in relation to contractor - Vendor participated in Gate3B review of client

	Group session: - Representation should be based on the workload - Still difference in expectations on the project location - Vendor obtains mandate to decide in relation to contractor and participated in Gate3B review of client. Trust and confidence is needed from the client
Transparency	**Interviews:** - No complete openness on budgets - Hard to know the exact level of transparency that is needed - Some dual flows of information, already investigated by project team **Group session:** - Transparent discussions are important for the relationship - Amount of information that is exchanged is already investigated by team (sometimes double) - Some members argue a full transparency on budgets should be incorporated (alliance structure), others agree on the situation as it is now
Mutual respect	**Interviews:** - Mutual respect is needed for the success of this relationship - Often linked to the relationship with the counter partner, which indicates a strong human factor - Job satisfaction can be noticed when counter partners have respect towards each other and each other's role and expertise **Group session:** - Respect to the counter partner is present and important for relationship - Discussions are often conducted on rational basis and not emotional - Job satisfaction while working in this way is in general present, largely based on relationship with counter partner
Even benefits	**Interviews:** - Win for the client due to less transactional moments, high quality, staying flexible with small own team, no more monodisciplinary products - Win for the vendor due to volume and continuity, attractiveness for employees, training and experiences for junior employees. - Describing services in products/using assumptions can be inaccurate resulting in changes to the contract with accompanying discussions - Client bears most of the risk due to contract structure, having bought the Project Management Plan and the use of Best Value method. Client can feel uncomfortable with the changes and costs following from changes to the contract **Group session:** - Attractive project for the client and vendor - Most members agree on having advantages in this way over monodisciplinary product contracts - Some discussion about changes to the contract can be good for the relationship however incorporates inefficiency. - No minimisation on changes needed however better anticipation on uncertainties or other ways to deal with changes are welcome

5.3. Analysis

Now the results are known and summarized, an analysis on these results can be performed. In the different criteria, overlapping results can be found. By cross-case comparing the results of the interviews and group session, the structure and implications of the case project become clear.

General

The client is, by using this type of integral contract with deliverables, able to cope with the capacity issues and has one expert that performs work in almost all disciplines of the project. The client sees and understands the added value of having one organisation performing all these activities so that he can focus on his core tasks.

In general, the project team is satisfied with the new type of collaboration. The vendor gets more responsibilities during all phases of the project and in the different roles that are fulfilled in this project. This project provides a challenging environment for the employees in which they don't have to execute a definite task but have a goal that needs to be achieved.

It appears that the relationship with the counter partner plays a large role in job satisfaction, as was seen at an example of the Stakeholder managers, making a human factor present.

Team member vs. Client/Vendor

One of the implications by working in this way is that there is no equality in decision making. Of course, the vendor cannot decide on the budget of the client, however, they play a certain role in the decision-making process. It appears that this role can be hard for the vendor to take and that it can sometimes be hard for the client to make a decision.

In some cases, the vendor strongly conforms to the role as an advisor, while the client desires more input. It appears that the more the project progresses, the more these expectations are aligned. However, sometimes a discussion on this topic arises. During the interviews, some respondents of the vendor indicate that they want to have more influence in the decision-making process. In the group discussion, it appeared that this was somewhat more nuanced and that decisions that are not part of the task of the vendor can only be taken by the client, for instance about the budgets.

A result of this inequality in decision making is that it is not clear whether a classical client/vendor relationship or a team relationship is the case in this project. The vendor in some cases sees himself as a conductor of tasks that are assigned to him while the client decides what will happen. This implicates that the teams are not very integrated.

Contract

A fact is that not all aspects of a project can be clearly defined upfront, which is handled by making certain assumptions at the beginning of the project. Due to a constantly changing situation, a consequence could be that changes to the contract and the initial Project Management Plan that was bought by the client are needed. Especially aspects that are sensitive to changes, such as Stakeholder Management, can be hard to quantify in the beginning. Although the discussion among these changes can be good for the team performance according to the team members, it is not efficient.

Another reason for changes is that the scope is minimised by using Best Value as procurement method. Sometimes additional work has to be purchased to guarantee the continuity of the project. This reason, in combination with the assumptions taken at the beginning of the project, results in changes to the contract on a regular basis. These changes often have to be paid by the client, partly

due to the Best Value Approach. A discussion about whether the vendor's plan does not suffice or unforeseen conditions that are for the account of the client can arise.

Efficiency

By working in this way, some aspects in which an increase in efficiency is possible can be noticed. To start, having a double IPM team incorporates squandering due to a lot of consultations and meetings with the counter partner. For the client, it is sometimes hard to let go of tasks, while the vendor can have difficulties executing his tasks in freedom. This was noticed in the interviews and validated in the group discussion. According to some respondents, it can be questioned whether a project management team is the right team to perform the role of the client.

Next to this, the presence of the vendor is an aspect that causes some discussion. In some cases, the client wants the vendor to be more present at the project location. When discussing this during the group session, everyone agrees on the fact that presence should be determined based on the workload. This indicates that the vision of both organisations is the same, however, apparently a difference in interpretation seems to be the issue, in combination with the differences between a public client and private vendor on the deployment of resources.

6. Conclusion & Discussion

In this section, the main question will be answered forming the conclusion, and the discussion on this conclusion will be given. The main question was:

Which governance factors play a key role in integral contracted engineering services and what are their implications?

6.1. Conclusion

The conclusion is divided into two sections, namely on the case project itself and the way this delivery approach can be seen in the context of different theories.

Case project

The current structure in this case project is visualised in Figure 8. The client and vendor are in general satisfied with the new way of working. Due to the integral character of the assignment, the vendor can perform the tasks with a team of his own and use the knowledge he possesses in his organisation, the client has a partner that executed the workload and thinks along on a strategic level. This way of working gives substance to the 'Marktvisie' and 'Market Consultation' as was performed recently by Rijkswaterstaat. It appears that the project managers experience, in general, job satisfaction while working in this way. This job satisfaction is however strongly dependent on the relationship with the counter partner.

The client has a scope which is basically to execute the project and realise the rest facility for the shippers. For the engineering services, an engineering firm is contracted for all disciplines and all project phases. By using Best Value as procurement method, the scope is minimised. The borders of the tasks the engineering firm executes are set pretty hard, due to the fact that a project management plan is bought by the client which includes and excludes the workload that is executed by the engineering firm.

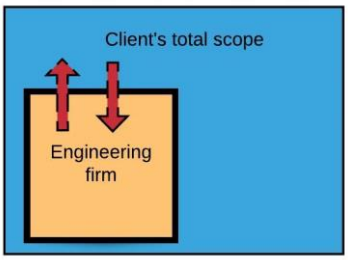

Figure 8: Structure integral contracted engineering services (case project)

Working in this way comes with certain implications. One of the implications as the two arrows visualise in Figure 8, is that both the client and engineering firm use the IPM model for their managers, resulting in two project management teams. A result is that a lot of meetings and consultations are needed with the counter partner to align the different visions and interests. Due to this, it is not very efficient to work with double IPM teams.

In addition, the communication between the vendor and client is not always clear, since a difference in expectations can occur. This is visualised by the dotted borders of the arrows in Figure 8. The vendor sometimes strongly confirms to his role as an 'advisor' while the client from time to time fails to give the vendor the freedom to act as leader in the project. This can also be seen in the way the decision making is established. Decisions about money or time are taken by the client, while the vendor prepares most of the work. The vendor can only decide on subjects that are part of his own scope, leaving him in the role of advisor. These are signs a principal/agent relationship is the case instead of a stewardship relationship. One way this can be noticed is that the client sometimes expects the vendor to be present at the project location more than the vendor thinks he should be present.

Another implication is that the client buys a Project Management Plan from the vendor, resulting in a workload that is divided pretty hard. This leaves room for discussions about work that needs to be done on this interface. Although these discussions are not necessarily bad for the team performance, they are not efficient for the process. This is visualised by the hard line between the engineering firm and client and a clearly defined square of the engineering firm in Figure 8.

For some uncertainties, assumptions are taken. Whenever these assumptions tend to be wrong, often the client has to pay for the extra work that is delivered by the vendor, which can feel uncomfortable for the client. The scope of the vendor gets bigger and the border shifts. This border was however set pretty hard, leaving a contractual discussion on the extra work that is performed.

Project delivery

When compared to the Integrated Project Delivery approach, we can see that there is no multi-party agreement due to the separate contracting of the engineering firm and contractor. There is however an early involvement of a key participant, namely the engineering firm. The decision making and control in the project are not collaborative and lies at the client's side, just like most of the risks in the project. The rewards are also not shared but a fixed contract price is used. When looking at the liability, we can see that the engineering firm can be liable for possible technical errors, which means that there are no liability waivers among key participants. The project goals are discussed in the project team on a regular basis and are embraced by both parties.

From this, we can conclude that this way of working reduces but still ensures some fragmentation in the building process. The teams are not fully integrated and the vendor still has to complete his tasks, even though these are not always very efficient or contributes directly to the scope of the client. In addition, the contractor is not involved in the case project at a very early stage, which keeps fragmentation in the construction industry present.

Another theory that was researched in this thesis was the 'Agency/Stewardship' theory. When using a governance structure as was established in the case project, some characteristics from the agency theory can be found. This can be seen in the way the decisions are taken by the client and the control remains at the client's

side. Stewardship, however, can be seen in the way these project teams pursue the same goals in the project, which are in line with the goals of the client.

Title of the contract

The title of the contract is 'integral outsourced engineering services', in Dutch; 'Integrale uitbesteding diensten'. This suggests that the services are outsourced in an integral way with minimal client intervention. The way this project is executed has a strong focus on collaboration between the organisations. The portfoliomanager that was involved in setting up the contract concentrated on the soft side of the relationship and the way the managers interacted and discussed certain issues. This way of approaching the project is in line with outsourcing as is proposed in the name.

6.2. Discussion

A discussion can be held on two main topics, the research approach and the findings of the research.

Approach

Personal bias

With qualitative research, personal bias could arise by the researcher, translating into prejudiced interpretations of for instance interviews. One way to reduce this is by working on the location of the client and the vendor alternately. In this way, the organizations of both parties become known and the way the parties address certain issues becomes clear. This ensures a reduction of the researcher's bias and enlarges the knowledge about the organisational structures.

Data collection

For the data collection, the framework of Snippert et al. is used and compared with a broader framework of Brinkerhoff. Due to the fact that a relatively new way of delivering a project is carried out, a broader framework provides more opportunities to see what the structure of this method is and what the implications are.

The pitfall of using a framework could be that essential information can be excluded from the research. A way to mitigate this risk is by using a semi-structured interview format. In this way, the respondent may differ from the initial question and the researcher can react with a question on this topic. In addition, the semi-structured interviews ensured that the respondents could place the case project in some contexts of for instance the political influence. This ensures that a comprehensive vision of the respondent on the project and the delivery method was obtained while the interview questions were answered as well.

The findings of the interviews could still be open for interpretation from the researcher's side and can be contradictory in some aspects, due to the difference in interests of the respondents. To reduce the possibility of wrong interpretation and increase the validity of the research, a group session was conducted. In the

group session, an open discussion took place about the topics that were discussed in the interviews.

The last step in data collection is to verify the recommendations by consulting the managers of the respondents. The respondents could want all kinds of things to change or stay the same, but this has to stroke with the vision of the organisation more or less. In this way, the validity and applicability of the research are increased. A side note is that these managers also have mangers with certain visions and agendas. Due to the time constraints and scope of this research project, these managers were not interviewed.

Sample

Since the research is based on a single case study that uses a new way of project delivery, the source of empirical information is fairly limited. Therefore the findings and conclusions have a more explorative character on this new type of relationship. A comparison with another project cannot be made since other choices are made and structures are used. Given the knowledge about this project delivery in science as well as the client's and vendor's organization, this way of researching is considered appropriate at this time.

Findings

Dutch civil engineering

The applicability of this research strongly depends on the environment the research is carried out in. This research is carried out by closely following a single case project in the Dutch civil engineering sector and gives advice on the implications of the structure as used in this case project. The sector has its own characteristics in relation to other countries and sectors. Comparing this delivery method with foreign methods or methods from other sectors will, therefore, be hard. In addition, this project is executed by Rijkswaterstaat and Royal HaskoningDHV. The results will most likely not fit completely for other governments such as provinces and municipalities, due to a different organizational structure. However, lessons that can be drawn from this research can be taken into account when a similar approach is desired. For the results to fit at another engineering firm, the project setting should roughly be the same.

Human factors

Due to fairly intensive collaboration between the organizations and a change in work the employees execute, a human factor is a massive variable that is hard to describe in this research project. It appears that people should have certain social skills while working in such a project, and have some kind of connection with the counter partner. In addition, the employees from the client should have the capacity of letting the vendor do the job while the employees of the vendor should feel the responsibility of this job. Therefore it is hard to exactly point out why certain aspects in this relationship work out or not or, under the same conditions, could work out differently due to a human aspect.

Conclusion

The conclusion indicates how the structure is established in this project and what the implications of this structure are. This research can, therefore, give guidance to future projects and the implications certain structures have. When different choices are made regarding the structure of the project, these should be evaluated during new research.

7. Recommendations

The recommendations are drawn to mitigate the implications that follow from the integral contracting of engineering services as done in the case project, and to advise future projects whenever a similar structure is desired. As a guide, the stewardship theory and integrated project delivery is used. In Figure 9, the recommendations are visualised.

Project governance

To start, it is recommended to integrate the teams to a more extent, reducing the fragmentation in the process. By combining roles or investigating the option for a proper 'Client' team, more integration in realising the project will be noticed. This results in the need for other roles than a standard IPM team and ensures the initial capacity problem will be dealt with even more. The expected result of a change in teams is that value the vendor creates almost directly will attribute to the end result of the project, instead of to their own assignment within the total scope. This is visualised in the shift of the engineering firm in Figure 9. The task of the engineering firm will be more integrated in the process of the client and not be defined as a strict assignment, which can be seen in the change from a square to a more integrated figure in Figure 9. In addition, the area of the engineering firm is increased, which indicates that more tasks will be executed by the engineering firm instead of RWS. An advantage of not having two teams is that fewer consultations and meetings with counter partners will be needed, which is expected to result in more clarity of the modes and frequency of communication in the team. Moreover, whenever the teams are integrated to a more extent, the decision making should be changed as well. For the vendor to be more committed to the project and act as an 'advisor' less, he should have more influence in the decision making.

The integration of the teams is visualised in the double arrow that indicates the exchange between the engineering firm and client in Figure 9. Moreover, the border of this arrow is drawn in a hard line, which indicates that the tasks and way of communicating is clear and comes with as less squandering as possible.

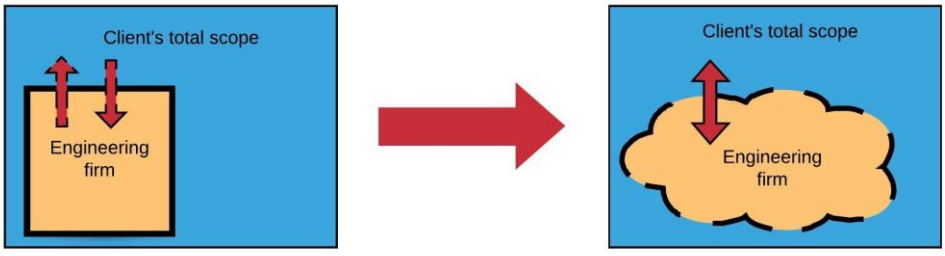

Figure 9: Recommended change in structure integral contracted engineering services

More integration between the vendor and client will only occur when the borders of the scope of the engineering firm are not set very hard and are integrated in each other's process. In this way, the total scope and scope of the engineering firm will interact to a more extent. This is visualised in having a dotted line between the scope of the engineering firm and client, and the change from a square towards a

more integrated figure. In addition, this is in line with the Integrated Project Delivery theory. One way to realise this is by having collaborative decision making and control and using shared risks and rewards. Whenever this theory is followed, the construction firm should be part of the team as well to reduce fragmentation.

Another way is to learn from the outcomes of Project 'DOEN', which uses the principle of together thoroughly discussing the uncertainties and planning upfront on how to act when changes in the project occur. This can be realised by setting up the Project Management Plan together, instead of only the vendor and the client to accept it. In addition, the uncertainties should be extensively discussed and a guideline to change when uncertainties occur should be drawn. This decreases the number of discussions needed on a contractual basis and improves the amount of time work for the project can be executed. Next to this, both organisations will be more flexible to react to unforeseen circumstances and to make sure the optimal result for the project is achieved. In this way, both organisations fully work towards the same goals so that a stewardship situation is established.

Vendor

By working in this way, certain desires the engineering firms have been fulfilled. The engineering firms are involved in a bigger project and can combine the knowledge they possess, which benefits the project of the client as well.

When the approach is changed to a more integral way, the pricing of the vendor should be based more and more on executing projects in an integral way as well instead of executing different tasks of the Work Breakdown Structure. This is a challenge for the vendor due to him being used to selling hours and products to a smaller extent. The client should encourage the vendor to do so in the criteria that are set up for the tender.

Next to this, the vendor should be proactive in steering the client in the tender phase of the project. With the experience of this case project, the engineering firm should steer on jointly establishing the Project Management Plan, have influence in decision making and possibly on sharing risks and rewards, so that they can get used to having a larger integral role in projects. In this way, the vendor learns from his new role and can execute and manage larger integral projects. It is important that the vendor sees himself as a steward of the client, and aligns his goals with the goals of the client.

Future contracts

For future contracts is is recommended to change the title of the contract. In this case, the title suggests that the engineering services are outsourced to a market organisation. There is, however, a strong focus on jointly executing the project. Therefore, the title should contain aspects of the joint approach and the way the organisations address this project. Titles such as 'Joint commisioning of [harbour 't Spijk]' will probably fit better.

8. Bibliography

AIA California Council. (2007). *Integrated Project Delivery: A Guide.* Retrieved from AIA California Council: http://info.aia.org/siteobjects/files/ipd_guide_2007.pdf

Baiden, B., Price, A., & Dainty, A. (2006). The extent of team integration within construction projects. *Elsevier*, 13-23.

Bakker, A. (2019, June 12). Contracten Rijkswaterstaat op de schop. *De Telegraaf*.

Brinkerhoff, J. M. (2002). Assessing and improving partnership relationships and outcomes: a proposed framework. *Evaluation and Program Planning (25)*, 215 - 231.

Eriksson, P. E. (2008). Procurement Effects on Coopetition in Client-Contractor Relationships. *Journal of Construction Engineering and Management*.

Kent, D., & Becerik-Gerber, B. (2010). Understanding Construction Industry Experience and Attitudes toward Integrated Project Delivery. *Journal of Construction Management and Engineering, 136(8)*, pp. 815 - 825.

Lam, K., Wang, D., Lee, P. T., & Tsang, Y. (2007). Modelling risk allocation decision in construction contracts. *International Journal of Project Management 25*, pp. 485 - 493.

PIANOo. (2019). *Best Value Procurement.* Retrieved from PIANOo: https://www.pianoo.nl/nl/inkoopproces/fase-0-organisatie-van-inkoop/prestatie-inkoop-of-best-value-procurement

PIANOo. (2019). *Contracten met ingenieursbureaus*. Retrieved from PIANOo: https://www.pianoo.nl/nl/markten/gww/inkopen-gww/gww-contractvormen/contracten-met-ingenieursbureaus

Potemans, A., Volker, L., & Hermans, M. (2018). From Agents to Stewards? Experiences from a Dutch Infrastructure Case Study. *Association of Researchers in Construction Management*, 475 - 484.

Project DOEN. (2019). *Gedachtegoed DOEN*. Retrieved from Project DOEN: https://projectdoen.nu/gedachtegoed-doen/

Rijkswaterstaat. (2015, november). *Best Value.* Retrieved from Rijkswaterstaat: http://publicaties.minienm.nl/documenten/samenwerken-best-value-meerwaarde-door-het-benutten-van-expertise-in-de-keten

Rijkswaterstaat. (2019). *Verslag marktconsultatie diensten 4 juli 2019.* Project diensten 2020-2030.

Rijkswaterstaat. (n.d.). *Integraal projectmanagement*. Retrieved from Rijkswaterstaat: https://www.rijkswaterstaat.nl/zakelijk/zakendoen-met-

rijkswaterstaat/werkwijzen/werkwijze-in-gww/werken-in-projecten/integraal-projectmanagement.aspx

Schillemans, T. (2012). Moving beyond the clash of interests. *Public Management Review*.

Smyth, H., & Pryke, S. (2008). *Collaborative Relationships in Construction: Developing Frameworks and Networks.* West Sussex: Blackwell Publishing Ltd.

Snippert, T., Witteveen, W., Boes, H., & Voordijk, H. (2015). Barriers to realizing a stewardship relation between client and vendor: the Best Value approach. *Construction Management and Economics*, 569 - 586.

van de Rijt, J., & Witteveen, W. (2017). *Als er maar twee winnaars zijn.* Retrieved from Deal!: http://bestvalue-group.nl/wp-content/uploads/2018/03/Artikel-Van-de-Rijt-Witteveen-Hybride-vormen-van-Best-Value-Deal-mei-2017-1.pdf

van Heel, P., & Buijs, M. (2019, March 6). *Ingenieursbureaus.* Retrieved from ABN AMRO: https://insights.abnamro.nl/branche/ingenieursbureaus/

Voordijk, H. (2018). A Governance Approach. *Course: Construction Supply Chain & Digitization.*

9. Appendices

9.1. Comparison Snippert et al. (2015)

Table 1 Overview and comparison of the agency theory, the stewardship theory, and Best Value approach (after Donaldson and Davis, 1991; Davis *et al.*, 1997a; Slyke, 2006; Kashiwagi, 2014a, 2014b)

	Best value approach	Agency theory	Stewardship theory
Model of man	Emphasizes an expert actor whose behaviour is ordered in such a manner that pro-organizational/pro-project, collective behaviour is realized with a focus on creating a win-win situation in which validated trust through past performance information is created with a focus on high performance and creating value.	Emphasizes a self-interested actor which searches in a rational manner for maximization of their own personal (economic) gain.	Emphasizes an actor as a steward whose behaviour is ordered in such a manner that pro-organizational, collective behaviour with higher utility than individualistic, and self-serving behaviour is created and sustained.
Central notions	Goal alignment: project goals and objectives are set by the client and developed into a scope by the vendor.	Goal incongruence: assumes goal divergence based on self-interested rational actors.	Goal alignment: mutual goals and objectives.
	Trust is established through performance information.	Initial position is to distrust.	Trust develops over time, initial trust position can be absent.
	Vendor is in the lead and involves the client when necessary.	Control-oriented management philosophy.	Involvement-oriented management philosophy.
	Management model is based on listening, observing and streamlining of the process.	Theoretical assumptions are derived from economics.	Theoretical assumptions derived from organizational behaviour, psychology, and sociology.
	Theoretical assumptions from information measurement theory and Kashiwagi solution model.		
Theoretical concepts	Verified trust (verified performance) and to a limited extent personal power.	Use of incentives and sanctions to foster goal alignment.	Responsibility. Autonomy.
	No control.	Assign risk to the agent to ensure goal compliance.	Shared culture and norms.
	No decision-making.	Monitoring and control mechanisms.	Personal power and trust.
	Expertise and professionalism.	Reward systems.	Other governance mechanisms.
	Minimization of communication.	Use of bonding threat to reputation.	Long term.
	Dominant information.	Short term.	
	Transparency.		
	Risk management (risk mitigation).		
	Long term (past performance and focus on win-win).		
Applications	Goals are aligned according to the project goals and objectives which are formulated by the client and fulfilled by the vendor.	Eliminate opportunistic behaviour.	Goal alignment based on shared goals and trust.
	Trust is developed through the use of past performance information.	Provide the level of incentives and sanctions which reduces the threat of information asymmetry.	Reward workers through non-pecuniary mechanisms.
	Expert is in the lead and has the control.	Correct, through specific contract requirements, for asset specificity and moral hazard.	Reduces the threat of opportunistic behaviour through responsibility and autonomy.
	Opportunistic behaviour, information asymmetry, moral hazard and asset specificity is reduced through the use of dominant information (transparency), leading role of the expert (vendor), and the focus on a win-win situation.	Uses reputation as an incentive and sanction.	Reduces the threat to the organization of information asymmetries, moral hazard, and asset specificity.
	Incentive system based on expertise enhancement and creating high rated past performance information (reputation as an incentive and sanction).	Ensure goal alignment.	Reduces dependence on legal contracts to enforce behaviour.
	Reduced dependency on the legal contract.		Uses reputation as an incentive and sanction.