Rijkswaterstaat
Ministerie van Verkeer en Waterstaat

Delft University of Technology

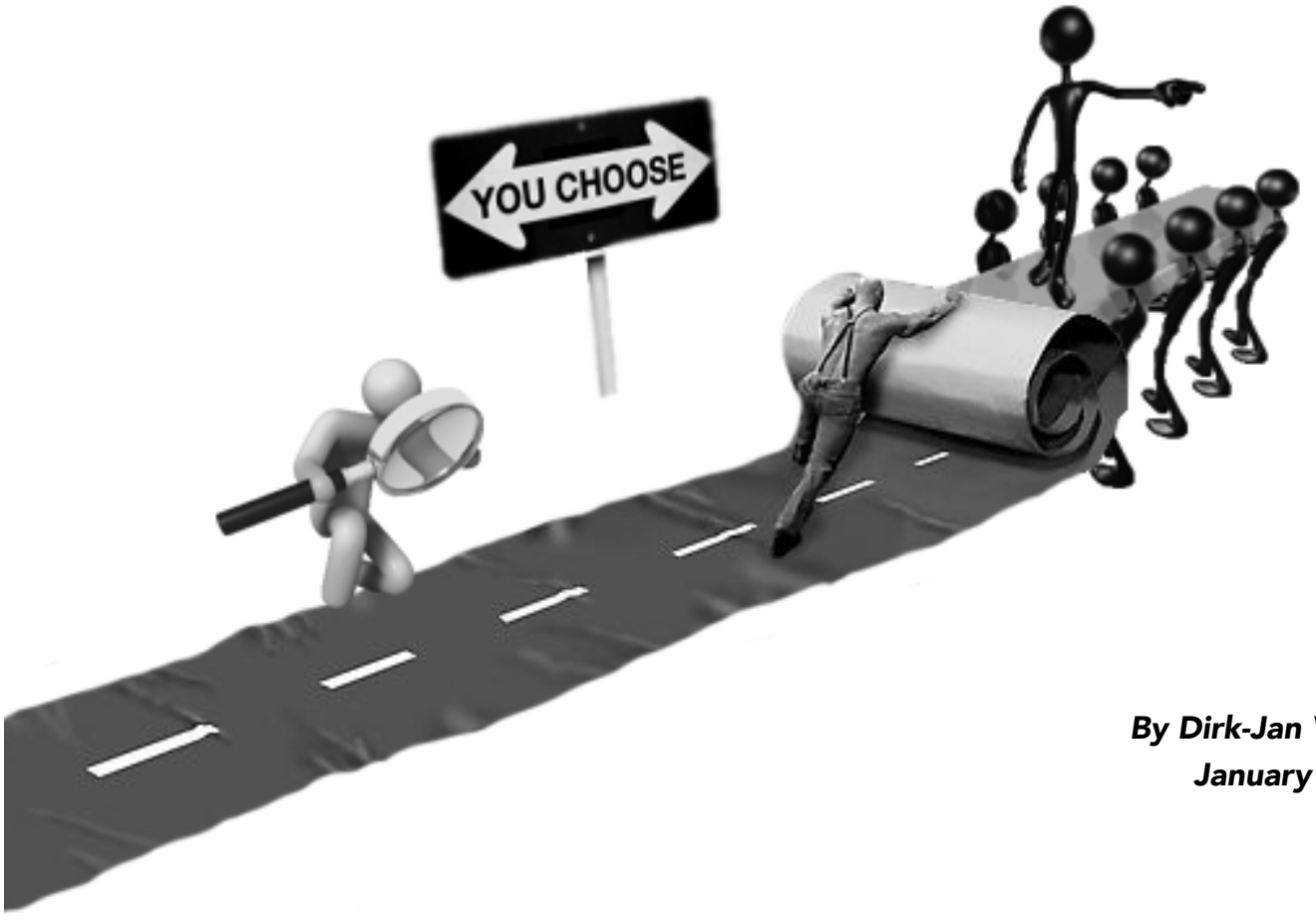
RIJKSWATERSTAAT

From

Skilful Technical Specialist

Towards

Strategic Professional Procurer



By Dirk-Jan Vinke

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COLOFON

Rijkswaterstaat from skilful technical specialist towards strategic professional procurer.

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PREFACE

After almost one year of hard work this report represents my final MSc thesis of the MSc Construction Management & Engineering (CME). This thesis is written in close collaboration with Rijkswaterstaat. Rijkswaterstaat provided the opportunity to create my own research. The research topic is related to the activities and experiences of the "Ondernemingsplan 2015". The report title is: '*Rijkswaterstaat from skilful technical specialist towards strategic professional procurer'*. Is it just another dream, or reality?

In the Netherlands there are 16 million national "coaches". People always talk about traffic jams. They want to drive on good roads without too many holes, bumps, and traffic jams. Mobility is a hot topic and related to the functioning of the whole country. The main focus in this research lies on the procurement processes of large infrastructural works by Rijkswaterstaat. The strategy of Rijkswaterstaat is compared with the procurement processes of Shell, FrieslandCampina, DSM, Schiphol Group, and ProRail. The content obtained from the companies was used as a reference framework.

During my internship at Rijkswaterstaat I had a great period with many positive experiences and lessons learned. It was a great and interesting experience to work at the agency Rijkswaterstaat. I experienced sympathy, openness, and interest from different persons. I learned a lot about different project and procurement related subjects through various conversations, discussions, and literature. The different kind of policy levels, the political influences, the public character, and the discussions and experiences related to the organizational change provided many insights in the work processes of Rijkswaterstaat.

REPORT OUTLINE

The report is separated in six parts:

- Part A consists of a general introduction and the research design. The research design provides a general introduction of the problem, the goal, the research questions, the followed approach, and the conceptual research model.
- Secondly, part B contains the theoretical analysis and orientation. Chapter 3 summarizes different theories and models concerning project management and the procurement of infrastructural works. Chapter 4 provides an overview of who RWS is, what characterizes their relation with the market, what their current procurement strategy is, and which experiences are already known. Chapter 5 provides an answer on the two first research questions.
- The third part, part C describes the interview approach in chapter 6. It contains a brief overview of the practical analysis of the current "purchase" processes of RWS versus the market. The analysis is bases on interviews at RWS and five different companies (Shell, DSM, FrieslandCampina, ProRail, and Schiphol Group). Chapter 7 elaborates the answers on the three last research questions.
- Fourthly, Part D consists of the discussion and validation. The discussion provides insight in the observations and the results from the interviews that are related to the thesis content. The discussion discusses the interview results from part C and links the results from the interviews together with several theories/literature from part B. In chapter 9 the results from the interviews are validated. The validation represents whether the result from part C and the discussion are recognized and acknowledged. The discussion and validation are input for the conclusion.
- Part E elaborates the conclusion and recommendations. In chapter 10 an answer is given on the research question. The conclusion gives an answer on the main research question. Moreover, several recommendations are represented. In chapter 11 recommendations for further research for Rijkswaterstaat are described. Chapter 12 provides a brief personal note about the experiences and observations from the author of this report.
- Finally part F consists of the appendices.

It is recommended to read the full main report in order to understand this research in full detail. More information about the organization of RWS, the transformation, and the project organization is described in appendix A. Furthermore, the results in part C and part D are based on several interviews. The interviews are not represented in this thesis report or the appendices. Yet the results of the interview analysis are represented in appendix D and E.

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ABSTRACT

Rijkswaterstaat (RWS) is a governmental agency that realizes large-scale engineering projects. Employees are proud to represent the brand “RWS” and they should be. The quality of the Dutch infrastructures is not bad at all. However, the price and efforts to achieve such qualities are often not mentioned. Managing time, costs, and quality are the utmost essential aspects of a project. Every project requires a different approach based on the characteristics, environment, stakeholders, complexity, and function. Managing projects is not only about technique, it is also about process and procurement management. Infrastructural projects would be realized long ago if a project would deliver profits and if uncertainties/risks would be adequately manageable. Administrative procedures in the Netherlands make it more challenging to manage these uncertainties/risks adequately. Yet, one of the core activities of RWS is to make sure that all different interests are well represented in a project

The “Ondernemingsplan 2015” (OP2015) mentions that the goals of the “Ondernemingsplan 2004-2008” (OP2008) and the “Agenda 2012” (AG2012) have not been reached yet in 2011. Throughout the years many things have changed, both positive and negative. Still, RWS is confronted with several obstacles and mistakes repeatedly. Several described findings in this report are not new, but it seems nobody is really responding. Procurement is often seen as a secondary process and just one of the process phases in the project. Currently, project teams steer the procurers. Moreover, it is often not clear what RWS is actually procuring. Procurement is the responsibility of the contract manager. The work RWS performs is pretty uniform so it is remarkable that there are so many obstacles in project realization every time again. Despite that RWS is a governmental agency this does not mean that RWS does not have to work efficient and effectively. The key to success lies within RWS itself.

The main research question in this thesis research is (from the viewpoint of RWS):

> In what way should the procurement process be improved to achieve the company goals for 2015?

RWS is transforming from a specialistic designer towards a professional principal. RWS had to reorganize their traditional and entrenched organization. Since the “discovery” of the construction fraud in 2002 distrust and a clear distance characterized the principal-agent relation. Contractors and RWS really needed to learn to collaborate again. Stimulated by the politics (“Markt, tenzij” and “Meer met minder”) RWS focused on outsourcing many activities and responsibilities towards the construction contractors. RWS is not “designing” anymore in detail and focuses on the work processes. Yet, the processes can be correct on paper, but when the input is incomplete/wrong the expected output is not achieved. The attitude of “distributing everything to the market” is too simple. “Market, unless” (“Markt, tenzij”) should mean more market mechanism (“meer marktwerking”). RWS is still confronted with several problems and obstacles like the principal agent problem. The problem is that both parties have different interest and asymmetric information.

The analysed obstacles at RWS are put into perspective with five companies (Shell, DSM, FrieslandCampina, Schiphol Group, and ProRail). One of the most remarkable conclusions is that especially the commercial companies did not acknowledge the obstacles of RWS as an actual obstacle. RWS experiences several obstacles like politics, the EU regulation, lack of supplier management, and “More with less” (“Meer met minder”) in role of a helpless victim. Yet the interviews with the commercial companies proof that these obstacles can be managed. They did acknowledge the existence of these “risks”, but it is also their responsibility to manage these obstacles on behalf of the company’s interest. RWS should actually think and act as a professional principal. RWS can learn a lot from the commercial companies. Public servants and especially the politicians should take their responsibility and accountability for the network performances. The networks’ functioning should be leading. That is the responsibility of RWS and the politics towards the 16 million users of infrastructures in the Netherlands.

The market is profit oriented. They strive to work as efficient and effective as possible in order to survive. Without any positive profits/continuity the companies right of existence is uncertain. A project manager works with a business case. A business case is used as a monitoring tool and provides insight in the ins and outs of the costs and benefits upfront, during, and after the project. It is used in the interaction between principal, project manager, and contractor when uncertainties/risks/changes occur. They strive for Value for Money. Without a positive final investment decision (FID) a project is cancelled. A project

manager controls the project scope. A procurement manager is responsible for the commercial part of the project and complements the project manager. Procurement is a strategic process. Procurers steer the project teams were necessary. A procurement manager makes sure that the demand from the businesses is defined, procured, and delivered correctly. Contract management is considered as one part of procurement management.

A procurement manager invests in the knowledge relationships with suppliers and contractors. Most of the design and construction activities are often outsourced and the principal is involved in a directing role, especially in the strategic parts of the project. Integrated decision-making and multi-disciplinary behaviour is crucial. In order to stay competitive the companies work together with “preferred suppliers”. They collaborate, evaluate, learn from each other, and try to find an optimal balance between the demand and supply. Past performance measurements are implemented to the search for improvements and better relationships with our contractors and suppliers in order to benefit from each other optimally. Opportunistic behaviour of contractors and suppliers is “not done” and could result in the discharge of both from the “preferred supplier” lists. In addition, the companies’ result is also depended on the actual behaviour and performances of employees. Employees are assessed on their performances. The managers steer, motivate, assess and direct the employees in the right direction.

“RWS is being relieved” does not only mean that RWS should perform less work with less people. How can RWS be a directive principal when the market directs them? Or how can RWS define a “simple” demand specification in juridical and contractual way when they do not understand the expected outcome? It is concluded that RWS does not procure their projects efficient and effective. There is a lack of knowledge and healthy relationships with the market. “Market, unless” (“Markt, tenzij”) and “More with less” (“Meer met minder”) do not always result in better (social) Value for Money. The decision-making of projects is in need to think and actually behave multidisciplinary instead of only informing each other. The focus should be on the network and not on the different tasks. As a principal you want to receive what you wish for, the supplier knows what you want, and he also delivers what he needs to deliver. This new approach requires new competences in especially the frontend-scoping of projects (integration of roles, responsibilities, functions, and decision-making). Currently, procurement managers and asset managers are not involved in the IPM model. The model does not facilitate procurement managers as understood by the commercial companies.

In the validation round almost all the findings and opportunities were acknowledged. RWS wants to be a professional principal and requires certain expertise and competences. A professional principal:

- Understands the needs of both the clients and RWS;
- Understands their network, their performances (functioning), and the current state of their assets;
- Knows the markets competences, invests in knowledge relations, and provides incentives to challenge the market to deliver the best possible performance within the available budget;
- Is supported by a firm base organization that satisfies the need in the projects;
- Searches towards optimum between network, purchase, control by clear project management;
- Steers where necessary, is in control over their own assets, and does not only validate the quality of the work processes;
- Controls the contract financially and juridical.

RWS should invest in knowledge development and evaluation and needs to learn to procure functions. RWS should direct from the procurement needs and the knowledge of their network on their projects and not other way around. The procurement manager has several tasks and responsibilities, especially upfront in the role of a directing principal. RWS should be equipped to stimulate their “players” to make sure they learn and improve their performances and assets quality gradually and one-step at a time. The procurement manager understands the competition, steers his staff workers, and reports to the board. The procurement manager complements the project manager. RWS should think, be, and stay in control over their network.

Nonetheless the performance of the project depends on multiple aspects and not only on the skills of the managers. It depends on the quality and actions of the players and staff workers involved, the team performance (multidisciplinary), and the quality of the facilities and resources. The whole organization should aim for one common goal, which is the optimal control of the network now and in future. RWS should reconsider who is currently in control. RWS should think from their network instead of from their

projects. The interviewed companies also know exactly what they want and how their assets are functioning. The networks' current performances and qualities should be common knowledge. Quality is a qualifier and should not be a differentiator. However, employees make mistakes as human beings. RWS should invest in evaluation and learning from best practises. Investing in relationships and knowledge in strategic elements is profitable for an organization of RWS as a whole, despite of their public character.

The main recommendations are highlighted below.

Managing obstacles

Politics, regulation, legislations, and organizational changes are occurrences that RWS have to manage just as risks. These are not only obstacles that obstruct the efficient and effectiveness of an organization.

Business case

RWS should adopt their financial (budget) system based on the network needs. Even as a public principal RWS should define, monitor, and control a clear business case in the projects for the interaction between the principal, the IPM team, and the market. Even though the result is negative RWS should demonstrate what they are doing and what the consequences are for the business case.

The demand

RWS should focus on a clear frontend-scope that includes the networks current state, strategic network needs, quality requirements, functions, and performances. The scope and end-result are clear when the project is put on the market. This information must be available at any time for the market to improve or innovate their assets in future projects. If the scope is not clear do not go to the market!

Procurement

Procurement should be a centralized strategic process and is more than defining a contract and the realizing a tender. Procurement should be a primary process that is part of the line organization, should focus on better relationships with the market, and forms the basis for knowledge development, sharing, and evaluation during all project phases. RWS should invest in strategic elements of the network where managers direct on knowledge.

Behaviour

RWS and the politics should take their responsibility and accountability to work, think, and decide efficient, effective, and multidisciplinary from the viewpoint of the network performances. Managers stimulate and create the conditions for an integrated way of decision-making by making a deliberate balance between project, process (environment), and procurement management.

SAMENVATTING

Rijkswaterstaat (RWS) is een agentschap dat grote infrastructuur projecten realiseert. Medewerkers zijn trots om het merk “RWS” te representeren. Dat mag ook, want de kwaliteit van de Nederlandse infrastructuur is zeker niet slecht. Alleen de prijs en inspanning die wordt betaald om hiertoe te komen is vaak niet inzichtelijk. Tijd, geld en kwaliteit zijn de meest belangrijke aspecten van een project om te managen. Elk project wordt verschillend benaderd op basis van de karakteristieken, omgeving, stakeholders, complexiteit en functie. Het managen van projecten gaat niet alleen om techniek, maar is ook gerelateerd aan proces- en inkoopmanagement. Infrastructuur projecten zouden allang zijn uitgevoerd als deze geld zouden opleveren, en de daaraan gekoppelde risico’s en onzekerheden goed beheersbaar waren. De administratieve procedures maken het echter uitdagend om risico’s/onzekerheden adequaat te managen. Deze belangenvertegenwoordiging is echter een belangrijke taak van publieke opdrachtgevers.

Het “Ondernemingsplan 2015” noemt dat de doelen van RWS uit het “Ondernemingsplan 2004-2008” en de “Agenda 2012” nog niet zijn bereikt in 2011. Door de jaren heen zijn er veel dingen veranderd, zowel positief als negatief. Verschillende resultaten uit dit verslag zijn niet nieuw, maar laten wel zien dat er nog genoeg werk te verzetten is voor RWS. Inkoop wordt vaak gezien als secundair proces en slechts een van de te nemen obstakels in een project. De inkopers worden vaak gestuurd door de project teams, maar vaak is niet duidelijk wat nu echt ingekocht wordt door RWS. Inkoop is de verantwoordelijkheid van de contract manager. Het werk dat RWS realiseert is behoorlijk uniform en daarom is het opmerkelijk dat er telkens weer zoveel fout gaat. RWS zou efficiënt en effectief moeten werken ondanks het feit dat RWS een publiek agentschap is. De sleutel tot succes ligt bij RWS zelf.

De onderzoeksvraag in dit rapport is (in de ogen van RWS):

> Hoe kan het huidige inkoopproces worden verbeterd om de organisatiedoelen voor 2015 te halen?

RWS verandert van een specialistische ontwerper naar een professionele opdrachtgever. RWS heeft zijn eigen traditionele en diepgewortelde organisatie moeten reorganiseren. Wantrouwen en een grote afstand kenmerken de opdrachtgever-opdrachtnemer relatie sinds de ontdekking van de bouwfraude in 2002. Aannemers en RWS moeten weer leren samenwerken. RWS focust zich op het uitbesteden van activiteiten en verantwoordelijkheden en wordt daarbij gestimuleerd door de politiek (“Markt, tenzij” en “Meer met minder”). RWS ontwerpt zelf niet meer en focust zich op de werkprocessen. Het probleem bij het proces denken is dat het vaak op papier klopt, maar uiteindelijk het resultaat anders is of tegenvalt door een verkeerde of incomplete input en/of verwachting. De houding van “alles uitbesteden naar de markt” is te simpel. “Markt, tenzij” zou meer marktwerking moeten betekenen. RWS wordt nog steeds geconfronteerd met obstakels gerelateerd aan het principaal-agent probleem. Beide partijen hebben verschillende belangen en er is sprake van asymmetrische informatie.

De geanalyseerde obstakels bij RWS zijn in perspectief geplaatst ten opzichte van vijf verschillende bedrijven (Shell, DSM, FrieslandCampina, Schiphol Group en ProRail). Een van de meest opvallende conclusies is dat op twee obstakels na de commerciële bedrijven de obstakels bij RWS niet herkennen als obstakel in hun eigen organisatie. Het lijkt bijna of RWS verschillende obstakels gerelateerd aan politiek, EU regelgeving, het gebrek aan relatiemanagement en het “Markt, tenzij” en “Meer met Minder” beleid ervaart in de rol van een slachtoffer waar weinig aan valt te veranderen. De commerciële bedrijven herkennen het bestaan van deze risico’s, maar het is ook hun eigen verantwoordelijkheid om deze risico’s zodanig te beheersen in het belang van het bedrijf. RWS moet daadwerkelijk gaan denken en acteren als een professionele opdrachtgever. RWS kan daarin heel veel leren van de commerciële bedrijven. Ambtenaren en vooral ook de politici moeten hun verantwoordelijkheid en aansprakelijkheid nemen voor de prestaties van het netwerk. Deze prestatie is leidend. Dat is de verantwoordelijkheid van RWS en de politici tegenover de 16 miljoen weggebruikers in Nederland.

De markt kenmerkt zich als winst georiënteerd. Ze streven om zo efficiënt en effectief mogelijk te werken om te overleven in de markt. Zonder positieve winst/continuïteit is het bestaansrecht van een commercieel bedrijf onzeker. Een project manager beheerst de scope van het project en werkt met een business case. Een business case geeft als monitoringstool inzicht in de ins en outs van de kosten en baten voor, tijdens, en na het project. Een business case wordt gebruikt in de interactie tussen de opdrachtgever, project manager en marktpartij om in te spelen op onzekerheden/risico’s/wijzigingen. Ze

streven naar “Value for Money”. Zonder een positieve “final investment decision” wordt een project gestopt of on-hold gezet. Een inkoopmanager is verantwoordelijk voor de commerciële kant van het project en complementeert de project manager. Inkoop is een strategisch proces. Inkopers sturen de project teams waar nodig. Een inkoopmanager zorgt ervoor dat de vraag van de projecten duidelijk en correct wordt geformuleerd, ingekocht en geleverd. Contract management wordt slechts gezien als een onderdeel van inkoopmanagement.

Een inkoopmanager investeert in kennisrelaties met leveranciers en contractors. Ook de bedrijven besteden heel veel ontwerp en bouw activiteiten uit, maar de opdrachtgever blijft als regiehouder nadrukkelijk betrokken in de strategische onderdelen van het project. Integrale besluitvorming en multidisciplinair denken en werken is cruciaal. Om competitief te blijven werken deze commerciële bedrijven met “preferred suppliers”. Er wordt gefocust op samenwerken, evaluaties, het leren van elkaar en het zoeken naar een optimale balans tussen vraag en aanbod. Het gebruik van past performance is gerelateerd aan het zoeken naar verbeteringen en opzetten van gezonde relaties met leveranciers om optimaal van elkaar te kunnen profiteren. Opportunistisch gedrag van aannemers wordt niet geaccepteerd en kan resulteren in een plek op de zwarte lijst. Daarnaast is het bedrijfsresultaat ook afhankelijk van de prestaties en het gedrag van eigen werknemers. Werknemers worden getoetst op hun prestaties. Managers sturen, motiveren, beoordelen en wijzen de werknemers in de juiste richting.

Dat RWS wordt ontzorgd betekent niet alleen dat RWS minder werk hoeft te doen met minder mensen. RWS kan geen leidende projectmanager zijn als het zelf gestuurd wordt door de markt. Tevens kan RWS geen heldere en duidelijke vraagspecificatie opstellen binnen de juridische en contractuele kaders zonder dat ze daadwerkelijk weten wat er wordt ingekocht. Er wordt geconcludeerd dat RWS zijn projecten niet optimaal inkoopt. Er is een gebrek aan echte kennis en gezonde relaties met de markt. “Markt, tenzij” en “Meer met minder” betekenen niet automatisch meer (maatschappelijke) “Value for Money”. De besluitvorming in projecten heeft behoefte aan daadwerkelijk integraal en multidisciplinair denken en gedrag in plaats van elkaar alleen te informeren. De focus moet liggen op het netwerk en niet op de verschillende taken. Als opdrachtgever wil je krijgen wat je wenst, de leverancier weet wat je wilt en hij levert wat hij moet leveren. Deze aanpak vraagt vooral in de frontend-scoping van een project om nieuwe competenties van medewerkers en leveranciers (integratie van rollen, verantwoordelijkheden, functies en besluitvorming). Bovendien zijn inkoopmanagers en asset managers niet direct aanwezig in het IPM rollen model. Het IPM rollen model faciliteert inkoopmanagers niet zo als bij de commerciële bedrijven het geval is.

In de validatieronde werden zowel bijna alle bevindingen bij RWS als de mogelijkheden benut door de markt herkend. RWS wil een professionele opdrachtgever zijn en dat vraagt nu eenmaal een bepaalde kennis en expertise. Een professionele opdrachtgever:

- Begrijpt de behoefte van zowel de klant als RWS;
- Begrijpt zijn netwerk, de prestatie van dat netwerk en de huidige status van deze assets;
- Kent de competenties van de markt, investeert in kennisrelaties en prikkelt de markt om een zo goed mogelijke prestatie te leveren binnen het beschikbare budget;
- Wordt gesteund door een ferme centrale organisatie die voldoet aan de behoefte in de projecten;
- Zoekt altijd naar een optimum tussen netwerk, inkoop en beheer door goed project management;
- Stuurt waar nodig, is in control over zijn eigen assets en valideert niet alleen de kwaliteit van de werkprocessen;
- Managet het contract financieel en juridisch.

RWS moet meer investeren in de kennis en inkoop van functies. Je moet sturen vanuit je inkoop en kennis van je netwerk op je projecten, en niet sturen vanuit je projecten op inkoop. De inkoopmanager heeft verschillende taken en verantwoordelijkheden, vooral aan het begin in het project. RWS moet ingericht zijn om zijn spelers te stimuleren om stap voor stap te blijven leren, en hun eigen producten en processen te blijven verbeteren. De inkoopmanager begrijpt de markt, de marktwerking, stuurt zijn medewerkers en bovendien heeft inkoop een directe link naar het bestuur. De inkoopmanager complementeert de project manager. Samen zoeken zij naar de juiste balans om afwegingen te maken in het project zowel vanuit het oogpunt van het project, het netwerk als de organisatie. Het belangrijkste is dat RWS in control is en denkt vanuit het netwerk.

Desondanks is de prestatie van een project afhankelijk van meer aspecten dan enkel de competenties van de managers. De prestatie hangt tevens af van de kwaliteit en daden van de betrokken spelers en medewerkers, de teamprestatie (multidisciplinair), en de kwaliteit en beschikbaarheid van de faciliteiten

en middelen. De hele organisatie moet zich richten op één doel, namelijk het optimaal beheren van het netwerk nu en in de toekomst. RWS moet heroverwegen wie er nu daadwerkelijk in control is. RWS medewerkers moeten denken vanuit het netwerk in plaats van alleen maar vanuit zijn/haar taak of project. De geïnterviewde bedrijven weten ook precies wat ze hebben, wat ze willen en hoe hun assets presteren. De netwerk prestaties en kwaliteit moeten algemeen bekend zijn. Kwaliteit is een “qualifier” en geen “differentiator”. Maar dan nog blijft het mensenwerk en mensen maken nu eenmaal fouten. RWS moet daarom investeren in kennis, evaluatie en het leren van “best practices” samen met de markt. Ondanks hun publieke karakter kunnen investeringen in strategische elementen/objecten voordelig zijn voor een organisatie als RWS in zijn geheel en de gebruikers.

De belangrijkste aanbevelingen zijn hieronder beschreven.

Managen van obstakels

Politiek, regelgeving, wetgeving en ook organisatie veranderingen zijn gebeurtenissen die RWS net als risico’s moet managen. Dit zijn geen obstakels die een efficiënte en effectieve manier van werken in de organisatie mogen belemmeren.

Business case

RWS zou zijn financiële kasritme budgetsysteem moeten instellen op de behoefte van het netwerk. Zelfs als een publieke opdrachtgever zou RWS een business case moeten definiëren, monitoren en beheren ten behoeve van de interactie tussen opdrachtgever, IPM team en de marktpartijen. RWS moet kunnen aantonen wat ze aan het doen zijn en wat dat voor gevolgen heeft voor de business case van een project ondanks dat het resultaat negatief is ingecalculeerd.

De vraag

RWS moet zich focussen op een duidelijke en heldere “frontend-scoping” welke rekening houdt met de huidige staat van het netwerk, de strategische netwerk behoeften, kwaliteitseisen, functies en prestaties zodat de scope en het eindresultaat duidelijk zijn als RWS de markt opgaat. Deze informatie dient te allen tijden beschikbaar te zijn om de assets/producten in de toekomst te blijven verbeteren en innoveren. Als de scope niet duidelijk is ga dan niet naar de markt.

Inkoop

Inkoop zou een gecentraliseerd strategisch proces moeten zijn en is meer dan het opstellen van een contract en het uitvoeren van een aanbesteding. RWS moet investeren in strategische elementen van het netwerk waar gestuurd wordt op kennis. Inkoop moet als een primair proces onderdeel zijn van de lijn, moet focussen op betere relaties met de markt en vormt de basis voor kennis ontwikkeling, deling en evaluatie gedurende het hele project.

Gedrag

RWS en de politiek moeten hun verantwoordelijkheid en aansprakelijkheid nemen om efficiënt, effectief en multidisciplinair te werken, denken en beslissen vanuit de behoeften van het netwerk. Managers stimuleren en creëren de voorwaarden voor een integrale besluitvorming door een bewuste afweging te maken tussen project, proces en inkoopmanagement.

LIST OF FIGURES AND TABLES

GLOSSARY OF TERMS AND ABBREVIATIONS

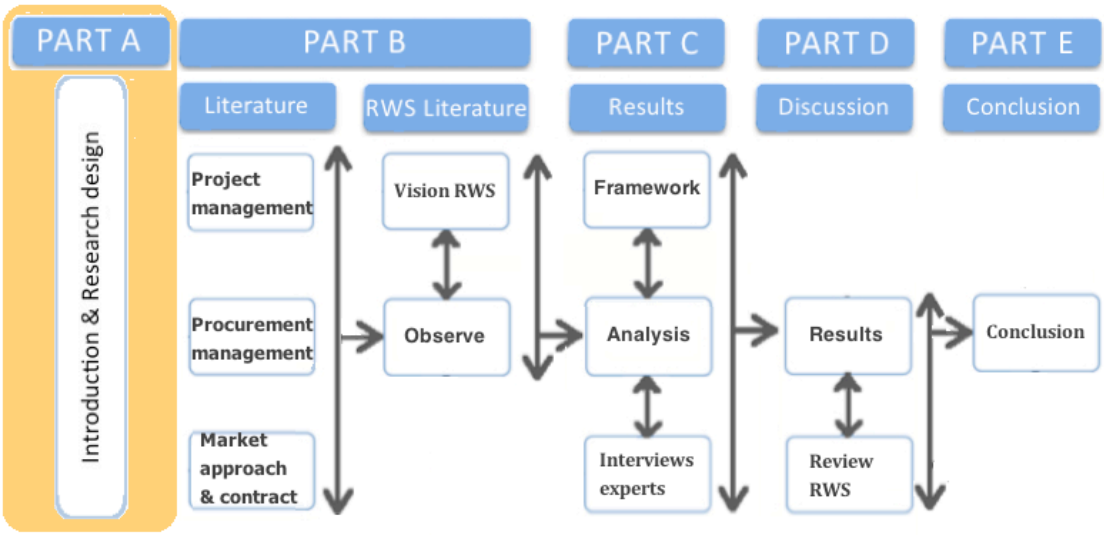
* (Cambridge University Press, 2012)

TERM	DEFINITION
BAO	"Besluit aanbestedingsregels voor overheidsopdrachten", decision procurement rules for governments.
Balance Scorecard	A strategic performance management tool and is used to evaluate the overall performance of a business in relation to its objectives. The Balanced Scorecard is effective in that *"it articulates the links between leading inputs (human and physical), processes, and lagging outcomes and focuses on the importance of managing these components to achieve the organization's strategic priorities."* (Abernethy, Horne, Lilis, Malina, & Selto, 2005).
BASS	"Besluit aanbestedingen speciale sectoren", decision procurement tender rules specific sectors.
BLS system	"Baten Lasten Stelsel", means literally "income-expense system"
Boundary condition	External restrictions of the solution space
Business case *	The business case provides information about the businesses future costs and benefits and the cash flow
Business plan ("Ondernemingsplan" (OP))	The strategic business plan of RWS that focuses on the short-term strategy for the next four years of RWS. Ondernemingsplan 2004-2008 (OP2008), Agenda 2012 (AG2012) & Ondernemingsplan 2015 (OP2015)
Client	The company/user that purchases from the market.
Collaboration	Collaboration is not about agreement, but it is about creation. *"The collaborative process merges differing views and conflicting ideas, while morphing into something that was previously unimaginable."* (Goosen, 2009) Collaborating means a higher level of integration and "removing the walls" between the different (internal and external) organizations. *"True collaboration requires a commitment to shared goals, a jointly developed structure and shared responsibility, mutual authority and accountability for success and sharing of resources, risks and rewards."* (Lukas & Andrews)
Construction contractor	A contractor that realizes the actual construction works on behalf of a client or under the supervisioning of an EC.
Cooperation	*"Cooperation emphasizes partners working together as a team in a timely manner to achieve organizational goals and objectives. …… It implies a balance between individual vs. organizational needs, and if addressed appropriately, will lead to the buy-in that will, in turn, lead to commitment. In cooperation the driving concern is creating value."* (Zomorrodian, 2011) Unlike coordination, for each cooperating group the "mutual benefit" or "end value" can differ. (Denise) *"Cooperation is now a hallmark for not every corporate behaviour, but corporate culture…."* (Denise)
Coordination	Coordination is about the harmonious functioning of parts for effective results by decreasing gaps, overlaps, and/or redundancies. (Forest, 2003) *"Coordination is about efficiency. Coordination looks to inform each unit or part of the whole as to how and when it must act. It is about two conditions: that people and units know what they are to do and when they are to do it; and that they see the relationship between what they do and what the coordinated whole achieves."* (Denise) *"Coordination, then, depends upon clearly articulated action plans and an organizational environment conducive to continual consensus building directly focused on goal setting and attainment."* (Zomorrodian, 2011)
Contract *	The contract is a legal document that defines the formal agreement between two different kind of parties
D&C contract	An integrated contract, in which the project phases of design and construction are awarded to one supplier/contractor at a certain fixed price.
DBFM	Design, Build, Finance & Maintain. An integral contract like D&C whereby the contractor or supplier is also responsible for the finance and maintenance of the project.
DG	"Directeur-generaal" is the head director of Rijkswaterstaat
Engineering Contractor (EC)	An EC is a company that provides engineering, procurement, construction (management) services.
Effectiveness	At effectiveness it is about whether the spend resources for the desired performances and expected social effects are proportionate to the revenues. It is impossible to act effective if every transaction is performed in a legitimate way.
EMVI	"Economisch Meest Volledige Inschrijving", and in English defined as Most Economic Advantage Tender (MEAT). This is selecting best value bid approach during procurement, which is not focused on lowest price. Also quality aspects, like sustainability and inconvenience during construction, have a critical role in the selection making process.
EPC contract	Engineering, procurement and construction. The contractor mainly manages the project and the costs' risk and control are weighted towards the Contractor and away from the Owner (Phifer,

	2012). EPC is based on a lump sum or turnkey kind of contract and EPC can be defined as contracting based on technical specifications. EPC involves single point responsibility.
EPCM contract	Engineering, Procurement and Construction Management services. The contractor will be responsible for managing or overseeing the other companies that have their own contracts with the owner (MSP Engineering Resource Development Consultants, 2010). So other subcontractors maintain their own contracts with the owner. EPCM involves multi-point responsibility and does not give a turnkey product guarantee, but he provides services.
Experiential value	One of the three aspects of value. It determines the experience of interior and exterior of a building/construction so the extent to which a building/construction is appreciated.
FIDIC contract	The FIDIC contract model is an open standard used throughout the world and includes, besides contract models themselves, even backgrounds (the guides), tendering procedures and model agreements. FIDIC contracts have an Anglo-Saxon background. In principle, FIDIC contracts use the same application of reasonableness and fairness as the UAV-GC.
Function*	The purpose that something has or a job or task someone/something does.
Functional requirement	Functional requirements specify the particular results/functioning of a system
Functional value	One of the three aspects of value. It determines the extent to which the building is functional.
Future value	One of the three aspects of value. Also known as technical value because this value is related to the technical characteristics of a building/construction.
GVKA bedrijf	"Verplichtingen-kasadministratie bedrijf", means literally "liabilities-cash administration company"
Goal *	A purpose, or something that you want to achieve.
GROTIK	Stands for Budget, Risks, Organization, Time, Information, and Quality ("Geld, Risico, Organisatie, Tijd, Informatie, Kwaliteit")
HID	"Hoofdingenieur-directeur", head director regional department RWS
Houtskoolschetsen	The precursors and rough outlines of the future organization and staffing plan of RWS according the OP2015.
HWN	"Hoofdwegennet", main road network
HVWN	"Hoofdvaarwegennet" the main waterway network
HWS	"Hoofdwatersystemen", the main watersystem network
Infrastructure Planning Act procedure	Legal procedure for governments to follow to realise OTB and TB decisions.
Insourcing	The opposite of outsourcing, performing activities internally
Integrated contracts	Contracts were several kinds of project aspects are combined in one contract. For example D&C, DBFM, EPC, and EPCm contracts.
IPM-model	"Integraal Project Management model". The Integral Project Management model, which is a "five-role" model developed by RWS and Berenschot Group BV to uniform the project organization of RWS.
Legitimacy	Legitimacy represents whether the (proposed) course of action is in accordance with the applicable regulation and legislation. Legitimacy stands under pressure whenever everything is processed in the most efficient way.
Life cycle	A systems life cycle can be distinct in the concept phase, development phase, realization phase, operational phase, maintenance phase, and demolition phase.
Life cycle costs (LCC)	Is an methodology that provides insight in the total cost of ownership (TCO) over the life of an asset
Mission *	The result that a company/organization is trying to achieve through its plans and/or actions
MKB	"Midden- en kleinbedrijf", all companies with less then 250 employees that are not part of the eleven large construction companies in the Netherlands (P. Groot en F. Jansen in Metze (2012))
MKBA	"Maatschappelijk Kosten-Batenanalyse", an analysis for the efficiency of an investment for the whole society.
OTB (Ontwerp Trace Besluit)	Is the political (legal) determination of a road infrastructure project design, which cannot be changed or adapted by the executive parties
Outsourcing	Outsourcing is related to subcontracting a process to a third-party company.
Procurement manager	Translation: "inkoopmanager". Also represent a particular form of purchase. Procurement is concerned with the overall gathering of resources, acquisition of goods and/or services at the best Value for Money.
Project management	Project management is the function that oversees execution of a project, is responsible for project resources (time, money, people, materials, energy, and space), and ensures that task and budget milestones are met. It consists of all management tasks to plan, organize, and control the project activities and project team members.
Projectmatig werken	Working by the means of project. A term used for the way of working in projects to realise a pre-defined goal. The basis of "projectmatig werken" is thinking first then act, from coarse to fine, and choose wisely between alternatives.
Professional management	In Dutch: "Professioneel opdrachtgeverschap". Acting as a professional principal. Provide in a clear and structured way the wishes and needs of the organization towards the entrepreneur/supplier/market party. Focussing on the business case/model.

Public private comparator (PPC)	An assessment for additional value. Is performed for projects larger then €60 million. The outcome shows whether a DBFM contract would be advantageous for the particular project.
Public Private Partnership (PPP)	In PPP private parties are expected to take on responsibility with regard to the financing of the project because there was a need to bring in private investment for public services and facilities. A PPP project is understood to be a project in which private parties on the basis of long-term contracts or arrangements are involved in the design, building, maintenance and/or operation of a public infrastructure, and co-finance it (Van Ham, 2002) (E.M. Bruggeman, 2010).
Regiehouder	RWS strives for an directing role and is called a director or in Dutch "regiehouder"
Requirement *	Describes what is wanted or needed by someone of something
Requirements analysis	Process step of SE that results in system boundaries and system requirements
Rijkswaterstaat (RWS)	Is the executive body of the Ministry of Infrastructure and the Environment of the Netherlands. This governmental organization manages and develops under supervision of the Minister of Infrastructure the road and water infrastructure network
SAA	"Schiphol – Amsterdam – Almere", currently the biggest road infrastructure project in the Netherlands
Scientific management philosophy or Taylorism	Management theory of Frederick Taylor and focuses on "conveyer belt" principle. Management from above and focused on control of subordinates by the necessary managers (Wikipedia, 2012g; Porter, 2008)
Service Level Agreement (SLA)	A service-level agreement (SLA) is a part of a service contract where a service is formally defined. A service-level agreement is a negotiated agreement between two parties, where one is the customer and the other is the service provider
Solution space	The set off all possible solutions and their corresponding success
Specification	A specification describes characteristics of variants, components, and elements in relation to function, form, and technique.
Stakeholder	A person, group, organization, member, or system that affects or can be affected by an organization's actions.
Strategy	The plans, policies, and principles by which individuals or organizations achieve their objectives/goals
Sub-system	A set of elements, which is the system itself, and a component of a larger system
Success	Success is related to the satisfaction of the different relevant actors.
Supplier	The market party, which delivers the service and or product to its client. In the purchasing circumstances of RWS the supplier is in most cases the contractor and the clients is RWS.
Systeem-gerichte Contractbeheersing (SCB)	"Systeem gerichte contractbeheersing", is a tool used by RWS to make sure that innovative contracts like D&C are controlled in an acceptable way. SCB is together with SE a supporting process tool at RWS.
System	"A system is an integrated composite of people, products, and processes that provide a capability to satisfy a stated need or objective" (Defence Acquisition University Press, 2001)
Systems Engineering (SE)	An interdisciplinary iterative, goal-oriented, and problem solving process tool that focuses on the customer needs and wishes during the entire life cycle: it enables the realization of successful systems.
Tender Procurement	Tender Procurement is primarily concerned with the selection of the best bid for executing a project.
Track decision (TB)	See Infrastructural Planning Act. In Dutch: Tracebesluit (TB); The final decision of the OTB.
Validation	Validating is checking whether the right thing is build
Value	The extent that determines what something is held to deserve; the importance, worth, or usefulness of something. This could be monetary or material worth of something. (Oxford Dictionaries)
Verification	Verifying is checking if it is built in the right way
VfM (Value for Money)	A statement that represents that something that is well worth the money spent on it.
Vision	An ideal picture of what the company should be if fulfilled all of its potential and all the human potential of its staff

PART A. INTRODUCTION & RESEARCH DESIGN



1 INTRODUCTION

In this first introductory chapter an introduction is given about the thesis context. The chapter is split up in two sections. The first section assesses in general how Rijkswaterstaat (RWS) is organized and describes the history briefly. Section 1.2 describes the thesis context.

1.1 Rijkswaterstaat

1.1.1 The organization

Rijkswaterstaat (RWS) is the executive organization of the Ministry of Infrastructure and the Environment. RWS sustains and develops the national infrastructural networks. RWS works on:

- Dry feet;
- A sufficient amount of clean water;
- Smooth and safe traffic flows on the road and on the water;
- Reliable and useful information.

The minister defines policy goals for the infrastructural networks in the Netherlands. RWS fulfils with what has been agreed upon with the minister. RWS "negotiates" with the politics about the policy objectives, the required performances, the available budget, and the risk delineation related to the operation and maintenance of assets. The Secretary General (SG) and the Director General (DG) RWS make Service Level Agreements (SLA) about these performances and are based on the SLA's defined by RWS. The arrangements are defined in service management contracts. These contracts are translated towards operators and realization tasks and (procurement) processes. Finally, the market is involved and agreements are made about the delivery of products and performances.

RWS is responsible for the ownership and operation of the three national networks of main road network (HWN), the main water system network (HWS), and the main waterway network (HVWN). The Dutch ministry of Infrastructure and the Environment spends in 2012 10.7 billion euro on national infrastructure (rail, road, waterways, water protection). About three billion euro is spent on road infrastructure (Rijkswaterstaat, 2011c). The current organization of RWS and the one RWS strives for towards 2015 are elaborated in subsection 4.1.3 and in appendix A. The new organization structure is shaped by the rough outlines of the new organization ("houtskoolschetsen") and is still under construction. These outlines are the precursors of the final organizational and staffing plan in 2015. Furthermore, RWS is part of the government and the government faces budget cuts through the new agreed budget cut policies ("Lente akkoord"). However, RWS will not change their strategy based on the political agenda and still strives for the goals defined in the business plan 2015 (OP2015). (Rijkswaterstaat, 2012a)

1.1.2 History

RWS origins from the late 18th century. After different river floods there was a call for upper regional water management. In 1798 the government proposed a plan that envisaged the establishment of the national "Bureau voor den Waterstaat". RWS its organization was characterized by Napoleonic militarist ideology. This means a hierarchical policy, decentralized execution, and the focus on professional technical perfect solutions. During the first 50 years different powers and authorities mostly dominated as a result of the different wars. Since 1848, the European revolution year, the national "Bureau voor den Waterstaat" became known as Rijkswaterstaat. Supported by a new liberal political system there was a generational internal shift in the RWS organization. The effects of this "shift" became visible in a broad wave of new investments around 1860. These investments led to the realisation of the "Nieuwe Waterweg" and the "Noordzeekanaal" that provided better connections between Rotterdam and Amsterdam to the "Noordzee". In the following years RWS realised major projects like the "zuiderzeewerken" (e.g. the "afsluitdijk" and "polders").

After the WWII the flood disaster in 1953 provided a unique opportunity for RWS to show their value. The "Deltawerken" gave a major boost to RWS its reputation (see Figure 1). However in the 1960s, RWS as a technocratic stronghold became a prey of democratization. The motto of RWS became "decentralized, unless". The regional management became the centre of gravity of the organization. The head director of the regional department of RWS ("HID") gained lots of power. The latter his power position was one of the elements that were rejected by the OP2008.

Figure 1 One of the Deltawerken (source: http://informatica.bc-enschede.nl/rmerjenburgh/waarom.jpg)

Since the 1980s the government changed their political vision on their role and responsibilities. Supported by the economic crisis there were a lot of budget cuts and reorganizations. RWS was an organization with lots of money and power and is "killed" by the politics from an administrative point of view. In the 1990s the market parties increased their role of importance in the design and realization of construction projects supported by their international experiences. The American New Public Management (NPM) ideology supported the withdrawing attitude of the government, also known as the "Market, unless" ("Markt, tenzij") policy. RWS abandoned the idea that they are the playmaker, but needed to accept the role of a (large) "player" in the network. NPM promoted both privatisation and Public Private Partnerships (PPP) to modernise the public sector. The main objective was to offer more and earlier market orientation in the public sector that will lead to greater cost-efficiency for governments (see also Figure 2). This was one of the reasons for the definition of the UAV-GC 2005 (and its predecessors) and the introduction of the integral contracts like "D&C" (see section 3.5 and chapter 4).

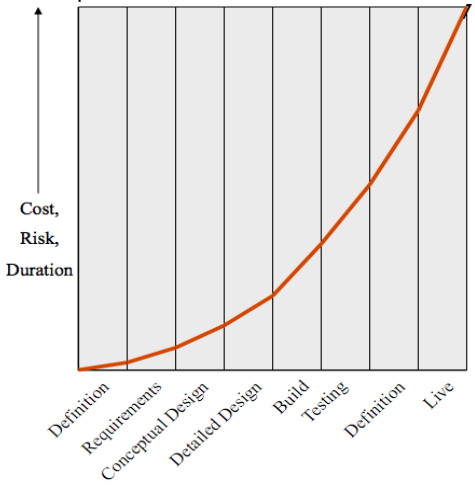


Figure 2 Effects of scope changes on project duration

Source: (Metze M. , 2009/2010)

1.2 Context

In the construction sector big projects are built. Immense new buildings, factories, bridges, roads and rail- and waterways are all designed and realised as a result of cooperating actors (see appendix B for more information about the current construction industry). In the past the most basic judgement that counted in the construction industry was "You ask, we build". The principal (RWS in this case) defines a project start-up and designed (or outsourced) the preliminary design. After that RWS or another engineering company worked out a design specification, drawings, calculations, quantities, and more until it was completely known what had to be build. After the final design the construction companies were involved. The construction contractor that subscribed with the lowest price was allowed to construct the asset (project). As a result these construction companies focused on analysing specifications and designs in detail in order to build the asset. The principal monitored the contractors at all times whether he complied with the requirements in the contract. The latter results in awareness (distance) on the principals' side and results in a tense relationship. From the outside it may seem ordinary, but these projects are not realised without difficulties and struggles. Projects experience that budget, quality, and time are still hard to sustain (e.g. the projects in Figure 3). Yet, RWS suggested that 90% of the projects are assessed based on quality in 2012 (Rijkswaterstaat, 2008).

Figure 3 Example projects: Noord-Zuidlijn Amsterdam (source: http://www.artfundum.com/nl/home/nieuws/6-algemeen/313-metrokunst/), Roertunnel (A73) (source: http://www.ttm.nl/nieuws/id25798-roertunnel-a73-drie-maanden-dicht-.html/), landtunnel (A2) (source: http://www.elfregadero.nl/2012/landtunnel-a2-weer-een-stapje-gezet/)

The construction industry is known as a "task culture". The sector is result oriented, consists of professional expertise, and is characterized by a technical paradigm. The sector thinks in a structured way, and is characterized by measurability, independency, autonomy, low communicative, stubborn, informal, marked by power positions, collegial, traditional, risk averse, hard work, Calvinistic, introvert, big network, often short term thinking, honesty, integrity, but not transparent. (Pries F., 2010) To provide a little bit more structure in what is typical for a construction project Koskela (2003) described three different peculiarities of construction projects. These are (1) one-of-a-kind nature of projects, (2) site production, and (3) a temporary organization. In addition Verster (2009) and Kok (2007) mention (4) client interference and price competition together with (5) a fragmented and multidisciplinary industry.

Failure costs and delays in construction projects still exist. With the increased size and complexity of projects these costs could raise even further. Innovation in e.g. tunnel safety systems often fails because they are "too safe" for users or are not really integrated into "the system". What is then "quality", what are the reasons for such failures, who are responsible, and how could this be prevented in future projects are hard to answer. These problems are related to several incorrect contract forms, opportunism and/or lack of quality of contractors, lack of knowledge at RWS, politics, and many more subjects. To make it even more complex the contractual issues, politics, environment, budget constrains, trust, experiences, risks, and culture are all related with the uncertain behaviour of the different actors. (Koskela, 2005) (Pries F., 2010) (Rijkswaterstaat, 2012g) (Rijkswaterstaat, 2011c) (Rijkswaterstaat, 2012c) (Verster, 2009) (Schoenmaker, 2011).

In the current construction projects there is a difference between the design and the realisation. It is about a responsive versus a creating organization. These separate worlds are involved in the current relationship of RWS and the market, but also inside RWS between the plan study and realisation phase. Firstly, contractors and RWS have conflicting interests. Secondly, the plan study phase requires different competences from employees then the realisation part (de Ridder, Systems Engineering Ontwerpproject 3, CT3061, 2009). The plan study is confronted with lots of uncertainties, different actors, complex environments, and lots of legislation, regulation, laws, directives, guidelines, etc. The plan study is often focussed at the final delivery of the TB decision. However, as explained this is not an end product. The TB decision is a milestone towards the end product, which is a well functioning, safe, reliable, and available road infrastructural network implemented correctly in the current environment

The division of roles was clear in the traditional Bid-Build model. RWS was in control over the design and whole specification, the UAV1989 conditions were clear, and the construction contractor was responsible for the realization. Supported by several influences (see chapter 4 and appendix A) RWS changed their policy towards "D&C unless". It was suggested that the Bid-Build contracts lacked of innovation and quality. The construction contractors were better equipped to come up with "cheaper" and practical solutions. The change was motivated by external influences from the politics and the events concerning the construction fraud. Governmental organizations paid on average 8,8% too much for years (Metze M. , 2009/2010). The organization of RWS became too complex, decision mandate was misused, finances were a mess, decision-making (fraud) was questionable, the trust of the politics and users was misused, and projects plan studies were a never-ending story (Metze (2009/2010)).

RWS is the executive part of the Ministry of Infrastructure and the Environment and is dependent on the policy directorates around them and for a small part also the internal procurement policy. Around every four years new politicians take place in the Dutch Second Chamber ("Tweede Kamer"). The changing

politics could result in uncertainties in budget for current and future Infrastructure projects. For example road projects are delayed or cancelled when the government cuts in the infrastructure budget and wants to invest more in other public facilities, education, healthcare etc. The minister decides and he is the one that “cuts the ribbon”.

RWS its right of existence is related to both the traditional practices of many years (see subsection 1.1.2) and their culture. Dutch engineers are used to solve problems. Their strength is to create unique and complex solutions (e.g. the maeslantkering). RWS was the technical specialist in the construction industry. However, nowadays RWS is not anymore a guardian of the market, but RWS is a purchaser in the market. The latter makes it not easier to operate for RWS. On the one side RWS wants to be decisive in their projects, and on the other side RWS is political sensitive. Furthermore the politics characterized RWS as too large, too expensive, and not efficient. RWS became an agency. An agency is an almost independent operating company, but it is described as a “consortia with its own goal”. RWS faces a challenge in upturning their organization. RWS must become smaller, do more with less people, and become cheaper. Still “we work pretty well” was a commonly heard answer among RWS employees, but RWS had to cut in their organization and should focus on different tasks and objectives. The question is whether or not the real problems’ causes were encountered. The policy “D&C unless” was predicted as one of the solutions. Still the “insufficient contracts” are appointed as cause of project “failures” after years where D&C contracts were initially the cure. Broadly speaking it seems that the contract was and still is experienced as the cause of several current obstacles and failures. Moreover people also often underestimate the impact of organizational changes (Metze M. , 2009/2010) (Meredith & Mantel, 2006) (Jütte, Balt, Zanen, Boer, & Croon, 2011).

The purchase of a “product” in infrastructures and in the construction sector as a whole goes a bit different then in other industries. In the construction industry a “process” is purchased instead of a product. RWS asks several functional requirements, but left several “freedoms” (or uncertainties) towards the market. The contractor fulfils his contractual specs and delivers a new asset. During realisation it is noticed that the contractor delivers a different kind of product then one of the stakeholders expected and RWS demands another type from the contractor. This is happening even when the contractor would comply with the functional specification at first. Broadly speaking RWS does not always know or understand what they really purchase. Such a “change in demand” could go along with several hard and legal discussions. Of course the latter example is related to different subjects and a result of several mistakes, distrust, and/or miscommunication. The purpose of this example is to show that the procurement of infrastructural works is underestimated. Several employees of RWS still experience procurement as secondary process (Jütte, Balt, Zanen, Boer, & Croon, 2011) (Rijkswaterstaat, 2012c). RWS and the contractors seem not always capable to realise the “products” within budget and time and against the desired quality.

Sources: (Rijkswaterstaat, 2011c) (Rijkswaterstaat, 2008)

2 RESEARCH DESIGN

In this second chapter the research design of this master thesis is elaborated in detail. The chapter has been split up in three sections. The first section describes the conceptual design of the research and defines the problem definition, goal of the research. Section 2.2 represents the research questions. The answers on the research questions provide together an answer on the main research question. Section 2.3 mentions the technical research design and elaborates the “how” question of the research. The research model is represented and elaborated. In section 2.4 the general interview approach is briefly described. Finally, section 2.5 describes the quality criteria for research.

2.1 Conceptual design

2.1.1 Motive & earlier thesis research

Many researchs are already performed towards optimal specification & design methods and different theories for both RWS and contractors. This research links several discussions and obstacles provided by earlier research (as mentioned below) and focus on the total picture of who RWS wants to be.

Van Heerden (2010) en Wiendels (2010) both discuss in their thesis research the lack of uniform processes at RWS. The Integral Project Management model (“IPM model) and systems engineering (SE) are not implemented in all phases of the project life cycle. In addition there is a lack of standardized blank documents for the implementation of the different processes prescribed by SE and IPM. Also Van Leeuwen (2009), Gazelle (2011), Dix (2010), and Swaay (2011) focussed on the improvement and implementation of the SE techniques. Particularly Gazelle (2011) questioned the added value of SE and system oriented contract control (“systemgerichte contractbeheersing (SCB)”) as it is currently applied at RWS. Furthermore, Kok (2007), Verster (2009), and De Vree (2010) researched the possibilities of a supply driven market. They focussed on a new mindset in the construction industry by working bottom-up instead of top-down. In all reports the theories have been explored, but it seems that the results are limited to the specific theories. What are RWS its underlying reasons to implement approaches like SE, SCB, Asset Management (AM), Building Information Model (BIM) and why does it still does not work out as they would like to see?

Dang (2011) performed a research on the maturity of the purchase organization at RWS. He concluded that RWS its purchase organization is far from “mature”. His model is based on the procurement model of Robert Monchka from the Michigan State University (MSU model). He questions whether or not RWS can become “more” mature because RWS faces political constraints, strict governmental regulations, that RWS does not purchase large volumes of the same products, and finally that efficient and effective purchasing is not always the top priority due to societal responsibilities.

RWS is structured and organized as an engineering organization because they still want to be influential on the technical aspects during design and construction. The procurement organization of RWS (IMG, “Inkoop Management Groep”) “successfully” implemented the standard contract buffet and became an advisory board regarding procedures, legislation, and regulation. Progression is made in communication with the market, selection/tendering, and application of procurement instruments. Many staff acknowledges the importance to develop “procurement” further in the organization. However procurement is still a secondary administrative process. Yet, several initiatives are introduced to change the latter assumption, but the management does not seem to pick up these developments fast enough.

2.1.2 Problem description

Before 2003, RWS executed many preparation and design work. Since 2004, the OP2008 started a reorganization of RWS. The market should relieve RWS (Rijkswaterstaat, 2004) (Rijkswaterstaat, 2011c). However, the result of this transformation required new competences from both RWS and the market. RWS was not equipped yet to prepare their work in the new required way without too many mistakes. RWS expected the construction contractors to deal with the inefficiencies in projects because they would realise these projects. The relation between RWS and the market remained tensioned and

contractors were accused of opportunistic behaviour. Consequently advisors and engineering contractors (ECs) are involved to deal with this "gap". The latter resulted in several inefficiencies between RWS and the construction contractors because a new party was involved in the process. Together with the market several partnerships are established to stimulate the contractors to comply with the expectations of RWS (Rijkswaterstaat, 2011c) (M. Hielkema, 2008) (M. Noordhuis, 2011).

With the current "new" innovative and integral contracts it is suggested that several risks and responsibilities are the responsibility of the contractor (Goossens, 2007) (J.A. Ribberink, 2008). In these contracts the definition of expectations of the principal are crucial. When the demand is not clear the project faces several not necessary risks during the project realization. However, the definition of the demand is depended on the current set of rules, laws, regulation, legislation, and different governments. RWS specifies several subjects into detail to "comply" with the rules and laws. In the current plan studies and administrative procedures (e.g. "Tracebesluit") RWS falls in a funnel of traditional discussions about details like garden fences instead of stimulating the market. RWS should focus more on professionalizing their procurement organization (Rijkswaterstaat, 2008). Yet, there is a tension between a procurer and a technician, especially at RWS. "*Current classification methods for projects based on their complexity seem to lack inclusion of other dimensions than the technical one."* (Bosch-Rekveldt, 2011). Technicians think from the viewpoint of technique and purchasing is considered as an obligatory process. However, in the end even these technical specialists are some sorts of procurers.

A common mistake in economic spheres is that (especially in big and complex projects) the client does not buy only a product, but a (often long) process. This process is in the construction industry often related to an expectation. The principal does not directly buy a product, but it is an expectation about what they expect to receive after construction. Whenever RWS purchases a new road with several entries and exits, viaducts and crossovers the contractor has to fit these "products" into an existing clear and dynamic environment and is confronted with several stakeholders. Stakeholders often have different kinds of (conflicting) interests and power (de Bruijn & Heuvelhof, 2008). The latter requires a process of close interaction and discussions, consists of several risks and uncertainties, and requires cooperation from all relevant parties. The latter is closely related to the chosen management approach.

One of the biggest transformations of RWS is the one of "D&C, unless" instead of the traditional Bid-Build models. However, it is general believed that contractors still receive "illusion" freedoms. Maybe RWS specifies too much in detail, but contractors seem to behave opportunistic. For such a contractor it is all about profit and continuity, which is understandable. When RWS "looses" money nobody will probably loose its job. When a contractor looses money this can be catastrophic for the future existence of the company and thus employees job security. These aspects are related to the economical differences between public and private parties (Van Ham, 2002). The delivery of public goods is often described as "market failure". Due to the economic crisis prices are under pressure and the principal-agent relation is confronted with several tensions. At RWS it is general believed that contractors try to earn back their profits through opportunistic behaviour and anticipate on several uncertainties in contracts. RWS seems to be convinced that in order to prevent contractors' opportunistic behaviour everything should be covered in the contract. On the other hand, rigid contracts should not be that important whenever contractors would not behave opportunistic.

To sum up, the mission of RWS seemed pretty simple: RWS should provide dry feet, enough and clean water, safe and fluent traffic flows. RWS should do a step backwards and the market a step forward. This sounds easier than it is because it still seems that RWS cannot procure its infrastructural works without any problems related to scope, quality, time, and budget (Rijkswaterstaat, 2008) (Rijkswaterstaat, 2012c). Influenced by the politics RWS changed along the policies of "Market, unless" ("Markt, tenzij"), more with less people ("Meer met minder mensen") and clear distance/directing role ("meer afstand/regiehouder"). The market should do the trick. However, RWS is still not the governmental agency that acts like a public oriented network manager and a professional project manager (Rijkswaterstaat, 2011c). Projects are tendered with new innovative integral contracts, but it seems that these contracts do not solve the traditional problems. Complex projects and integral contracts ask for better collaboration between RWS and the market, but it is generally experienced at RWS that true collaboration with the market is hampered by legislation, regulation, current contracts, distrust, and the traditional distances. Moreover, the organization of RWS faces an extreme makeover

for over more then ten years. The expected benefit is not reached yet and projects still face severe delays. After more than ten years of change the question “what goes wrong?” is still not answered. The question that remains is how should RWS procure its future projects?

After the problem is clearly described the problem definition is defined as:

> Rijkswaterstaat is a traditional project organization focused on the technical aspects of their projects. Procurement is no part of the core business of project managers. The current organisation does not function according to the organisational mission statement for 2015. Their attitude in the procurement process is not yet referred to as a directing principal according the organizational goals for 2015.

2.1.3 Research goal

The earlier described problem description in section 2.1.2 emphasises the inefficient use of both the skills of the market and RWS. Different researchers already focussed to improve the current construction industry with improved or “new” (technical and/or project management) techniques, tools, and/or models (see section 2.1.1). Some suggest there is a lack of understanding of the fundamental values of these techniques. Some even suggest going back to the traditional bid-build system. In this research the main considerations and conclusions of earlier researches will be used as a basis for this thesis research. This thesis particular focuses on the procurement processes of RWS. It seems that RWS does not procure their assets correctl. What should RWS do and what should be left to the market are important questions. In order to find an answer for the problem definition the research goal is:

> Improving the current procurement processes of large infrastructural works.

2.2 Research questions

This research focuses on advice for Rijkswaterstaat. The problem stated in section 2.1.2 is solved by answering the following research questions:

Main question:

- In what way should the current procurement process be improved to achieve the company goals for 2015?

An answer on the main research question is underpinned by answering the following sub questions:

- Why does Rijkswaterstaat want to change into a (more) professional principal?
- How does Rijkswaterstaat procure its infrastructural works in practice?
- What are the current obstacles in the procurement process?
- Do other large companies and organizations acknowledge these obstacles?
- How do these companies and organizations deal with those obstacles?

In Dutch:
Onderzoeksvraag:

- Hoe kan het huidige inkoopproces worden verbeterd om de organisatiedoelstellingen voor 2015 te halen?

Sub vragen:

- Waarom wilt Rijkswaterstaat veranderen in een professionelere opdrachtgever?
- Hoe koopt Rijkswaterstaat zijn infrastructurele werken daadwerkelijk in?
- Wat zijn de huidige obstakels in het inkoopproces?
- In hoeverre worden de obstakels door andere grote bedrijven en organisaties herkend?
- Hoe gaan deze bedrijven en organisaties hier mee om?

2.3 Research design

2.3.1 Research type

In this research is chosen for a combined descriptive and exploratory research. In a descriptive/exploratory research the goal is to describe a phenomenon and to explore factors that influence and interact with each other. The exploratory part focuses on the relationships among these factors. The effects of one variable on another are predicted and relationships that are supported by scientific theories are tested. An exploratory research aims for the definition of a theory or hypotheses. The output is considered as non-experimental or observational research. Explorative research is mostly small scaled and descriptive in nature. A case study is a good representative for this kind of research. One of the disadvantages is that exploratory research is less controllable. Unlike in evaluation research the different stages and operations are not completely elaborated. Definitive conclusions should only be drawn with extreme caution. (Baarda & Goede, 2006) (Douris)

Exploratory research often relies on secondary research like available literature and/or data reviews, or qualitative approaches such as informal discussions with consumers, employees, management or competitors, and more formal approaches by in-depth interviews, focus groups, projective methods, case studies, or pilot studies. The results of exploratory research are not usually useful for decision-making themselves, but can provide significant insight into a given situation. Although the results of qualitative research can give some indication as to the "why", "how" and "when" something occurs, it cannot tell us "how often" or "how many". (Schutt, 2012)

Exploratory research is focused on the description of processes and the relevant applicable variables. The research is based on a fixed pattern. The pattern is structured in five steps:

1. Explorative literature research (see chapter 3 and 4);
   During the literature research the researcher learns as much as possible about the phenomena and formulates a research question.
2. Define a technical research design (see chapter 2);
   One of the most important aspects in the technical research design is the chosen research strategy. The research strategy determines how the research is executed. Decisions about qualitative versus quantitative, and empirical vs desk research are made.
3. Define a group of respondents (interviews) (see subsection 2.4.1 and appendix D.1);
   It is important to get insight in where you could find the required material/information. In addition it is important to find out how the correct information is obtained.
4. Processing results (see chapter 6, 7, 8, and 9);
   After the required information is gathered the results are processed. Order and structure in the obtained input is crucial. Finally conclusions are drawn (see chapter 10).
5. Further research (see section 11)
   The researcher explains his results in new research questions for future research.

2.3.2 Research model

In Figure 4 the research model is represented and below the different aspects are highlighted. First of all the research starts with an introduction and the research design (Part A). Different theories and models are elaborated (Part B). It is important to analyse what RWS wants and really needs. An independent view is required to understand the current construction industry RWS works in (Part B). During this further research the process is viewed through these “policy glasses”. What is the policy they strive for, how should the policy be implemented and most important why? In addition, RWS asks something from the market. Therefor it is important to understand what performance RWS expects from the market. Both literature study and interviews should provide insight in these aspects. What are the key issues in decision-making and in what way do RWS’s interests relate to the market parties’ interests?

The output of Part B provides insight in the current theoretical models/processes and how RWS wants to procure their products. It is important to understand the different processes of procurement and project management (literature) related to the vision of RWS. In addition the different interests and problem perceptions of both the client and the market are assessed. The procurement role of RWS can

be evaluated when it is clear what both principal and agents' value perception is. Literature study (especially RWS documents) and informal conversations should provide input for these subjects. These informal conversations are used to get some feeling with the reality.

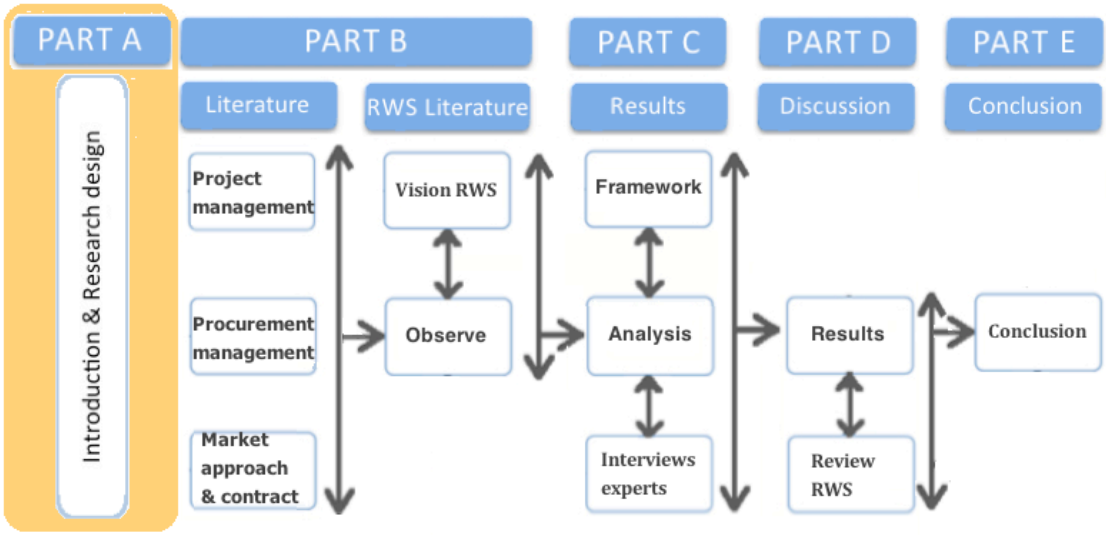


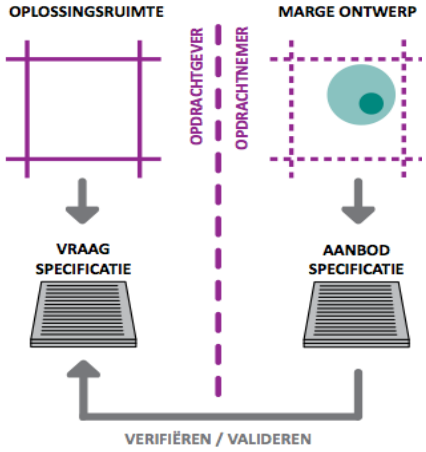
Figure 4 Research model

"Part C" focuses on how projects' procurement and relations are structured and implemented in practise. The analysis provides additional insight in the procurement approaches of large comparable companies like Shell, DSM, FrieslandCampina, ProRail, and Schiphol Group (Part C). Interesting is how the workforce experiences the actual work processes. Under what conditions do they work? What are the different roles and responsibilities between the principal and agents? What kind of procurement and/or project strategies are implemented? What are the reasons for several forms of contracting? Subsequently it is essential to take a look at the current projects' obstacles. What are the obstacles and how do the different parties experience these obstacles? It is important to analyse whether the causes of (possible) problems are found in particular roles/behaviour. The result provides insight into the case study's core problems. Especially the underlying causes are hard to define because this requires openness and honesty from all involved actors. It is crucial to understand and consider the observed opinions and motives from different viewpoints.

The next step in "Part D" is to discuss the found results. The discussion links and analyses the different theories/literature of Part B with the interview results from Part C. The results from both RWS and the market are analysed, compared, and evaluated. It is essential to compare the different results and see if there is any consensus in the acknowledgement and countermeasures by all analysed parties. Possible conflicts are traced back towards process steps so that non-added-value steps are identified. However, conclusions drawn based on several interviews are not sufficient enough for a well generalizable conclusion. Therefor the findings of this research are verified whether or not these events/processes/bottlenecks/problems also occur at other projects of RWS. The latter is performed by means of a validation round with two different RWS managers. The output of the discussion round is used to verify the found results in this research. The conclusion and recommendations are defined in Part E. The conclusion provides an answer on the main research question.

2.3.3 Research scope

The focus of this research starts with understanding what RWS wants. Understanding the wishes and needs of RWS should lead to an independent view on how RWS expects to realise their objectives. What is the policy they strive for, what do they expect from the market and most important why? The report is written from the viewpoint of RWS. The contractors' market interests are taken into account, but this research provides advice for the role and tasks of RWS as a directing principal. The research is related to the procurement of infrastructural works in relation with several commercial companies. This



research does not provide a new process model for improvements of the current (functional) specification process of RWS and the contractors. The goal is to provide insight in potential obstacles, their functioning, and coherence in strategic, organizational, and operational processes. The current collaboration between RWS and the market is involved in different stages and levels of the life cycle of projects. For example RWS collaborates with contractors, advisors, architects, maintenance contractors, and many more. The thesis research main scope is related to procuring infrastructural works (not services). In general the whole plan/design phase is assessed, but the focus lies in detail more on the transition phase between RWS and the market (purple line, see Figure 5). The procurement of a system/project/asset in the principal-agent relation is this thesis main subject.

Figure 5 Transition process between demand & supply specification (Rijkswaterstaat P. B., 2009)

To sum up the following boundaries are defined for the scope of this research:

- Takes into account the interest of the market parties, but the viewpoint of RWS is leading.
- The new organizational structure per 1-4-2013 is not taken into account because this final design was not clear upfront and during the research.
- Focuses on the procurement of road infrastructure projects related to the HWN, not on the specific maintenance, management, and service contracts.
- Focuses on infrastructural works and not on services. For the maintenance part this means that maintenance as a part of the lifecycle is taken into account, but maintenance (performance) contracts for current already existing infrastructures not. However, in e.g. DBFM contracts the maintenance part is included and therefor cannot be completely excluded from this research.
- Compares the different mission, vision, goals, and strategies of RWS with the implementation in project related issues.
- Takes into account the different RWS processes of SE, SCB, Supply Chain Management (SCM), IPM, etc., but does not focus to evaluate/create/improve a new design theory/model.
- Focuses on the procurement processes and does not focus optimize the design processes of RWS and the market.
- Focuses on the practical implementation of procurement and not in detail on the content of the procurement vision.
- Takes into account the different reasons for integral contracting, but does not focus to create a new contract form or standard for a demand specification.
- The interviews relate obstacles with personal behaviour, but do not focus on the deeper (psychological) explanation of this behaviour.
- This research focuses at five reference procurement strategies of Shell, DSM, FrieslandCampina, ProRail, and Schiphol. The research focuses to compare these different approaches with RWS. It is not an assessment of whose strategy is better.
- ProRail has more similarities with RWS than the other companies and is not classified as commercial company in the comparison between RWS and the market.

2.3.4 Research objects

This thesis research aims on large road infrastructural works in the Netherlands. The maintenance, management, and service contracts are taken into account were necessary, but are not part of the research scope. In this research the project SAA (Schiphol – Amsterdam – Almere) is chosen as a target group for the interviewees. Currently, SAA is the biggest road infrastructural programme of the Netherlands and consists of five projects. A programme differs from a traditional project organization (Brache & Rummler, 1995). The projects are awarded to a consortium and the consortium negotiates with RWS about the final design. The programme SAA is a delicate example that characterizes RWS its current project approach. A small overview about the programme SAA is given in appendix B. Five different companies are chosen based on their scope and technical relevance in order to compare RWS its (procurement) strategy with the market (see subsection 2.3.3 and appendix C).

2.3.5 Research strategies and issues

Research strategies are a set of interrelated decisions about how research is conducted. It is relevant to obtain materials and information and to process these materials/information towards valid answers on the research questions. In literature several types of research strategies are defined. Most of the different separations are very similar. There is a split up into quantitative and qualitative strategies. Five often-described strategies are a survey, experiment, case study, grounded theory, and desk research (Baarda & Goede, 2006) (Doorewaard & Verschuren, 2007). In this thesis research the experiment, case study, and the grounded theory approach are left aside. The interviews strategy is elaborated more into detail in section 2.4.

- Survey – Quantitative
  A survey is a method to measure a broad opinion, attitude, and knowledge of a big group of people. Interviews and the survey (questionnaire or oral) are two forms of interrogation. The answers on the survey are mostly limited, predefined and/or scaled answers. A disadvantage is the limited results' depth. Interviews offer opportunities for more in-depth open questions.

- Desk research – Qualitative
  The researcher makes use of many different available sources of information. By reflecting the used information the researcher defines new insights. An advantage is the opportunity to obtain a lot of information in a fast way. However, the available information is most of the time written for other purposes and the research is dependent on the type and quantity of the data. Desk research is often used to define a research subject and to define a conceptual model.

2.4 Interviews

Interviews are used to provide insight in the current plan/design/realization processes in projects of both RWS and the commercial companies. These were held with different employees in different roles (see appendix D.1). The interview round focuses on higher management and operational roles. It provides insight in the "what" and "why" questions related to the organization, projects, and procurement. The interviews are based on open and closed questions. Interviews provide room to explain their own story and interviews could result in more detailed answers and experiences then for example a survey. In addition, open questions provide the opportunity for creative answers supported by examples and motivation. It is important to stay to the subject instead to receive answers of all kinds of different questions. In order to provide a clear interview structure a basic interview question format is used and adapted with different interviewees. The questions are related to the following subjects:

- Purpose of procurement
- Procurement organization
- Procurement strategy
- Procurement versus planning
- Distribution of roles
- Quality requirements
- Incentives
-

These subjects follow from a brainstorm session and relates to the research questions, which are represented in appendix D.1.

Before the interviews were held the questions were send in advance to the interviewees. It contained information about the content and length of the interview. The research goal was mentioned to direct the conversation towards the right subjects. Finally, it was told what would happen with the obtained information of the interview. Yet, an ex-ante framework to categorize the results is not defined upfront. Consequently, the interviews provide a widespread range of answers (see appendix 16 and 17).

2.4.1 Internal and external interviews

Internal interviews

The “internal interviews” are understood as “all interviews held with employees that currently work for RWS (hired personnel as well)”. There is a distinction between interviews with “project” employees and “line” employees. The projects’ interviewees work mainly for the programme SAA (see appendix B). The “line” interviewees work mainly for IMG and the head department of infrastructures (“DI”). The interviewees are chosen based on advice of the thesis committee and encompass different roles. The interviewees comprise employees from different management levels (from project director to operator).

External interviews

The goal of the external interviews is to provide a “reference framework” for RWS to critically reassess their tasks, roles, and responsibilities. Five external companies (Shell, DSM, FrieslandCampina, Schiphol, and ProRail) are interviewed to provide a clear picture of the procurement/business approaches in other industries. These companies are chosen based on several similarities with RWS and based on advice of the thesis committee. The five industries are chosen on their scale, type of organization, and relevance with large construction works. ProRail and Schiphol are owned by the Dutch State. In appendix C the different companies’ core businesses are briefly described.

Remaining interviews

Several (informal) interviews were held to get a better picture of current practises. These interviews are used to understand several statements or practises and/or to broaden the knowledge of the student.

2.5 Research quality criteria & validation

2.5.1 Theory criteria

Quality criteria are important to sustain and control the quality of research. Several criteria are taken into account. The criteria are split up in six categories, which are (Doorewaard & Verschuren, 2007; Baarda & Goede, 2006) (Baarda & Goede, 2006):

- Validity; measure what you should measure is very important. Validity can be split up in internal and external validity. Internal validity is related to the way the research is executed. Internal validity is relevant to say something about the quality of the research in a broad sense. It determines whether or not the measured that is valid. External validity determines the generalizability of the obtained data. External validity means that a research can be considered valid for a bigger group of people then the respondents.
- Reliability; a reliable research is independent from specific characteristics of the research. The reliability determines whether the same results are obtained in successive repetitions. The internal consistency is important.
- Representatively; it means that the sample is comparable with the target population. It is not only about the quantity of the sample, but also counts for the quality.
- Accuracy; measurements should be accurate.
- Objectivity; objectivity determines if the obtained results are objective and not part of subjective judgement. This is sometimes hard to determine because researchers also have their own opinions. Inter-subjectivity is used when different researchers reach consensus about the obtained results.
- Usefulness; Research about aspects that have no value is a waste of time and money.

2.5.2 Validation

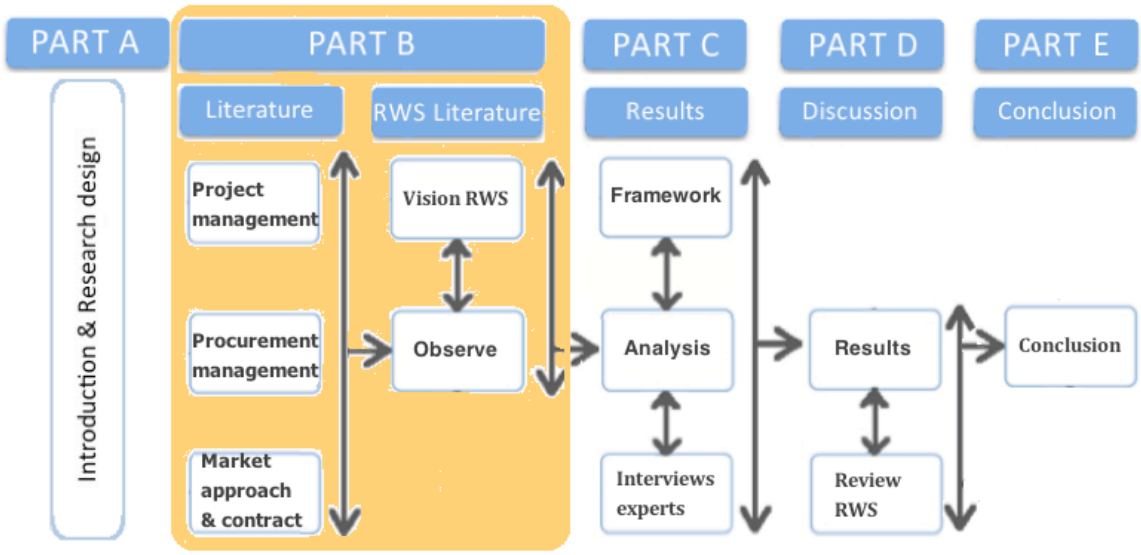
This subsection gives a brief description about the guaranteeing of the reliability and validity in this research. Different choices and their justification are documented and traceable. The internal validity is ensured to make use of multiple information sources (persons, literature, other research) and to obtain data on different ways (observation, interviews, document analysis) and to look from different theoretical viewpoints. Furthermore the results of this research are generalized by a validation round. The validation round provided insight whether or not the analyzed results were similar experienced by managers in two other projects (chapter 9). The interviews were held with eleven employees of RWS and seven externals (appendix D.1). At RWS several project roles within the programme SAA were interviewed.

The obtained data is considered to be representative because the projects are realised according to the latest standards and work methods of RWS. Most of the interviewees' were also involved in other projects at RWS. Moreover the found results are not particularly related to the programme SAA, but more towards RWS in general. In the external interviews five managers/directors, the chairman of MKB INFRA, and an external consultant were interviewed. The different interviewees work in different roles and departments/companies and provide a broad range of answers in different policy levels (chapter 6).

The data gathered and used is compiled with greatest care. Uncertainties in the data arose at moments where measured data was required, but where it was flawed by deficiencies. When possible, data was gathered by "real life measurements" (interviews). A lot of effort was made to remove deficiencies by tracking back the causes in the obtained interview results. The graduation committee reviewed the interview questions in advance to ensure the accuracy of the interview questions. Subjective answers are still a problem for the reliability of the results. Remaining uncertainties are tackled by assumptions and simplifications or are kept out of the report and tables. In the analysis of the interview results the "opinion" related answers are filtered from the actual processes. However, all the retrieved data from the interviews should be handled with care. The obtained data remains depended on the quality and objectivity of the subjective data given by the interviewees.

In the end, this research is useful for the evaluation of the current procurement processes of infrastructural works by RWS. The report provides input for further research for RWS to become a more efficient and effective professional principal. The results of this report should be handled with care in case statements are used to generalize several aspects. However, the research does provide insights given by different people from different companies and industries, which perform different functions, and are involved in different project phases. The report is not written to see what company acts best and what is the truth, but the thesis research focuses on stimulating an evaluation discussion of the observed differences/similarities between the several companies. The results give an indication as to the "why", "how" and "when" something occurs, it cannot tell us "how often" or "how many".

PART B. THEORETICAL ANALYSIS & ORIENTATION



3 THEORETICAL CONTEXT

It was mentioned that purchasing a construction asset is not the same as buying a car, computer, house, and many more products (see subsection 2.1.2). Several related subjects are highlighted to provide insight in the different related processes involved in the "purchase" of a construction. First, the relevance of the different theories is described briefly in section 3.1. Secondly, every project strives for a particular amount of success (see section 3.2). Project management is the leading principle in construction projects and is described in section 3.3. However, procurement management is also growing in importance (see section 3.4). Moreover the transaction of construction asset is formally defined in a contract. The latter content depends on a particular market approach (see section 3.5). A summary is represented in section 3.6.

3.1 Theory relevancy

Projects are managed based on time, costs, and quality (Meredith & Mantel, 2006). Yet, the importance of good principal management ("goed opdrachtgeverschap") is growing (Molen, 2008). In common knowledge a healthy business means profit and continuity. Business value relates to the entire value in a business, which includes tangible and intangible assets. Business value is about the long-term acting and development of the firms and is related to more than economic values. Business value embraces also customer value, shareholder value, employee value, partner value, supplier value, managerial value, environmental value, and societal value (Wikipedia, 2012b) (Barron's Real Estate Dictionary). However, there is a difference in the perception of value by different actors. Public organizations attach more value towards social values then business values. Nowadays the project management approach depends on several additional variables and is closely related to process and/or procurement management (Jacobs T., 2012) (Zaal, 2009) (see 3.4). The procurement of construction projects is complex. The procurement involves many different subjects and also relates on the organizations' strategy and organization (see 3.4) (Weele, 2008) (Van Der Valk & Wynstra, 2010). RWS focuses on partnerships and different forms of contracts (see 3.5) (Goossens, 2007). The construction assets are brought on the market in a tender (see A.3) (Hardeman, 2012). RWS its strategy is focused on outsourcing several responsibilities towards the market. Yet there are some differences between outsourcing, procuring, and purchasing (see 3.4.3).

Involving actors like contractors in the "social" and administrative processes requires collaboration between both actors. However, collaboration conflicts with RWS their traditional behaviour of keeping the distance between principal and agent as described in the principal agent theory (see 3.4.1). Collaboration is not about agreement, but it is about creation and common goals and interests (Zaal, 2009) (Bryson, 2004) (Forest, 2003). Without trust a smooth collaboration is (almost) impossible (Van Ham, 2002) (Schoenmaker, 2011). RWS projects' distinct themselves often by their scale and complexity and are often focussing at creating something new (see 3.3.2) (Koskela, 2005) (R. Vrijhoef, 2000). The process towards a final design/product is an intensive and complex process with a lot of interaction between different stakeholders (de Bruijn & Heuvelhof, 2008). It is important to search for common interest and values to assess a projects success (see 4.2.1) (Markensteijn, 2010) (Aken, 1996) (Gazelle, 2011) (Hedeman, Van Heemst, & Riepma, 2008). Furthermore, there are different kinds of strategies to manage these projects (Van Gunsteren, 2011) (Koppenjan, Broekhans, Steenhuisen, & Eindhoven, 2012). A top-down approach is common knowledge in the construction industry, but the bottom-up approach is relatively new in the construction industry and commonly known in other industries (see 3.5) (de Vree, 2010) (Verster, 2009) (de Ridder, LEGOlisering van de bouw, 2011) (de Ridder, Het Living Building Concept, 2006) (de Ridder, Design and construction processes; paper series 1, 2007).

3.2 Project "success"

In the book of Meredith and Mantel (2006) the following definition of a common project success is described: Project success is the way in which a project is realised conform budget, planning, and requirements and boundary conditions (Project management triple constraint). The definition does not

take into account other relevant actors. Van Aken (1996) defined project success as the extent in which the stakeholders are satisfied by the project result. A result-oriented approach and Dedicated and result oriented staff with a clear division of tasks, responsibilities and powers is are important conditions for project success. Control aspects of time, cost, scope, quality, organization, communication, and risks are related to work in a project-based approach and are not always directly related to project success. MKB Infra defines a governmental project success as: A conform the specifications, qualitative responsible technical execution with a justified social efficiency for governmental principals and a business economical return for contractors (MKB INFRA, 2011). A success factor for entrepreneurs is the amount of profit and continuity. Yet, from public perspective project success sometimes attach more value towards social economic aspects instead of cost, time, requirements, and boundary conditions. In short success is depended from its environment and is based on the equation of quality (or value) x acceptation.

3.3 Project management

Briefly, project management means managing a project. The principal is responsible for the total project and the project manager is responsible for the daily operations. Project management is related to “Projectmatig werken”. This latter aspect leads towards a basic structure for project phasing, decision-making, and control moments between principal and project manager. It is about phasing, managing (or controlling), and decision-making. The managing or control part is very important. It consists of planning, executing, monitoring, and controlling all project activities to realise the desired result. Deming created a model for these activities and named it the PDCA cycle. Deming recommended that business processes should be placed in a continuous feedback loop of plan, do, check, and act. In this way managers could identify and change the process were necessary. Besides the control activities from the PDCA cycle there are control aspects or control variables. Along the years many different project management methods (e.g. PRINCE2) have been designed to represent these control variables of money, time, organization, information, quality, risks, safety, and benefits.

3.3.1 Decision-making approach

There are different kinds of decision-making processes described in literature. Koppenjan et al (2012) describe broadly two approaches: (1) predict & control, and (2) prepare & commit. “*Project management was shown to shift from a traditional “one size fits all” and “command & control” approach towards a more adaptive project management style, taking into account the environment and including a “prepare and commit” approach”* (de Bruijn et al., 2003; Shenhar & Dvir, 2007b). From a rational viewpoint the plan study results in one decision. A clear research (predict) of relevant technical, juridical, financial, political, and social conditions results in a clear scope and requirements specification. Project management adds instruments/tools (change management, risk management and progress management) to ensure that the predicted outcome is actually realized. Several project management recommendations are based on this ideal. The second prepare and commit approach understand the project execution decision as part of the process. The success of a project cannot be conditioned in just one decision because of the complexity and dynamics of the environment. Project management requires process management. In the dialogues the involved parties recognize and understand the projects uncertainty and dynamics, create arrangements and process agreements to deal with obstacles, and organizes a process where principal, agent, stakeholders, and the public are informed. Van Gunsteren (2011) distinct these two approaches as PI and PII management. Complex project should be addressed with PII management (process management oriented), the less complex activities should be addressed with PI management (project management oriented). In the construction industry the most applied approach is the traditional PI practice. For a successful project, it is important to mix both approaches appropriately (Van Gunsteren, 2011).

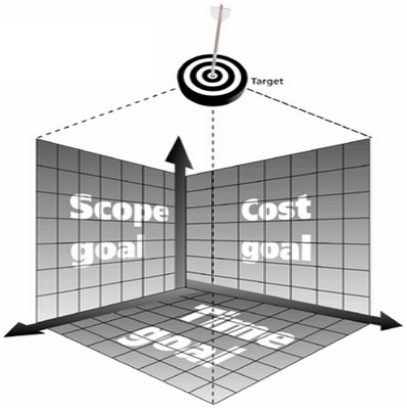


Figure 6 Triple constraint (source: http://20102175.blogspot.com/)

The familiar traditional project management steers mainly on time, costs, and scope (or quality). The triple constraint of scope, costs, and time is stressing at defining norms on these axes. There is no solution space concept. The solution is fixed. The solution is fixed at a certain scope/quality, against a certain budget, and in a particular time scheme. "*The method is often used to illustrate that project management success is measured by the project teams' ability to manage the project so that the expected results are produced while managing time and costs."* (Wikipedia, 2008) The traditional project management works pretty well for projects defined by clear boundaries, tight planning, and measured risks.

Zaal (2009) defined the business process of a new way of thinking and working. The latter is about the construction and execution of an integrated development, design, and engineering process for products and services, seen over the whole life cycle as Integrated Design and Engineering (IDE). Project management in large complex projects requires new competences to deal with many uncertainties and dynamic environments in comparison with the traditional design and engineering domain. These changes are related to the need for soft aspects of collaboration, flexibility, creation of trust in the project team, and thinking in the interests of the different actors (Jacobs T., 2012). It is about the right balance of culture and structure. Zaal represents this "play-ground" in a solution domain. The core or kernel of IDE (see Figure 7) is related to the solution space model as described by de Ridder (2011). The IDE separates the products, process, and multidiscipline axes and links these with a fourth imaginary axis that represents the cooperation of stakeholders in the IDE process. The IDE process focuses on the right product, the right process, and the right people. (Zaal, 2009)

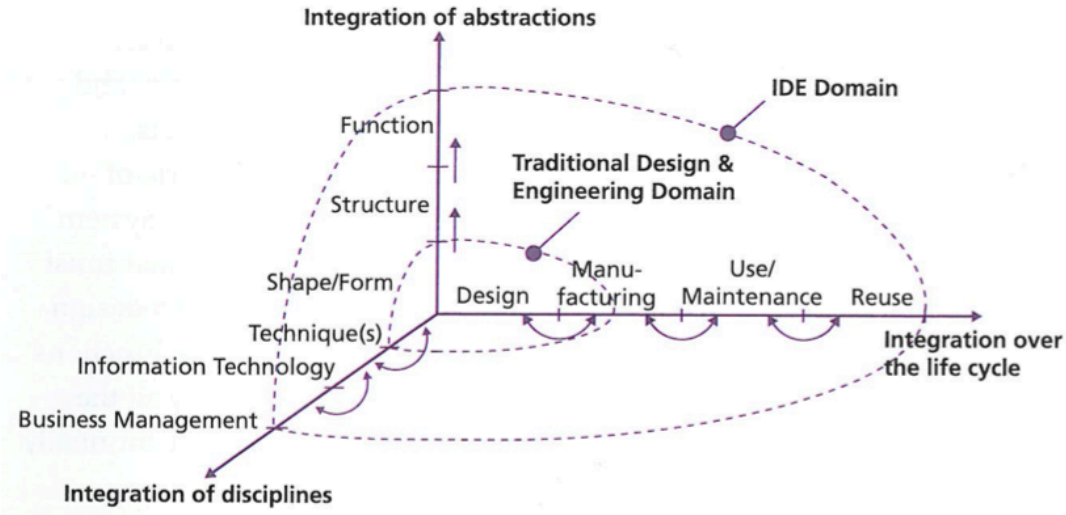


Figure 7 IDE solution domain/space (Zaal, 2009)

3.3.2 Project complexity

The different management approaches are thus dependent on the complexity of projects. Bosch Rekveldt (2011) mentioned in her research that an increasing project complexity is one of the contributors to project failures in terms of overspent budget or delays. However, traditionally project management is often based on a predictable, fixed, and simple environment. Project complexity is a subjective concept and highly dynamic. Project complexity indeed negatively influences project performance in the areas of goals / scope, uncertainty in methods, incompatibility of PM methods /tools, resources and skills scarcity, interfaces between different disciplines and a lack of company internal support. Complexity as a project characteristic is distinguished from other project characteristics such as size and uncertainty. (Bosch-Rekveldt, 2011)

3.4 Procurement

3.4.1 Purchase/construction agreement

The purchase/construction agreement is a very common agreement in different kind of markets and industries. It is used in cases *"where one of the contract parties is a professional entrepreneur, property developer or contractor and the other consumer party the acquirer, client or purchaser"* (E.M. Bruggeman, 2010). The purchase agreement is related to the two-role model (see 4.2.1). The agreement is distinct in three components (E.M. Bruggeman, 2010): (1) the purchase/construction agreement and general terms and conditions, (2) the warranty and assurance scheme, and (3) the technical specifications. The main task of the purchaser is to pay the product. This payment consists in construction out of furnishing of security (e.g. bank guarantee), financing (e.g. taking a mortgage), and the payment itself. The entrepreneur is responsible for the quality of the product. He has to complete the product on time and within budget.

3.4.2 Transactions

A purchase agreement is a form of transaction. A transaction takes place between two parties. This transaction can take place internal in a company ("hierarchic transaction") or external with other (specialized) companies ("market transaction"). The transaction is the transfer of a product of service at a certain price. According to the new institutional economics (NIE) the goal of both parties is to realise this transaction as efficient as possible. In the NIE two characteristics of the human behaviour are assumed. The first is the bounded rationality of actors and the second the potential opportunism of actors. Actors strive to take rational decisions, but are often limited and/or incompetent to find or handle all the necessary information. Potential opportunism is related to an actor's behaviour whenever he strives for his own interests with tricks and fraud. Two aspects of opportunistic behaviour from the agency theory are (Schoenmaker, 2011):

- Moral hazard (hidden action) by e.g. incomplete monitoring;
- Adverse selection (hidden information) by the creation of new information or imperfect information, and when the principal has more knowledge then the agent;

The way a transaction is designed is dependent on several characteristics of the product or service. According to the theory of NIE three pillars are important to consider: (1) theory of property rights, (2) Transaction Cost Economics (TCE), and (3) the principal agent theory. The core problems of transactions according to those theories are uncertainty and information asymmetry. The theory of the property rights mentions that it is necessary for the efficient functioning of the economic system to have a clear set of formal rules of the game and that property rights are well structured in an institutional environment. The principal agent theory focuses on finding the right contract form between the principal and the agent to minimize the "agency costs". The problem is that both parties have different interest and asymmetric information. The latter problem is also known as the "principal-agent problem". The TCE is about finding the most efficient economic form of organization given a particular transaction. Williamson defines it as *"to get the governance right"*. It is about how the game is played. As a result of possible opportunistic behaviour Williamson also introduces the implementation of ex-ante transaction specific safeguards to protect the transaction investments (penalties, control structures, and reciprocity). However, Williamson is convinced that trust does not provide any additional value to the TCE theory. (Schoenmaker, 2011)

Trust is considered as important aspects in construction projects. Collaboration is related to trust and teamwork (Zaal, 2009). This collaboration requires a process of learning. Trust is often mentioned in relation to the successfulness of a project. Trust is important in all relationships in all the different phases of a project. A lack of trust shows often up in project evaluations as one of the causes of high project failure rates/costs of projects (Kuhlmann & Merema, 2011) (Schoenmaker, 2011) (Zaal, 2009) (Jacobs T., 2012). A lack of trust also prohibits the will to mutually strive for more a common goal like more quality. Without trust smooth collaboration hampers and complex projects are doomed to fail. Social behaviour is a success factor of teams (Jacobs T., 2012). Creating value for others by the continuation of the relation (transaction) increases the reliability and results in trust. "Solid trust" could lead to less control, which leads to more trust at the trustee to the contractor, and results in lower

monitoring costs for both. Trust is a result of reliability. The trustee has an incentive related to the value of a future business relation to act reliable. Trust can be attributed to relationships between people and between different social groups. Social behaviour is an uncertainty. Nothing is more uncertain then the behaviour of actors in different situations. The use of formal and legal measures to prevent opportunistic behaviour can also cause distrust. However, creating mutual dependencies instead of formal measures can prevent opportunistic behaviour. Such mutual dependencies stimulate long-term relations. Mosch stated that in long-term relations formal influences on trust could transform into informal influences of trust (Schoenmaker, 2011).

3.4.3 Outsourcing, procurement, and purchasing

Procurement becomes more important because of its understood advantages for a company's result. Companies that excel in purchase and supplier management were more successful after five years compared with the mean (Kearney, 2004). However effects of such procurement strategies are often indirect and depended on several conditions. There is a positive correlation between the financial performances and procurement strategy for companies with a centralized procurement process combined with standard products and companies with a decentralized procurement process combined with unique products (David, Hwang, Pei, & Reneau, 2002). In this context the term purchaser is used to describe the more operational realization of transactions between organizations. Purchasing construction projects requires much more then only paying money. The term procurer is used to describe this role of the "purchaser" at RWS (see section 4.4).

Procurement is often seen as a collection of operational and at best tactical activities. However, procurement involves also strategic processes (Wynstra, 2006). Procurement is the act of getting possession of something by acquisition of goods and/or services at the best possible total cost of ownership, in the right quantity and quality, at the right time, in the right place and from the right source for the direct benefit or use of corporations, or individuals, generally via a contract. Complex procurement involves long-term partnerships (supply chain management). Purchasing merely reflects the act of acquisition by paying money, for example purchasing land. Procurement encompasses more elements of the supply chain (re logistics, transportation etc.) against special efforts. Three different kind of often mentioned terms related to procurement are described briefly below to prevent misunderstanding about the term procurement.

Figure 8 Procurement subjects (source: http://www.morganmckinley.ie/article/interested-career-purchasing-professional)

Outsourcing is related to subcontracting a process to a third-party company. Different components, half-fabricates, end products, and/or services are delivered based on specifications. In several markets it seems that there is an outsourcing trend present. However there are not many results about the consequences of outsourcing on the company's results. Advantages are positive effects on capital budget, cost reductions by economies of scale, and strategic independency. Disadvantages of outsourcing are in an increased dependency or opportunistic behaviour of suppliers. (Wynstra, 2006)

The NEVI considers outsourcing only as procurement if the service or product that has to be bought/outsourced, used to produce or execute in-house, but due to policy-changes is transferred to third parties (suppliers). It does not only consist of operational tasks of buying, but also on the more strategic responsibilities such as market research and quality management. From a business perspective procurement could be defined as the activity of searching and obtaining goods, services and other resources to comply with the needs of the company and with a view to continuing and enhancing the current competitive position of the company (Weele, 2008). (Dang, 2011)

Purchasing is the specific act of acquiring something by paying money for that particular product or service. Purchase is especially present in obtaining goods. Purchase was considered less important in services that were purchased ad hoc or by marketers of technical professionals. However, there is a difference between purchasing products or services. A service only exists after delivery and that is why continuing alignment between demand and supply of client and supplier is necessary. Several entrepreneurs are grouping services based on technical content, but Van der Valk & Wynstra mention that grouping based on service functionality better assists purchasers. (Van Der Valk & Wynstra, 2010)

Wynstra (2006) uses the term Purchasing and Supply Management for procurement. Purchasing and Supply Management involves the managing of strategic, tactical, and operational activities. The Purchasing and Supply Management knows several definitions, but is described by Finn Wynstra (2006) as *"design, initiation, control, and evaluation of activities within and between organizations aimed at obtaining goods and services from suppliers"* (Wynstra, 2006). So it is about economic transactions between organizations, the transfer of ownership. The latter is the biggest difference with the supply chain theory that is focused planning and controlling the physical goods and service flows from raw materials unto end users. Strategic Purchasing and Supply Management consist of two main processes that are "make-or-buy" decision (insourcing/outsourcing) and secondly "Category of Commodity Strategy Development". These two processes are part of the purchasing excellence model of Monczka. However the model of Monczka highlights six other processes as well as strategic processes while they are tactical processes. The goals of Purchasing and Supply Management are reducing costs, optimizing return of investments, and creating value by improving market shares and/or higher prices in the market.

Arguments to buy are related to several factors (Hedeman, Van Heemst, & Riepma, 2008):

- Competence; Is their enough competence to realise the desired quality in time and within budget?
- Capacity; is there enough capacity to realize the project?
- Flexibility; procuring and outsourcing deal with peaks and diseases inside the organization.
- Costs; are there any economies of scale with third parties?
- Risk transfer; buying results in a transfer of project risks.
- Acceptation; due to expensive advice management decisions are legitimized.
- Control; outsourced work can better being controlled compared to in-house activities.
- Licenses; in-house organizations is not always qualified to perform several activities.
- Creativity; external expertise can be of additional value in "out of the box" thinking.

3.4.4 Procurement policy

Integral procurement is related to the connection between procurement and network management. It is about the implementation of the procurement processes in the whole supply chain and to get insight in the longer term needs (programming and asset management). Procurement should become an integral part of the processes. Procurement is about guaranteeing the long-term functioning and performance of the network against acceptable cost for the users. RWS highlights six subjects as crucial for the several procurement domains. These six processes (Rijkswaterstaat, 2011b) are defined as (1) demand management, (2) procurement strategy, (3) market relation management, (4) financial economic knowledge, (5) contract control and management, and finally (6) procurement process management. To describe the procurement function four primary tasks are mentioned (Weele, 2008):

- Ensure continuity of business processes;
- Reducing procurement related costs;
- Reducing the vulnerability of strategic procurement markets;
- Product and process innovation.

A procurement plan is not just a management document containing answers on "how to control" questions. This plan goes deeper and puts stronger focus on answering the "what to want/need to control" questions. A procurer starts with the "purchasing needs". From there the procurement framework is established. Market analyses provide insight in the potential suppliers/contractors. Well informed the procurer defines the tender and contract form. Then the procurer focuses on the implementation of organization, control, budget, planning, and risks.

An organizations' mission is translated into a general policy, which describes the goals and objectives of an organization, how the organization is managed and controlled, and provides a guideline for actions. The procurement policy is a translation (in plans) of the general policy into procurement. It consists of general procurement principles and long-term strategic goals and is focused at realising the policy. The plans consist of tasks, responsibilities, budget, and planning. All eight strategic and six supportive processes of the MSU+ model (Wynstra, 2006) should be considered in the procurement policy. The procurement goals should be in line with the organizational and other goals. However, governmental procurers values conflict. Their values are to handle public goods efficient and effectively. The governmental procurer puts the political general interest above the individual persons/organizational interest. A governmental procurer should act as a role model of integrity and continue acts in both the policy's letter as the spirit. Furthermore, a governmental procurer takes care of an objective, transparent, and democratic justification. Governments should obey several laws, regulation, and furthermore codes of conduct like the principle of equality, care, motivation, trust, fair play, and ("averting of authorities"). (Kennisportal inkoop) Further it is critical to apply a clear and structured information system. This system combines and integrates successive links in value chains and is a criterion to refine and develop products and processes. (NEVI)

Figure 9 Procurement structure (NEVI)

Procurement aims on the long-term goals and even more on the organizations strategy and its impact. Tactical and operational procurement are part of the line and the strategic procurement asks for procurement intelligence (Harink, 2007). The procurement organization should support the procurement policy in the realisation of the organizational goals and the derived procurement objectives. It is important that procurement fulfils a strategic organizational position. Also, all necessary multidisciplinary teams should be involved in the suppliers' evaluation, selection, integration, and improvements. Finally, the procurement organization and its structure should be in line with the policies, goals and structure of the organization and supports the organization in the strategic, tactical, and operational procurement processes. Procurement performance monitoring (KPI's) emphasizes the focus on realising maximum benefits in relation to the set goals.

A procurement strategy is shaped by a consistent and recognizable (sub-) market policy. It should be uniformly supported by the means of different procurement instruments. The strategy should be used as a repetitive process for the short and long term. It consists of technology development plans, SWOT's for products and suppliers, and an action plan. It is important to understand the product requirements for internal and external clients (function, costs, quality, performance, technical and environmental requirements). Another essential aspect is to understand the developments, skills, and performances of current and potential suppliers and the specific company situation. The crucial question at procurement strategy is: "how does the procurement function develops in the coming years?" The crucial question at strategic management is: "how doe we contribute to competitive advantages?" Finally, the crucial question at a commodity strategy is: "how do we deal with a procurement package?" (Harink, 2007)

Strategic procurement is defined as the set of activities within the procurement function that contributes to the development and implementation of an organizations' strategy and thus contributes to obtain and maintain a sustainable competitive advantage of that organization (Harink, 2007). Strategic procurement creates a difference that is appreciated by the organizations' clients. Strategic procurement means that the procurer (Harink, 2007)

- Supports the definition of the core processes of the organization (analysing suppliers market and identifying potential strategic suppliers);
- Supports the design of the preferred organization and its relations with suppliers (make or buy decision);
- Selects and contracts strategic suppliers;
- Develops and manages strategic suppliers;
- Operational procurement at the strategic suppliers.

Operational procurement focuses at acquisition activities to supply internal clients with the right products. Tactical procurement is related to the specification of the procuring needs, selection of suppliers, and contracting those suppliers. Both the tactical and operational procurement form the six basic steps of the procurement process (see Figure 10). The tactical procurement defines the terms and conditions for operational procurement to perform their tasks. Finally the strategic procurement activities influence the organizations' position on the mid-term and creates terms and conditions to realise the tasks efficient and effectively at other levels (inside and outside the procurement organization). An important remark is that procurers should be involved early in the process during discussions about all kind of procurement spending. Purchasing and Supply Management involves the managing of these strategic, tactical, and operational activities (see section 3.4.3). (NEVI)

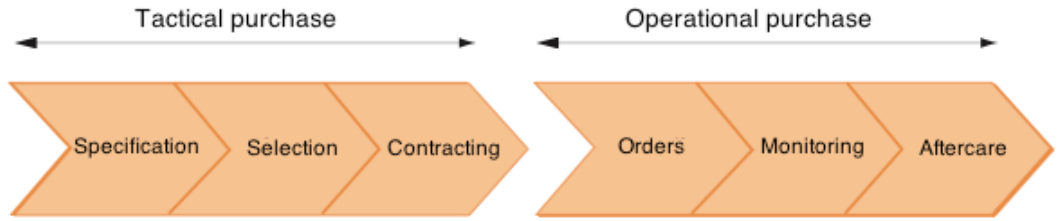


Figure 10 Aspects of tactical and operational procurement (NEVI)

3.4.5 Procurement roles

About ten years ago there was also a development related to tender management and procurement besides the already described liberalization/privatization ideology. There was the *"The emancipation of the purchaser at governmental organizations"* (NEVI). In the past there were the technical departments and on the other hand the facility services. "Procurement" felt under the responsibility of the facility services. Coffee, pencils, paper, etc. were purchased. However, after many years of research (also by the NEVI in the Netherlands) the procurement role in organizations emancipated. The idea was that the total turnover in organizations was huge. There were opportunities for optimizations when someone would become responsible for such purchases.

Since a couple years a "good" procurer is expected to speak from a particular power position towards another. The procurer will purchase what the other needs. According to the NEVI the procurers become certain "staff" workers. At RWS the technicians were formerly also procurers. Such procurers step in at once in the process and deliver the contract and ask to comply with this contract. Whenever things go wrong or people face obstacles then people should comply better with the contract. In practice the procurer does not buys a product, but a long complex dynamic integral process. Such procurers often step out after the contract is defined, but for a technician the project just started. The connection between these two is described as the procurement manager – contract manager relation. Both function have conflicting interests, but finally they strive for the same purpose, which is to deliver infrastructures.

Purchase mostly act from its own "silo" and there was a lack of close involvement in the primary process of the projects. Recently, several new trends caused a relative change in these perceptions of the purchaser. The purchaser is involved with many different external and internal subjects (see Figure 40 in appendix A.7). The NEVI defined seven new roles for purchasers/procurers and are presented in appendix A.7. The trends that caused a change are (Bellekom, Arsath Ro'is, & Marcelis, 2011):

- Increasing outsourcing;
- Values versus cost thinking;
- The supplier is the specialist (Performance purchase!);
- Open innovation and rapid product development;
- Sustainability and Corporate Social Responsibility (CSR);
- Transparency;
- Knowledge sharing and networking;
- Change the position of purchasing;
- Change in the process of purchasing;
- Scarcity of raw materials.

3.4.6 RWS purchasers versus NEVI purchasers

The purchase pillar of RWS (SDG M&I, IMG, and BIO's, see also appendix A.6) is engaged with the purchase processes of RWS from the procurement strategy to the final contracts. The procurement in projects is carried out with mandatory use of this pillar and the procurement advisors from the BIO departments. The different departments of DI / RD / DID BIO / IMG provide procurement advice and expertise in projects and with cost expertise (Rijkswaterstaat, Werkwijzer Aanleg, Deel 1: Sturing en beheer, 2011e). The BIO departments are responsible for good advice, purchase of products, and monitoring the quality of contracts and procurement process towards the contract awarding. The steering within the project proceeds via the IPM managers towards the project manager and then to the internal client. In a major dispute between the contract manager and procurement advisor (BIO), the purchasing advisor has the responsibility to notify the internal client through the main BIO and the project manager. The internal client is ultimately responsible for the contract.

Contract management is closely related to procurement. It is about a group of people that spend money versus a group of people that delivers a product/service. The procurement manager “creates” solutions and aims at negotiations, suppressing prices, and more quality. The procurer focuses to make sure he knows what he needs, how the market looks like, and what incentives are required. During the tender this procurement role gradually transfers into the role of the contract manager. The latter is based on understanding what procurement choices have been made on what grounds and in what way he can make sure that this procurement really results in the necessary value. The contract manager officially starts after the contract awarding, but whose knowledge is also required upfront during preparation of the contract. The contract manager executes and controls the contract on his own way. The contract manager pays, assesses the contractor (SCB), and handles scope changes, and issues (claims).

In the IPM team procurement is the responsibility of the contract manager (see section 4.3 and appendix A.5). The contract manager is responsible for the process-oriented control of procurement. Aspects like defining the procurement needs, procurement plans, contract preparation, and tender and contract control within the limits of time, budget, quality, and risks are crucial tasks. The contract manager is the daily contact with the market parties. (Rijkswaterstaat, Werkwijzer aanleg deel 2 herzien, 2012i) Contract management is related to all activities by the principal that focus on the fulfilment of the contract requirements such that the governments’ risks remain acceptable. The quality control/management is part of the contractors’ responsibility (SCB). A continue process of Plan, Do, Check, Act (PDCA) is necessary to take corrective, remedial, and/or preventive measures during this whole process. RWS chooses to control this dynamic and intensive process on a distance. The fulfilment of the requirements in the contract by the contractor is checked by planned system, process, and product tests (SCB). These tests review the functioning of the integral project management and the quality control/management system of the contractor. RWS makes use of different quality documents and plans to execute these tests. The tests are planned based on actual risks for RWS. A lack of good contract management is a risk for the effectiveness, efficiency of the transaction and justification of the payments at governmental agencies like RWS (Schoenmaker, 2011).

Compared to the NEVI roles of a procurer (see appendix A.7) the contract manager of RWS is similar to the performance manager with several additional responsibilities. The contract manager is focused on “Meten = weten”. In this role, the procurement professional constantly searches for improvements in performances. The contract manager monitors, manages, and monitors supplier contracts with a high degree of perseverance. These are quality products and services and agreements on delivery of products and services. The performance manager works with challenging and realistic targets and informs stakeholders about relevant performance indicators. The performance contracts manager can monitor contracts, compare performances through benchmarking, and translates customer requirements into concrete performance indicators. He combines information and could identify possible improvements that customers need. The performance manager can give value to the performance indicators and steers on results. He develops new performance indicators where necessary in cooperation with customers and suppliers. He reports his findings to the management of the organization. (Bellekom, Arsath Ro’is, & Marcelis, 2011)

3.4.7 Life cycle costs

Life cycle cost (LCC) thinking is part of the AM and SE approaches of RWS. RWS acknowledged the importance of these new LCC trends as well. RWS uses the maintenance part in DBFM contracts as an incentive for contractors to take into account LCC. The contractor is bothered with the LCC question in the project because the availability of the road is his responsibility for 25 years. A higher ex-ante investment can be earned back later because e.g. less maintenance is required. Total Cost of Ownership (TCO) is related to LCC thinking. The differences between these two are their timeframe. LCC is related to the whole lifetime of an asset. TCO is related to a particular time schedule, for example operational time. The point is that during product development/realisation it is important to take into account more aspects then only minimal design/construction costs. First the life cycle of a system will be described. Every systems life cycle can be distinct in the concept phase, development phase, realization phase, operational phase, maintenance phase, and demolition phase (Rijkswaterstaat P. B., 2009). Between these phases there are information transfer moments between the different stakeholders involved. These transfer moments are crucial for the system because these transfers could suffer from information losses. During the whole life cycle of the system, open communication between the different stakeholders is crucial for the development of a successful system.

3.5 Market approach & contract

The traditional top-down building industry is demand driven and is characterized by a concept-to-order production strategy (M. Noordhuis, 2011) where the demand is specified in advance. The latter encounters several problems (see Figure 11). The level of standardization and the contract level are realised on element level. This means that the principal/client specifies the construction into detail. Large infrastructure projects are very resource intensive one-of-a-kind projects in different environments.

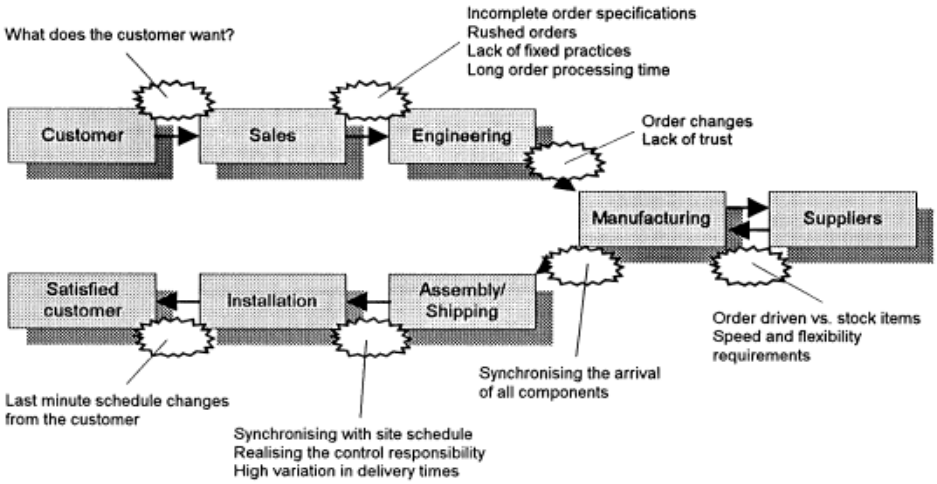


Figure 11 Most common problems in make-to-order supply chains (R. Vrijhoef, 2000)

It is impossible to fully standardize construction like buying infrastructure off the shelf. Nevertheless, it is possible to develop concepts and designs in a client-independent and project-independent manner (bottom-up approach, (de Ridder, Design and construction processes; paper series 1, 2007) (de Ridder, Het Living Building Concept, 2006)). This means that supplying parties will develop pre-engineered concepts and designs, which are virtually available. The development of product families is a result of market research and technical research. This is neither the case in the traditional situation or with the integral contracts (de Ridder (2007)). The main purpose of this idea means that in the construction industry the suppliers/contractors will learn from their mistakes. Long-term collaborations between suppliers stimulate them to review the product supply chain. The cycle of adoption, implementation, problem solving, learning, induces a process of continuous improvement. A supply driven bottom-up approach results in a radical change from a reactive pull market towards a proactive push market. The differences between the demand and supply oriented approaches are summarized in Figure 12. (Kok, 2007) (Dang, 2011)

Demand-driven:	Supply-driven:
Responsive supply (pull market)	Proactive supply (push market)
Creativity in demand	Creativity in supply
Concept-to-order	Adapt/configure-to-order
Functional specialization	Product/market specialization
Commodities	Specialties
Built facility focus	Customer focus
Disintegration problems	Integral (total) solution
One-off project organization/collaboration	Strategic partnering
Price competition	Knowledge competition
Competitive advantage: Capacity	Competitive advantage: (Market) Research and Development
Scattered responsibilities	One focal point
Competition within supply chains	Competition between supply chains
Project/client specific concepts and innovations	Project independent concepts and innovations
One-of-a-kind (prototype-like)	Repetition, learning and continuous improvement
You ask, we design or build	We design and/or build, you choose (adapt/configure)
No marketing and branding	Marketing and branding
No concept/product families	Concept/Product families
Supplier surprised by demand	Demander surprised by supply

Figure 12 Differences demand and supply driven construction industry (Kok, 2007)

The transition phase between principal and the agent is crucial because this is where the contract is all about. It forms the basis of further collaboration between both parties. It defines the distribution of roles and responsibilities of both parties. In the current construction industry the contract is the heartbeat of a project. Well-defined contracts result in a “healthy” project. As a result, the contract is an important document for the success of the project, but the success is not depended on the contract. Contracts that penalize problems and outsource only specific work at specific times hamper information sharing and provide no mechanism to explore costs and capabilities in a dynamic environment. Rather than looking to individually optimize each contract, managers should pay or provide suppliers with incentives to improve the overall system performance. (O’Brien, 1999)

The content of a contract is related to the level of specification of the product (see Figure 13). The complexity of the contract should be low if the level of standardization is low and when the client specifies the whole product. The contractor only builds what is demanded. In integral contracts responsibilities and tasks are distributed towards the contractor. However, the client still specifies what he wants until a particular level of detail. The grey area between the responsibilities of the client and the contractor related to the detailed specification increase the complexity of the contract. The contractor has the responsibility to build something that someone else has (partly) designed. This results in uncertainties and these should be mitigated in the contract. The latter results in higher chances of conflicts between agreements and requirements in the contract. The latter could lead to discussions and legal issues between the client and contractor. (E.M. Bruggeman, 2010)

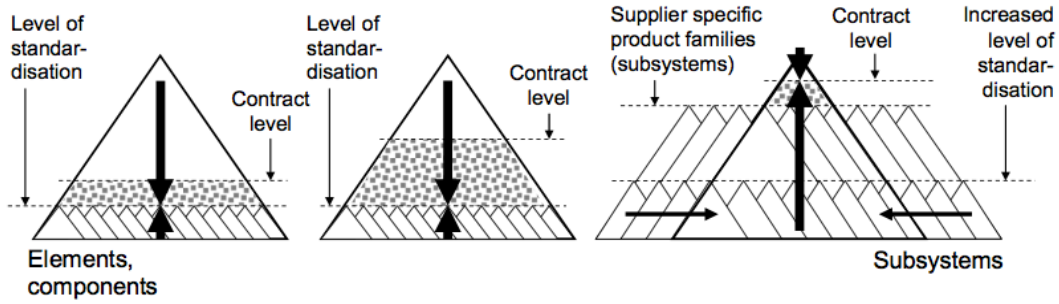


Figure 13 Pre-contractual part (de Ridder, Design and construction processes; paper series 1, 2007)

Different contract forms construction industries

Since a couple years the term integral or innovative contract is a new hype in the construction industry. In the earlier days, the governmental organizations (client) like RWS designed and specified the work. The realization/execution was outsourced towards the construction contractor. This is known as the "Traditional bid-build procurement". In this bid-built contract the client takes full responsibility for the design of the object. After the design is finalized a contractor is contracted (in a tender) to build the object against the lowest price. Nowadays, integral contracts like the Design & Construct (D&C) or Design & Build (D&B), Design, Build & Maintain (DBM), Design Build Maintain & Finance (DBFM), and Design Build Maintain Finance & Operate (DBFMO) contracts are preferred above the traditional Bid-Build and "bouwteam" contracts by RWS. The UAV-GC-2005 offered a clear conditional framework for the new integral contract forms. It was a result of a sudden governmental transformation towards performance-oriented outsourcing. This new strategy consists of a shift towards "innovative procurement" by the government. The explanatory notes of the UAV-GC explicitly advise not to deviate from the premises in the given framework. Both the large and small contractors are not familiar enough with both aspects. Contractors have to learn to think proactive instead of reactive. Contractors are often not familiar with the whole process of control, maintenance, and finance of an asset on the long term (Goossens, 2007). Remarkable in this list is that there are much more potential (international) contract forms possible then the current used D&C and DBFM forms at RWS (Roelofs & Reinderink, 2005).

Design & Construct contract

In a D&C contract the UAV-GC 2005 conditions are often used as general terms and conditions. Arguments for choosing a D&C are constructability, throughput, technological innovation, more Value for Money, distinct division of risks, single point of responsibility, relieve of the principal responsibilities, and lower transaction costs. Furthermore the principal is only involved in one contract relation, the principal-agent relation (single point responsibility). In practice the innovative part is questioned. To facilitate innovation the following aspects are important:

- Early transfer from employer to contractor;
- Transparency as a result of communication;
- Balance of risk;
- Sufficient time for the submission of the tender documents (R&D costs time);
- No limitation of the contractors' working procedures (surprise the employer).

There are three types of D&C contracts. These differ in the design responsibility of the contractor. The first is a D&C were the contractor receives a functional list of requirements and delivers and realizes a complete design (early contractor involvement). In the second form the contractor receives a preliminary design with functional and technical requirements. The third form is related to the so-called engineering & construct contract. In these E&C contracts the market have limited design freedom for innovation. Additionally there are D&C turnkey contracts. This contract is in essence the same as a normal D&C contract, but the asset is delivered lump sum. D&C turnkey is known as the "bahama model". Turnkey is related to the contracts' content and is defined as contracting based on functional specifications.

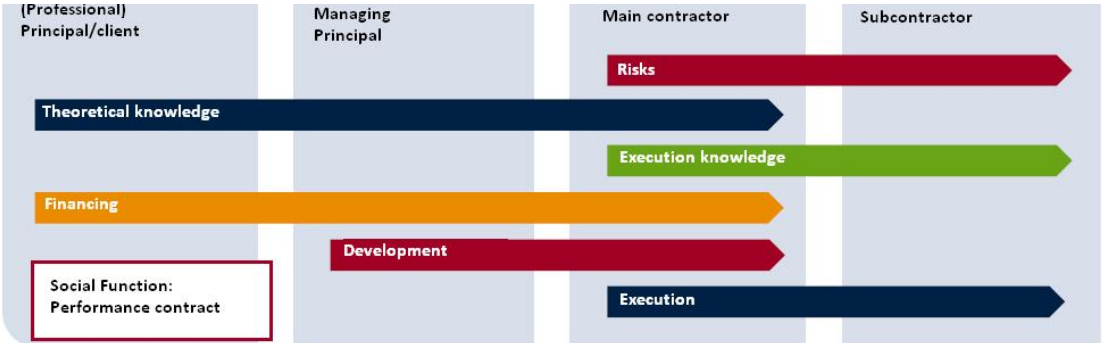


Figure 14 Responsibilities D&C contract (J.A. Ribberink, 2008)

DBFM

A DBFM contract is based on the D&C contract were the contractor is also responsible for the maintenance and finance of the project. DBFM is considered advantageous because of its financial advantages for the government organizations. The government has the opportunity to realise projects that could not have been realised without the participation of private parties. The government can keep these PPP projects “off-balance sheet” because the capital cost of a public-sector project can be spread out over its whole life. “Off-balance sheet” means that PPP’s do not show up as public-sector borrowing, nor does their original capital cost show up as expenditure in the public budget. In this way the government can break with the short-term constrains of insufficient tax revenues and limits on public sector borrowing. However, for example service fees or shadow tolls are a future annual cost and thus have an impact on the public- sector budget. That is why opponents describe this “off-balance sheet” method as “off-balance sheet borrowing” by government.

In DBFM contracts the performance regime creates a relation between the product and payment. RWS expects availability and that is contracted in the contract. That is clear. The earlier the road is available the earlier the payment will start. Incentives in a DBFM contract are much better structured then current D&C contracts. Incentive contracts also prevent contractors from opportunism. The only thing a principal should not do in such cases is implementing scope changes.

3.6 Summary

The familiar traditional project management steers mainly on time, costs, and quality. The IDE separates the products, process, and multidiscipline axes and links these with a fourth imaginary axis that represents the cooperation of stakeholders in the IDE process. Especially in large and complex projects the need for process management skills is required more and more. The different management approaches are dependent on the complexity of projects. An increasing project complexity is one of the contributors to project failures in terms of overspent budget or delays (Bosch-Rekveldt, 2011). The role of integrated teams and the right balance between project and process management is crucial for a projects’ success and in dealing with this raising complexity.

Procurement is the act of getting possession of something by acquisition of goods and/or services at the best possible total cost of ownership, in the right quantity and quality, at the right time, in the right place and from the right source for the direct benefit or use of corporations, or individuals, generally via a contract. According to the new institutional economics (NIE) the goal of both parties is to realise this transaction as efficient as possible. According to the NEVI the technicians of RWS were formerly also some sorts of procurers. Recently, several new trends caused a relative change in these perceptions of the purchaser. In this report procurement stands for the strategic, tactical, and operational activities as understood by the Purchase and Supply Management definition. Integral procurement is related to the connection between procurement and network management. One of the most important decisions with procurement and outsourcing is whether or not a make or buy-decision is chosen. The contract is the formal agreement between principal and the agent. It forms the basis of further collaboration between both parties.

The purchase pillar of RWS (SDG M & I, IMG, and BIO's) is engaged with the purchase processes of RWS: from the procurement strategy to the final contracts. The procurement in projects is carried out with mandatory use of this pillar and the procurement advisors from the BIO departments. In the IPM team procurement is the responsibility of the contract manager. Contract management is closely related to procurement. It is about a group of people that spend money versus a group of people that delivers a product/service. The contract manager is the daily contact with the market parties.

4 ACTOR ANALYSIS OF RWS AND THE MARKET

Rijkswaterstaat realizes several goals to achieve its mission to offer dry feet, enough and clean water, safe and fluent traffic flows on roads and waterways, and reliable and useful information (see section 1.1). The vision and strategy of Rijkswaterstaat according to the Business Plan 2015 (OP2015) is elaborated more into detail in section 4.1. In appendix A.4 the earlier experiences with the Business Plan 2004-2008 (OP2008) and the Agenda2012 (AG2012) are elaborated. Section 4.2 presents the different interests and several characteristics of the current RWS-market relation. Furthermore, RWS its procurement strategy is elaborated in section 4.3. What RWS expects from the market parties is described in section 4.5. The goal of this chapter is to understand who RWS is, what they do, and what their interests are.

4.1 Rijkswaterstaat, the executive organization of the ministry I&M

Sources: (Rijkswaterstaat, 2008) (Rijkswaterstaat, 2011c) (Rijkswaterstaat, 2012c) (Rijkswaterstaat, Werkwijzer aanleg deel 2 herzien, 2012i) (Wermer, 2009)

4.1.1 RWS and its vision, mission, goal and strategy

RWS employees are civil servants. The organization of RWS is based on strong past experiences and values. RWS is characterized by a hierarchical top-down fragmentation, divided responsibilities, and multiple interfaces. RWS coordinates a relative large part of the infrastructures at a national level. There is a fragmentation of governmental responsibilities between the different types of roads. RWS is only in control over the highways. The provinces and municipalities are responsible for “N-roads” and local roads.

RWS its vision is to become a:

- Leading project manager;
- Public oriented network manager;
- Professional crisis manager.

The mission of RWS is (Rijkswaterstaat, 2011c):

> RWS is the executive part of the Ministry of Infrastructure and the Environment that controls, maintains, and develops national networks in a sustainable way. RWS works on (1) dry feet, (2) enough and clean water, (3) safe and fluent traffic flows on roads and waterways, and (4) reliable and useful information.

RWS has defined the following goal to perform this mission (Rijkswaterstaat, 2011c):

> In 2015 RWS works as one team intensively with others and improves their results every day. The public, the politics, and our partners notice and appreciate RWS as an effective and efficient network manager, project manager, and crisis manager because of high quality knowledge and experiences.

Figure 15 Mission and vision (Rijkswaterstaat, 2011)

Since the start of the transformation in 2002, RWS wants to shift more towards a directing role in the overall process ("regiehouder") and wants to act more like a procurement ("inkoop") manager (Rijkswaterstaat, 2008) (Rijkswaterstaat, 2011b). RWS acts according to the "Market, unless" ("Markt, tenzij") and "More with less" ("Meer met minder") policies. Key issues of RWS are (see Figure 10):

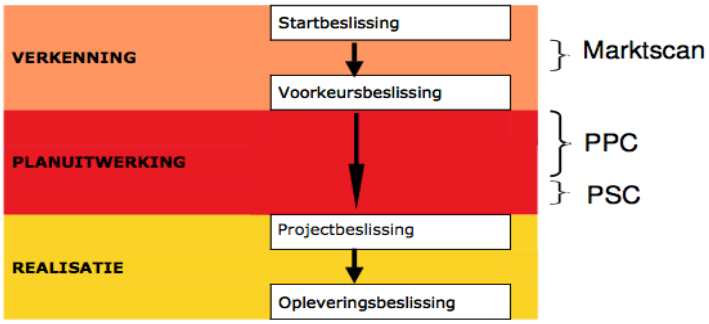
- Focus on the public;
- Be innovative;
- Make use of the creativity and experience of the market;
- Realize a reliable production.
- Be efficient.

RWS is as a directing principal confronted with many interfaces inside the contract, between the contracts, and with many involved actors (internal and external). Firstly, RWS is an agency and works for the ministry of Infrastructure and Environment. RWS is related and sensitive for political decisions. Secondly, the current relationship between RWS and the market means two separate worlds that work together. There is a clash of interests between social values versus profit. Thirdly, there is an internal and external separation in the plan study and realisation phase. There are diverging interests between the objectives to deliver the TB versus the realization of the project. Furthermore, there is a clear separation between the regional and national offices (regions versus DI ("Dienst Infrastructuur")). Both have several diverging opinions about the implementation of the provided frameworks. In addition, technicians "clash" with purchasers. Procurement is experienced as secondary process and as "just a formality" by project teams. In RWS terms this is related to the relation between IPM teams, operators, and procurers. These interfaces are characterized by low interaction, minimal mutual communication, and are dependent on RWS intrinsic motivation.

Figure 16 "Werkwijze RWS" based on OP2015 (Rijkswaterstaat, Werkwijzer aanleg deel 2 herzien, 2012i)

4.1.2 MIRT and the demand

The ministry of Infrastructures and Environment demands a certain network performance from RWS (road operator), for example 10% less traffic jams around Amsterdam. The MIRT Project Book, multiannual program infrastructure environment and transport ("Meerjarenprogramma Infratructuur Ruimte en Transport"), provides an overview of all spatial programs and projects where the government works on together with provinces and municipalities. This demand is translated into national performance requirements per network (SLA) and forms the base for contracting. The MIRT rules framework there are three different "meerwaardetoetsen", which are (1) market scan, (2) Public Private Comparator (PPC), and (3) the Public Sector Comparator (PSC). RWS specifies the specific needs further into a demand specification ("Tracèbesluit", TB) and outsourced these by several projects to the market. In the main road network there is a subdivision of four different network categories. Each category is differentiated with certain performances dependent on the usage intensity. The products in the realization programme Realization & Maintenance ("Aanleg & Onderhoud" (A&O)) are the heartbeat of RWS their procurement plans. Maintenance is procured in several logical units of the network.



Decisions should be made consistent and from an organization-wide approach. RWS remains responsible for the risks related to the network performances, the realization of the top performances, and to safeguard the maintenance and control of life cycle costs (LCC) optimal assets. (Rijkswaterstaat, 2012g)

Figure 17 Additional value assessments (in Dutch: Meerwaardetoets) (Rijkswaterstaat, Werkwijzer aanleg deel 2 herzien, 2012i)

RWS complies with its "BLS" system, which literally means "income-expense system". Most of RWS their turnover is realised at the "GVKA bedrijf", which means literally "liabilities-cash Administration Company". The ministry manages the budget system ("kasritme system"), which gives a forecast of expenditures per time period (in this case annually). The minister defines the distribution of these funds. This budget system clearly defines what the consequences are, but sometimes also leads to suboptimal solutions. The budget system ("kasritme system") means that RWS as an agency receives budgets for (1) MIRT and (2) maintenance and regional projects. The MIRT contains projects larger than €35 million euro and all DBFM(O) projects. The so-called SLA budgets are used for conservation of infrastructures by the regional departments. The SLA's are based on agreements with the ministry for a period of four years. However, the budget is defined per year and government's budget surplus cannot be transferred to the next year. The agreements made are related to the Basic Maintenance Level ("Basis Onderhouds Niveau", "BON"). RWS (often) has deficit budget to keep all the assets at the preferred levels of quality. RWS prioritises their projects by taking into account the SLA. (Götz, 2012) (Vries, 2012) (Putte, 2012)

4.1.3 Business plan 2015

In 2011, RWS published the OP2015. The OP2015 goes further where the AG2012 and earlier the OP2008 stopped: reorganizing RWS towards a public oriented governmental executive organization of the ministry of Infrastructure and the Environment. RWS should be innovative, makes use of the creativity of the market, and aims for a reliable production. RWS improved since the start of the OP2008 in 2003. Still, RWS does not fulfil their goals for 100% by the end of 2011. The need to really change the work processes is obligatory for success. It is important to act as one RWS that breaks down the different walls between internal and external organizations. Only continue improvements lead to a future proof organization.

The OP2015 focuses on the further realisation of the goals of the OP2008 and the AG2012. These two latter and their transformation are described in appendix A.4. RWS states that:

- The end-user is centralized in the work processes and collaboration with operators is improved.
- RWS grows as a project manager even under high pressures. RWS knows the ins and outs of the new integral contracts and the market grows along with RWS.
- As an agency RWS works more business oriented, more efficient, and better targeted. RWS works more with less people. In infrastructural projects the IPM-model, asset management, and environment management steer RWS to realise these core tasks.
- RWS has a professional, concerned, and competent workforce.

Towards 2015

In the OP2015 collaboration and alliances with co-managers, market parties, and knowledge institutions are important. Together with them RWS has to strive for more quality, effectiveness, efficiency, and stronger relationships. The challenge for the next four years is to work more as one team, to collaborate more intensively, and continue to improve the quality towards the ministry and the users of the infrastructural networks. The ambition remains to become a public oriented network manager, a leading project manager, with a better information provision/ICT. In addition RWS strives for the role of a pro-active crisis manager.

RWS works and thinks from their networks, collaborates more and better with partners, has an integral structure and works multidisciplinary, and finally is flexible and relates uniformity with diversity. RWS puts a lot of energy and effort in knowledge development and information facilities. RWS notices the importance of their internal organizations' behaviour. RWS defined their core values in six different codes of conduct, which are RADIO-V. RADIO-V stands for result-oriented ("Resultaatgericht"), accountable ("Aanspreekbaar"), service providing ("Dienstverlenend"), integer ("Integer"), entrepreneurship ("Ondernemend"), and connective ("Verbindend"). The RADIO-V codes of conduct are about commitment, steer on different interests, robustness, integrity, flexibility, transparency of processes, learning of mistakes, thinking in chances, acting in critical situations and show courage, and last but not least keep it simple.

New organization

In the OP2015 (Rijkswaterstaat, 2011) the main structure of RWS is changed and is still being renewed as a result of new management principles (more information in appendix A):

- The board of RWS ("bestuur") manages the whole, supported by the board staff.
- RWS in the regions (RWS/ Zuid-Holland, Noord-Holland, Oost-Nederland, Midden-Nederland, Noord-Nederland, Zuid-Nederland, and Zeeland Noordzee) are responsible for the networks and focuses on the users and administrative partners.
- The national executive ("Landelijke uitvoering") focuses on efficiency, standardization, and "one face" towards the market.
- The framework development ("kaderontwikkeling") including reviews and advice focuses on policy, knowledge, and innovation.
- Finally, the corporate service ("corporate dienst") optimally supports the primary processes.

Operational work processes are more embedded in the line. Activities for water and roads are integrated to exploit synergy advantages. Responsibilities are distributed as low as possible in the organization to provide enough room for the employees them self. *"We worden één Rijkswaterstaat."* ("We will become one RWS") (Rijkswaterstaat, 2011c)

One of the first steps was related to: "*Organizing differently means working differently*" (Rijkswaterstaat, 2011c). In this new organization it is all about exploiting synergy advantages. Secondly RWS wants to comply with the dynamic and changing expectations of the politics, users, partners, and market parties by investing more in the improvement and extension of the current relations. RWS focuses on better relations with other operators, market parties, and knowledge/research institutes. Work together, share responsibilities, and share "profits and losses" are aspects that are involved in the set up of such collaborations. Alliances offer chances of more effective and qualitative better and more efficient primary processes. Finally alliances can strengthen the organizations' position. Mutual trust and openness are crucial factors in these processes. Yet, acting from a business attitude remains the first task. RWS only collaborates if it fits the goals of the organization and offers demonstrable value.

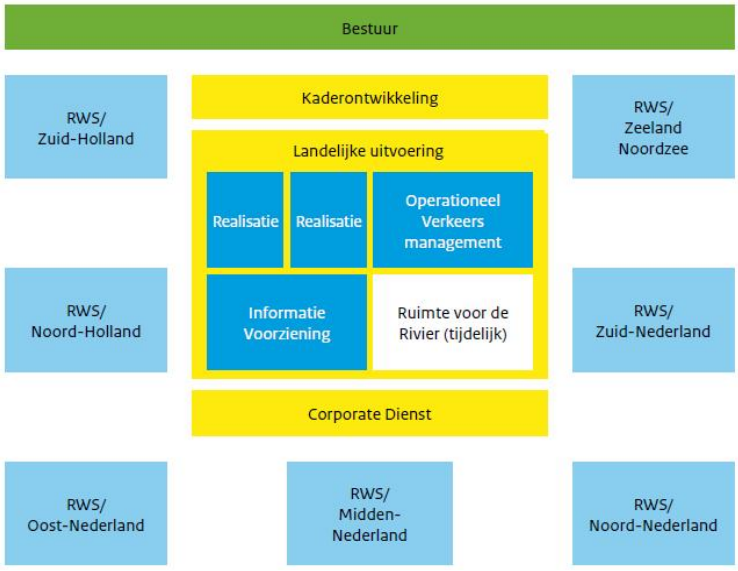


Figure 18 Main structure RWS (Rijkswaterstaat, 2011c)

Human-centred

The next aspect RWS strives for is a human-centred approach. The workforce performance is crucial in continue process improvements. RWS strives for daily job improvements by exploiting the best out of the employees by the KR8 principle. KR8 stands for client value ("Klantwaarde"), Respect, and eight types of wastes (related to correction, transport, movements, waiting, over-editing, over-production, supply, and talent). The current work processes are mapped and only those processes are retained that focused on increasing the clients' value. KR8 learns people to take responsibility and to be influential on their work. It is about making step-by-step improvements with a clear goal in mind, learning by practice, and servant leadership. The KR8 principle is related to the Lean management theory applied by Toyota. However, implementing "lean management" is not just using a set of tools, but more important is the underlying understanding of the "Toyota Way" of thinking (Liker, 2004). It requires a drastic change in a company's culture and working.

Improving the strengths

RWS aims on their strengths. To act as a better public oriented network manager RWS should collaborate cross networking, cutbacks to usage, strives for safer usage of the networks, customized information, and develops knowledge. The dynamic behaviour of networks leads to capricious decision-making. The content of the problem shifts in the course of time. Threats become opportunities and opportunities become threats. The design process should adapt to the outcome of the network to achieve a win-win situation. This process does never end. New rounds and opportunities are created and evaluation remains an on-going activity.

Being a professional principal ("Professioneel opdrachtgeverschap") was an important pillar in the AG2012. Remarkable is that the latter transformed in a "leading project manager". The improvement of a leading project manager is dependent on the following actions. RWS should work more from the viewpoint of its network. Dialogues with relevant actors are set up in an early stage to make sure that wishes from the environment are taken into account. RWS remains focused at sustainability and room for innovations is still important. Earlier market involvement stimulates the market parties to come up with innovative solutions. RWS wants to professionalize and centralize its procurement processes. Finally, RWS invest in the quality of their employees on crucial roles. Knowledge development & sharing and flexible human resourcing are important. The project managers and their teams think from the supply chain and involve the environment well timed. They understand the procurement process and link this knowledge with the functionality and technology of the networks. Specific knowledge is necessary to sustain an integral overview and a directing role over the projects in the network. Flexibility is the key to smarter solutions.

The third strength of RWS is to become a decisively crisis manager. Providing clear, uniform, and actual information for all relevant actors does improve the role of crisis manager. Tasks and roles are clearly defined in the crisis organization. Finally, timely up scaling during crisis events is important and is a performance that is earned back in the stages afterwards.

Reliable information facility

Nowadays reliable information is crucial in times of modern technology, social media, and technological innovations. Information is present in all daily work processes. It is related to communication, data processing, and applications and many more. Information is an inseparable part of the work processes and delivers independent products for RWS and its partners. Knowledge about information systems should be common knowledge to all market parties. Not only with the supplier of the tunnel safety systems, but also at the construction contractor to bring projects to a successful end. The internal supply chain of the market should be stimulated to develop and collaborate intensively. The efficient delivery of information services is very important as well to secure frameworks for industrial automation. Ultimately, RWS strives to take into account the information facility as an asset in their collaboration. This should result in a better, easier, and faster customized information transfer with partners and the market. Knowledge about information facilities must be linked with knowledge about RWS its networks.

Summary

RWS is an agency depended on:

- Politics and environment;
- Whether the base organization is rigid and well structured;
- The quality and clearness of the demand;
- Whether the required competences are acknowledged in the whole supply chain of the (construction) contractor and its suppliers;
- Human behaviour.

In short to reach their goals RWS:

- RWS should work more from the viewpoint of its network;
- RWS wants to professionalize and centralize its procurement processes;
- Implement uniformity in systems, documents, and work plans (one RWS);
- RWS has a professional, concerned, and competent workforce and RWS invest in the quality of their employees on crucial roles;
- Dialogues with relevant actors are set up in an early stage to make sure that wishes from the environment are taken into account;
- Continue improves its processes every day;
- Provides “attractive” room for innovation and optimization of construction activities;
- Provides clear, uniform, and actual information.

4.2 Interests RWS and the market

The relation between RWS and the market is built on many years of experience. It is about a demander versus a supplier. Since 2002 this relation faced an extreme makeover (see section 1.2 and 4.1 and appendix A.4). It is a makeover in an era where the emancipation of the procurer at governmental organizations conflicts with the technocratic bureaucracy. In the first subsection the different actors and value perception are briefly described. In the second and third subsections RWS and the markets’ goals and interests are elaborated. A balanced scorecard model (Norton & Kaplan, 1996) is used to represent a brief overview of the goals and interest of both actors. The goal of this chapter is to provide insight in both the wishes and demands of both RWS and the market.

4.2.1 Actors and value

In the construction industry (especially line infrastructures) there are different kind of stakeholders or actors directly or indirectly involved in a project. Plan studies projects are characterized by finding consensus between the different subject and actors. It is about the discussion. Directly involved stakeholders/actors are e.g. the client, the users, project director, architect, and the contractor. Indirectly

involved stakeholders/actors are citizens, shareholders, governments, environmental groups, politicians, regulators, companies, and banks. As a governmental agency RWS should take into account all the different interests of relevant actors. Especially the preliminary plan and design phases last for many years. RWS is constraint by politics opinions about their performances. The politics saw RWS as too large, too expensive, and not efficient (Metze M. , 2009/2010). However in some projects this distinction between direct and indirect stakeholders/ is not quite easy. The difference between a stakeholder and an actor lies in the way they are related to the system. An actor interacts with the system while a stakeholder might have an interest in this system. The latter do not always directly acts with the system.

Another distinction of actors is related to value consumers and value providers (de Ridder, Het Living Building Concept, 2006). The first strives for Value for Money and the latter for money for value. The two groups are connected by the facility/construction/asset. Project-based processes do all take place in an environment. The environment consists of all relevant life in the surroundings of the project, e.g. citizens, animals, flora and fauna. The environment is related to environmental, technical, legislative, administrative, and social aspects. In some way all different actors are differently related with this environment. Generally, engineers seem well capable of dealing with technical complexity. They seem to have more difficulties in dealing with organizational complexities or, even more distant, external complexities (Bosch-Rekveldt, 2011). These unique relations make it hard to find a solution for a particular problem.

The different actors are categorized in three categories, which are government (RWS), consumers (users), and the industry (contractors) to link the different actors with their interest in value, costs, and revenues (see Figure 19) (de Ridder, 2007). These three interests are related to the People, Profit, and Planet ideology. The different actors have different interests and goals. However, the different context of the different actors will in some way overlap. The triangle in the middle consists of similar interests between actors. This overlap can be considered as the solution space. The solution space determines the boundaries of the framework wherein the solution should fit (de Ridder, Design and construction processes; paper series 1, 2007). The solution space is depended on value versus costs. The value part consists of requirements towards boundary conditions and the costs are constrained by the minimal costs towards the available budget. Value is about client perception, the stakeholders behind the client (users), and the stakeholders outside the client (indirectly affected stakeholders). Value is obtained at a certain price. This price can be measured in money or in something else that is measurable (like labour). Value can change over time, which means that value is dynamic. These dynamics can be related to a dynamic market, a dynamic tender, or a dynamic product. The experienced value in constructions could be distinct in three different groups, which are the experiential value (of architecture), the functional value (experience of quantity), and the future or technical value (experience of quality) (de Ridder, LEGOlisering van de bouw, 2011). The three values of constructions are often more relative than absolute. The interest of the project satisfaction is dependent on the cohesion between the actor and the projects result (Aken, 1996).

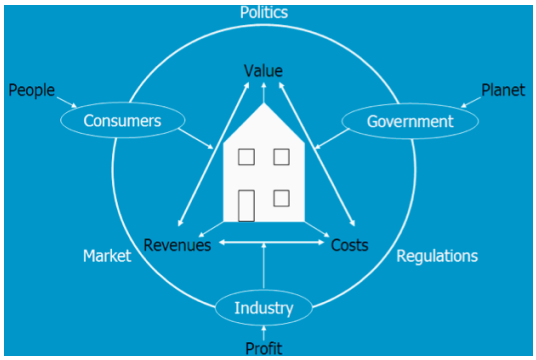


Figure 19 Actors interest (de Ridder, Design and construction processes; paper series 1, 2007)

4.2.2 Rijkswaterstaat

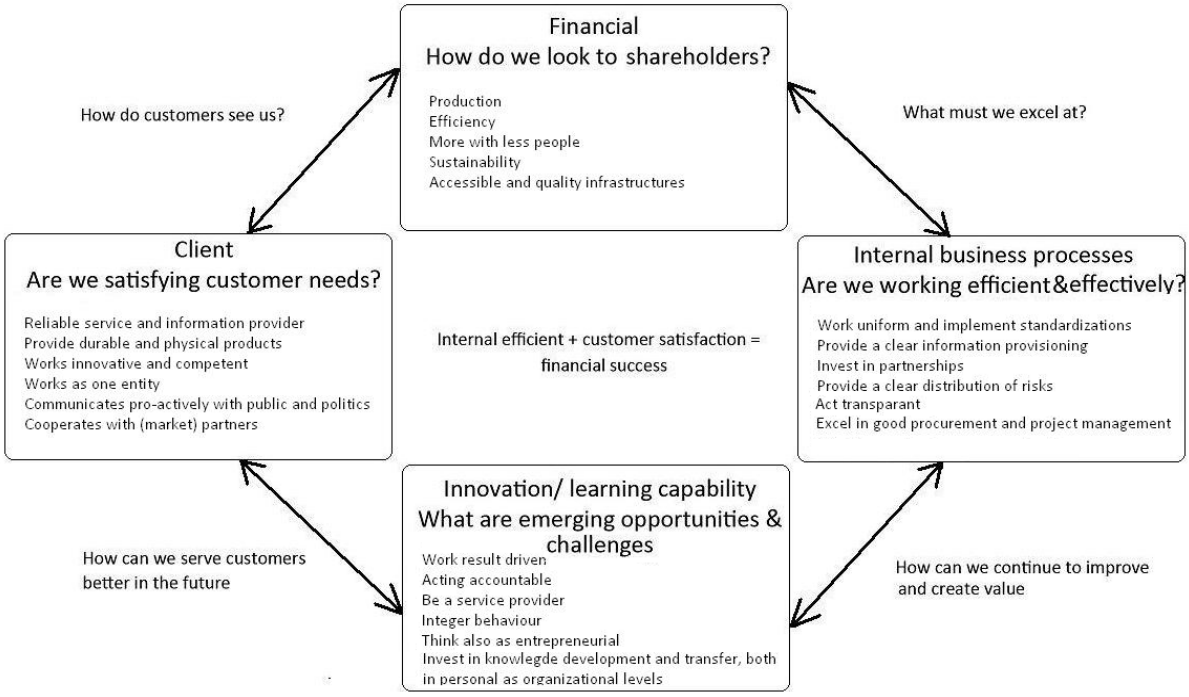


Figure 20 Aspects to strive for by RWS

Client

"To achieve our vision, how should we appear to our customers?" (Norton & Kaplan, 1996)

RWS works for the ministry of Infrastructures and Environment. Indirectly RWS works for the users of the road and waterways, which are the inhabitants of the Netherlands. From the viewpoint of the client RWS should be a reliable service and information provider. RWS should provide durable and physical products and services, is competent and innovative, realizes complex projects, works as one entity, communicates proactively with public and political, and cooperates with fellow market parties and operators. User satisfaction is important because dissatisfaction probably leads to several complaints at the addresses of the politics. RWS attaches lots of value to their reputation. Positive social value is more important then financial profits. Aspects like environmental quality, spatial implementation, limitation of nuisance, and protect the inhabitants against infringing developments are important tasks.

Financial

"To succeed financially, how should we appear to our shareholders?" (Norton & Kaplan, 1996)

As a governmental agency RWS its shareholder is the ministry of Infrastructure and Environment. The minister attaches value to the production of RWS. Ministers are focused on good performances in the viewpoint from the public and influence infrastructural projects decision-making when necessary. Furthermore RWS was too large, too expensive, and not efficient. RWS financial structure must be clear and structured. The minister attaches value to the efficiency of RWS. RWS should do more work with less people. Budgets are limited, but the demand is fixed. RWS must focus on cheap and effective solutions. However, sustainability remains an important subject besides RWS its core task to deliver quality infrastructural assets that comply with the availability and accessibility demand of the users.

Internal business process

"To satisfy our shareholders and customers what business processes must we excel at?" (Norton & Kaplan, 1996)

RWS strives for more uniformity and standardization in their approach to the market ("een RWS"). RWS wants to work more from the viewpoint of the network. RWS must improve their internal and external information provision (being a reliable service provider). By the "Market, unless" ("Markt, tenzij") policy RWS becomes more dependent on the quality of the market parties. RWS describes collaboration even as participating and investing in "partnerships". The investment in current partnerships and relations with partners is crucial to comply with the changing demand of society and to keep up with the technical innovations in the market. RWS aims with these partnerships also at partners like other administrative governmental institutes, universities, Deltares, TNO and NLingenieurs. RWS should focus on a clear distribution of risks to provide both incentives for RWS and the contractors to strive for one common project goal. Work together, share responsibilities, and share "profits and losses" are aspects that are involved in the set up of such collaborations. Collaboration means a higher level of integration and "removing the walls" between the different (internal and external) organizations. RWS as a directing principal must be competent enough to steer and assess the contractors in a transparent way. RWS must excel in good procurement and good project management. This specific knowledge is necessary to sustain the integral overview and a directing role over their projects in their networks.

Innovation/learning capability

"To achieve our vision, how will we sustain our ability to change and improve?" (Norton & Kaplan, 1996)

RWS strives to work as one team, as a team that collaborates intensively with others, and as a team that continue improves his processes and quality. Room for innovations is important, but RWS should work result driven. In order to achieve their vision RWS acts accountable. This means that employees take accountability and correct others when necessary. RWS acts integer and attaches more value to act like an entrepreneur. Results do not show up themselves. RWS employees show their guts and become pro-active. Especially, employees learn from their mistakes. Furthermore, RWS wants to invest in the quality of their employees on crucial roles. Knowledge development, knowledge sharing, and flexible human resourcing become more important.

4.2.3 Contractor market

Distinction different market parties

A market party is a broad term. In the construction industry a principal like RWS works with different market parties. These contractors are often architects, engineering companies, consultants, construction companies, supervisors, jurists, suppliers, and more. In relative "simple" projects different kind of market parties are involved, and each have their own (conflicting) interest and goals (see 4.2.1). The most common aspect all of the market parties is that they more or less all strive for profit. They deliver the value and the customer has to pay (see 4.2.1). However, unlike that these market parties all strive for the same goal, which is profit, they can be divided in different groups with different interest and dependencies. The market companies often work according to their own agenda. It is a game of the survival of the fittest and your own company has top priority. Even in alliances/consortia different companies do not always strive for the same goals. Squeezing sub contractors (Cobouw, 2012) is not a surprise, but is more a less taboo or accepted in the construction industry. This survival behaviour is understandable the contractors offer is based on a certain risk profile. In this report the term market party is used to define commercial companies like Shell, DSM, and FrieslandCampina. The terms construction contractors and engineering contractors (ECs) are used to define involved parties in the construction process. The description below focuses on the contractors of infrastructural works.

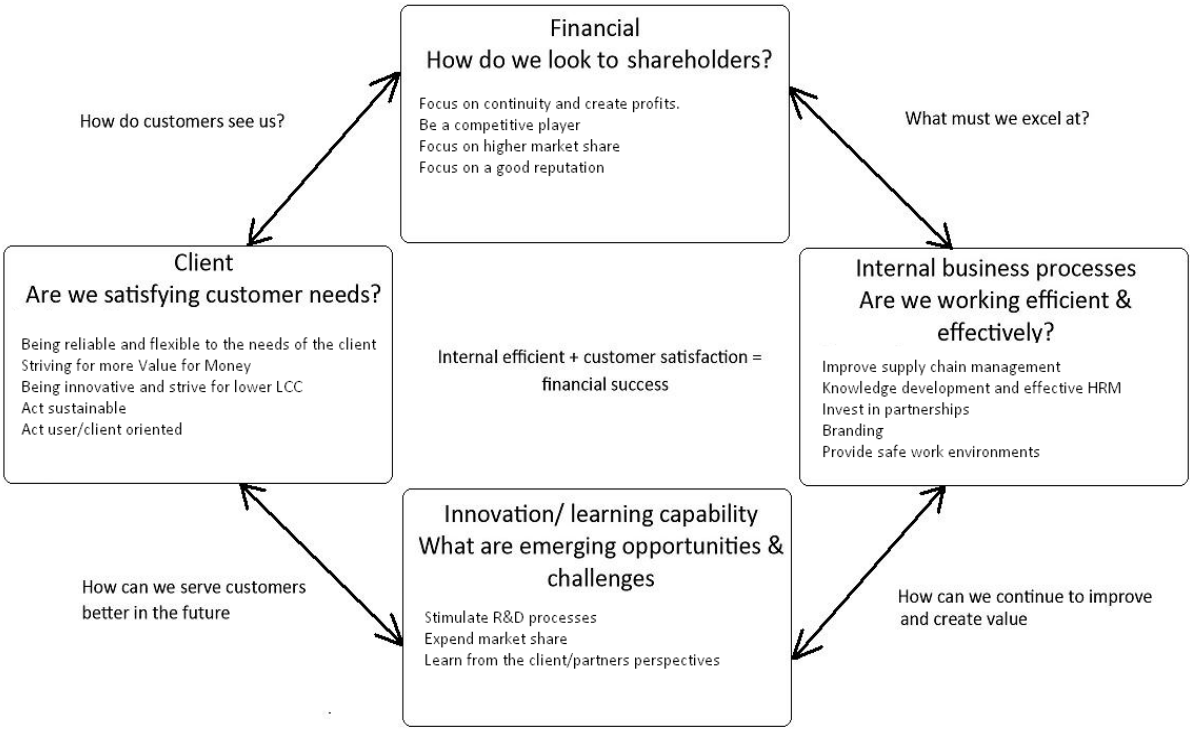


Figure 21 Aspects to strive for of the market

Client

"To achieve our vision, how should we appear to our customers?" (Norton & Kaplan, 1996)

RWS is one of the most important principals for the large construction contractors. RWS expects a construction contractor to deliver a smart design, deliver what they want, acting mature, relieve RWS, develops added value and delivers quality. RWS expect from there partners to provide the right services. Furthermore RWS faces a dynamic environment with lots of uncertainty and attaches value to flexibility of their partners. RWS is a governmental institute and strives for social value against lowest cost, which conflict with the contractor's vision of more profit against lowest cost. Therefore the client expects contractors to come up with new innovations and develop sustainable products. Furthermore, RWS expects contractors to provide additional value related to life cycle cost of projects. Moreover, they expect contractors to approach projects also in a user/client friendly oriented way and to be aware of their social responsibility.

Financial

"To succeed financially, how should we appear to our shareholders?" (Norton & Kaplan, 1996)

The market parties are focused on profit and continuity. Money is the most important incentive for contractors because their existence depends on a positive cash flow. However, money is also the most important incentive for opportunistic behaviour. A commercial company cannot afford to loose money on projects too often because he will go broke. Shareholders even demand a certain profit margin after each year. Furthermore, market parties are, especially in the construction industry, involved in a competitive environment. In order to "survive" the company must be competitive compared to their competitors. Current projects are often still won based on "lowest" price. Another important aspect is growth. Commercial companies and especially their shareholders attach value to a higher market share. This does not only affect the cash flow of the company, but is also related to the company's reputation.

Internal business process

"To satisfy our shareholders and customers what business processes must we excel at?" (Norton & Kaplan, 1996)

The market company must be aware of their product supply chain to improve their business. Investments in knowledge can be profitable for the whole chain. Supply chain management asks time and effort from multiple suppliers and can result in alliances/agreements. These relations can offer additional value in dynamic markets in uncertain environments with changing demands. Furthermore, long-term relations stimulate the search of improvements in products and processes. Knowledge development, knowledge sharing, and flexible and effective human resourcing are important issues to improve and optimize cost levels. Another important topic in the commercial market is branding. Companies with a good reputation are respected and this provides extra opportunities on the private market. Also, clients and principals expect market parties to provide good and safe work environments. Especially in the construction industry safety is an extremely important topic.

Innovation/learning capability

"To achieve our vision, how will we sustain our ability to change and improve?" (Norton & Kaplan, 1996)

For commercial companies it is important to improve and stay competitive. Companies want to safeguard and expend their market share. Therefore many companies attach value to stimulate R&D and learning from best practices. It is crucial to evaluate projects to improve the "supply chain". Furthermore as a commercial company it is important to understand the market of principals, sub-contractors, suppliers, and even competitors. Focussing not only on profit, but also on the clients' social interest could create new opportunities. In order to stay competitive or to increase profit margins the company must learn from mistakes in the past.

4.3 IPM model

Since 2006, RWS uses the Integral Project Management (IPM) model to uniform the project organization. By the IPM model RWS focuses on more uniformity and standardization in control, organization, and staffing of projects. A public oriented approach, the "Market, unless" policy, a directing role, better internal collaboration, and project management in control are some of the most important objectives of the IPM model. One of these goals is related to comply with one of the strategic goals of RWS: to have a clear distribution of roles with market parties. Together they strive for maximum quality of the (partial) products. The sum of the whole is bigger then the sum of the parts. RWS develops more into a business oriented, professional principal. The IPM model is implemented as a "five-role" model. The five roles are defined as project manager, environmental manager, technical manager, contract manager, and finally the supportive role of project controller (see appendix A.5). The IPM model is divided in the processes of integral project management and integral project control (see Figure 22). The IPM five-role model origins from the IPM process model. The IPM model is broad and external oriented. The focus is result-oriented, but also goal-oriented and provides a lot of attention towards environments. The IPM model is the solid basis for all construction projects of RWS, wet and dry, both in the plan study and in the realization phase. Deviations from the IPM model are explicitly specified in the project plan. (Expertgroep Projectmanagement Rijkswaterstaat, 2008) (Rijkswaterstaat, Werkwijzer Aanleg, Deel 1: Sturing en beheer, 2011e)

The goal of IPM is that each project team performs its activities standardized from an integrated project wide responsibility and from the entire lifecycle of the project. The aim is that:

- Projects and project risks can be better controlled;
- A better definition of the necessary relationships;
- The organization becomes more transparent;
- The learning capacity of the organization increases;
- Flexible deployment of staff should be possible.

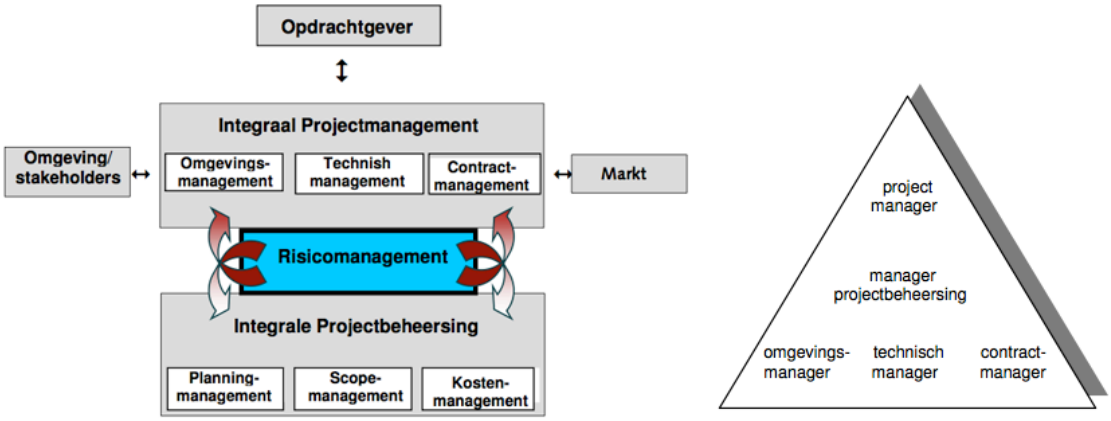


Figure 22 IPM process model and role model (Expertgroep Projectmanagement Rijkswaterstaat, 2008)

The IPM managers direct the team within the project, they manage the "going concern" within their area of expertise, and they identify opportunities and risks for the project and take the initiative to deal with those. They are responsible for the implementation within the project of the processes under their jurisdiction and the required collaboration with the other managers. The interpretation of these roles in terms of tasks, responsibilities, processes and accents is worked out in Part 2 of “Werkwijzer Aanleg”.

4.4 RWS procurement strategy

Procurement is a “profession apart”. It is a process of dialogue between client and supplier to agree upon how the project should be realised and delivered (Kuhlmann & Merema, 2011). In a “simple” transaction there is a buyer who asks, a supplier that offers, a buyer that pays, and a supplier that delivers. In the traditional bid-built models this was quite normal. RWS specified the demand in detail and the construction contractor built the predefined asset. There was a clear distance between RWS and the contractors, which resulted in a tensioned relationship. In this section RWS its procurement strategy and current obstacles are described based on several internal RWS documents and literature.

4.4.1 Ambition of RWS

Procurement is an “art” and procurers should distinct themselves with knowledge about what is procured. A projects’ tender phase means more then the tick off of juridical steps. The procurement process for governmental organizations in the construction industry is related to the common known “tender procedures” (“aanbestedingsrichtlijn”) (Jansen, 2009). Procuring constructions is complex because the procurement cannot be seen apart from the legislation and regulation regarding the TB procedure. Governmental institutions are bound with national and international European (EU) legislatives for procuring projects. The latter encourages the interest of “fair competition” (see appendix A.3). This whole legislative framework with all its regulation is focussed on protecting the Dutch inhabitant from becoming a victim of construction projects. However, by focussing on the inhabitant it is harder to comply with the nationwide goals. Projects face environmental dependencies. Projects are known as dynamic and involve many uncertainties. All kinds of events could happen, but the problem is you never no which events will happen. In such situations, uncertainties are way to high for contractors to step in. Risks of extraordinary transactions costs are certainly present (Delmon, 2011) (Van Ham, 2002).

Procurers need to master the technique of procurement, speak the business language, knows and understand the market, and act like an equal partner. The arrangements related to the projects’ tender are established in contracts (see section 3.5). RWS separates seven different sub processes in the process “aanleg” (see appendix A.2). For the subject procurement RWS defined an organization-wide strategy. This strategy is related to the two leading principles at RWS that are “Market, unless” (“Markt, tenzij”) and “more with less” (“Meer met minder mensen”). RWS their procurement management group (IMG) provides the framework for the integral contracts.

The procurement process consists of the following steps:

- Determine purchasing needs;
- Make purchasing plan;
- Preparing contract;
- Tendering contract.

Different stakeholders, interests, and regulation affect projects in all different kind of ways. Therefor procurement becomes an integral process. RWS tries to reorganize their processes from a tendering authority towards a professional procurer (Rijkswaterstaat, 2011b). Additionally, RWS implemented a "professionalization process" at the division of infrastructure (DI). This professionalization includes the description and recommendations for the procurement process. In some parts RWS experiments with the MSU+ model (Wynstra, 2006) as a development and benchmark model. As a result, RWS stated their ambition to comply with the needs of the "customers" as follows. The procurement processes is designed such that (Rijkswaterstaat, 2008):

- The entrepreneurs contribute maximally towards the realization of public goals and tasks of RWS;
- RWS has one procurement process for all the RWS needs in the primary process;
- RWS makes optimal use of the knowledge and capacity of the market;
- The operational procurement process is effective and efficient and lacks changes and deviations;
- The above-mentioned goals and tasks are realised within time and resources.
- The specific contribution towards the realisation of goals by a contractor is clear during the procurement of projects.

In addition, the procurement process includes incentives for contractors to act according to the defined expectations. RWS wants to improve their market approach through:

- Always enough suppliers (a sustainable and competitive market);
- A good price/quality ratio for the demanded products and services;
- Provide information about uniform network functions and quality requirements (clear demand);
- A more efficient tender process (less time & lower transaction costs). Through communication a contractor understands what is expected by RWS. Especially concerning the longer-term goals.

RWS choose for a reorganization in which contracts were optimized by (Rijkswaterstaat, 2011b):

- Integration and clustering of work in contracts to prevent fragmentation and to optimize the product from the viewpoint of the whole life cycle;
- A public oriented approach that is leading during the integration & clustering of work;
- Keep the projects' size controllable/manageable to provide enough opportunities for competition;
- Uniformity through a "buffet" of standard contracts.

4.4.2 Procurement framework

The preferred performance of the network is the starting point for the new procurement framework. Important is the long-term guarantee of the required function and performance of the network against acceptable costs. RWS operates, facilitates, guides, finances, and steers the use of the network. RWS should be in control of the knowledge to decide upon the crucial required and preferred measures to comply with the political network performance requirements. Maintenance is procured in logic network units that are adapted to the markets' capacity and lead to efficiency advantages. In the realisation process the definition of generic boundary conditions and premises for contract trade-offs is important (e.g. between DBFM and D&C + PC maintenance). The several mentioned criteria are budgetary flexibility, limited capacity of the market and RWS, complexity interface management related to traffic flows, future stability, scope extension, regional collaboration, market policy, innovation, administrative plan procedure dependencies, and finally the kind of infrastructure. (Rijkswaterstaat, 2012g)

RWS highlight six subjects as crucial in the procurement domains. These six processes are defined as (1) demand management (e.g. recognizing the need in the primary processes and transforming them towards procurement needs), (2) procurement strategy (e.g. strategic procurement knowledge, supply chain thinking, make/buy/ally/share decisions, network vision, and early market involvement), (3) market relation management (e.g. knowledge about the market, suppliers, market approach, performances, and

influences), (4) financial economic knowledge (e.g. knowledge about financing PPP/DBFM, budget control, and cost estimation), (5) contract control and management (e.g. performance management and monitoring), and finally (6) procurement process management (e.g. knowledge about innovative contracts, EMVI, tender procedures, standards, and supporting processes). (Rijkswaterstaat, 2011b)

In short, RWS is confronted with several conflicting interests, procedures, and strategies, but RWS strives for the following aspects in their procurement of infrastructural works (Rijkswaterstaat, 2012c):

- A stable national programmatic procurement plan (tactical organizational) agreed upon with the minister and other principals;
- The actual project portfolio can be realized within the available internal and external resources;
- One "procurement process" towards the market available in RWS its primary process;
- A centralized procurement organization with specialistic proactive procurers in the strategic, tactical, and operational procurement process;
- An efficient procurement process with minimal scope changes;
- A professional operator that effectively and efficiently steers the market;
- Clear and well informed relation management;
- Standardized and uniform base for contract forms;
- Development of steering on continue improvement (KPI's and a learning cycle);
- An uniform exchange of information and requirements between RWS and the market;
- RWS frameworks include uniform functions and quality requirements of RWS their networks.

The RWS-wide purchasing strategy simulates a quality/price ratio of 40/60. If necessary this ratio is evaluated and adjusted based on tenders. The developed Economically Most Advantageous Tender (EMAT) criteria (guideline EMAT) may also be used as a guideline. (Rijkswaterstaat, Werkwijzer aanleg deel 2 herzien, 2012i)

4.5 RWS and the market in 2012

RWS wants to be relieved by the market, increase their directing role, perform harder contract management, and the contractors should fill up the "residual gap". The latter is a result of RWS its "downsizing vision" and the impact of the NPM philosophy in the nineties (see subsection 1.1.2). Doing one step back does not mean RWS performs less work. Further, RWS is not the only actor that faces changes. The contractor faces more uncertainties compared to the traditional bid-build models and RWS acts in a different role. All engineering firms, construction contractors, partners, and suppliers should transform to succeed. A flexible work attitude is necessary to strive for more value. However RWS and the market have different interests. A short description is given about the characteristics to procure an (future) expectation.

4.5.1 Procurement of an expectation

RWS is not a playmaker anymore and caused a fundamental change in the Dutch construction industry. In the earlier days several contractors asked RWS for advice on several technical topics. Nowadays, RWS asks the same contractors to come up with solutions for RWS. RWS plays in a game together with other experts besides the already complex legislative frameworks, contracts, and different norms. The IPM model (see appendix A.5) aims for the connection between these different interfaces, but does not results in the expected link between plan study and realization. A qualitative good and clear demand specification sets conditions for the base organization to link the different aspects of plan study and realization. In addition several desired and undesired forces between the technical feasibility and the political feasibility influence the demand specification. (Koppenjan, Broekhans, Steenhuisen, & Eindhoven, 2012)

The demand specification (even in the traditional bid-build models) is an expectation. As a principal you should have the knowledge to define and evaluate these expectations. The expectation of several market parties, like engineering and construction contractors is always different. In the current "game setting" the competence of enough knowledge is crucial for the principal. "D&C, unless" instead of the traditional Bid-Build models is one of the biggest transformations made by RWS. RWS introduced new

contracts types and methods like SE and SCB to ensure that a construction contractor would deliver the preferred quality that RWS expects. RWS outsourced most of their work to ECs and construction contractors. RWS uses short term D&C and long term DBFM contracts for the realization of infrastructural works and the “ingenieurscontract” for ECs. In D&C contracts RWS is still responsible to safeguard the maintenance and operation of the assets. Since a couple years the “finance” and “maintenance” components are used as incentive in DBFM contracts above the expected “advantages” of D&C. Innovative contracts should allocate responsibilities and are based on collaboration and trust. This asks for a new attitude and different culture that conflicts with RWS is “distance” strategy (Jacobs T., 2012). However, the UAV-GC2005 is understood and based in many aspects on the earlier UAV1989. Engineers still try to solve problems by the top-down decomposition towards smaller elements. The latter is performed cyclic and by several different actors (see subsection 4.2.1). Another aspect is that governments have too high expectations of these innovative contracts. These contracts are just new way of making agreements with each other. The contract is accused to be improper, but governments should learn from these experiences. (Kuhlmann & Merema, 2011)

The contract consists often of a TB specification, which means that RWS works out a pre-design or functional specification until a particular level of detail. A specification means describing characteristics of variants, components, and elements in relation to function, form, and technique. The contractor has to obey the contract and the specification provided by RWS. Figure 23 represents why clarity is important in the specification.

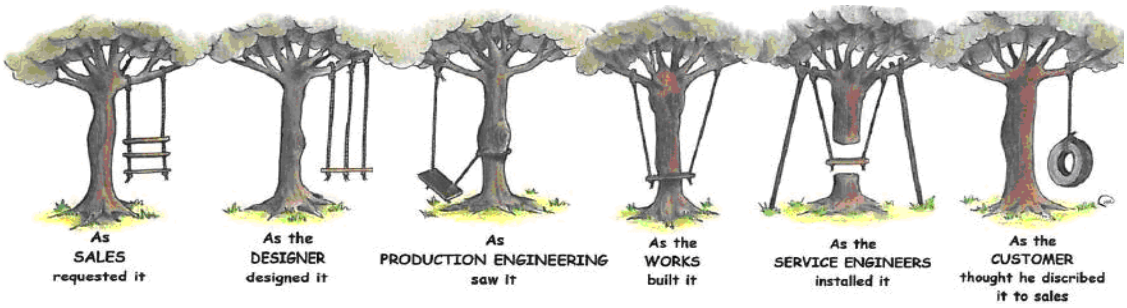


Figure 23 Why clarity is important about what you buy (Zaal, 2009)

4.5.2 Earlier and current expectations

RWS is confronted with opportunistic behaviour, scope/claim discussions, and a lack of quality. New projects are dependent on a correct and clear definition of the demand that includes the contracts’ scope. The expectation of a larger autonomy of a contractor and the linkage of performance requirements and payments in maintenance and DBFM contracts lead to effects for the principal that are not only advantageous. Strategic (or opportunistic) behaviour of contractors during long contracts remains a risk. In the past some contractors have proven to misuse the shortcomings in contracts. Private parties are very good in advantageously defining (self interest) the “fit for purpose” (Goossens, 2007). The latter suggest that the taxpayers are not always better off by the new “obliged” D&C and DBFM contracts. Procurement is about linking the demand from the primary processes (internal RWS) and the supply from the market (external). The contract manager is focused at the market approach, the tender phase, and controlling the contractor during the realization. The roles of the procurement and contract manager are different, but they both strive for the same purpose, which is the delivery of infrastructures that complies with the expectations of the client. The role of procurement is part of the responsibility of the contract manager.

The earlier involvement of the market in new innovative contracts also has its limitations. The earlier construction contractor involvement together with performance-based payments in complex projects is not a guarantee for success. Yet, strategic behaviour is not only related to the contractors’ behaviour, but it is also dependent on how RWS organized the whole “transaction process”. Possible advantages are often contrasted with traditional executed projects (RAW). Based on several researches and case studies Schoenmaker (2011) mentions that it is hard to actually prove that these “advantages” are a result of other forms of (traditional) contracting in road maintenance performance contracts. However

the amount of variables that are involved in these advantages is large, unpredictable, and hard to compare in an objective way. The latter is in need of close collaboration.

There are not many large successful D&C projects known yet. In a DBFM contract the need for a clear demand specification is more important through the long-term contract period. The latter asked for an underestimated change in the mindset, capacity, and competences of RWS and the market:

- Construction contractors should take into account different interests of different stakeholders;
- Construction contractors are earlier responsible for communication and information management in projects;
- Construction contractors should not focus only on the product, but on the system as a whole;
- Increasing value should become more important then the focus on lowest costs.

4.5.3 Future expectations of professional entrepreneurship

The expectations of the contractors in a "professional entrepreneurship in the construction industry" are elaborated briefly. The report separates three different aspects (J.A. Ribberink, 2008):

- Profiling of the contractor; the contractors should respond in a better way to the client/users wishes. A proactive attitude is required.
- Combining and creating; the contractors should improve internal collaboration between different disciplines and external collaboration with their partners to stimulate co-design, co-maker ship, and standardization in products and processes.
- Make it true; they should improve internal business processes and should deliver what has been agreed upon in (performance) contracts.

Contractors have to "deliver" what is promised. The contractors should learn to use account management ("client" management), ICT support, share knowledge with partners, life cycle approach, supply chain, and should transform the new roles into their organization. The relation between RWS and contractors is based on contract outsourcing. Boundary conditions, responsibilities, and tasks are ex-ante defined and distributed in the contract. RWS talks a lot about the earlier contractor involvement in the project, but often this step is really realised after the contract is signed. RWS makes market parties more accountable for performances and services instead of only products ("Market, unless" ("Markt, tenzij") policy, see subsection 4.1). The "High trust, high penalty" is implemented in contracts to prevent strategic behaviour. However, awarding a contract based on lowest price does only work if the client can exactly specify what the needs (predictable environment). One of the consequences of the current integral contracts is that specifications are ex-ante defined in the contract. The more detailed these specifications are the lower the remaining opportunities for innovative changes ("imaginary freedoms"). The contractor is limited to the ideas and expectations of the client. In abstract functional requirements loose ends are present, but not expected. It is not common at RWS to sustain the distance by introducing loose ends (e.g. by procedure agreements) in a controllable way like the Highway Agency in England (Schoenmaker, 2011).

On the other hand, this suggestion raises questions whether or not the contractors are aware of the risk allocated decisions upfront in projects. RWS questions the contractors' capability and willingness to take social responsibilities into account in their products. The awareness of this potential burden hardens the position and attitude of RWS even more and results in old traditional design patterns with a clear distance between RWS and the contractor. However, taking distances or even the distribution of responsibilities does not solve the problems. Uncertainty remains an issue. RWS even tries to prevent these uncertainties by clear contract specifications and supervises the contractors' work by several process plans (SCB).

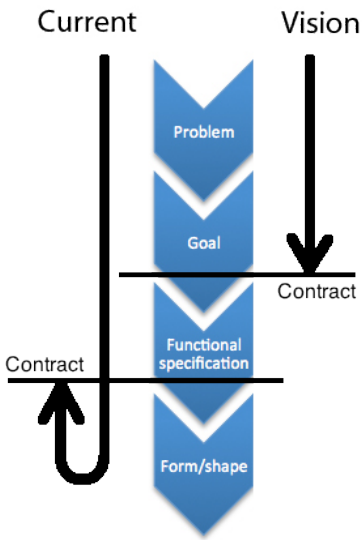


Figure 24 Global design process

4.5.4 Procurement obstacles

In recent years, the operational management has changed positively. An approved accountants audit became "business as usual", RWS developed several standards, and executive functions are bundled or outsourced. Now, RWS checks often only afterwards, and whether it is properly reported, and if it ensures the expected quality well enough. Operational staff is not active in a proactive role in the process. Operational management should voluntary support the organization. However, "*our internal environment management takes more time than the external environment management*." (Rijkswaterstaat, 2012h)

Currently, the collaboration between RWS and the contractors is not a perfect one. Their relation is known as hard, complex, and lacks of trust. This distrust is related to past experiences between both parties. "*Collaboration means to work jointly with others on a common goal … This means planning jointly, pooling resources, and evaluating outcomes together."* (Forest, 2003) The current distance in the principal-agent relation between RWS and the contractors does not support the latter. Is it necessary for RWS to collaborate with the market? Is a client-supplier relationship/cooperation not adequate enough? Does RWS need to focus on being a collaborating partner in order to become a professional principal? The RWS procedures stimulate earlier market involved and transferring tasks and roles earlier in the design process, but whether these actors fit the conditions for true collaboration is unexpected. "*Collaborations are highly vulnerable to the protocols required by larger forms of togetherness*" (Denise).

The biggest "top-waste" for procurement is that RWS uses too many resources of time, money, and manpower to procure the whole productions' need. There are too many scope changes and production delays too comply with the agreements. Incorrect human actions are more often related to the causes of failure rates/costs then technical complexity. Ex-ante ill-considered decisions negatively pay off during further project phases. In addition, projects are considered as stand alone objects. Learning curves are limited to the project life cycle or even not implemented. A lot of knowledge and experiences remain unexploited. Projects are still centrally managed and planned and coherence is not present. There is not a uniform procurement strategy towards the market. Scope changes to comply afterwards with the SLA cost many efforts during realization. (Rijkswaterstaat, 2012c) (Jacobs T., 2012)

RWS cannot prove whether or not solutions comply with the expectations of the client (Rijkswaterstaat, 2012b). The earlier project processes should be reorganized from the start. At RWS a group of people analysed the current problems/obstacles for different subjects. One of those subjects was the "procurement/market involvement" during construction and maintenance projects. Several observations (human versus organizational, see Table 1) and five spills are elaborated.

Table 1 Analysis current situation RWS (Rijkswaterstaat, 2012c)

Human	Organizational
Personal profiling is important	Procurement is a secondary process
Lack of long term awareness	Multiple management/steering lines
RWS personnel acts conflict avoiding	Legitimacy RWS = projects = short term # network performance thinking
RWS personnel acts risks avoiding	Wrong people at the wrong positions
A lot of autonomy of the individual employee	Procurement is uncontrollable because the market is not structurally being observed (lack of dependency awareness of the market)
Some people are not in the right place and lack of motivation in performing their tasks	Control on creativity in full range, but not on implementing standards
Knowledge scarcity	Decentralized procurement leads towards diversity

The five procurement spills mentioned by RWS are (Rijkswaterstaat, 2012c):

- Instable client wish;
- Procurement is not a partner of demand management;
- Actual market knowledge and supplier knowledge is insufficient;
- Standards are insufficient traceable and not coherent;
- Transaction costs are inadequately managed.

Instable client wish

The demand from the internal process (TB) is inadequate explicit to translate it towards the tender process. The real wishes, demands, needs, boundaries, and conditions are insufficient explored in earlier projects phases (planning phase). Furthermore the market knowledge is insufficient and the procurement control is still immature to manage these obstacles (Rijkswaterstaat, 2011b). During realization there are still many design changes and production delays. The realization of different tasks as agreed upon in the contract cost a lot of effort and (often) money.

Procurement is not a partner of demand management

Procurement is still considered as a secondary process. Procurement is insufficiently being involved during the definition of the service level agreements (SLA) and the MIRT process. The integral alignment/optimization of procurement between construction and maintenance is not optimal translated towards lower operational levels. The SE process plan model of RWS (Rijkswaterstaat, 2011d) shows that the procurement processes from assignment towards demand specification only aim for work breakdown structures and procurement strategies for engineering companies. Procurement is closely related to other businesses and this means that RWS should obtain, share, and buy knowledge. Currently, hired external personnel staff several crucial (procurement) positions within RWS and its projects. These positions are insufficient considered as a source of knowledge. Finally, the obtained and experienced knowledge is insufficient secured in the whole organization.

Actual market knowledge and supplier knowledge is insufficient

Another goal of RWS was “Market, unless” (“Markt, tenzij”), which means, “outsource more tasks and/or responsibilities towards the market”. The latter requires a more intensive relation with the contractors. During tender processes RWS seeks towards the maximum span of freedom by innovative contracts and tender procedures. The contractor is involved earlier in the different project phases to exploit their knowledge and expertise. However, during the procurement process there is no room for the collection of knowledge from the contractor. The learning curve between projects is insufficiently translated towards improvements. A design contest is not optimal if the winner is not awarded with the contract.

Standards are insufficient traceable and not coherent

Investments in uniformity and transparency should lead to an organization that acts like “one RWS” (Rijkswaterstaat, 2011c). Contractors suggest that RWS evolves (e.g. “contracten buffet”), but acts diverse as a principal. There is not one uniform market approach and procurement strategy. Currently the pro-active guidance, development, implementation, and distribution of standards are lacking.

Transaction costs are inadequately managed

The fifth spill is based on descriptions of several statements. There are too many players and transfer moments involved (many stakeholders and long contractor selection procedure). Further, the need for information and the available information do not match. Information management is not efficiently organized and transferred during tender phases. RWS does not have a complete and uniform system to request and inform about RWS its assets and their condition. Without the latter RWS and contractors remains confronted with not quantifiable uncertainties.

4.6 Summary

RWS wants to be a professional principal and needs to professionalize. Untill now RWS makes progression and is transforming towards becoming a better executive agency (Rijkswaterstaat, 2012a) (Rijkswaterstaat, 2011c) (Rijkswaterstaat, 2012g). A procurement organization implements the procurement policy in the realization of organizational goals and the derived procurement objectives. Therefor procurement should have a strategic position in the organization. Changes are not only based on organizational changes, but also relate to deeper organizational and cultural values in order to become a professional principal. RWS expects the current construction sector to make an extreme culture change. Since 2002, RWS is continually changing and this cost time and resources of the management because this organizational change was intern not commonly supported (Metze M. , 2009/2010).

Profit is not equally understood. RWS changes towards a more directing principal and expects the contractors to fill in the gap the leave behind. This transformation does not occur without any disturbances and actors must “learn by practise”. Improvements and the prevention of mistakes/spills are accomated by a “learning curve” over the projects and with the suppliers/contractors. The distribution of roles and responsibilities remains complex. RWS still focuses on the traditional preliminary start up of projects and procurement is considered a secondary process and differently implemented in the project organizations (lack of uniformity) (Rijkswaterstaat, 2012c). Design and realization are still two complete different worlds.

The relation between RWS and the contractors is complex. RWS is a governmental agency. Both parties face conflicting interest and work along different principles. The “kasritme” system is controlled by the ministry and provides certainty about the annual budget, but limits the possibilities to make optimal multi annual trade-offs in a business case. The mutual understanding of each other’s goals and interests and the deed for both to strive towards one common goal is not present. RWS lacks of integrated decision-making and integral consideration of procurement (fragmentation and sub-optimization) (Rijkswaterstaat, 2012c). Decision-making goes slowly in the multi tiered organizational levels (Metze M. , 2009/2010). RWS focus more on service providing instead of product development. RWS aimed at a new way of working (new contracts, “Markt, tenzij”, and “Meer met minder” policy). The shift is a result of the changing versatility of projects and rooted prejudices of the construction industry. The complexity of environments rises and society changes and asks for more transparency. Changes by the OP2015 (and its predecessors) are not only restricted to organizational changes. They also relate to deeper organizational and cultural values.

The lack of trust is still one of the major issues in distribution of responsibilities and tasks in the construction industry. There is a lack of supply chain thinking (Zaal, 2009) (Kok, 2007). Implementing tools and methods is not enough for RWS. Common understanding of the deeper underlying values of such tools and methods is even more important (Metze M. , 2009/2010). Subsequently, codes of conducts and procedures are created to prevent fraud in future projects and to realize a more fair and transparent tender process. RWS controls the contractors during the execution of the work, but lacks a suitable performance measurement system. Performance management should focus not only financial results, but also on product quality, innovation, cost, planning, sustainability, satisfaction, collaboration, communication, and selection (Schoenmaker, 2011);

5 MAIN FINDINGS RWS LITERATURE

In this chapter the first two sub research questions from section 2.2 are answered. Since 2002, RWS is changing. The need for change is related to several organizational and political subjects and is described throughout the report from chapter 1-4. In the first two questions it is important to understand who RWS is and what vision RWS strives for. Different aspects related to the organization of RWS and the organizational change are represented in chapter 4 and appendix A. In section 5.2 it is briefly described how RWS procures its infrastructural works according these new OP2015 view. The behaviour of RWS is closely related to the vision and strategy of RWS and is discussed in the interview results and in chapter 7 and 8. A brief summary is given in section 5.3.

"If you do what you did, you will receive what you had." (Mireille Götz, 2012)

5.1 Why does Rijkswaterstaat want to change into a (more) professional principal?

5.1.1 In general, a professional principal

RWS is responsible for the ownership and operation of the three national networks of HWN, HWS, and HVWN. RWS works from the viewpoint of its network to comply with the goals of the OP2015. Between 2011-2015 RWS strives to work as one team, as a team that collaborates intensively with others, and as a team that continually improves their processes and quality. The market strategy became "Market, unless" ("Markt, tenzij") and "more with less" ("Meer met minder"). RWS wants to invest in the quality of their employees on crucial roles in the organization. Knowledge development and flexible HRM are more important. Specific knowledge over the work processes is necessary to sustain an integral overview and a directing role over the projects in the network. In appendix E.1 the definition of a professional principal is defined as:

> A professional principal understands the needs of both clients and RWS, knows the markets competences, is supported by a firm base organization, and search towards the optimum between network, purchase, and control by clear project management.

5.1.2 Need for change

The OP2015 states that the goals have not been reached yet in 2011. RWS should be relieved by the market and should act more into a directing role ("regiehouder"). The former minister G. Zalm stated, "RWS was too large, too expensive, and did not worked in an efficient way". RWS is as an agency depended on the ministry and sensitive for political opinions. As an agency RWS lost their "policy" powers and is currently steered by the ministry of Infrastructures and Environment. RWS had to professionalize their work processes and attitude into a more "business like" manner. In addition, several projects were not realised within time and budget and/or delivered the expected quality. RWS is still in need of leadership to create and sustain clear and firm frameworks. The (top-down) policy implementation is complex and insufficiently concentrated on the connection between management and operational levels. The organizational change resulted in resistance under the traditional RWS employees and management. Employees find it hard to let go their traditional work patterns. RWS is in need of "new" engineers. RWS and its DG are aware that in order to realize their goals they really need to work differently as one RWS. In order to do so RWS focuses on new or improved work processes.

5.1.3 Towards 2015

RWS wants to be the best executive organization of the government. RWS wants:

- To be an organization that controls and maintains their network from their national functionality.
- To be a reliable productive executional part of the ministry of Infrastructure and the Environment that brings aspects of infrastructure, spatial planning, and the environment together.

- To be a partner that connects with other partners in the managerial environment, in knowledge institutions, and with market parties to improve mutual performances.
- To professionalize and centralize its procurement processes.

Personnel are the key to success in becoming the best executive organization. They are stimulated and influential in their work. Investments are taken with care and in close consideration in times of crisis. Trade-offs between optimal and suboptimal projects are inevitable. Organizations become “the best” when they learn from their mistakes and make improvements every day. There is a need of a principal that has the knowledge and competences to steer contractors at all times. Not only a principal that verifies the quality of the deliveries, controls the contract financially and juridical, and steers where necessary. It requires a principal that has the competences to understand, follow, and redirect the outsourced processes well informed. RWS wants to act as a better public oriented network manager. RWS wants to professionalize and centralize its procurement processes. It requires an interactive process that involves an integral approach.

5.2 How does Rijkswaterstaat procure its infrastructural works in practice?

5.2.1 Strategy

RWS is not a market leader, but RWS has a “monopoly” over the Dutch highways. RWS is a project-oriented organization and aims to prevent scope changes during realisation. This behaviour is related to their organizational culture and their experiences in the past traditional bid-build contracts. RWS is responsible for their annual budget, not their profitability. The minister of Infrastructure and Environment is the direct client of RWS, but indirectly RWS works for all the Dutch citizens. The ministry demands a certain network performance from RWS (road operator). This demand is translated into national performance requirements per network (SLA) and forms the base for contracting. RWS its responsibility is considered as a high social responsibility. Employees are civil servants and RWS is differently organized compared to commercial companies with a more clear business case mindset.

RWS wants to be relieved by the market and strives for measurable and quantified output. RWS is in need of a contractor that behaves on behalf of the interest of the principal. Contractors are earlier involved to exploit their knowledge and experiences (Markt, tenzij). Furthermore, RWS increases their projects’ scope and outsources more tasks to the market to minimize their control efforts (“Meer met minder”). Yet, the market still suggests that they receive many illusionary freedoms. RWS collaborates cross networking, strives for customized information, cutbacks to usage, strives for safer usage of the networks, and is developing knowledge. As a leading project manager RWS should work more from the viewpoint of its network. The project managers and their teams should think from the supply chain and the networks and they should involve the environment upfront. They understand the procurement process and link this knowledge with the functionality and technology of RWS its networks. Flexibility is the key to smarter solutions. RWS must understand who is in control and who is responsible.

5.2.2 Procurement

Procurement is for years considered as a secondary process. Projects (technique) were and still are considered as the primary process. Procurement was an obligatory formality. However, with this simple view RWS was not able to realise their projects in a satisfied way. Yet, in profit and non-profit organizations procurers became more and more important for strategic work, which was supported by new economic theories and visions during the nineties. RWS acknowledges procurement as a “core task” and they should stay in control of this task (Rijkswaterstaat, 2011b). The procurement strategy is elaborated in section 4.3. IMG provides the framework for the integral contracts (“contractenbuffet”). Currently procurement is not centralized high in the organization (see section 4.5). The project procurement is mostly decentralized over the regional departments. The different projects and the regional procurers (BIO) approach the market within the predefined procurement frameworks of IMG. Procurement is the task of the contract manager and in a tender the contract is awarded to the contractors.

RWS focuses on ex-ante contractual completeness (clear scope and lump sum prices) such that ex-post interaction is prevented. Since the new innovative contracts (D&C, DBFM, alliances) the needs in the projects and organization changed significantly. The innovative contracts are based on traditional Anglo-Saxon contracts (clear distances), but introduce the matter of “reasonableness” and “fairness” (“redelijkheid & billijkheid”) from the Rijnlandse contract model. These new forms of contract require better collaboration between both parties. RWS wants to focus on the “what” question. The “how” and “when” questions are less important. Yet, RWS is still involved in several design phases and discussions (TB procedure). The distribution of roles and responsibilities is a complex issue and should be covered in the contract to safeguard the “distance” between RWS and the contractors. Still, acting from a business attitude should remain the primary task of RWS. RWS should only collaborate if this fits the goals of the organization and when it offers demonstrable (social) value.

5.3 Summary

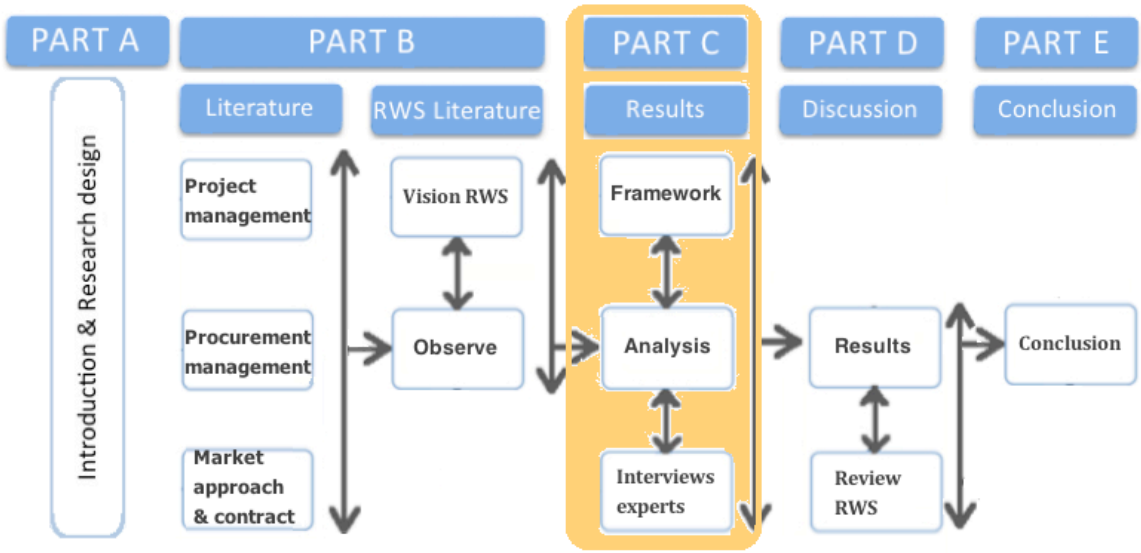
Why does Rijkswaterstaat want to change into a (more) professional principal?

- RWS wants to be the best executive organization of the government.
- RWS strives to work as one team, as a team that collaborates intensively with others, and as a team that continually improves its processes and quality. The OP2015 states that the goals have not been reached yet.
- RWS was too large, too expensive, and did not worked in an efficient way.
- RWS should be relieved by the market and should act more into a professional directing role (“regiehouder”). There is a need of a principal with knowledge and competences to steer contractors at all times.
- The interactive processes require an integral and multidisciplinary approach.

How does Rijkswaterstaat procure its infrastructural works in practice?

- The politics demand a certain network performance from RWS (road operator) and the demand are translated into national performance requirements per network (SLA).
- Contractors are earlier involved to exploit their knowledge and experiences (“Markt, tenzij”).
- RWS increased their projects’ scope and outsources more tasks to the market to minimize their control efforts and overhead costs (“Meer met minder”).
- Procurement is the task of the contract manager and in a tender the contract is awarded to the contractors.
- The different projects and the regional procurers (BIO) approach the market within the predefined procurement frameworks and the “contract buffet” defined by IMG.
- RWS focuses on ex-ante contractual completeness (clear scope and lump sum prices) such that ex-post interaction is prevented.
- RWS is still involved in several design phases and discussions (TB procedure) and the distribution of roles and responsibilities are covered in the contract.

PART C. RESULTS



6 INTERVIEW FRAMEWORK AND ANALYSIS

Interviews are used to obtain information and provide many detailed and wide-ranging information of the procurement approaches of RWS and market parties (see section 2.4). In this thesis ProRail, Schiphol Group, FrieslandCampina, DSM, and Shell are entitled as “market parties”. The interview content is analysed on differences and similarities compared to RWS. These findings are represented in appendices D.4 and E. The analysis does not focus on exposing the “best way of practice”. The objective is to map and explain the differences and similarities about the procurement approaches in practice. The analysis findings provide insight in different political, strategic, organizational, and operational procurement related topics. The output of the interview analysis is used to provide an answer on the last three research questions in section 2.2 and are represented in chapter 7.

6.1 Interview approach

Table 2 Different kinds of used categorization during the interview research

Interview questions	Interview results	Final report categories
Purpose of procurement	Strategy	Politics
Procurement strategy	Business	Strategy
Procurement organization	Organizational structure	Organization
Procurement versus planning	Procurement	Operational procurement
Distribution of roles	Relationship	
Quality requirements	Contract	
Incentives	Organizational culture	

6.1.1 Interview questions

The categorization of the interview results was an iterative process. Upfront the wide-ranging scope of the questions resulted in a comprehensive insight of the different procurement processes. The interviews are executed by the means of open questions (see section 2.4 and appendix D.1). The different interview questions are related to the research questions in section 2.2. The interview answers were reorganized based on the interview questions. A directing framework was not defined upfront.

6.1.2 Interview results

The interviews are recorded and written out, but are not represented in the report. The answers are used as input for the result analysis tables in appendix D.4. The findings from the interviews are represented in two tables (RWS versus commercial companies and RWS versus “public” companies). The interviews content elaborates strategic, tactical, and operational content. The framework used in this step is based on the obtained findings. These findings are gathered and categorized into eight subjects, which are (see Table 2 and appendix D.3):

- Strategy;
- Business;
- Organizational structure;
- Procurement;
- Relationship;
- Contracts;
- Organizational culture;
- Politics.

The subjects incorporate the obtained interview results and are defined in collaboration with the thesis committee. It was not possible to compare all results in the same way due to incomplete answers of the open interview questions. The interview results are elaborated in chapter 7 and 8.

6.1.3 Report categories

The analysed content of the interviews in appendix E is used as input for the results in the main report. The different interview results are linked with the research questions on relevance. However, the widespread interview output resulted in a modification of the research questions. In addition, it was very difficult to process these results along the earlier defined eight subjects. “Procurement” is related to strategy, business, organization, contracts, and relationships as well. Organizational structure and culture are both related to a company’s organization. Contracts, relationships, and procurement related subjects are related to operational stages in a project. Therefor the eight subjects of the interview content table were bundled into four encompassing categories:

- Politics;
- Strategy;
- Organization;
- Operational procurement.

The four categories encompass different kinds of policy levels. The first is related to the institutional environment and its influences. The second and third categories are related to more strategic/tactical (business) aspects of an organization/company. The fourth category is related to the interpretation of these strategies in operational stages. Remarkable in this framework is that “procurement” is not a specific category because procurement is the thesis main topic. Procurement is comprehensive, and encompasses the above four categories. The content of the four categories is described below.

Politics

The first subject politics can be divided in internal and (inter-) national politics. Politics exercises several influences on the construction industry. Especially on governmental organizations like RWS. The politics (ministry) defines and/or appoints the frameworks and legislation. Another aspect is internal politics. Internal politics are related to relations between the board of control and several internal departments.

Strategy

The strategic part explains something about the company’s philosophy. It tries to explain the current related context. It elaborates the preferred direction of company, their strategy, and their core values. It explains some of the underpinnings for project approaches and decision-making. It discusses the related business attitude of actors and their profits vision. In addition of the interviews results, the input of the strategic part is derived from the companies’ websites as well.

Organization

The organizational structure distinguishes several aspects related to a company’s organization, but also their project organizations. This subject explains how the company is organized and what kind of structure is implemented. Procurement is also related to the base organization and the project organizations. In addition several company’s in-house responsibilities are described.
The organizational culture describes the cultural related aspects of an organization. It is related to the motivation (intrinsic and extrinsic), which is a pre to reach a target (Verschuren, 2011), and the behaviour of employees. An organizations culture has several impacts on an employee’s deeds and acts. Organizational changes also impact the employees’ behaviour.

Operational procurement

Operational procurement combines several subjects into one. It is about how the company’s strategy is implemented in the projects and operational phases. The operational procurement describes how the roles and tasks are distributed. Procurement is related to match the demand from the primary processes with the supply of the market. Furthermore it describes several relationships that are involved during operation between principal, client, and internally in the principals’ organization. It involves selection and award criteria, relationships, quality demands, and is also related to the type of contracts and its specification. Finally the distribution of risks is elaborated as well.

6.2 Summary interviews findings

In Table 3 the main findings regarding the differences and similarities towards RWS are represented. These findings are based on the interview analysis in appendices D.4 and E. The interview content tables separated the "public" and "commercial" companies. The commercial companies are highlighted under one column. The interview results of Schiphol Group are part of the commercial column. Schiphol Group is organized and steered as a commercial company just like Shell, DSM, and FrieslandCampina. ProRail has more similarities with RWS than with the four companies. This thesis aims on RWS and not on ProRail and thus ProRail does not fall under the term "commercial companies" later on in this report.

Table 3 Summarized aspects RWS versus the commercial companies (excluding ProRail)

	RWS	Commercial companies
Politic	Faces national politics and EU regulation	International politics, cultural differences, and corruption
	Internal competition based on a "power game"	Internal competition based on performance
Strategy	Agency for the ministry of I&M	Company with board of directors and shareholders
	Directing role, keep in control	Directing role, keep in control
	Aim for social values (non-profit) and lowest cost price	Aim on profits; "Need to survive"; Value for Money
	Lack of business case thinking. Only MKBA in plan study	The business case is always leading
	Faces no competition	Involved in a competitive environment
Organization	Complex decentralized organization	Clear centralized base organization
	Slowly and careful implemented organizational change	Fast and rigid organizational change
	Project organizations	Project organizations and procurement organizations
	Clear separation between plan study and realization in both scope, decision-making, and project teams	Characterized by integrated decision-making & earlier involvement and integration of plan study, realization, and operational roles
	Procurement is a secondary process and is decentralized in the regions.	Procurement is a strategic service, centralized high in the organizations, and integrated in project teams.
	Civil servants	Business people
Operational procurement	Unclear responsibilities and roles.	Clear responsibilities and roles
	Many activities outsourced	Different outsource strategies dependent on technical complexity
	Procurers support the project teams in an advisory role. Friction between procurement and contract management.	Procurers complement project teams, have insight in the business, share knowledge, and search towards the best suitable supplier for a specific need
	Procurers are lately involved in project preparation and procurement is seen as a project activity to fulfil.	Procurement is involvement early in the projects to support the definition of needs and market approach.
	Demand (TB) is "pushed downwards" towards the contractors	Organizes intelligence sessions and/or dialogues during selection to match demand and supply
	RWS wants to be relieved by the market ("Markt, tenzij" & "Meer met minder")	Market stays closely involved (monitoring/super visioning)
	Controls contractors based on process plans (SCB)	Controls contractors on quality checks.
	Quality is a differentiator and is not equally perceived.	Quality is not a differentiator
	LCC thinking just started (asset management)	LCC/TCO thinking is "business as usual"
	The contracts are often experienced as a goal	Contracts are just a mean
	The Dutch "innovative" D&C and DBFM market is not mature	EPC(M) contracts are mature and internationally acknowledged
	RWS uses short term D&C and long term DBFM contracts. "Finance" component is used as incentive in DBFM	Market use short-term contracts and keep finance in-house because of preferred independencies and flexibility from contractors
	Maintenance outsourced based on short- and midterm performances contracts	Maintenance performed in-house or outsourced for short term periods
	Short term supplier/project relations and are not assessed/evaluated periodically	Build on long-term supplier relations and evaluates and/or monitors performances and experiences. Market can "cheat" in the choice for a contractor
	Past performance ECs just started	Use past performance and short/ long lists (preferred) suppliers
	High trust, high penalty, but also "Pap bij nat houden"	Focus on bonus incentives and "Deal is a deal"
	Contractors claiming additional work is an issue	Contractors are rarely claiming additional work

7 MAIN FINDINGS INTERVIEWS

The main interview findings are elaborated by answering the latter three sub questions from section 2.2. In section 7.1 the current obstacles experienced by RWS are represented. In section 7.2 it is elaborated whether or not the commercial companies acknowledged these obstacles. Section 7.4 describes what kind of measures the companies implement to prevent such obstacles as experienced by RWS. The interviews analysis in appendices D and E are input for answering these research questions.

7.1 What are the current obstacles in the procurement process?

Projects plan studies and realization still faces several problems, obstacles, delays, budget overruns, and legal claims. Remarkable is that several obstacles often relate to “behaviour”. The behaviour of RWS goes back to the establishment in 1798. A Napoleonic and militaristic regime characterized their culture. It seems that the behaviour of RWS, which is focused on technique, strict regulation, and ex-ante risk prevention, is similar to the past strict discipline that is characterized by many rules and supervision. Even more then 200 years later RWS is confronted with their Napoleonic militarist tradition. The hierarchical top down behaviour is still observed in the interviews. The behaviour of RWS is a complex, but crucial factor in the whole process. Below the most important observed and analysed procurement obstacles are elaborated. In appendix F the different sources from the interviews are linked with the defined obstacles in subsection 7.1.5.

7.1.1 Politics

“RWS is depended on the politics” is an often-heard statement at the agency RWS:

- The ministry influences the decision-making of RWS its project portfolio.
- The government could change the “rules of the game” during project realization.
- EU regulation is experienced to prevent RWS from entering long-term supplier relations.
- Political opinions change roundabout every four years or less.

Briefly the dynamic politics confront RWS with several strategic changes roundabout every four years. RWS requires flexibility to anticipate and respond to these actions. Currently the changing politics and regulation are used as an excuse for a lack of relation management and the presence of many scope changes. However, RWS seems not equipped to respond with these conditions in a flexible way. The latter influences the longer-term strategies of RWS.

EU legislation may seem to prevent RWS from relation management, but in essence these regulations focus on transparent and objective procurement, which is in the eyes of the commercial companies normal. RWS is not restricted to involve contractors earlier in the process as long as this does not create an information inequality. Not the EU regulation, but the legal procedures (“Tracé- (TB) and Planologische Kern Beslissingen” (PKB) procedures) and internal RWS regulation hamper the possibilities of functional specification and earlier contractor involvement. RWS is less self-thinking and more steered from the environment (political). RWS lacks a strong base organization with a clear view on the opportunities for flexible decision-making by taking into account political influences.

Obstacle: RWS is confronted with dynamic political and environmental influences in their decision-making process, but is not equipped to manage these for the long-term.

7.1.2 Strategy

An often-heard argument for the “weak” successes of RWS is the lack of business case understanding. Moreover costs and benefits are experienced differently, both external (social value versus profit) as internal (organization versus project). Yet, a MKBA is performed earlier in the projects plan study phase. After the project teams are involved the awareness of these “business principles” often disappears and the “technique” becomes leading in the project. The project is responsible for the projects budget and not for the cost/benefits of these projects. Furthermore, it seems that the strategic positions elaborate several “business case” related aspects (e.g. IMG). Yet the problem is the translation towards the

projects. Projects often observe reactive and corrective behaviour and focus on the technique and the contract. The clear “needs” of a project are not sufficiently defined upfront (lack of qualitative TBs).

Obstacle: RWS does not sustain a business-case related mindset in the entire projects’ life cycle.

RWS is confronted with simple technology and complex environments. However projects still fail or are confronted with obstacles and failures. RWS outsources more towards the market to solve these issues. From a technical viewpoint the “Market, unless” (“Markt, tenzij”) policy aims to relieve RWS from several responsibility (by D&C/DBFM contracts). Yet, both the civil and non-civil aspects seemed to be underestimated in these large integrated projects. The distribution of these responsibilities requires new competences from RWS in a different role. In these complex and dynamic projects process management becomes more important, which is a good thing. However, RWS is still a project organization with clear focus on project management (IPM model). In order to keep their distances RWS aims on clear process plans to remain in control over the processes of the contractor (by SCB). However, RWS remains involved in detailed design aspects. Synergy advantages (larger scope with less people and only one contact (single point risk allocation in directing the market) are assumed to be advantageous in the road infrastructure projects. Yet, the “being relieved” strategy clashes with the whole partnership/collaboration ideology.

Obstacle: RWS expects to be relieved by contractors, but are during realization still involved in several scope/design discussions with the contractors.

7.1.3 Organization

RWS has cut in their workforce because of the “More with less” (“Meer met minder”) policy, but lacks of sufficient internal qualified or educated personnel to deal with the new integrated contracts. External consultants are hired to fill up these “gaps”, even in crucial (project) positions. In addition, there is a lack of evaluation in the projects and in procurement. RWS looses lots of crucial knowledge after and even during projects when these externals leave RWS. Even the available information is not always complete and transparent. One of the consequences of this “knowledge” scarcity is related to uncertainty. Uncertainty is again related to the behaviour of RWS employees and their project approach. Uncertainty provides input for discussions, but there is a lack of alignment, communication, and evaluation about these discussions and between the projects. Different employees solve obstacles/failures/contract mistakes in different projects and reinvent the wheel over and over again. Many employees are forced by time pressure, do not commonly learn from their mistakes, and perform many corrective actions. RWS employees mentioned that is often unclear who is responsible in case when things go wrong. RWS lacks of clear information management and is not in control over reliable and complete information about the current assets state, and the actual users, clients, and organizational needs.

Obstacle: RWS lacks of well-qualified human/organizational resources to deal with and to learn from current project activities and experiences.

Furthermore, the different roles of market, procurement, technique, environment, operator, contract management, and risk are multi-disciplinary, but still think from their own framework about the “what” and “how” questions. It was mentioned that IMG is not “equipped” to act as a centralized procurement organization. IMG does focus on the procurement organization at a strategic level. They provide advice for the projects if required, but IMG is not integrated in the projects. IMG provides procurement frameworks for the regions and not directly purchasers for in the projects (which is a task of BIO that is decentralized in the regions). Yet, project teams find it hard to work within these frameworks and conditions. The procurement strategy of RWS seems clear, but the translation from strategic to operational management (regions and large projects) seems lacking. In the current IPM teams procurement is part of the responsibility of the contract manager. Nonetheless procurement is still experienced as a secondary process. BIO’s perform “procurement” within the required frameworks (“contractenbuffet”), but this does not result in clear transparent contracts for the market (“one RWS”).

Obstacle: RWS lacks of a clear and strong base procurement organization that provides procurement managers in the projects and learns from experiences across projects.

Organizational behaviour

RWS was used to set their own policy, and realise, maintain and operate their own assets. Nowadays, RWS works as an agency for the ministry and involves contractors earlier in the process to become relieved. The focus of RWS on new partnerships and true collaboration with the market conflicts with their “distance” behaviour as a public supervising authority. The current organizational change involves drastic consequences. Organizational changes are based on efficiency gains to improve the whole process/product. Synergy advantages and more integrated projects should lead to better quality are some of the reasons. However, every strategy/theory offers opportunities and threats. Despite the possible synergy advantages there remains an unclear large “grey” gap of uncertainties by increasing the contract level to a higher level and by keeping the specification level “low” (see section 3.5). The organizational change is put forward as "thou shall", but it seems that RWS still searches for the right organizational structure. Moreover, RWS employees lack of knowledge and experiences to deal with this new approach. The real obtained “efficiency gain” related to the organizational change is questioned in the interviews. Project employees question the effectiveness and usefulness of the organizational change. Employees lost their faith after more then ten years of change. The latter makes it harder to succeed. However, many people forgot RWS its starting point. RWS drastically changed, works more efficient, and acts more like a public oriented network manager then RWS did in 2002.

Obstacle: “Higher” (project) management and IMG still encourage the organizational changes, but lower in the projects several employees lost their faith in a successful change.

RWS and the market have conflicting interests. Value is experienced differently (social value versus profit). Moreover, RWS is like almost every large organization characterized by several not congruent roles of a purchaser, builder, operator, and road director with again conflicting interests. Projects will often involve elements that are in conflict with one of the interests of for example the operator (act in accordance with the public versus the needs of the network). Both the project and the operator are one organization, but both are confronted with different interests, internal as external. RWS aims on the delivery of good infrastructures to comply with the vision to be a public oriented network manager and professional project manager. Engineers do not accept suboptimal solutions, but (based on traditional believes) strive for the best (e.g. “zero” hinder during construction for road users). It is about the network, not the individual projects or even small objects. Such network thinking can result in trade-offs between projects. Yet, clear dialogue and communication about risk distributions are often not present. RWS remains responsible for the risks related to the network performances and realization of the top performances. The latter conflicts with “Market, unless” (“Markt, tenzij”) and “More with less” (“Meer met minder”). The behaviour of RWS is characterized as the “pap bij nat houden” culture.

It is experienced that contractors design their proposal in a way that is the most advantageous for the EMAT score. RWS strives for Value for Money, but is confronted with difficulties to make the demand clear and in consensus with all different roles. Ex-ante communication is important to make uncertainties clear and to let people understand each other’s interests. However, the relation between RWS and the contractor is tensioned and fixed in a formal relationship, the contract. RWS uses (in performance and DBFM contracts) a strong financial incentive for contractors to comply with the performance requirements (high trust high penalty). On the other hand, too high risky damages are in some way (partly) involved in the contractors’ offer. In the interviews was mentioned that project teams have never fined a contractor based on his non-performance with high penalties. Most of the time a “package deal” is made with the contractor and the projects keep on rolling. Afterwards these projects are brought to the public as large successes, but the actual hard and though experienced collaboration is not mentioned and “forgotten”.

Obstacle: RWS often lacks of responsibility and accountability to act professional like from a business oriented viewpoint.

The implementation of tools like SE, AM, SCB, and the multidisciplinary approach lack of common understanding to realize the expected benefits. Project teams do not always understand these additional values. It was mentioned in the interviews that the integrated multidisciplinary approach of these tools is not always clear and conflicts with the traditional RWS behaviour. Projects still face cyclic

design/decision-making processes and there is an organizational separation between plan study teams, IPM teams, IMG, and operators. It was mentioned that employees still make “preventable” mistakes despite of the introduction of the IPM model and the focus on more effective communication. It was also mentioned that some employees do what they like to do as engineer and do not act according to what is really necessary. The latter argument is taken with care, but it seems that employees lack of incentives to act according the interest of the whole organization. The latter is supported by the fact that several managers experience the project interest more important than the organizational interest. The traditional RWS employee was used to specify almost everything into detail and is demanded to specify as much as possible in functions. The common awareness of these real problems is not formally acknowledged. The latter requires an intrinsic motivation from employees. As a result of unclear scope and contracts,

Obstacle: The lack of good and clear incentives hampers the multidisciplinary thinking and efficiency and effectiveness of projects.

7.1.4 Operational procurement

The demand

Several interviewees mentioned that RWS does not work as one RWS and not uniformly approaches the market. Several departments and projects have an own set of documents and strategies to act towards the market. RWS aims on an internal uniform interpretation of contracts and IMG defined the framework and conditions for this approach. RWS is involved in a complex vicious circle were RWS on the one hand prevents uncertainty by creating distances (contract), but also is in need of collaboration to prevent other uncertainties in earlier project phases (market involvement). RWS can only sustain the traditional principal-agent distance when the “what” question is clear (like the bid-build model) and the environment acts predictable. However, there is a risk of more uncertainty for both principal as agent by steering on earlier abstract results (functional requirements). Current discussions in projects are all related to scope. These uncertainties have negative consequences on the behaviour of RWS employees. The demand is still not explicitly defined. Employees do not understand what is expected to be a good and smart demand (lack of uniformity and evaluation). The contractors still ask RWS about “what to do” because of an uncertain demand while the market should take over this responsibility.

RWS employees experience the TB procedures (or even the politics as a whole) as an obstacle to specify in a functional manner like prescribed by the systems engineering approach (Rijkswaterstaat P. B., 2009). Governmental organizations fall into a funnel of current legislation and regulation. They are upfront often confronted with detailed specifications while the real need is not clear enough yet or is not understood. Innovation is hampered. RWS do not possess sufficient information and knowledge about their assets current state and performances. A DBFM contract is depended on a stable environment for 25-30 years and it is mentioned that this is exactly not were RWS is prepared for. RWS expects the market to fill up the “gap”, but contractors’ lack of incentives and experiences to support RWS in the expected way. Especially the small and mid-sized contractors are in the current context/demand not equipped to reasonable price long-term lump sum projects (not to mention the construction activities). In “functional” requirements uncertainties are not expected, but are present. The real benefits of a “relieved directing principal” are questionable when the “what” question is not clear. It is mentioned that several additional claims from contractors and present uncertainties are still a result of an unclear scope.

Obstacle: RWS is not ready (yet) to cope with the unpredictable contractor market and lacks of defining a clear and fixed demand specification to procure projects against lump sum prices.

“Markt, tenzij” & “Meer met minder”

RWS transfers a large part of the responsibilities towards the construction contractors (“Markt, tenzij”), but actually remains closely involved (traditional behaviour). RWS employees question whether the contractors are equipped and willing to act according to a design manager and on behalf of RWS (maximum social value against lowest cost). There is a tension between “more market” (“Markt, tenzij”) and “market mechanisms” (Porter, 2008). Yet, it was mentioned that it is experienced that sometimes contractors make misuse of this close involvement. A common “misunderstanding” between RWS and the market is that RWS understands a quality milestone as a minimum while the contractor experiences

this milestone as an end point. RWS could specify as many as they want. Discussions remain a never-ending story when there is no consensus about quality standards between RWS and the contractors. Responsibilities are transferred back towards RWS when there are several uncertainties and scope changes in the awarded contract. In case these risks are present then the contractor would not be responsible for the outcome. Incentives to prevent this behaviour are related with EMAT, but after contract awarding there is room for "giving & taking" in the contract. RWS work culture is often linked with consultations until there is consensus. Innovative procurement depends on trust, commitment, and requires more interaction between demand and supply. The market should acknowledge that LCC (see subsection 3.4.7), functionality, and sustainability are context bounded. RWS lacks of clear monitoring, "positive" incentives, knowledge about their assets functionality, and do not assess contractors based on actual behaviour. Tools like EMAT make sure that contractors take a better look at their internal processes and the LCC of the assets, but there is still a lowest price angle. Yet, lowest cost price, favoured or not, remains a reasonable award criteria in times of crisis.

Obstacle: "Markt, tenzij" is experienced to be the solution of the inefficient public performances, but contractors are not motivated to act according to the interests of RWS.

RWS wants to be relieved by the market through the policy of "More with less" ("Meer met minder"). The latter resulted in an increased project scope (clustering in large integral contracts). However, "up scaling" has its limits, could increase complexity, and asks for more knowledge capacity of the IPM teams. Up scaling projects means a reformation of the current markets demand and is experienced to create synergy advantages in both outsourced roles and responsibilities. Nonetheless, only a few contractors will be sufficiently equipped to manage these projects when RWS increases their scope of projects too much. Synergy is only achieved whenever a contractor could perform the activities better or more cost effectively then the principal. The latter is related to the complexity and standardization of the product. Consequently, when the choice of suppliers decreases (lack of competition), prices will increase. On the other hand, a larger scope increases the projects complexity and the need for integral decision-making as well. Large infrastructural projects are not only about civil engineering. Several conflicts about unclear (technical) specifications and contract agreements were mentioned in the interviews.

Obstacle: The capacity of the IPM teams and the employees are overestimated by the "meer, met minder" approach, while complexity and the need for more competent control rises.

Procurement

Procurement is experienced as a secondary process. RWS is still a project organization that tenders projects. The current procurement role is part of the responsibility of the contract managers. However, procurement and contract management are two different worlds. The "current procurers" often leave the project after the contract is awarded, but after that the real process for technicians starts. During realization, the contract manager and purchasing advisor are the contact with the market. The contract manager is often lately involved in the plan study phase and this procurement is often focused on contracting ECs and defining a WBS for the contract. They do not understand the real procurement process usefulness and do not link this knowledge with the functionality and technology of the networks. An overall procurement manager that focuses on the projects (procurement) needs, the market relationships, the market performances, and evaluation is not present. The term relation management is unknown or experienced as forbidden by the EU regulations.

Obstacle: Procurement is experienced as a secondary process.

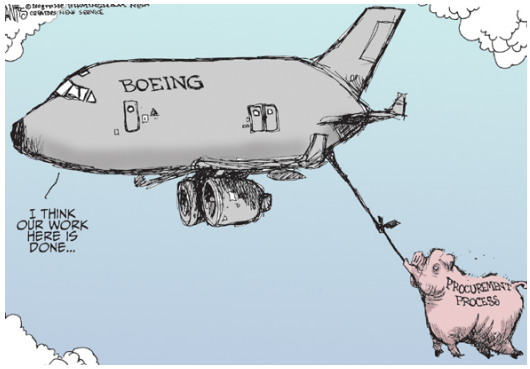


Figure 25 Procurement obstacle (source: http://blog.al.com/stantis/2008/09/boeing_and_the_procurement_pro.html)

In addition, tools like SCB to control the contractor do not result in the expected qualities as well. In the interviews it was mentioned that SCB is experienced as a “paper tiger”. SCB in the current form is not experienced as the solution. There is still a lack of clarity in the different project processes about the distribution of roles and responsibilities between RWS and the contractors. The lack of clarity leads to unforeseen problems during further design and realisation phases. There is no capacity to deal with these obstacles and problems. The supervision transforms from the construction site towards the desks. The process (plans) becomes more important then the product (result). The focus lies on process compliance instead of quality and cost of the product. RWS expects to receive a good qualitative product when the contractors’ processes are right. Yet the product quality itself (actual need) is often not understood. The interviewees mentioned that these “process” assessments based on plans is not quite successful yet. SCB is theoretically right, but in practice its shows different outcomes. The awareness of this potential “collaboration” burden hardens the position and attitude of RWS even more and results in old traditional design patterns (see organizational behaviour). However whether or not the market can perform these tasks better from a social viewpoint is questionable as well.

Obstacle: RWS does not assess contractors based on actual quality, but focuses mainly on process plans on paper.

Contracts

It was mentioned that the choice of the type of contract misses a clear consistent and coherent trade-off framework and is influenced by the politics by means of “Market, unless” (“Markt, tenzij”) and “More with less” (“Meer met minder”). The contract is the formal agreement between RWS and the contractor and result in a particular formal distance. There is always a tension between autonomy and accountability of parties (project versus organizational’ interest). From the interviews there was a diverging opinion about the relation between purposes of the contract. Some stated that RWS lacks of good collaboration while others mentioned the lack of a good contract. However, it is not about the contract, but about the scope. The scope of RWS is mentioned to be not clear enough and latter results in uncertainties in the contract. The strategy of RWS is focused to realise better-restricted "legally fitting" contracts (Anglo-Saxon). Yet bureaucratic, relatively thick and detailed contracts procedure descriptions are sensitive for uncertainties. The new contracts cannot be assessed whether they are really advantageous in terms of Value for Money compared to the traditional bid-build models. The future will proof whether the current promised advantages are justified.

Not acting conform the contract is an often-heard issue for opportunistic behaviour of contractors. The contract is one of the few means to restrict opportunistic behaviour in transactions (), but it seems that this is not the solution. A contract provides a certain “certainty” towards a client and a principal, but the contract is not the element that really realizes the product. In the construction sector the contract is not about a product, but about the realization of long-term and complex process. The discussion could result in advantageous opportunities, but opportunistic behaviour remains a problem. The Dutch UAV-GC consists of too much reasonableness and fairness for contractors to acquire claims when the contract is not perfect. Distrust leads to the need for more control, thicker contacts, and even more distrust, which is self-reinforcing. The awareness of this potential “collaboration” burden hardens the position and attitude of RWS and the market even more and results in traditional behaviour, claims, and distrust.

Obstacle: There is a lot of attention given to the contract forms instead of creating the “best” conditions to procure what is really needed.

7.1.5 Summary

In this section several obstacles at RWS are elaborated. The obstacles mentioned are:

Table 4 Analysed obstacles RWS

Subject	Obstacle
Politics	RWS is confronted with dynamic political and environmental influences in their decision-making process, but is not equipped to manage these for the long-term.
Strategic	RWS does not sustain a business-case related mindset in the entire projects' life cycle.
	RWS expects to be relieved by contractors, but are during realization still involved in several scope/design discussions with the contractors.
Organization	RWS lacks of well-qualified human/organizational resources to deal with and to learn from current project activities and experiences.
	RWS lacks of a clear and strong base procurement organization that provides procurement managers in the projects and learns from experiences across projects.
	"Higher" (project) management and IMG still encourage the organizational changes, but lower in the projects several employees lost their faith in a successful change.
	RWS often lacks of responsibility and accountability to act professional like from a business-oriented viewpoint.
	The lack of good and clear incentives hampers the multidisciplinary thinking and efficiency and effectiveness of projects.
Operational procurement	RWS is not ready (yet) to cope with the unpredictable contractor market and lacks of defining a clear and fixed demand specification to procure projects against lump sum prices.
	"Markt, tenzij" is experienced to be the solution of the inefficient public performances, but contractors are not motivated to act according to the interests of RWS.
	The capacity of the IPM teams and the employees are overestimated by the "meer, met minder" approach, while complexity and the need for more competent control rises.
	Procurement is experienced as a secondary process.
	RWS does not assess contractors based on actual quality, but focuses mainly on process plans on paper.
	A lot of attention is given to the contract forms instead of creating the "best" conditions to procure what is really needed.

An interesting notion is that several analysed obstacles at the more strategic and organizational levels are related to operational procurement. Especially obstacles that are related with an unclear project needs. Whenever the need is not clear upfront the whole project will face difficulties and discussions when dealing with this uncertainty. The behaviour of employees is also depended on the quality of the demand specification. When RWS does not properly understands their demand employees act more risk adverse and cautious.

7.2 Do other large companies and organizations acknowledge these obstacles?

In this section the observed obstacles of RWS from section 7.1.5 are generalized towards general obstacles. These are checked whether the commercial companies (excluding ProRail) acknowledge these as an obstacle as well. In section 7.3 it is elaborated how these commercial companies manage/prevent these obstacles.

7.2.1 Politics

The commercial companies acknowledged the “political influences” on the decision-making process, both (inter-) national and within the company. It even seems that especially international politics produce a larger business risk for the commercial companies. The commercial companies recognize that they are allowed to change their scope drastically even after the contract is awarded. The latter conflicts with the EU tender regulation for governments (principles of procurement law (E.M. Bruggeman, 2010)) that prevent large contractual changes after the contract is awarded. Also, RWS cannot just choose a contractor based on a particular “feeling”. Everything should be outsourced in open competition. In the worst cases these governmental tenders should be performed all over again.

7.2.2 Strategic

The market parties did not acknowledge both the strategic obstacles. The commercial companies think in profit from a business perspective and not from a public perspective. A business case is always leading. Yet, Schiphol Group and ProRail are both indirectly dependent on the government like RWS, but these companies are directly responsible for their results and strive for profit as well. ProRail even mentions their various cash flows. Nonetheless, ProRail is also depended for particular construction/maintenance work on the budget of the ministry. The commercial companies also recognize the opportunistic contractor market, but seem to be “in control” over these suppliers because opportunistic behaviour is experienced rarely. Moreover, scope changes do always exist. During realization the companies are also involved in several scope/design discussions with the contractors. Yet, these commercial companies can oblige the market to follow as they say so. Otherwise contractors could loose their preferential status.

7.2.3 Organizational

The external interviewees do not acknowledge most of the organizational obstacles. Uncertainties are part of the job and should be managed. The lack of well-qualified human/resource capacity is partly acknowledged by the other interviewees. Organizational changes require specific knowledge and learning by practice. These organizational changes are based on efficiency gains. Yet, none of the external interviewees mentioned the relevant tension between the strategic and operational levels during these transformations, which is remarkable. In the interviews there were no insurmountable obstacles mentioned related to the behaviour of their employees at the commercial companies. Not even with Shell and DSM that recently changed their organization and strategy.

7.2.4 Operational procurement

The interviewees acknowledge one of the obstacles related to operational procurement. The companies acknowledge the complexity of the demand specification and they recognized the risk of uncertainties in projects. Yet they did not mentioned obstacles in dealing with these uncertainties. A lot of time and resources are invested upfront in the initial phases and the FID is only taken when the demand is clear and the delivery contracts are signed. The companies work along different “distances” towards their contractors. The interviewees mentioned that the perception of the contract as a goal is understandable, but is in fact a result of unclear demand. Further they do acknowledge that contractors have to be motivated by incentives to perform at best on behalf of the principals’ interest. The contract is one of the few means to restrict opportunistic behaviour, but this is not the solution to demand quality from contractors. The commercial companies mention there is always room for improvement by learning from their mistakes. Failures and mistakes are inevitable, but the basic things should be performed correct.

The overestimation of the "Market, unless" ("Markt, tenzij") policy is partly acknowledged because all companies outsource many tasks towards the market. Yet strategic responsibilities are kept in-house. As a directing principal they need to be and stay in control. It was acknowledged that all companies struggle with the problem to decide where they can and cannot exert an influence on. They also recognized the different opinions about quality between principal and agent. Especially Shell, FrieslandCampina, and ProRail mention to act with caution when outsourcing tasks and responsibilities. The overestimated competence of the employees is recognized in the interview at FrieslandCampina. FrieslandCampina invests a lot in the internal involvement upfront in projects. However, with the current growth prospects the technical departments are not ready to fulfil their job as they do right now. Shell mentions that in too large contracts contractors even unsubscribe from the tenders because the projects are experienced incontrollable or too risky to deliver within the available budget.

7.2.5 ProRail

In section 6.2 it was mentioned that ProRail has more similarities with RWS then with the other companies. The thesis focuses on RWS and not on ProRail. Therefore the results of ProRail are kept out in the table below as well. However, the latter is an interesting conclusion. RWS and ProRail seem to have a lot in common despite that ProRail stands further from the politics then RWS.

7.2.6 Summary

In the table below it is represented whether or not the commercial companies recognize the observed obstacles of RWS in their own organization as a problem. The table does not suggest that these risks do not exist, but it shows whether the commercial companies experience these as an obstacle.

Table 5 Recognized generalized obstacles (based on Table 4) by the interviewed companies (excluding ProRail)

Subject	Generalized RWS obstacles	Recognized obstacle by commercial companies		
		YES	NO	CONSENSUS
Politic	(In-) direct dynamic political and environmental influences in the decision-making process.	Yes		Yes
Strategy	A business-case related mindset is not leading in the entire projects' life cycle.		No	Yes
	The principal is not relieved by contractors, but is still involved in several scope/design discussions with the contractors during realization.		No	Yes
Organization	The organization lacks of well-qualified human/organizational resources to deal with and to learn from current project activities and experiences.		No	Yes
	The organization lacks of a clear and strong base procurement organization that provides procurement managers in the projects.		No	Yes
	There is uncertainty/lack of clarity between the strategic and operational levels.		No	Yes
	Employees often lacks of responsibility and accountability to act professional from a business-oriented viewpoint.		No	Yes
	The lack of good and clear incentives hampers the multidisciplinary thinking and efficiency and effectiveness of projects.		No	Yes
Operational procurement	The principal is not ready (yet) to cope with the unpredictable contractor market and lacks of defining a clear and fixed demand specification to procure projects against lump sum prices.		No	Yes
	Contractors are not motivated to act according to interests of the principal.		No	Yes
	The capacity of the project teams and the employees are overestimated, while complexity and the need for more competent control rises.			No; 1:3
	Procurement is experienced as a secondary process.		No	Yes
	Principal does not assess contractors based on actual quality, but focuses mainly on process plans on paper.		No	Yes
	A lot of attention is given to the contract forms instead of creating the "best" conditions to procure what is really needed.		No	Yes

7.3 How do these companies and organizations deal with those obstacles?

7.3.1 Politics

The commercial companies did acknowledge the “political influences” as an issue in the decision-making process. However, the commercial companies define politics as a risk, which can be taken or treated. There are (inter) national and internal politics. Firstly, compared with RWS it seems that international politics and their cultural differences provide an even bigger challenge. These involve many risk considerations during decision-making and affect the profitability of the project. RWS is also confronted with politics, but the political choice to build a tunnel or a bridge does not affect their “right of existence”. The commercial companies did not recognize the “obstacle” of EU regulation because commercial companies are not all limited by EU procurement legislation. Nonetheless the commercial companies have to obey certain rules and safety precautions (legislation). ProRail and Schiphol Group fall under the BASS, which provides them a little bit more freedom in their tender procedures compared with RWS. Secondly, internal politics are involved in all companies. For companies like Shell the right of existence is depended on the projects’ performances. They have to manage these issues in their projects correctly (result oriented). Some interviewees mentioned that it is good for RWS as a public service provider to have a client like the ministry that takes into account all the inhabitants interests. Others mention that “politics” make it almost impossible for an organization like RWS to act as a professional entrepreneur. In both cases the political influences are related to uncertainty.

7.3.2 Strategic

The market parties are not public servants and think in profit (business perspective). Schiphol Group, and ProRail are both indirectly dependent on the government, but are directly responsible for their results/profitability like the Shell, DSM, and FrieslandCampina. In large projects employees are multidisciplinary depended on different disciplines. These need to work and communicate efficient and effectively in order to succeed. Decision-making is often executed with “everyone around the table” to prevent miscommunication and conflicting decisions. A common view of “value” is not always possible, but the understanding of each other’s values is (see section 4.2.1 for more information about “value”).

Still, commercial companies do not attach that much value on social values like a governmental organization, but more important is to invest in the "function" and find out what fits around that best. Contractors can better price their proposals when the demand and the incentives are clear. Too much room for multi-interpretation of uncertainties are undesirable. *“We keep in control, we know what needs to happen, and we can test the contractor whether he is doing what he has to do”* (Biesboer, 2012).

In the commercial companies almost every project FID is based on a business case. The business case is experienced as the heartbeat of the project. The business case is always leading and in terms of social/public value this can be a disadvantage. A negative business case can result in a project closure. For services Schiphol Group even asks contractors for a business case with several criteria and KPI’s for additional value. The latter result obligation is less relevant for construction assets, but a well-defined assessment based on qualitative criteria is an opportunity for constructions. The commercial companies strategy are not only focussed on lowest price, but strive for Value for Money and take into account LCC/TCO (see subsection 3.4.7). The most important award criterion remains the choice of a contractor who is capable of realizing the projects goal and requirements most optimally.

From the interviews it is concluded that all companies focus more or less on project management. Managing the projects within budget, time, and quality is the main goal of the project managers. The latter is only possible when the frontend-scoping is clear. In addition, it was mentioned in the interviews that project managers are in fact some sorts of procurement managers. In their current directing role the projects outsource almost all the work. The project manager wants to be in control and focus much more on the needs of the projects and a clear scope. The procurement managers complement the project managers in their role in the “commercial” side of the project. This new way of project management requires a process-oriented approach (see also section 0).

7.3.3 Organizational

All external interviewees recognized that it is important for a directing principal to have the knowledge and competences to steer contractors at all times. Without a proper base organization it is hard to remain successful, to control the contractors, and to improve the systems as a whole. However, the interviewees also mentioned that the technical complexity of infrastructures is lower compared to railway technique and industrial plants and refineries. Organizational changes also require specific knowledge and learning by practice. The companies invest a lot of effort in evaluation and improvements within the organization and with the suppliers. They invest in strategic elements were the company steers on knowledge. External advisors are hired when the company lacks of internal well-qualified employees.

The commercial companies mention that procurement is an art, just like technique is a different art as well. Procurement should be part of the “line”. At all companies (except RWS and ProRail) procurement is centralized high in the organizations. The procurement organization provides procurers for the project teams that complement project engineers. However, all companies “implement” procurers slightly different. The influence of a centralized organization is only effective when the manager takes responsibilities. At DSM the procurement role is experienced “equal” to the project managers’ role. The project manager is responsible for the scope and the commercial side of the project is the responsibility of the procurement manager. Schiphol Group “set” procurers alongside their project organization. Procurers are aware of the procurement strategy and complement the project teams/managers in their activities. The role of a procurement manager is considered different from the contract managers’ role unlike that both strive for the same end purpose. Another important remark is that procurement involves more then the civil discipline just like the integrated project organizations. Procurers learn from technicians and vice versa. Procurers are involved earlier in the project and step off after the contract is awarded. Procurers risk becoming a procurer that “buys what the rest thinks you should buy” when they are involved too late. Defining clear boundaries and act strictly, professional, and obvious is crucial. The contract is just a mean and the discussion about results should be stimulated upfront. At FrieslandCampina the procurers are also involved to deal with contractual issues during realization. In the other companies the contract manager and/or jurists often discuss these contractual issues. A good procurement makes the job of the project manager a lot easier.

Organizational behaviour

In the interviews there were no obstacles mentioned related to the behaviour of their employees at the commercial companies. Not even with Shell and DSM that recently changed their organization and strategy. There is always a tension between strategic and operational levels, but in the interviews was mentioned that well-thought and -prepared changes can be implemented fast and successful. The success is related to a particular drive from the management that should be transferred lower in the organization. Engineers are always confronted with conflicting interests between their personal believes and the required new way of multidisciplinary thinking by the organization. The companies mentioned that it is important that employees all strive for the same goals. Common understanding of the different disciplines, intensive communication, and multidisciplinary decision-making are some aspects related to this behaviour. Employees are assessed based on their performances because the company’s results are more or less also dependent on the skills and performances of their employees.

Engineers are always in some sort of way confronted with conflicting interest between the business values and social values. Engineers work in line with the strategy of the company, but engineers should keep in mind the social and environmental impacts of their deeds. This is their social responsibility. In the commercial companies the most clients/users are business oriented and strive for the best Value for Money. They are not confronted directly with a public or social responsibility like civil servants. However, several international environment offenses/disasters (e.g. Shell-Nigeria, BP-Gulf of Mexico) show that these market parties are confronted with a tension between social and business values during design as well. The latter even happens within the zero tolerance strategy of these companies.

7.3.4 Operational procurement

The demand

In essence a project is only about three things: managing time, costs, and quality. The latter starts with a very well frontend scoping. The companies invest many time and resources upfront in the initial phases and even until the front-end design is ready. The companies acknowledge the complexity of a clear demand specification. However, the interviewees did not experience this as a problem. An important task of a procurer is to make sure that the demand specification clear and consistent (e.g. availability, reliability, aesthetics, price). The companies mention that a FID is only taken when the demand is clear and the delivery contracts are signed. When the demand is not correct the project could be confronted with expensive risks. Failures, discussions about scope are almost always related to an unclear demand. *"There is no cutting corners in project management"* (Slegte, 2012). Yet, there is always room for improvement by learning from mistakes.

"Markt, tenzij & Meer met minder"

Expect RWS and ProRail, the companies mentioned to be well equipped to realize their expectations against lump sum prices. The companies recognize the opportunistic contractor market, but seem to be "in control" over their suppliers. The commercial companies mention the awareness of outsourcing some "crucial" tasks not only to construction contractors because of the risk of opportunistic behaviour. The commercial companies mention that the key of success lies in focusing on quality. Quality is not a differentiator and cannot be a subject for discussion. Assets are (often) procured based on a mix of price and quality. Lowest price is only used whether this means lowest TCO or LCC (Value for Money over the whole life cycle of an asset, see 3.4.7). LCC or TCO are principles that are considered as business as usual. The maintenance component is important. The companies want to act cost efficient and effective. They have the knowledge about the assets' functions and performances. Ex-ante well thought investments are earned back during realisation. The companies recognized the obstacle that there is not such a thing as consensus about quality standards between the principal and the contractors. Therefor the FEED packages (functional and performance related requirements) contain many work/quality standards for contractors.

The contractors are steered on cost and quality in an objective way. There are different kinds of playing grounds. In all these levels there is a need of close interaction and coordination. These levels are:

- An executional level where the principal checks the quality processes.
- A preparation and control level where it is monitored what really happens.
- A tactical level where KPI's are monitored, assessed, and improved.
- A strategic level where the real purpose and goal of the projects are evaluated.

The commercial companies mention that they are allowed to change their scope even after the contract is awarded. Decision-making is performed in a multidisciplinary and integrated way to prevent the risks of an unclear demand. The actual needs of all the different stakeholders, users, and operators should be clear upfront. However, the latter does not mean that all these tasks have to be performed in-house. Several interviewees mentioned that they invest in the ex-ante internal frontend design phase in projects. However, with the current growth prospects the technical departments are not ready to fulfil their job as they perform right now. High "quality standards", close involvement, and complex technology make it almost impossible to act like a "More with less" ("Meer met minder") policy. It was mentioned that in too large contracts contractors even unsubscribe from tenders because the projects are experienced incontrollable or too risky to deliver within the available budget and conditions.

Procurement

A difference with the commercial companies is the role, responsibility and importance of procurers in the projects. RWS wants to safeguard the lack of knowledge by focusing on the work processes. RWS believes that good work process results in a better product. Partly true, but when the demand is not clear (input) then the outcome of the process is uncertain as well (output). Yet, the different design tasks (outsourced or not) are still executed. The difference with RWS is that e.g. Shell knows very well how their plants are used and knows exactly what they want. Some companies still invest in internal strategic technical knowledge upfront to keep updated with the newest assets technology and optimizations. In

the interviews it was mentioned that these companies were not satisfied by their past "outsource" strategies. The distribution of these tasks and responsibilities requires a new approach. When the "what" is clear then the contractor can decide about "how it should be build and in what order?" The principal should act transparent in what is supposed to be important because else the market will guess what the principal thinks is important (input ≠ output). The task of a procurer is to make sure that the demand specification is clear and consistent. The companies are as a directive principal closely involved in the supervision of the contractor, but keep their distances from the contractors real work processes. They assess the contractors based on several KPIs. The commercial companies experience quality in certain levels, like e.g. that an electrical output always produces 220V. In addition many acceptance test (e.g. Factory Acceptance Tests) are used to assess the contractors' delivered quality. The business case monitors and assesses whether project investments and scope changes are still advantageous for the total network. Again the demand should be clear and should prevent unclear scope discussions during realization.

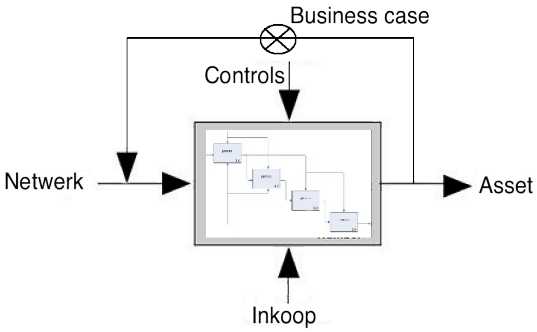


Figure 26 Business process

Both RWS and the commercial companies mention that (quality) control is crucial to check whether the demand is actually delivered by the contractor. However RWS focuses mostly on processes (SCB) and the commercial companies more on qualities. The most effective way to prevent opportunistic behaviour is to verify the contractors performances (more then contractual conditions) and by working on trust and reciprocity between principal and contractor during the contractual process. Relations require "maintenance" to sustain and assessments of these relationships are reasonable. Knowledge transfer and mutual understanding is crucial for improvements (supply chain thinking). Both cooperating parties need too be aware of a company's interests and both their strengths and weaknesses. Relation management thus requires a continue/periodically process of assessments, learning, and evaluations on safety, processes, and mostly quality. The latter costs time and resources. Failures and mistakes are inevitable, but the basic things should be performed correct. *"We learn from them and they learn from us"* (Berends, Interview Shell, 2012). Principals must act hard against contractors, but need to accept "bleedings" if they make a mistake. Simplistically saying, *"there are no "bad contractors", but only humans with limited competences"* (Biesboer, 2012). Procurement is a strategic process and closely related to the primary project processes of demand specification, tender regulation, relation management, and contract management. Important/strategic tasks and responsibilities are not transferred, but are elaborated in close collaboration with the right incentives.

All interviewed companies mentioned the necessity to monitor on past performance. Performance management should focus not only financial results, but also on product quality, innovation, costs, planning, sustainability, satisfaction, collaboration, communication, and selection. The assessment of a contractors' behaviour that influences future project awarding is a very important incentive to prevent opportunistic behaviour. The continuity of work is more important then profit (leaving extremes aside) for commercial companies. Furthermore a risk provision can be used to prevent claims from contractors. In these cases a margin of 2-3% is taken into account in the contract and remains for the contractor without any efforts when additional work is not submitted. Yet, in case of misbehaviour contractors are not immediately transferred to a black list (past performance). Many time and efforts are invested in current relationships as well. The commercial companies mentioned that they improve the suppliers' performances through reactive and proactive (strategic) activities by the purchaser. For example, the contractor also expedites the suppliers' deliveries (e.g. whether a safety object is delivered as expected and fits the system). Crucial aspects mentioned are:

- A manageable (often relatively small) supplier base;
- Knowledge and expertise to provide support to the supplier;
- Knowledge and skills to identify the suppliers with the greatest potential to improve performance;

- The willingness of the management. Time and resources need to be "invested" in supplier relations to help, and understand that both need to continually monitor and improve their performances.

To sum up, these commercial companies mention the importance of investments in knowledge. The principal should be independent from contractors, keeps in control, knows what is happening, and can steer the contractors whenever necessary. *"A directing principal understands the demand and can define a demand specification now and in future."* (Biesboer, 2012)

Contracts

The companies work along different "distances" towards their contractors. Again the interviewees mentioned that it is understandable that the contract is experienced as a goal, but is in fact a result of unclear demand. The commercial companies consider the scope as extremely important. *"It is all about scope, scope, and scope. When this is not clear the project manager should ask, ask, and ask until it is clear"* (Slegte, 2012). Whenever a contract forms an obstacle it is better to prescribe a specification. In the end it is still about receiving a piece of infrastructure. *"We as a principal keep in control, we know what needs to happen, and we can test the contractor whether or not he is doing what he has to do."* (Biesboer, 2012) Communication about "if I do this then I expect that from you" is understood to be crucial by the commercial companies. Moreover, most of the companies mentioned that there are almost no discussions about additional work. Contractors are monitored and assessed on their past behaviour. Non-performance, non-desirable behaviour, or even distrust can be punished, but better is to stimulate positive incentives to prevent these "disadvantages". The "high trust high penalty" policy is not always acknowledged.

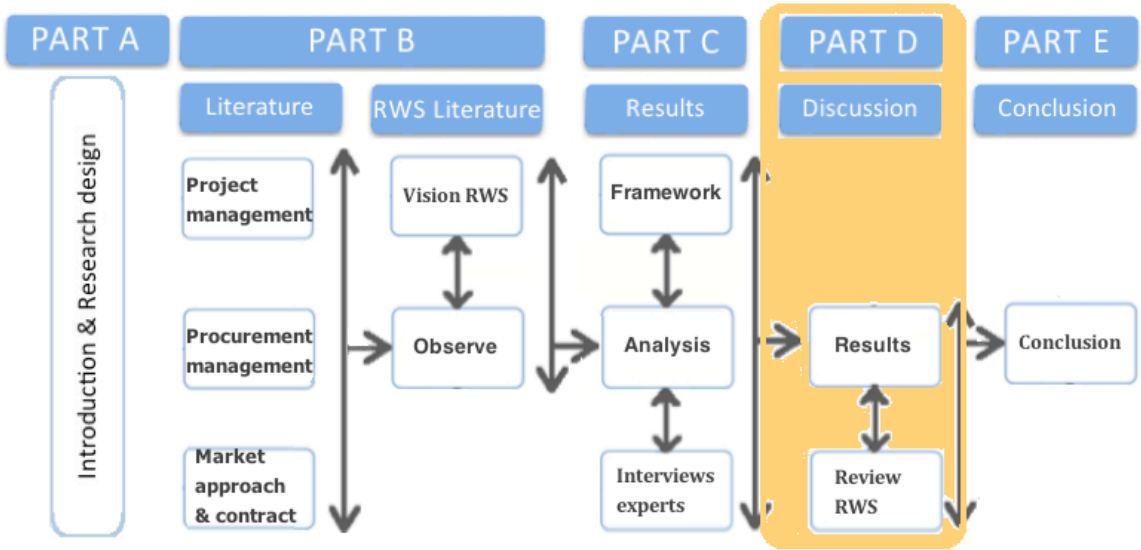
All analysed companies use different kind of contracts. RWS created their own Dutch D&C and DBFM contracts. Shell, DSM, and FrieslandCampina use two types of contracts: Turnkey or EPC(m) contracts (Anglo-Saxon models). In large projects the principal needs an engineering contractor (EC's) not particular for the purchase of a product, but more for the procurement of services like engineering, procurement, and construction management (EPCm) (Clifford Chance, 2009). ProRail uses traditional Bid-Built contracts and D&C (light) contracts. Schiphol Group (service provider) implements short-term (5-8 years) maintenance contracts with options for additional work with a maximum budget (open price books). Additionally Shell and DSM mentioned the use of lump sum projects were the contractor delivers the key of the factory after construction. Both principals remain involved in a directing role. Some of the companies work during the contract period with open price books and predefined profit margins. There is nothing wrong with earlier contractor involvement. Yet contractors have to be motivated by incentives to perform on behalf of the principals' interest to prevent the principal agent problem.

7.3.5 Summary

Table 6 Obstacles RWS (Table 4) versus measures by the commercial companies

Subject	Obstacle RWS	Measure commercial companies
Politics	RWS is confronted with dynamic political and environmental influences in their decision-making process, but is not equipped to manage these for the long-term.	Manage politics as a risk by choosing to Take, Treat, Transfer, or Terminate in the most optimal way.
Strategic	RWS does not sustain a business-case related mindset in the entire projects' life cycle.	Business case is leading in projects and includes LCC/TCO thinking.
	RWS expects to be relieved by contractors, but are during realization still involved in several scope/design discussions with the contractors.	Commercial companies are relieved in less strategic subjects and contractors decide about the how and when during realization. FID not clear/sufficient? Do not go to the market.
Organizational	RWS lacks of well-qualified human/organizational resources to deal with and to learn from current project activities and experiences.	Proper base organization, investments in knowledge transfer, development, and evaluation. Knowledge based steering.
	RWS lacks of a clear and strong base procurement organization that provides procurement managers in the projects and learns from experiences across projects.	Centralized procurement organization high in the organization that invests in relationships, knowledge, and evaluation. "Delivers" procurers towards the projects.
	"Higher" (project) management and IMG still encourage the organizational changes, but lower in the projects several employees lost their faith in a successful change.	Organizational changes are based on clear efficiency gains and are implemented top-down, fast and clear towards the operational levels.
	RWS often lacks of responsibility and accountability to act professional like from a business-oriented viewpoint.	Hard and business oriented behaviour (survival of the fittest). Multidisciplinary decision-making by creating a common understanding between different roles and disciplines.
	The lack of good and clear incentives hampers the multidisciplinary thinking and efficiency and effectiveness of projects.	Business case and multidisciplinary decision-making are leading in projects. Employees are assessed based on their performances.
Operational procurement	RWS is not ready (yet) to cope with the unpredictable contractor market and lacks of defining a clear and fixed demand specification to procure projects against lump sum prices.	Invest in a clear frontend-scoping. Decisions take into account risk management and quality control by clear criteria, norms, and procedures. Invest in the "function" and find out what fits around that best.
	"Markt, tenzij" is experienced to be the solution of the inefficient public performances, but contractors are not motivated to act according to the interests of RWS.	Focus on better relationships with enough competition by past performance tools and relationship management. Long term relations and short term contracts.
	The capacity of the IPM teams and the employees are overestimated by the "meer, met minder" approach, while complexity and the need for more competent control rises.	Invests with sufficient resources and knowledge in strategic positions
	Procurement is experienced as a secondary process.	Procurers are part of the line, involved during frontend-scoping and complement project managers in projects. Procurers are in lead during involvement.
	RWS does not assess contractors based on actual quality, but focuses mainly on process plans on paper.	Principal is closely involved (supervision) and keeps in control of the quality aspects.
	A lot of attention is given to the contract forms instead of creating the "best" conditions to procure what is really needed.	When the scope is clear the contract should not be the issue. Contracts are just a mean. Invest in a clear frontend-scoping.

PART D. DISCUSSION



8 DISCUSSION

The goal of this chapter is to create a link between the obtained obstacles at RWS (see section 7.1) and the measures to manage these obstacles by the market parties (see section 7.3). The latter obstacles and measures from Table 6 are represented above the sections below. Additionally the mission, vision, goals, and strategy of RWS are also evaluated based on the interview results. Several theories and literature are used to analyse, link, and understand the findings from the interviews. Understanding the goals and the reasons of activities, changes, and discussions is very important to understand the system/organization as a whole. Does RWS construct roads every time again or does RWS not really understand the "ingredients" for these roads? It is remarkable that it seems that there are so many obstacles present in the realization of projects. The "Market, unless" ("Markt, tenzij") and "More with less" ("Meer met minder") policy seem promising. RWS should be relieved and the contractors perform all the design, construction, and maintenance of the assets in a better way then RWS did before. Current experiences, research, and observations represent a hard reality. The discussion provides input to give an answer on the main research question in section 2.2.

"It is all about scope, scope, and scope. When this is not clear the project manager should ask, ask, and ask until it is clear" (Slegte, 2012).

8.1 Evaluating vision, mission, goal, and strategy

Why do strategies fail? Not because they lack of a clear viable vision, rather, they are gathering dust because they have been poorly implemented. To work along the core values of the organization is experienced as a big challenge (Jütte, Balt, Zanen, Boer, & Croon, 2011). Therefor, the mission, vision and goals of RWS are evaluated briefly based on the found results in this report. This research did not focus on the role of crisis manager.

Vision

RWS its vision is to become a:

- Leading project manager;
- Public oriented network manager;
- Professional crisis manager.

DO: A leading project manager should create a balance between the actual needs of the network, of the organization, and of the client/users and convinces the principal of the value and urge of the required solution.

The term project manager is questionable. RWS focuses as a public oriented network manager on managing their assets in an optimal way. The latter is more a case of establishing the right scope, information, conditions, and requirements for a contractor in order to realize the asset. Managing the project realization is the responsibility of the contractor. Acting as a "leading" project manager and "professional" crisis manager are commendable visions, but do not provide a clear focus on improvements. Such process improvements should be tied to measurable goals. RWS should focus more on the improvement of the right procurement. Not about procurement like "purchase of pencils", but procurement that is about "creation" of solutions and aims at negotiations, suppressing prices, and more quality. The procurer focuses to make sure he knows what he needs, how the market looks like, and what incentives are required. The project manager manages the projects on time, costs, and quality, but in the role of a directing principal the project manager should focus also on "procurement management" (or "process management"). A leading project manager should create a balance between the actual needs of the projects, the needs of the organization, and the needs of the client/users and convinces the principal of the value and urge of the required solution.

Mission

The mission of RWS is (Rijkswaterstaat, 2011c):

> RWS is the executive part of the Ministry of Infrastructure and the Environment that controls, maintains, and develops national networks in a sustainable way. RWS works on (1) dry feet, (2) enough and clean water, (3) safe and fluent traffic flows on roads and waterways, and (4) reliable and useful information.

RWS acknowledges the importance of good information in their mission, which is a good thing. However, the real information is located in the projects and with the project employees. Several obstacles and discussions mentioned and analysed from the interviews suggest that the information still contains a lot of weaknesses and results in inefficient "project management". Currently, RWS bears the consequences of providing incomplete information (unclear scope) to the market (claims and opportunistic behaviour). Project teams will remain acting in a corrective way without good and reliable information about the current assets. Especially in the large complex projects it is not only about civil constructions. Aspects like information (ICT) are crucial for the success of a project. RWS must deliver good and complete information to the clients because it is their responsibility as a governmental agency and as the only and "best" executive organization of the ministry of Infrastructures & Environment. RWS should be a role model for the market, especially in providing the right information. The latter is not only true for management and process developers. The real process starts when the plans have to be implemented in the operational levels.

DON'T: Do not underestimate the importance of good, clear, and complete information/ICT systems.

Goal

RWS has defined the following goal to perform this mission (Rijkswaterstaat, 2011c):

> In 2015 RWS works as one team intensively with others and improves their results every day. The public, the politics, and our partners notice and appreciate RWS as an effective and efficient network manager, project manager, and crisis manager because of high quality knowledge and experiences.

The goal to improve their results every day and to work efficiently as one team seems reasonable. However, working as one team sounds easier then it is in reality. Several roles/departments have conflicting interests. In addition, the intensive collaboration between these different roles requires specific resources, effort, and competences. As a result of the "More with less" ("Meer met minder") principal RWS cut a lot in their workforce. Knowledge and experiences are decreasing/lost in several ways. Employees need to learn to collaborate again. Experiences from the past are often missing or were not secured in the organization and sometimes not even in the projects. As a consequence project teams act mostly in a corrective way and cannot perform their actual job activities. Yet, Brache and Of course, RWS improved a lot compared to the start of the OP2008, but in the projects the employees of RWS are still confronted with hard collaboration and complex discussions. Some do not experience this as pleasant working and thus effects the intrinsic motivation of employees as well. Small improvements only work temporary. In the projects employees still wait on the real additional value of the OP2015 (and its predecessors). In order to reach their goal it seems that RWS is in need of a different strategy.

Strategy

RWS strives for the "Market, unless" ("Markt, tenzij") and "More with less" ("Meer met minder") to achieve their goals and objectives in an optimal way. However these two policies are implemented through political influences. The goals of RWS are to become a better principal that works efficient and effective and creates, maintains and operates the network in an optimal way. The earlier market involvement is dependent on many different uncertain and risky variables, especially in public, large, and complex projects. The latter involves many stakeholders with many different interests, powers, and behaviour (de Bruijn & Heuvelhof, 2008). It is questioned whether the strategy of RWS is just a strategy to fulfil the need of the ministry. Downsizing should not be the badge of honour. Successful companies maintain or grow staff to keep pace with the increased demand they created (Brache & Rummler, 1995). It should focus on how RWS could provide more Value for Money for the actual users and how RWS could stimulate the environments in and around their network. The strategies "Market, unless" and "More with less" work for relative simple projects were synergy advantages seem reasonable. Yet, these activities still have to be paid, whether different parties execute these works or not. In fact, if RWS really wants to change their efficiency and effectiveness then the organizational change should not only focus on transferring responsibilities towards the market. *"No meaningful change will occur without active participation of functional, regional, and product-line management"* (Brache & Rummler, 1995).

DO: The strategy of RWS should strive for more Value for Money for the actual users/taxpayers of the network.

8.2 Politics

Obstacle RWS	Measure Market
RWS is confronted with dynamic political and environmental influences in their decision-making process, but is not equipped to manage these for the long-term.	Manage politics as a risk by choosing to Take, Treat, Transfer, or Terminate in the most optimal way.

RWS is as a governmental agency depended on the ministry and EU regulation. Political influences cannot be seen apart from current events in the construction industry. The ministry is the direct client of RWS. Politics must have the will to give RWS the mandate to do what is necessary. Without such responsibility RWS lacks of a self-thinking attitude. RWS remains always more or less involved and responsible for certain tasks and activities, which seems reasonable because RWS is working for the public. The question that RWS should ask themselves is how they could measure this “risk” of EU tender regulation in the most optimal way? It seems that RWS and the market lack of a relationship based on trust and reciprocity to deal with the internal and external politics in an optimal way.

Stimulated by external market related events (fraud and NPM, see chapter 1) the politics are certain that the market is better equipped to realize projects better then governmental organizations (“Markt, tenzij”). However, it seems that the politics are not aware of the content, obstacles, and struggles in the (legislative) processes in infrastructures. RWS and the market have conflicting interests and values. Legal procedures (“Tracé- and Planologische Kern Beslissingen” procedures) and internal RWS regulation hamper the possibilities of functional specification and earlier contractor involvement (Koppenjan, Broekhans, Steenhuisen, & Eindhoven, 2012). These legislative processes require a certain patience, management, and expertise. The latter does not always complies with the “more with less” strategy of RWS. The process to legally implement for example beneficial scope changes involves drastic administrative hurdles that do not always outweigh the savings. Yet, even within the EU regulation RWS is allowed to have “contact” with suppliers as long as the principal does not create an information inequality (non- discriminatory). The use of appropriate political tactics and behaviour for organizational change/ projects increases the change of success. Such political tactics and behaviour consists of making alliances with powerful stakeholders, networking, negotiating both mutually accepted solutions as seemingly insoluble problems, and the recognition of the principle of give and take of negotiation and compromise. (Meredith & Mantel, 2006)

Different experiences with earlier market involvement show that even the contractors find it hard to deal with all the social economic, political, and public subjects. The outsourcing of these legislative responsibilities seems reasonable by the politics. The current long preparation periods of project should be performed more efficient and effectively. The biggest “top-waste” related to procurement (see also subsection 4.5.4) is that RWS uses too many resources of time, money, and manpower to procure the whole productions’ need (Rijkswaterstaat, 2012c). In the interviews it was mentioned that RWS still wants to be the best, but it seems that RWS pays the price for this behaviour as well. RWS works along their public values and stakeholders are protected against the “hammer” of the market. Social value is important, but from a commercial viewpoint this is not desirable at all costs. Lower overhead costs and higher turnover per employee may suggest a good performance in the short-term, but in the end it is about the quality of the assets in the long term. The prices are paid during operation and not after the realization of the project. RWS and the politics do not think according to the LCC principle (see 3.4.7). Governments are not used to meet deadlines, but contractors are. Still, RWS does not have to be the best in everything. A perfect organization never exists, but the basic things should be performed well.

8.2.1 Summary

- The politics set new requirements for the project organization of RWS, but lack of a LCC mindset;
- RWS should anticipate, inform, and convince the politics about the network needs, quality, and performances;

8.3 Strategy

Obstacle RWS	Measure Market
RWS does not sustain a business-case related mindset in the entire projects' life cycle.	Business case is leading in projects and includes LCC/TCO thinking.
RWS expects to be relieved by contractors, but are during realization still involved in several scope/design discussions with the contractors.	Commercial companies are relieved in less strategic subjects and contractors decide about the how and when during realization. FID not clear/sufficient? Do not go to the market.

8.3.1 Business strategy

In the OP2015 there was a small, but remarkable change in the strategy of RWS. The OP2015 aims on becoming a public oriented network manager, a professional project manager, and a decisive crisis manager, which is remarkable. In the OP2015 it seems that the focus on "professional management" ("professioneel opdrachtgeverschap") (AG2012) changed again towards a project-oriented approach. The latter crisis manager is not relevant for this report and will not be further discussed. The strategy of RWS requires a process of learning and improving. Changing towards a client-oriented business is not just involving new ICT tools. It is about changing the processes at first and creating the right conditions in the environments (structure) and with the employees (culture). After the processes are improved the business focuses on delivering quality and finally the business aims for a client-oriented way of thinking (Jacobs T., 2012). Still, the project-oriented way of thinking is one of the biggest mistakes. A construction may be unique, but the processes and underlying products are not. It is about the actual functioning of the network and the efficient procurement to realize the functioning of these infrastructures, not only the projects (Figure 27).

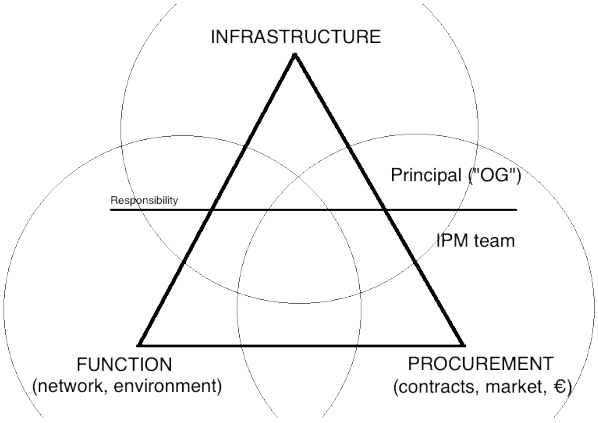


Figure 27 Responsibilities and interest circles RWS

RWS is still a project organization that actually outsources things. *"As a professional principal RWS transforms from a project machine that procures projects towards a more procurement orientated organization that realises projects."* (Vis & Keur, 2012) Good project management is believed to be the key to success to become a professional principal. Yet good project management is all about a clear scope. A professional principal is understood as:

> A professional principal understands the needs of both clients and RWS, knows the markets competences, is supported by a firm base organization, and search towards the optimum between network, purchase, and control by clear project management.

The strategy of RWS is still focused on project management. Yet, the activities that RWS should perform are related to project, process, and procurement management (Rijkswaterstaat, 2012c) (Rijkswaterstaat, 2008). The IPM model takes into account several aspects of this process management, but it seems that this is not enough. Control aspects of time, cost, scope, quality, organization, communication, and risks are related to work in a project-based approach and are not always directly related to project success. An integral approach leads to advantages for both the client as the supplier. There is a need for good procurement and competent asset managers.

Figure 28 Working strategic together (source: http://www.calfp.com/resources/partners/index.htm)

It is not suggested that project management is useless for RWS. Currently more time is spent on preventing failures instead of making sure that everything goes well. The latter is the core business of a project manager. However, RWS is currently reinventing the wheel over and over again. RWS should focus more on re-using or improving standards. Project managers are in need of "room for trade-offs" in their project budgets. In these dynamic and uncertain environments the projects are confronted with several scope changes. RWS should search per project for the right balances between project and procurement management. This balance should be defined based on the needs of the project and the network (see section 3.3 and 3.4). The "real" project management during realization is the responsibility of the contractors. RWS should not interfere with this project management structure because the contractors' base organization is based on this project management and quality system. Instead, RWS managers should stimulate and discuss professional management with contractors ("Goed opdrachtgeverschap") (Molen, 2008). People should stand above their own interests and take into account the interest of their partner. The harmony with relevant actors is necessary for RWS to create win-win situations. It is important that profit incentives are not forgotten in creating a common interest with market parties. RWS would like those contractors to act according their (the network) interest.

DO: Create conditions for win-win situations for both RWS & market

8.3.2 Procurement strategy

RWS wants to professionalize and centralize their procurement processes (see chapter 4). The main task of IMG is to anchor the purchasing strategy within the organization and resulted in several improvements, especially at the strategic level. Yet, procurement should be considered more as part of the line of the primary process. The procurer should link both "worlds" of plan study and realization. Procurers should be responsible for the commercial part of the project instead of only following the demand of the project teams. There is a lack of procurement knowledge in the projects. In both literature and interviews procurement is considered as a secondary process. Efficient and effective procurement hampers in the projects. The procurement organization of RWS lacked of "maturity" according to the MSU+ model (Dang, 2011). Project managers should understand the procurement process and link this knowledge with the functionality and technology of RWS their network. Specific knowledge is necessary for RWS to sustain an integral overview and a directing role over their projects and networks. Yet, RWS seems not equipped or well organized to execute these tasks optimally in the projects. The link between these two levels (from strategic towards operational levels) consists of a certain hurdle for employees. Different kinds of policy levels require different kind of interaction, coordination, assessment, etc. The management seems to focuses more on the processes of management instead of the actual realization of the work in the projects.

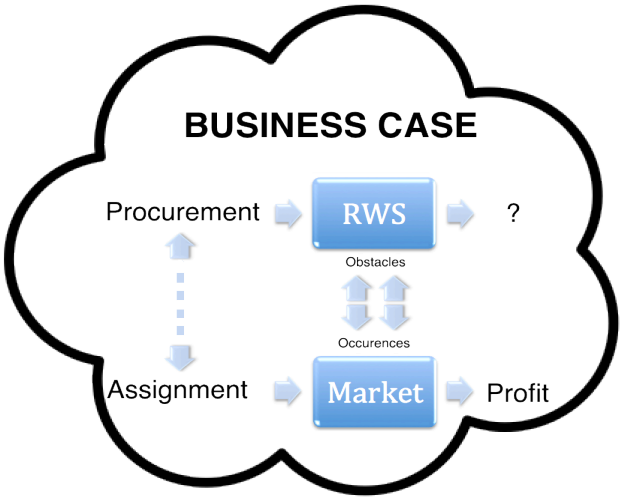


Figure 29 Business case approach RWS vs the markets' approach

RWS is a non-profit governmental agency and is not directly responsible for their profitability. Yet, even a governmental agency should work in an efficient and effective way. As a directing principal RWS should be relieved in less strategic subjects and let contractors decide about the how and when during realization. At the commercial companies the business case is used as a tool for the project manager to make deliberate decisions during the realization of the project. Yet, currently almost none attention is given to monitor these strategic elements in a "business case" during the realization of infrastructural projects. In the plan study costs and benefits are early analysed and assessed in general ((M)KBA). This "business case" mindset is often not continued during the further realisation of the project.

Employees lack of evaluation and best practices in and between projects. A business case provides opportunities for measureable steering on scope, quality, and performances. The fact that RWS does not have to make profit is not an excuse to work inefficient. Short-term profits are no guarantee for long-term success. A business case stimulates managers to be aware of the consequences of scope changes in terms of money (Value for Money and LCC thinking, 3.4.7)). Social values can also be taken into account in a business case. The business case provides insight in the cost and benefits of projects and in the impacts of decisions/trade-offs on the profitability of the project. The latter could be used in the interaction between principal, project manager, and contractor to evaluate/assess scope changes and decisions. RWS should invest in measurable steering variables on scope, quality, and performances (Brache & Rummler, 1995).

DO: RWS should work efficient and effective despite they are a public agency.

8.3.3 "Markt, tenzij" & "Meer met minder"

There are several examples in society were "more market" does not result in better social values (e.g. health insurers, public transport, energy market). The fact that RWS outsources several tasks and responsibilities is a good thing, but the main goal should be to focus on the network performances and not on different processes. RWS wants to be relieved, but there is a need for close collaboration in the dynamic and complex (administrative) environments. By keeping their distance both lack of a clear understanding about each other's interests. It is not always advantageous to involve contractors earlier in the process because it is unclear who actually benefits. Price competition does not only have advantages because there is a risk of market failure ("marktfalen") and governmental failure ("overheidsfalen"). Companies like DSM mentioned not without reasons that several responsibilities are not outsourced towards construction contractors (risk of "fit for purpose" (Goossens, 2007)). The latter suggest that the taxpayers are not always better off. Possible advantages are often contrasted with traditional executed projects (RAW). Moreover, there is always a tension between autonomy and accountability of parties. There is a lack of process agreements about how to deal with these scope changes (Koppenjan et al (2012). These changes are often discussed on political level and outside the projects. Legal professionals (lawyers) benefit from these difficult situations. The strategy of RWS should focus more on clear and measurable goals that relate to the network and project needs (see seven deadly sins of process management by (Brache & Rummler, 1995)).

Outsourcing increases the dependency or opportunistic behaviour of suppliers (Wynstra, 2006). More rules, more supervision, and more responsibilities are (partly) inevitable when a principal is not (or does not want to be) in control anymore (Tjeenk Willink in Metze (2012)). The outsourcing role requires new competences and skills from the contractors and RWS in the different project phases. It is about a responsive versus a creating organization. These separate worlds are involved in the current relationship of RWS versus the market, but also inside RWS between the plan study and realisation phase. The transfer moments in this process causes risks for a "knowledge drain" and results in uncertainties that impact the projects' realization phase.

DON'T: RWS should not always outsource/distribute tasks/risk towards the market

The interviewees mentioned that construction contractors criticize that the projects' process side might be exaggerated. RWS is in need of ECs to deal with several discussions with the contractors. RWS distributed their problems towards the market. Yet, the market faces the same problems as RWS. In this case not only RWS, but also the market parties are involved and impacted by the unclear demand. The commotion of involving more advisors during the process is a result of the "evaporation" of design knowledge at governmental agencies combined with increasing/regular distrust towards construction contractors. Without learning from their obstacles RWS will always remain focussed on this "reactive" behaviour in the projects. RWS will not be relieved and pays for the failures in future. It was mentioned that the constructions contractors do confirm the statements about opportunistic behaviour in several projects. The latter is understandable from the viewpoint of the contractors (sharp prices to win the contract, high risks, and many uncertainties). Distributing risks towards the market is risky and not always advantageous (Van Ham, 2002). Intern risks can be safeguarded by a risk provision or insurance. The contractors price

risks in their proposals and earn money when these risks do not occur. RWS should reconsider the make/buy decision by taking into account the networks' interest. The market should be suitable to perform several administrative tasks. If not, do not transfer these responsibilities towards the contractors. Interviewees mentioned that crucial knowledge is lost during role transfer moments, both internally and externally. The distribution of roles and responsibilities should be critically reassessed.

8.3.4 Market reformation

The market will reform as a result of the organizational transformation of RWS. A radical change from a reactive pull market towards a proactive push market means a complete "cultural change" in the Dutch construction industry. The roles of contractors change a lot as a result of new forms of contracts (J.A. Ribberink, 2008) (de Ridder, LEGOlisering van de bouw, 2011). Compared to the traditional contractor the focus of different elements (functions) differs enormous. Aspects as finance, development, operation & maintenance become more important as well. RWS expects the suppliers to surprise the clients, whereas in the demand-driven situation the suppliers were surprised by the demand of the clients. The main purpose of this idea means that the suppliers/contractors will learn from their mistakes. However, these contractors lack of experience in their new roles. Goossens (2007) already "warned" for a similar market transformation like in the oil and gas sector. A fairly isolated elite will emergence of particularly large contractors that realise projects. This elite offers opportunities and threats. The opportunities are related to the gathering, monitoring, and managing of knowledge. However, every elite has powers and these powers could have negative impacts on competition and the concentration of powers. RWS should not underestimate their influence on this market reformation.

RWS only involve "top" contractors and these should deliver "top" quality. It is questionable whether these new large D&C and DBFM contracts indeed deliver more Value for Money compared to the "smaller" projects that are realized by middle-sized companies (MKB) (Metze M. , 2012). MKB contractors do not have the capacity/competences to deal with the design and project management obligations in large projects. As a result the market of the MKB shrinks by up-scaling these project scopes and competence requirements for tender subscriptions. The changing market conditions could induce owners to explore different strategies and tactics such as cooperative forms of contracting. Yet, there is a risk for the public party to become overwhelmed by the knowledge of the large private parties. The latter could lead towards projects were the general interest is replaced by the aim for profit (Van Ham, 2002). For RWS as a directing public principal it is important to stay in control by strategic investments and knowledge development.

The new innovative market approach resulted in high transaction costs because of long extensive selection procedures. Some interviewees even suggest going back towards the traditional bid-build model. Why is it wrong to be the best in infrastructure? A government that controls and operates the whole network must be competent. The infrastructure is a national asset. Inhabitants pay taxes and expect that the government spend these taxes well. In the nineties RWS hired a project management company to manage their projects. Why did they transfer this role towards the construction company? Companies like Shell also contract an EC (EPC(m) contracts) to manage construction contractors. Large integral projects require specific competences to steer and manage the multi-disciplinary interfaces. Yet, EC involvement involves the risk of "conflict of interest" (Metze M. , 2012).

8.3.5 Summary

- A strategy focuses on clear and measurable goals that relate to the network and project needs.
- Working along a business case by means of LCC/TCO should be a matter of "just as usual".
- Project managers search for the right balances between project, process, and procurement management.
- Procurement should be considered as part of the line in the primary process.
- Procurers manage and are responsible for the commercial part of the project.
- The "real" project management is and should be kept the responsibility of the contractors.
- RWS is not always better off by outsourcing tasks and risks towards the market.
- A radical change from a reactive pull market towards a proactive push market means a complete "cultural change" in the Dutch construction industry.

8.4 Organization

Obstacle RWS	Measure Market
RWS lacks of well-qualified human/organizational resources to deal with and to learn from current project activities and experiences.	Proper base organization, investments in knowledge transfer, development, and evaluation. Knowledge based steering.
RWS lacks of a clear and strong base procurement organization that provides procurement managers in the projects and learns from experiences across projects.	Centralized procurement organization high in the organization that invests in relationships, knowledge, and evaluation. "Delivers" procurers towards the projects.
"Higher" (project) management and IMG still encourage the organizational changes, but lower in the projects several employees lost their faith in a successful change.	Organizational changes are based on clear efficiency gains and are implemented top-down, fast and clear towards the operational levels.
RWS often lacks of responsibility and accountability to act professional from a business-oriented viewpoint.	Hard and business oriented behaviour (survival of the fittest). Multidisciplinary decision-making by creating a common understanding between different roles and disciplines.
A lack of good and clear incentives hampers the multidisciplinary thinking and efficiency and effectiveness of projects.	Business case and multidisciplinary decision-making are leading in projects. Employees are assessed based on their performances.

8.4.1 Procurement organization

It is important to define and implement an organizational model that fits the vision and goals of the company/business. The organizational model is the basis for further processes and collaboration. A good organizational model requires wishful thinking and a well thought structure of the businesses. The organization strives for uniform processes and links different processes in the right way. Clarity is crucial, especially in complex dynamic environments wherein RWS wants to be in control. RWS should create an integrated way of decision-making and stimulate knowledge sharing. Building on external collaboration without an internal basis does not work. The organization itself should "breath" the new vision (J.A. Ribberink, 2008). *"No meaningful change will occur without active participation of functional, regional, and product-line management"* (Brache & Rummler, 1995). RWS currently seems to focus on this proper base organization. However it requires a certain effort from the organization to transform procurement from a mechanical function towards a professional and strategic position (see section 3.4). The procurement organization should be in line with the policies, goals, and structure of the organization and supports the strategic, tactical, and operational procurement processes. The latter is questionable because it was mentioned that IMG is not equipped to comply with all the procurement needs of RWS.

RWS aims to centralize their procurement organization (Rijkswaterstaat, 2012c). Shell, DSM, FrieslandCampina, and Schiphol Group also centralized their procurement organizations high in the company's organization. Yet, there are still not many scientific results that state that organizations with a centralized procurement organization are always successful. There is a positive correlation between the financial performances and procurement strategy for companies with a centralized procurement process combined with standard products and companies with a decentralized procurement process combined with unique products (David, Hwang, Pei, & Reneau, 2002). In the understanding that every infrastructure project is unique a decentralized procurement should be plausible. However, plural forms of decentralization at RWS stimulate information asymmetry. Also the technique is relative simple and standardized. From that point of view RWS would be better of with a centralized procurement organization.

DON'T: Do not think procurement is only usefull for procuring pencils and notebooks.

A centralized procurement department does not solve the problems. Incorrect human actions are often more related to the causes of failure rates/costs then technical complexity (Jacobs T., 2012). The scope of IMG is focused on the strategic part of the procurement organization, while it is concluded from the interviews that the link between the strategic and operational part seems to miss. The latter is related to one of the deadly sins of process management: *"Process design is all-academic until implementation. Implementation requires equipping the organization to absorb the change. Teams fail to leave behind a measurement system and other parts of the infrastructure necessary for continuous process improvements. Process improvement must change towards process management after implementation to realize its potential "return of investment"."* (Brache & Rummler, 1995).

According to the interviews the current BIO and IMG lack of the required competences/capacity to accommodate all projects by qualified procurers. Departments like BIO faced several forced outflows ("Meer met minder"). Procurers should be implemented earlier in the project teams and procurement should be considered as a primary process. Some even suggested in the interviews that the right people are not always in the right place. Influence of a centralized service cannot be implemented successfully without a good clear focus, distribution of roles and responsibilities, and dedicated and result oriented staff. The HRM policy should be in line with the organizational goals and the needs in the projects as well. In the commercial companies the procurement organization is linked with the operational levels by a close involvement of procurers in the projects. More about the role of procurers is described in section 8.5.

8.4.2 The transformation as a learning process

Organizational change

An organizational change is a process of trail and error, but it should not be underestimated. The current policy forces RWS to overthrow their traditional and entrenched organization (see subsection 1.1 and 4.1). RWS should be aware of the risk of an organizational "overkill". Changing management seats and new organizational structures in not enough for an organization like RWS to become successful. Furthermore after ten years of change the organization reached a certain resistance in the projects. It seems that certain success factors for a successful organizational change are not met (Hedeman, Van Heemst, & Riepma, 2008). RWS should acknowledge the importance of a fast clear change and should put a lot of effort in earning back the trust of the employee. A theory, model, procedure, work approach or whatsoever stands or falls with the performance of the employee and leadership. *"There are leaders and those who lead. It is about power versus inspiring. We follow those who lead not because we have to but because we want to."* (Sinek, 2009) Everybody in the company should be involved to accomplish a successful transformation. Employees learn from each other and from the projects. *"The transformation is everybody's job"* (Hedeman, Van Heemst, & Riepma, 2008).

The success of top-down changes is dependent on the quality of the change. Coercion is one of the vilest measures to implement changes and it is important to create a sense of urgency, commitment from the top management, clear and consistent vision of the end result (Hedeman, Van Heemst, & Riepma, 2008). At DSM the organizational transformation took roundabout two years and based on the interview the change is quite successful. Well-intentioned measures in the system ask for a response that voids the advantages (Hedeman, Van Heemst, & Riepma, 2008). RWS drastically changes, works more efficient, and acts more like a public oriented network manager then in 2002. Yet, this organizational change still has several similarities related to several reasons why strategic plans fail in common (Wikipedia, 2012d) (Forbes, 2011) (Bottary, 2010). RWS seems to fail to understand the real customer, which are the users. Furthermore the aspects of incompetency, a lack of incentives/rewards, lack of flexibility, bad leadership, and a lack of accountability were mentioned in the interviews.

Knowledge development and evaluation

The organization is changing and old knowledge is removed or replaced by new knowledge. However, a large and complex running organization cannot change at once. Projects are not fixed objects like products, but are long and extensive processes. Parties need to learn to change. The interviewees mentioned that several employees still fall back into familiar habits. RWS cuts in their technical expertise, but this lack of expertise is experienced as an obstacle (see section 7.1). RWS still needs to manage technical issues and uncertainties. In these processes "technical" expertise (or "experience") remains crucial. RWS is not equipped/competent to hand over and understand the current state of their assets. The "asset managers" could provide these actual conditions and needs clearly towards the project managers in the future. Contractors are confronted with incomplete information, even during realization. RWS managers act corrective to provide this information to keep the production of the contractors on going. The latter costs many time and efforts from both the IPM team and the contractors.

DO: IMG should close the current learning circle between the several and different contracts.

The essence of being “strategic” lies in a capacity for "intelligent trial-and error" rather than linear adherence to finally honed and detailed strategic plans (Moore, 1995). RWS does not really learn from their mistakes. Interviewees mention that several problems occur in different projects over and over again. Problems are often solved in the projects, but cross-organizational best practises are still lacking. Employees still use different kind of methods despite of the more uniform and standardized work processes. There is not a common knowledge between the different internal and external clients. When RWS sustains this problem-solving attitude in the projects then the line management will never define practical standards. Synergy advantages (because of larger scopes) are presented as opportunities, but are still depended on the competences of the workforce and simplicity of the projects. Financial advantages (e.g. less staff) because of clustering of projects are not justified yet (experienced as distribution of costs) (Metze M. , 2012). RWS will never become successful without a proper base organization and/ or governance model that steers on knowledge development and evaluation. It’s still about receiving just a part of infrastructure.

Figure 30 "Collaboration" (source: www.etechsecurity.com/expertise/overview/)

8.4.3 Organizational behaviour

There are institutional differences between public and private parties (Van Ham, 2002). These institutional differences cause considerable problems for collaboration. Different core businesses and different understanding of risks characterize both public and private parties. Another aspect not yet mentioned is the different cultures between the design and realization phase. The transformation from Bid-Build contracts towards integral contracts involves a change in context for different involved actors. However, in the end the same work still has to be performed. Drawings have to be drawn, calculations have to be made, and the contractors still realizes the work. Several aspects characterize procurement within a governmental organization. Governments are identified as protectors of the public interest, they are not forced to compete, but are accountable for their choices, and are expected to be a role model (Harink, 2007).

Reactive behaviour

DO: RWS employees should take their responsibility and act like a professional principal

RWS its behaviour is experienced as reactive behaviour. Employees mention that they are often busy with corrective measures in projects. For more then 200 years RWS was as “Master of Arts” in the construction sector. RWS was used to be the best and omniscient principal. Nowadays they distribute most of their responsibilities towards the market. Yet RWS is still involved in such a way that they fall in a funnel of detailed designing. Several TBs and specifications lack of quality and offer many “freedoms” for contractors to act opportunistic. The latter results in many discussions, which are not always taken into account in the contract. These (corrective) discussions (mainly about scope and quality) are the responsibility of the project team. The legislative “design” role conflicts with the “Market, unless” (“Markt, tenzij”) and “More with less” (“Meer met minder”) approaches. It does not result in becoming a relieved principal. The latter does not mean that RWS is in need of detailed design knowledge. It does mean that RWS should invest more in their knowledge in strategic elements to make sure that such discussions/uncertainties are managed during realization. Multidisciplinary working is not achieved by better communication. It requires reorganization of departments and the working culture to be effective, especially in a traditional top-down hierarchical and decentralized organization. RWS should focus on clear management, with one common vision, and that stimulates and improves further collaboration between the departments.

“One-size-fits-all” processes

RWS employees are no “one-size-fits-all” employees (“eenheidsworst”) and are not used to work according “one-size-fits-all” processes. Implementing unambiguously instruments is not enough. It is

about a common understanding of the deeper underlying values of tools and methods like AM, SE, and SCB. Risk distributions are considered important, but RWS lacks of clear dialogues and communication in these risk distributions. The role of integrated teams (joint owner / contractor teams) as well as thorough application of risk management is shown to be crucial to improve the projects performances (Bosch-Rekveldt, 2011). In the RWS work culture it is about details, reviews, and reports. It was mentioned in the interviews that several departments/externals think according “the more paper the better”. However, there is a lack of evaluation. Yet coaching and self-evaluation as leadership style are appreciated (Jütte, Balt, Zanen, Boer, & Croon, 2011).

The behaviour of RWS (and hired) employees could be experienced as conflict and risk adverse. It was mentioned that this conflict and risk adverse behaviour results in “traditional” viewpoints and distrust towards contractors. Risk adverse attitude is something completely different than risk controlled steering. Such behaviour results in several specifications and contracts to maintain the distance between principal and agent. Yet contracts are realised by human beings and the latter make mistakes. The contract is just a mean, but its base requirements should be clear and rigid. The acknowledgement of incomplete contracts is a better starting point for a relation based on trust. However, social influences are limited or expelled (crowding-out) whenever too much emphasizes is put on the instrumental and systematic agreements (detailed contracts and lots of supervision). Then the contract becomes an end in itself. Distrust is self-reinforcing and leads to more distrust and a “self protecting” attitude.

Incentives employees

A result-oriented approach is an important condition for project success. Project success benefits from human talent instead of fixed methods and structures. Assessments based on performances are important to stimulate this behaviour within the organization. Furthermore a competent project manager is crucial for the success of a project (pro-active project management). It would not be strange if project managers and procurement (or contract) managers were classified with a certain ranking (e.g. IPMA). Not only hero’s, but also good performances should be awarded. Employees should be managed and steered with incentives and should be assessed based on actual performances. Several employees mention that career opportunities are related to an employees network and not to its skills. It was mentioned that the current reward structure aims to reward “the firefighters that save the day”. Hero’s are sometimes more appreciated then employees that are just performing their task correctly at once. The cause for this obstacle seems related to an unclear frontend-scoping. There is still a need for “hero’s” to solve problems during realization. Steering on different incentives is the key to successfully change the behaviour of employees. Employees should be aware of the situation and the need to change. Multidisciplinary teams only work if people really think and act in a multidisciplinary way. The latter is closely related with mandate and responsibility issues in crucial project roles.

Figure 31 "Key to success" (source: www.machinevision.nl/over-ons/competenties.html)

DON’T: RWS should not only award the hero’s for their performances in the projects.

However, more important is that employees should be aware of their responsibilities towards the users. The market parties’ right of existence is related to making profit. Non-performance results in redundancies or even bankruptcy. Hard and business oriented behaviour is crucial to survive, especially in a competitive market in times of crisis (survival of the fittest). RWS should focus more on “damages” to society resulting from their decisions (e.g. by insight in a business case). Production stagnation because of a small “obstacle” is not comparable with the stagnation of the whole production chain of the contractor. The contractors are a business and are depended on the projects profitability. It seems that RWS employees lack of incentives to act “professional” from a business related viewpoint. In the RWS culture individuals search their 'own way' of interpretation to be effective as a professional (Jütte, Balt, Zanen, Boer, & Croon, 2011). RWS expects the contractors to contribute maximally towards the realization of the public goals and tasks of RWS. RWS still thinks they control the market, but RWS is a buyer in the market and manages the network in a director role. This requires a new pro-active way of thinking. Just keep it simple, which is hard enough. On the congress “Time to maintain” (11-10-2012) it was mentioned that “asset managers” should encounter assets, as “it is my bridge, or my road”.

8.4.4 Summary

- Clarity in the organization in roles and responsibilities is crucial, especially in complex dynamic environments where RWS wants to be in control.
- An integrated way of decision-making, result-oriented approach, knowledge development and sharing, and learning from mistakes are important criteria for success.
- The procurement organization should be set high in the organization and delivers qualified procurers towards the projects that think and act multi-disciplinary.
- Influence of a centralized service cannot be implemented successfully without a good clear focus, distribution of roles and responsibilities, and dedicated and result oriented staff.
- Employees should learn from each other and from the different projects. Knowledge is a key to success.
- Not only the hero's, but also good performances should be awarded.
- Multidisciplinary working is more then asking people to collaborate.

8.5 Operational procurement

Obstacle RWS	Measure Market
RWS is not ready (yet) to cope with the unpredictable contractor market and lacks of defining a clear and fixed demand specification to procure projects against lump sum prices.	Invest in a clear frontend-scoping. Decisions take into account risk management and quality control by clear criteria, norms, and procedures. Invest in the "function" and find out what fits around that best.
"Markt, tenzij" is experienced to be the solution of the inefficient public performances, but contractors are not motivated to act according to the interests of RWS.	Focus on better relationships with enough competition by past performance tools and relationship management. Long term relations and short term contracts.
The capacity of the IPM teams and the employees are overestimated by the "meer, met minder" approach, while complexity and the need for more competent control rises.	Invests with sufficient resources and knowledge in strategic positions
Procurement is experienced as a secondary process.	Procurers are part of the line, involved during frontend-scoping and complement project managers in projects. Procurers are in lead during involvement.
RWS does not assess contractors based on actual quality, but focuses mainly on process plans on paper.	Principal is closely involved (supervision) and keeps in control of the quality aspects.
A lot of attention is given to the contract forms instead of creating the "best" conditions to procure what is needed.	When the scope is clear the contract should not be the issue. Contracts are just a mean. Invest in a clear frontend-scoping.

8.5.1 The demand specification

A project is only about three things: managing time, costs, and quality (see section 3.3). The latter starts with a very well frontend scoping and the identification of the projects needs. *"There is no cutting corners in project management"* (Slegte, 2012). The top demand should be related to the network and the user. The network should be approached in a way that it is clear that an asset provides a certain performance (e.g. like users experience an electrical outlet). It was acknowledged in the interviews that weaknesses in the demand provide opportunities for opportunistic behaviour (Schoenmaker, 2011). The principal should check whether he does not purchases something that is not of any additional value (smarter scope). Secondly, the principal checks whether he does not purchase something that is over specified or lacks of specification (what do you buy). Both are expensive in case of insufficient quality. After that the principal checks whether there are possible procurement advantages.

DON'T: Not ready to go to the market yet? Do not go!

Most of the observed and analysed problems are all related to scope. Several additional claims from contractors and present uncertainties are mentioned to be a result of an unclear scope as well. Quality is still experienced as differentiator. The demand is still not explicitly defined. Employees do not understand what is expected to be a good and smart demand (lack of uniformity and evaluation). All companies recognize the risk of uncertainty in projects, but they did not mentioned obstacles in dealing with these uncertainties. Uncertainties are part of the job and should be managed correctly. The commercial companies consider the frontend-scoping very important. A small mistake in the frontend-scoping could have major consequences during realization and operation.

It is important that RWS should invest in a clear frontend-scoping. The whole project is dependent on clear and correct information about the assets of RWS. Information management and ICT are crucial factors in the success of large complex infrastructural projects. Investments upfront are earned back during the further project realization (LCC thinking, see subsection 3.4.7). It is important that the strategy of RWS focuses not only on mapping and monitoring the need, but also the current situation. When RWS has insight in the ins and outs of their network they are better equipped to define what they really need. In these cases not everything is clustered in one giant contract whenever this is not in favour of the network. RWS should make sure that the demand is clear and that contractors can work within clear boundaries and conditions. RWS should invest in the "function" and finds out what fits around that best. Equally important is that RWS communicates these needs in a clear way with the market such that the market is capable to act along the interest of RWS.

RWS strives to work as one team, as a team that collaborates intensively with others, and as a team that continually improves its processes and quality. RWS involves the contractors during the procurement process to discuss risk distributions and specification alterations, but there are limited resources to determine the project needs. In these upfront phases RWS faces several conflicting interests within and outside their organization. Project teams have to deal with many uncertainties. RWS should choose the level of control based on the uncertainty of the project. The project manager should manage the project based on the real needs and not on the policies of “Market, unless” (“Markt, tenzij”) or “More with less” (“Meer met minder”). Whenever the frontend scope is not clear/sufficient then RWS should not go to the market yet. Top-level requirements must be clear and hard and lower level requirements could be flexible. Whenever RWS awards a contract that consists of risky uncertainties the question is whether the project is still beneficial afterwards (e.g. the budget overrun of the Noord Zuidlijn in Amsterdam).

RWS often defines specifications in a particular level of detail to get approval by the public and politics (TB procedures). Ex-ante risk prevention results in lower presence of the information asymmetry problem (see subsection 3.4.2), but does not solve the asymmetry itself. The asymmetry remains also involved when contractors are earlier involved. This ex-ante risk preventing behaviour should lead to a reduction of the project complexity. A clear scope, lump sum prices, and keeping the distances between RWS and contractors are conforming the need for ex-ante and complete contracts. Yet, the ex-ante completeness is not achieved due to uncertain events and ambiguity of the requirements (Schoenmaker, 2011). These specifications often lack of quality and stimulate strategic behaviour (multi-interpretable requirements, many cutting and pasting in contracts, and a lack of evaluation). Important decisions involving resources are made by bargaining and deal making. It is a power game where strategic behaviour is inevitable. Project managers must learn to use such political system to their advantage. Upfront discussions/consultation/process agreements are inevitable for a smooth realization progress. The “prepare & commit” approach (see subsection 3.3.1) supports the opportunity of these “dialogues”.

8.5.2 Procurement

The managers should focus on the ex-ante procurement of the product. A close collaboration between the procurer and the project manager is required. Otherwise the question is “who benefits?” pops up again (principal-agent problem). The procurer must find a balance between users, market, and RWS, so the purchaser must connect network, procurement and maintenance with each other (Anneeze, 2012). Opportunistic behaviour can be prevented when the scope and the end-result are clear (business case). RWS should invest in the clear frontend-scoping by means of defining, monitoring, and controlling a clear business case, which is used in the interaction between principal, project manager, and contractor. It provides insight in the different processes, changes, and financial impacts and is valuable for evaluation and learning from best practices. A preferred supplier policy as implemented by the commercial companies makes selection “easier”, but again it is more important to invest in the relationships in an objective and transparent manner. RWS should provide incentives for cooperative behaviour. A professional principal maximizes effort and provides incentives to challenge the market to deliver the best possible performance within the available budget. Positive incentives stimulate even better or smarter solutions/products/services.

Procurement role

RWS faces a transformation from an “outsourcing technical tender manager” towards a “professional procurer” (Rijkswaterstaat, 2011b). Companies like Shell, DSM, FrieslandCampina, and Schiphol consider the procurer role of major importance because procurement realizes a certain additional value in projects. In the interviews was mentioned that the current successes of these multinationals are also the merits of their purchasers. Procurement asks for specific specialism and knowhow (section 3.4.5). The described role/scope/tasks (see section 5.1) of a better public oriented network manager, a leading project manager, and the definition of a professional principal have one thing in common: they are all related to “procurement”. Procurement is all encompassing and should be experienced and penetrated in the mindset of the employees. Knowledge about decisions taken upfront could be of crucial value during the realization of complex projects. Several obstacles mentioned in the interviews are related to a lack of “good” procurement. These are an unclear scope, the lack of business case thinking, a lack of quality, and a lack of trust and reciprocity in relationships. The positive effects of a "good purchase" are created upfront together with the market, not by outsourcing all the work to contractors. The definition of a procurer is elaborated in section 3.4. RWS as a principal should have the competences to understand, follow, and redirect the outsourced processes in a well-informed way. RWS should be in control. Linking procurement with network management requires business skills and process chain thinking to procure according to the longer-term network needs. The project manager steers on the relation between time, costs, and scope and is in control of these variables. *“It is all about scope, scope, and scope. When this is not clear the project manager should ask, ask, and ask until it is clear”* (Slegte, 2012).

DO: Procurement managers are responsible for the commercial part of the project.

However, the scope (or quality) should not be a differentiator. Procurement is about guaranteeing the long-term functioning and performance of the network against acceptable cost for the users. Procurement is considered a primary task in the interviewed commercial companies. RWS highlights six crucial subjects for the several procurement domains. These six processes are defined as (1) demand management, (2) procurement strategy, (3) market relation management, (4) financial economic knowledge, (5) contract control and management, and finally (6) procurement process management (Rijkswaterstaat, 2011b). The procurement manager focuses on these processes and “creates” solutions, aims at negotiations, suppressing prices, and more quality. The procurer focuses to make sure he knows what he needs, how the market looks like, and what incentives are required. The procurer should link both “worlds” of plan study and realization in order to define a clear demand in the contract. Procurers direct and are responsible for the commercial part of the project instead of only following the demand of the project teams. The latter connection is not comparable with the relationship of BIO and IMG at RWS.

Procurers at the commercial companies have a prominent role in the project teams. These procurers are part of the line, are involved during the frontend-scoping, and complement project managers in decision-making of projects. Procurers are in lead during involvement, but they also should know the market and their competences. The procurer should make use of the networks and searches for new opportunity “windows”. The procurer should be closely involved (supervision) and keeps in control of the quality aspects, especially during the frontend-scoping. The procurer prescribes quality criteria, norms, and procedures. He makes sure that the contractor delivers the actual expected quality. He also evaluates and monitors the performances of the contractors and stimulates improvements at both sides.

On the other hand, the contractors should know what they do, work together with several subcontractors and suppliers, have insight in the strengths and weaknesses of the supply chain, deliver what they have to deliver, and behave as much as possible on behalf of the clients wishes (otherwise there is a risk of the principal agent problem, see section 3.4.2). Both require an interactive multi-disciplinary process so that several existing products and services could be adjusted and improved over time. The danger of close collaboration is that RWS falls in a funnel and remains involved and responsible. Therefor procurers must search for a procurement process in such a way that RWS receives what they wish for, the contractors know what RWS wants, and finally the contractor also actually delivers what he has to deliver. The procurer must find a balance between users, market, and RWS, so the purchaser must connect network, procurement and maintenance with each other (Anneeze, 2012).

Procurement versus contract management

RWS lacks of good procurement (whether or not organizational or personal related). “Good” procurement is about making improvements step by step and with a clear goal in mind. Procurement is an art and procurers should distinct themselves with knowledge about what is procured. What should not be forgotten is that the role of a procurement manager is different from the role of contract manager (see subsection 3.4.6). Procurement is closely related to tender regulation, partnerships, contract management, procurement strategy, and project control. Good contract management is not possible without a good procurement. However, contract managers still decide about procurement related aspects in the projects of RWS. The five procurement spills mentioned by RWS (see section 3.4.6 and 4.5.4, (Rijkswaterstaat, 2012c)) are again related to an unclear frontend-scoping. Currently, the contract managers are the only link with the market parties. In the current IPM model (origins from 2006) procurement was experienced as a secondary process. The current role of procurer falls under the responsibility of the contract manager, but according the NEVI contract management is one of the roles of procurement. A lack of good contract management is a risk for the effectiveness, the transactions’ efficiency, and payments’ justification at RWS (Schoenmaker, 2011).

Implementation of procurers

RWS its management does seem to acknowledge the importance of the presence of a good procurer during a project, but lacks of an integral inclusion. The role of integrated teams is a crucial one (Bosch-Rekveldt, 2011): integration in terms of involving all relevant parties in the team (owner and contractor, but also different departments within a company) and also integration in terms of resource continuity throughout the different project phases (researchers as well as operations people). Integrated teams have short communication lines, which enable efficient decision-making and potentially avoid late scope changes. The IPM team is an integrated team, but lacks of the clear inclusion of a procurer and operator.

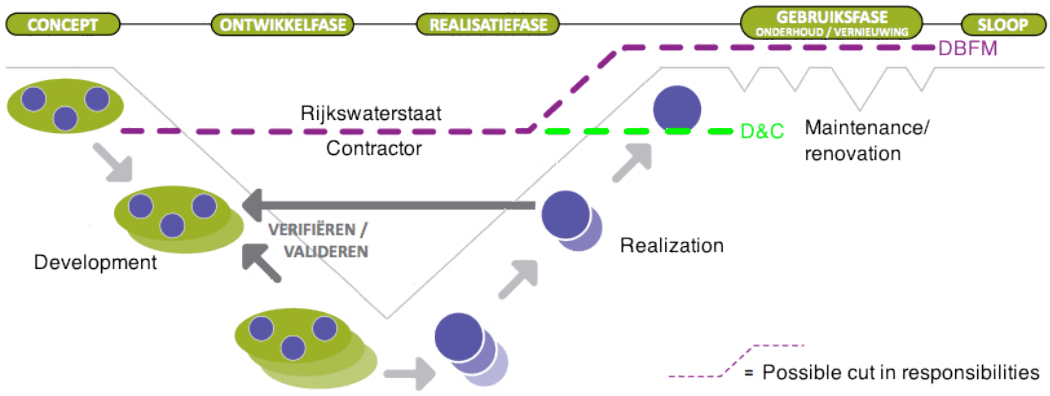


Figure 32 Expected division of responsibilities between RWS-contractor (modified from (Rijkswaterstaat P. B., 2009))

In the interviews was mentioned that procurers of RWS are not part of the project team, are not involved from the beginning, and only “support” the project teams in defining the contract. Specifications are not defined in close collaboration with purchasers, which should ensure the desired quality. RWS its current “leading project manager” vision (see section 4.1) is in fact closely related to the role of a procurement manager. Project management is an issue for contractors during design and realization. Project control, technical management, and project management are in fact mostly tasks of the contractor (see Figure 32). RWS should not be involved in (technical) discussions about scope and details when the demand is clear. The latter is supported in the different interviews were it was acknowledged that current “project managers” are in fact some sort of “procurement managers”. Figure 32 visualizes a “new” vision based on the goals in the OP2015. RWS wants to change more into a role of a directing principal that procures what they need. This requires a new attitude from RWS employees, which is also supported by the “asset management” approach and several theories/models (e.g. IDE, SE, project management 3.0, bottom-up approach, see chapter 3). However, the link between procurement and technique is a complex one and should not be underestimated.

Quality

The key to better quality lies in the hands of RWS (Rijkswaterstaat, 2008). "*A professional principal maximizes effort and provides incentives to challenge the market to deliver the best possible performance within the available budget.*" (Peters, 2012) Quality should be more important than price. Quality is not a differentiator at the commercial companies. If their contractors do not comply with the standards they are "kicked off" the project and/or are removed from their long/short lists. Qualitative incentive steering mechanisms of RWS are lacking such incentives/penalties and are focussed mostly on processes. However, it was mentioned in the interviews that describing processes creates more paper and not directly more quality. Process design is still academic until implementation. Implementation requires equipping the organization to absorb the change (Brache & Rummler, 1995). Companies like Shell also specify quality X. The EC transforms these qualities in the design and the construction contractor just delivers/builds. The ECs are responsible for the contract realization and steer the construction contractors. It is concluded from the interviews that there is a lack of common understanding about quality at RWS. Quality consensus in the demand specification should be clear upfront in the project. By learning from best practices RWS should standardize more in the quality demand of the project. In this way uncertainty is reduced and contractors are better equipped to price these contracts lump sum.

DON'T: RWS and politics need to accept solutions that are not lowest in cost price.

The RWS management seems to focuses more on the processes of management instead of the actual realization of the work in the projects and/or the quality of the assets performance. Contractors should be stimulated to innovate their products. RWS lacks of clear monitoring, "positive" incentives, and do not assess contractors based on their actual behaviour (see section 7). In other words contractors are besides their good will not motivated to act according to the interests of RWS. A design contest is not optimal when winner is not awarded with the contract. The "search for innovation" stops abruptly after the contract is signed (Beeker, 2010). A proactive attitude is required. The construction contractors barely see the (social) threats of the integral contracts and still experience a semblance of freedom. The earlier involvement of the market has its limitations. The question emerges is: "who benefits?" (Goossens (2007)) Tools like EMAT make sure that contractors take a better look at their internal processes and the LCC of the solutions, but there is a lowest price angle. EMAT criteria are often related to "safety plans", "risk plans", "vehicle hours lost", and planning. It is important that those "plans" are used and implemented during realisation and are not only focused at winning the contract. RWS never awards projects based on submitted business cases. Contractors still consider EMAT in several projects only as a formality. EMAT should not be used in a way that basically selects on price.

In addition, the "price war" between contractors is influenced by the current economic crisis. Contractors are influenced by though market conditions in the last years. Contractors still "squeeze" the contracts. It is expected that contractors work according the new principles, but *"We want to do it, but we cannot do it (yet)"* (Goossens, 2007). More important is that RWS should invest in relationships with the market.

Relation management

RWS focuses on partnerships and mutual trust in the projects (DBFM, alliances), but is confronted with opportunistic behaviour of contractors. Yet the latter "relations" are approached and limited from the viewpoint of a project. If RWS wants to make optimal use of the knowledge and capacity of the market they should invest in relationships that go beyond a projects' scope. Consensus about quality should be clear in these relations. Without better relationships the discussions about scope and quality will remain a never-ending story in several projects. Moreover, strategic behaviour has several impacts on the levels of trust between RWS and the contractors. As a professional principal RWS should manage these market conditions just like the commercial companies do. RWS should focus on relation management by past performance and relationship managers. Relationship management is considered a criterion for project success. Yet, it was mentioned that several trends like past performance were already proposed in the past, but did not survived.

However, in August 2012 a start is made by the start-up of a past performance rating for ECs that work for RWS. Contractors are aware of the possible impact of exclusion in future projects. RWS introduced

"high trust high penalty". Yet the focus lies again in the prevention of opportunistic behaviour by the exclusion of the risk. The commercial companies aim on incentives to stimulate "better behaviour" of the contractors. Several interviewees mention that it is more important too learn from mistakes instead to penalize the supplier and search for a new partner. RWS should focus more on the relations and the improvement of the overall system. Combining the strengths of public and private parties would offer opportunities. For the client it should lead to a comprehensive solution. The integral approach should lead to a higher customers willingness to pay for higher values of the end product. RWS (probably even more the politics) need to accept solutions that are not lowest in cost price, but in life cycle costs (LCC).

The question that RWS should ask itself is whether they are ready to outsource these projects to receive more Value for Money? RWS uses SCB to complement the inspection system of the contractors. However, RWS its control is experienced as a "paper tiger". Contractors still act opportunistic and take their advantages of current contract weaknesses. Opportunistic behaviour of contractors is a serious issue. New contracts are implemented with high expectations and are experienced to be the solution for the disappointing quality and the opportunistic behaviour. Yet, when the scope is clear the contract should not be the issue. Contracts are just a mean. Schoenmaker (2011) supports that SCB sustains the distance between RWS and contractor. He stated that SCB decreases the monitoring costs of RWS, but increases the distance between principal and agent. In the light of SCB RWS must say, "prove it". However paper and theory is one thing, practice is a second thing, and both are connected by partnerships, collaboration, and trust. The SCB method does not stimulate better relation management. The commercial companies often use ECs to supervise the construction contractors their work. RWS expects the contractor to take these responsibilities themselves, but the latter is pretty risky (opportunistic behaviour). However, the commercial companies also mention that a process like that is not unrealistic. More important is that the principal is always in control and knows what he is doing.

8.5.3 Contracts

Every project requires a different approach. Making deliberate decisions about what contract fits which project is important. Not one contract is perfect and people should learn from mistakes. D&C and DBFM contracts are the current obliged forms of contract. Yet, the choice of a contract must be supported by the politics or comply with the ex-ante defined political framework (Kuhlmann & Merema, 2011).

Contract relation

In the traditional bid-built models the relation principal-agent was clear, and experienced as simple. Now, the quality of the contract relation is not always "healthy". A bad contract relation could be depended on wrong specification, poor designs, poor contracts, or too much freedom for opportunistic contractors. Still one of the biggest challenges is restore trust between the public and private parties. The emphasis lies often on new forms of contracts that keeps this institutional separation intact and at the same time creates opportunities for synergy. Contracts are a good solution for the reduction of risks and the clarification of relations between parties, but contracts are incomplete. The interviewees acknowledge that the contract is one of the few means to restrict opportunistic behaviour, but this is not the solution to demand quality from contractors. Communication about "if I do this then I expect that from you" is understood to be crucial by the commercial companies. In such situations trust is again a crucial factor for good contract management (see section 3.5). The latter is currently lacking between the public and private parties. A lack of trust is often involved in project evaluations as one of the causes of project failure rates/costs (Kuhlmann & Merema, 2011) (Schoenmaker, 2011) (Zaal, 2009) (Jacobs T., 2012).

Selection and awarding

Currently, RWS is insufficiently prepared to award contracts based on other criteria then price. Lowest price is fine in times of crisis, but better should be the assessment on lower "total cost of ownership" or "lifecycle costs" (LCC) (see subsection 3.4.7). More important is the choice of a contractor who is capable of realizing the projects goal and requirements most optimally. However, can the market justify an open and transparent attitude and realises the project within budget. Is it "Market, unless" ("Markt, tenzij") or is it "RWS, unless"? Opportunistic behaviour is stimulated because of financial incentives (e.g. profit) and the relational distance between both principal and agent ("though"). Also information asymmetry enforced the opportunistic behaviour of the contractor (Schoenmaker, 2011). Without any

good incentives the market parties will never prefer social value above profits. These incentives are closely related with the responsibility/accountability of the assets performances defined in the contracts. The commercial companies award their projects often to ECs by means of an EPC(m) contract. The contractor bears the risk of integrating the performance of all package contractors, including designers. A high degree of certainty (on paper) can therefore be attained as to cost, time and quality. EPC procurement is widely used and understood and is the most "bankable" procurement method. EPC has been unpopular among some contractors (though market conditions are rapidly changing). One of the main reasons for not awarding these contracts towards a construction contractor is that it is unclear who controls the construction contractor when he is in charge. A principal with an outsource strategy is dependent on the knowledge of the contractors. Contractors will add a substantial risk premium to the price. In EPCm an EC manages the project on behalf of the principal. When an EC is in charge he will make/manage the design and manages the integral project aspects. The EC also coordinates the construction contractor to build the asset against the required quality. At RWS the ECs are often only accountable for their advice and not the projects results, but the latter is also related to the “incompetent” contract relation. (Clifford Chance, 2009)

DBFM

DBFM contracts form a standard for large integral projects/programmes in the portfolio of RWS. DBFM is chosen after a positive PPC outcome (up to a maximum of 25%). However, the PPC seems not a very objective criterion because it only compares DBFM with D&C contracts. The trend of innovative contracts like D&C and DBFM is based on efficiency gains, but the rumour that these contracts are pushed through by politics is often heard. How can you predict the future during maintenance periods when construction is not even finished yet? These PPP contracts offer budget advantages for governments (Van Ham, 2002). The latter is also supported by the way new strategic policies of “Market, unless” (“Markt, tenzij”) and “More with less” (“Meer met minder”) were implemented in the organization (see section 4, 7, 8.1, and appendix A.4). In DBFM all risks are transferred to the contractor, which should mean RWS themselves are less at risk. Do DBFM really lead to higher levels of efficiency, more innovative potential through better technology, healthy competition through open tenders, and risk transfer to private parties? The latter is questionable (de Jong, 2011). None of the other interviewed commercial companies implement DBFM contracts. Finance is kept in-house because the latter is related to a particular form of control. Even maintenance is outsourced separately in short-term contracts. What about competition advantages in year 2, 3, 4, and more? Currently there are no reliable and comparable results available. The future will proof whether these contracts were a success.

The financial accountability in DBFM projects should make the contractors more responsible of the quality and performance of the realized assets. DBFM contracts provide incentives for earlier availability and less maintenance during operation of infrastructures (only when this is more profitable). The current trendsetters of DBFM suggest that quality problems/discussions are history. Banks are involved and are much more focussed on risk management and project returns (ROI). The contractors’ opportunistic behaviour seems prevented, but the real question is whether or not this is true. How valid is risk transfer? A DBFM (or PPP) provides an essential public service. Nevertheless, what is essential for the public sector could not be so essential for the private sector. If a private party faces a negative business case he can stop these investment. If the PPP fails it is likely that the Public Authority will incur extra costs to maintain the public service.

Currently RWS is still struggling with defining specific quality standards. Take for example tunnel safety, traffic information, and technique. RWS did not define a clear and widely accepted standard for small tunnels or bridges or whatsoever. Plan studies also require a complete different approach whenever these projects are contracted out as a DBFM contract. What about the already started/completed plan studies? DBFM contracts are only successful whenever you steer completely on product performances. If not, prices probably increase in DBFM contracts. It would be possible, but it must be efficient.

RWS does not have any experience with these contracts on the longer term. RWS lacks of an internal stable and sufficient coordination between integral aspects. The IPM role model is not mature yet and the affectivity related to the goals of the OP2015 is questioned as well. Moreover, in the current setting it is hard to penalize contractors for their performances. Scope changes in DBFM contracts are even more complex because the whole payment system of the contractor is based on the contract. Changing

this “payment” structure by scope changes can have enormous consequences. Payments on availability hamper further changes/improvements/innovation of assets when this is disadvantageous for the assets’ availability and payment. DBFM contracts are based on a stable environment for 25-30 years and that is exactly where RWS is not prepared for. RWS is still depended on the expertise’s of the market. Yet, private parties are also very good in advantageously defining (self interest) the “fit for purpose” (Goossens, 2007). The latter suggest that the taxpayers are not always better off by the new “obliged” D&C and DBFM contracts. These DBFM contracts should help an organization to reach their goals. Whenever such contract forms an obstacle it would be better to prescribe a specification.

8.5.4 Summary

- RWS should invest in this clear frontend-scoping by means of defining, monitoring, and controlling a clear business case that supports LCC/TCO thinking, which is used in the interaction between principal, project manager, and contractor.
- Whenever the frontend scope is not clear/sufficient then RWS should not go to the market yet.
- RWS as a principal should have the competences to understand, follow, and redirect the outsourced processes in a well-informed way. RWS should choose the level of control based on the uncertainty of the project.
- The managers should focus on the ex-ante procurement and quality is not a differentiator.
- Procurers have a prominent role in the project teams and are part of the line.
- Procurers make sure that RWS receives what they wish for, the contractors know what RWS wants, and finally the contractor also actually delivers what he has to deliver.
- Lowest price is fine in times of crisis, but better should be the assessment on lower “total cost of ownership” or “lifecycle costs” (LCC)
- Relations are important in knowledge development, evaluation, and learning from best practises.
- When the scope is clear the contract should not be the issue.

8.6 Miscellaneous

Systems Engineering

An interesting observation is the link between the obstacles as represented in section 7.1 and the findings of several research towards the implementation of SE/SCB by Oliedam (2010), van de Gazelle (2011), Wiendels (2010), Uil (2006), and van Leeuwen (2009). The implementation of procurement in the primary process is confronted with some of the same obstacles as experienced by implementing SE. System Engineering is a design tool, but is like procurement a way of thinking that should be represented in the entire organization. It seems that the projects face the most difficulties of these transformations. The SCB and SE process tools are not controlled in an efficient and effective way. SE is still too much a technical management matter. SCB does not lead to higher quality because it is an indirect way for project and quality control. When RWS uses SCB for quality control they really have to take their distance. SE and the SCB tests are not interwoven and there is a gap between the IPM model and the implementation of SCB, which results in frustration. In this context SE/SCB and procurement are in some parts overlapping. Yet, it shows that RWS is confronted with several problems in the implementation of new tools/structures like SE or a centralized procurement organization. Both changes require a different way of thinking from the employees.

Relation contractor and the sub-contractors

The relation between the main contractor and the sub-contractors should not be underestimated. RWS as a principal has only contact with the main contractor/consortia. Price agreements between the main contractor and sub-contractors are not monitored. However, the quality of the project stands or falls with the quality delivered by the sub-contractors. Often the subcontractors realise the actual work. In the interviews was mentioned that this contractor-subcontractor relation suffers from a price war. Knowledge is not always shared and the philosophy of supply chain thinking (White, 2010) is not present. Even in consortia these companies often work according to their own agenda and there is a lot of competition involved between the different contracts. It’s a game of the survival of the fittest and the survival of your own company is the top priority. Though the supply chain thinking is in the production chain exactly one of the main success factors for additional value in for example D&C contracts.

9 VALIDATION

In this chapter an overview is given about the findings from the validation round. The reports findings are validated in order to confirm the findings from the interviews. The validation round is executed by means of a discussion round. The student, the thesis committee, a project manager (Ger Vos), and a contract manager (Rob Spit) were involved. Upfront the two managers were only informed about the research problem, goal, and research questions. During the meeting a short introduction about the research approach was given. The discussion focused on several findings from the interviews (chapter 7) and discussion (chapter 0). This discussion was structured in five themes. Each theme consists of one or more statements. The statements were based on the answers from the market parties (appendix F). The results are analysed and structured along the four subjects politics, strategy, organization, and operational procurement. In Table 7 both the obstacles of RWS and measures from the market from subsection 7.3.5 are validated whether they are recognized and/or acknowledged as an opportunity for RWS. A brief explanation is given about the different findings in the validation round. Two aspects were not discussed in the discussion round and no judgement about these two is given below.

Table 7 Results validation round

Subject	Obstacles RWS (straight) / measure commercial companies (*Italic*)	Recognized obstacle / acknowledged opportunity	
		YES	NO
Politics	Dynamic political and environmental influence the decision-making process.	X	
	Manage politics as a risk by choosing to Take, Treat, Transfer, or Terminate in the most optimal way.	X	
Strategic	A business-case related mindset is not leading in the entire projects' life cycle.	X	
	Business case is leading in projects and includes LCC/TCO thinking.	X	
	The principal is not relieved by contractors, but are during realization still involved in several scope/design discussions with the contractors.	X	
	Market is relieved in less strategic subjects and contractors decide about the how and when during realization. FID not clear/sufficient? Do not go to the market.	X	
Organization	RWS lacks of well-qualified human/organizational resources to deal with and to learn from current project activities and experiences.	X	
	Proper base organization, investments in knowledge transfer, development, and evaluation. Knowledge based steering.	X	
	RWS lacks of a clear and strong base procurement organization that provides procurement managers in the projects and learns from experiences across projects.	X	
	Centralized procurement organization high in the organization that invests in relationships, knowledge, and evaluation. "Delivers" procurers towards the projects.	X	
	"Higher" (project) management and IMG still encourage the organizational changes, but lower in the projects several employees lost their faith in a successful change.	*	*
	Organizational changes are based on clear efficiency gains and are implemented top-down, fast and clear towards the operational levels.	*	*
	RWS often lacks of responsibility and accountability to act professional like from a business-oriented viewpoint.		X
	Hard and business oriented behaviour (survival of the fittest). Multidisciplinary decision-making by creating a common understanding between different roles and disciplines.	X	
	The lack of good and clear incentives hampers the multidisciplinary thinking and efficiency and effectiveness of projects.	X	
	Business case and multidisciplinary decision-making are leading in projects. Employees are assessed based on their performances.	X	

* Not discussed

Subject	Obstacles RWS (straight) / measure commercial companies (*Italic*)	Recognized obstacle / acknowledged opportunity	
		YES	NO
Operational procurement	RWS is not ready (yet) to cope with the unpredictable contractor market and lacks of defining a clear and fixed demand specification to procure projects against lump sum prices.	X	
	Invest in a clear frontend-scoping. Decisions take into account risk management & quality control by clear criteria, norms, and procedures. Invest in the "function" and find out what fits around that best.	X	
	"Markt, tenzij" is experienced to be the solution of the inefficient public performances, but contractors are not motivated to act according to the interests of RWS.	X	
	Focus on better relationships with enough competition by past performance tools and relationship management. Long term relations and short term contracts.	X	
	The capacity of the IPM teams and the employees are overestimated by the "meer, met minder" approach, while complexity and the need for more competent control rises.	X	
	Invests with sufficient resources and knowledge in strategic positions	X	
	Procurement is experienced as a secondary process.	X	
	Procurers are part of the line, involved during frontend-scoping and complement project managers in projects. Procurers are in lead during involvement.	X	
	RWS does not assess contractors based on actual quality, but focus mainly on process plans on paper.	X	
	Principal is closely involved (supervision) and keeps in control of the quality aspects.	X	
	A lot of attention is given to the contract forms instead of creating the "best" conditions to procure what is really needed.	X	
	When the scope is clear the contract should not be the issue. Contracts are just a mean. Invest in a clear frontend-scoping.	X	

9.1 Politics

It was mentioned that being a public principal requires special attention. Especially in road infrastructures the decision-making is politically steered. Upfront in the plan study phases there are discussions with all the stakeholders about the usefulness and necessity ("nut & noodzaak"). A cost benefit analysis does not provide detailed insight in the financial resources. The "business case" thinking even lacks of traceability after the project decision is taken. Finally the preferred solution is often way more expensive than was budgeted upfront. Furthermore, municipalities and water authorities also want to benefit in the context of environmental integration ("natuurlijke inpassing"), especially in the DBFM contracts. Everybody should be involved, but the latter results in several disturbances. It was mentioned that the EU regulation makes it difficult to involve and collaborate with just one supplier/contractor. In addition, the politics are mentioned as one of the causes of the lack of knowledge in the current organization. The policies of "Market, unless" ("Markt, tenzij") and "More with less" ("Meer met minder") were implemented "successfully", but much knowledge disappeared at RWS.

9.2 Strategy

RWS wants to be a leading project manager, but the latter is not very clear compared to the market. Companies like Shell strive for profit, market share, and continuity. The market is and RWS is not confronted with competition. It was mentioned that the business strategy of RWS is influenced by the politics (market, unless; more with less). However, the companies distinct themselves from RWS with the business case oriented strategy. It is about profit and continuity. Yet, the social benefits are experienced hard to measure and defining a "positive" business case is experienced complex. On the other hand, a business case provides insights in the effectiveness and efficiency of the project. The market has a clear link between continuity and market share. At RWS this link is not so clear and is related to the political choice (probably based on economic interest). The connection with the economic purposes via the politics is not clearly represented at RWS. Investments by the companies in e.g. knowledge and innovation mean that they want to improve their business cases and market shares. It is acknowledged that the link with the business case is lost in the projects when RWS starts procuring. The latter affects the developments in innovation and knowledge transfer. There is a large gap between the plan study and the realization. Mechanisms like being a professional principal and leading project manager are expected to provide the same incentives as market leadership, but are questionable.

9.3 Organization

9.3.1 Organizational structure

It was mentioned that the current IPM model seems different than proposed in earlier consultation rounds of RWS. It was mentioned that the plan was that procurers would have a direct line towards a company director. Otherwise the procurer would not be in the position to argue the projects' decisions. Yet, as observed in the interviews the latter was not implemented and the risk that procurement would remain a secondary process became reality. The department procurement became procurement support ("inkoopondersteuning", BIO). Procurement managers became procurement advisors. The IPM team consisted of contract managers that are responsible for procurement as well instead of procurement managers that control the contract management. It was acknowledged that as a result several project teams only involved procurement advisors (BIO) as late as possible to define the contract. Yet it was also mentioned that there are developments stimulated by IMG that still try to achieve the aforementioned centralized procurement roles. It seems that procurement management and contract management are experienced more as one integrated subject. Still, at RWS there is always a tension between the organizational interest (smart efficient procurement) and the project interest (availability of the road). It was mentioned that the project interest was the most important one for more then 180 years. Both procurement and technique would probably organize their own "escalation line" towards the boards in future. Still the problem of a lack of clear result responsibilities is acknowledged to be present in the IPM model.

The discussion about the actual responsible project leader was interesting. In the current IPM model every manager has his own responsibilities, but the common responsibility was built up in the projects. However, changing staff members/positions creates certain weaknesses in these project-based relations. The project manager is formally the boss in the contract, but he is not the party that interacts with the contractor. He is the internal link with the principal. The responsibility of the contract manager is the contact with the market, while the technical manager discusses the technical issues with the contractor and environment. The manager project control is actually the internal project leader and focuses on risks and quality. However, he does not take over the responsibility like a project leader would do. Nobody is really responsible for the project, but only for his own specialism. There is not such a thing as a project leader that is supported by several managers, but the latter is also not unanimous acknowledged as crucial. Nonetheless, RWS will always need to create a balance between the technique, procurement, and environment. The project manager should keep these three together.

9.3.2 Organizational behaviour

It was mentioned that the behaviour of RWS is characterized as avoidance behaviour. There is a working culture where everybody wants to reach a joint result, but within their own specialism. The multidisciplinary decision-making is not optimally implemented. The intention is not right. The same is experienced in the development of knowledge relationships with contractors. The exploitation of a knowledge relation because it is beneficial for us is different then the current intention that focuses on the prevention of opportunistic behaviour. Yet, the latter was not supported unanimous because RWS believes that contractors should be responsible for this knowledge development (avoidance behaviour). It was mentioned that RWS would like to see that contractors would share their knowledge. Yet knowledge separates a contractor from other contractors. Contractors have to compete because the latter is related to their market share and continuity. Several RWS employees characterize the markets' behaviour as "as much as possible mess for the least possible money". The latter attitude is acknowledged to be incorrect. RWS thinks too much from large to small. By organizing their dominance RWS introduces a reactive behaviour that is probably not advantageous for RWS in the end. Yet, it was mentioned that the latter "traditional" behaviour is changing.

The attitude of RWS employees is not considered as a lack of responsibility/accountability, but is considered as too much responsibility/accountability. The average RWS employee that works longer then ten years for RWS would probably define the current changes, as "it should be forbidden". They often experience that they have to fix the current processes through several backdoors. Yet feeling and being responsible is something different. The latter is mentioned to be valid whenever it is compared

with the actual delivered performances and final settlement. However, it was mentioned that RWS does not have a performance-based assessment. Every time again RWS is involved in consultation, consultation, and even more consultation. In the end there is always a solution, but the question is who benefits? It was mentioned that the commercial companies can assess and reject contractors that ruin the whole thing one or several times and RWS cannot.

9.4 Operational procurement

9.4.1 The demand specification

The demand specification is very important to make clear what is procured. It was not commonly acknowledged that the demand is not clear, but it was mentioned that it is strange that RWS does not have a basic specification, for example for a "slice of road". Not even in this low-tech infrastructural business. It was also acknowledged that the current baseline situation ("nulsituatie") is often not clear. The latter involves many scope changes even during the tender and realization phases. Hennes de Ridder mentioned, *"contract what is known and buy what is measured" ("contracteer wat je weet en koop wat je meet"*). It is acknowledged that RWS often contracts uncertainties and risks because it is sometimes unknown what lies below the surface. It was mentioned that the latter is related to the traditional behaviour of some employees that transferred these responsibilities towards the contractors. Again the lack of knowledge/information seems to hamper further collaboration. Yet, it was mentioned that the contractors are also not ready yet to deal in an optimal way with the new way of working.

It is mentioned that RWS is currently even specifying more to strive for more uniformity in e.g. contracts ("contractenbuffet") and standardization in e.g. work processes. Yet, the focus should lie on the uniformity of the use and standardization of the elements. Hennes de Ridder mentions an example of a car: *"Every car has gas pedal, brake, and clutch that is the same in every car. Everybody can drive that car. That is a uniform use. Elements like batteries, wheels, etc are standardized."* It is acknowledged that RWS fails to specify top requirements in a functional way. The reason is that a function cannot be budgeted without a function carrier ("functiedrager"). RWS still involves a reference design during the decision-making, but the actual drawings are not provided to the market. Only the specifications are represented in the contract. It is mentioned that specialists could "forget" the context of their work especially in the project specific specifications. It is acknowledged that RWS prescribes what is already known. It mentioned that RWS employees are not afraid to specify in a functional way, but the warranty conditions and risk plans that go hand in hand with this kind of specification are a problem. Contractors are not stimulated to improve the network step by step. One of the consequences of the current management is that RWS faces five different traffic control centres with each its own system and lack of uniformity.

However the problem is not the specification itself. Companies like Shell also specify a lot. It is about the multidisciplinary decision-making where everybody collaborates to reach a common goal and is not only about informing what you want. Moreover RWS their specifications strategy is a result of the budget cuts at the government. It was acknowledged that designing was not allowed anymore, but the legislative regulation and procedures obliged RWS to remain involved in the design work (ambition document, "welstandscommissie", DBFM). The intention to specify less is not based on the actual project and environmental needs.

9.4.2 Procurement

Another important subject is related to the relationships with the contractors. It was acknowledged that RWS focuses on short-term relations and long-term (DBFM) or short-term (D&C) contracts. The latter is the opposite of the commercial companies that focus on short-term contracts en long-term relationships. RWS works with one party in one project for thirty years. It was mentioned that DBFM contracts should solve the problems of the D&C contracts where contractors did not design as sustainable and maintenance friendly as expected. On the other hand the market works with different parties, but per project another supplier could be chosen (preferred supplier). The focus and investments in relationships and knowledge is an important one and is acknowledged not to be present at RWS. Yet, RWS does not want to build on too intense relationships with contractors. The responsibility to develop

and innovate is left to the contractors and they should adapt these with their own systems. You ask and we build ("U vraagt wij draaien"). However, whether or not the assets are realized really smart, efficient, effective, and cheap is unknown. The quality of the assets, which is good, explains nothing about the quality of the realization process. The difference with the commercial companies that is acknowledged is that these companies documented everything. These systems, like cars, developed step by step with proven technology.

Compared to the commercial companies the procurement department of RWS is not the department that invests in the contractor relationships and evaluations. Past performance is experienced as a fantastic tool, but needs to be made legal proof in the legislative environment of RWS, which is hard to realise. Yet it is also doubted whether past performance would work if the damages (e.g. a black lists of suppliers) would be hard to realize. It is unclear what kind of requirements these contractors should posses now and in the future. It is questioned whether this "preferred" supplier would be such preferential over five years as in the beginning.

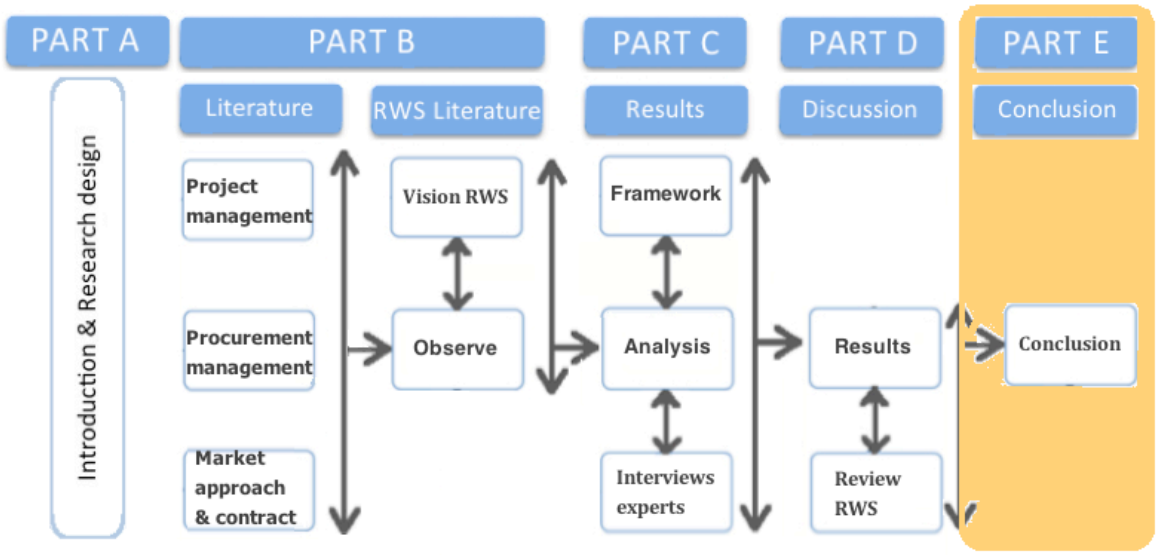
Yet the core of these relationships is knowledge. Currently, RWS focuses a lot on process plans. Contractors with better process plans receive bonus points during the award procedure. The statement that a good process results in a good product is not commonly acknowledged. Also there is a lack of consensus whether the contractors do posses the required knowledge. Knowledge lies currently at the engineering companies, but the latter lacks of responsibility. Compared to the market there is a big difference because these commercial companies want responsibility for and competition in this knowledge. These companies have themselves the knowledge about the strategic elements for their businesses. They even invest a lot in this strategic knowledge. The latter is acknowledged by RWS, but the difference with RWS is that these commercial companies interfere with potential suppliers and their opportunities because it is also in their interest that these succeed. RWS or maybe even more directly the politicians expects the market to realize these tasks herself. It is acknowledged that RWS cut too much in their knowledge. For example, RWS and the market do not understand industrial automation, but is sometimes required according the current demands.

Moreover, in the construction industry there is almost no evolutionary development because it is low tech. The clustering and complexity thinking is lacking. Compared to the commercial companies it is acknowledged that these technology suppliers are much more integrated with the knowledge about the business operation of the commercial principals. The OP2015 focuses again on sustaining more knowledge in the organization itself, which supports this argument. It is even questioned whether RWS should outsource the electronic and traffic control systems with the concrete structure instead of a tunnel that includes these electronic systems. The latter is currently understood as disproportional, but consist of the biggest risks related to the actual availability of the tunnel.

9.5 Summary

The validation committee acknowledged most obstacles and opportunities. Just one was not unanimous acknowledged and one obstacle was not directly discussed. It seems that RWS acts in a reflective role. Several tasks/activities are executed or are not performed. An often-heard comment was "we have to or we are not allowed to do so because of the politics". However, RWS should take their social responsibility for the actual users in their work despite that the politics are the direct client of RWS. The acknowledged opportunities like past performances, clear responsibilities, and knowledge-based relationship steering are examples that probably would be implemented by far when RWS would be a commercial company. It is all about the network performances. This way of working should be based on an intrinsic motivation. The validation shows that RWS has a lot of work to do. The latter should be visible in the behaviour of the employees at RWS and in particular at the politicians. RWS can learn a lot from the commercial companies, despite they are a governmental agency.

PART E. CONCLUSIONS AND RECOMMENDATIONS



10 CONCLUSION AND RECOMMENDATION

This research provides insight in the several procurement related characteristics of the construction industry. The answer to the main research question is underpinned by the content of this report based on the literature, interview findings, and analysis described throughout this report. The recommendations describe how RWS could improve their business. The main research question is answered in section 10.2 based on the answers of the research questions in section 10.1. The main research question is:

> In what way should the current procurement process be improved to achieve the company goals?

10.1 Answers on the research questions

Why does Rijkswaterstaat want to change into a (more) professional principal?

- RWS was too large, too expensive, and did not work in an efficient way.
- The interactive processes require an integral and multidisciplinary approach.
- RWS strives to work as one team, as a team that collaborates intensively with others, and as a team that continually improves its processes and quality. The OP2015 states that the goals have not been reached yet.
- RWS should be relieved by the market and should act more into a professional directing role ("regiehouder"). There is a need of a principal with knowledge and competences to steer contractors at all times.
- RWS wants to be the best executive organization of the government.

How does Rijkswaterstaat procure its infrastructural works in practice?

- Procurement is a task of a contract manager. In a tender a contract is awarded to a contractor.
- Contractors are earlier involved to exploit their knowledge and experiences ("Markt, tenzij").
- RWS increased their projects' scope and outsources more tasks to the market to minimize their control efforts and overhead costs ("Meer met minder").
- RWS focuses on ex-ante contractual completeness (clear scope and lump sum prices) such that ex-post interaction is prevented.
- RWS is still involved in several design phases and discussions (TB) and the distribution of roles and responsibilities are covered in the contract.
- The ministry demand a certain network performance from RWS (road operator). The latter demand is translated into national performance requirements per network (SLA).
- The different projects and the regional procurers (BIO) approach the market within the predefined procurement frameworks as defined by IMG.

What are the current obstacles in the procurement process?

This research provides insight in several internal obstacles at RWS. The obstacles are defined based on the output of the interviews and its analysis (see section 7.1). A distinction is made between the obstacles that were recognized unanimously and those that were not. The obstacles from section 7.1 are based on several different, but related subjects. The obstacles were validated in a validation round (see chapter 9). The main obstacles are related to:

- The uncertain dynamical political and legislative frameworks and procedures;
- The internal tension and distance between the strategic and operational levels;
- A lack of faith in the current organizational change;
- The lack of good human and organizational resources;
- A lack of common quality understanding;
- The lack of a professional and business oriented attitude and behaviour of the employees;
- The lack of incentives to prevent opportunistic behaviour of the contractors and/or partners;
- The lack of knowledge, evaluation, and learning from best practices in projects and relations;
- The lack of internal and external assessments of relationships based on performances.

Do other large companies and organizations acknowledge these obstacles?

The obstacles analysed from the interviews (section 7.1) are generalized and compared with the interview results of the five other companies (see section 7.2). The results suggest that in particular ProRail works very similar to RWS, but works more according to the traditional bid-build model. From the interviews is concluded that RWS experiences several obstacles for the current mistakes/failures from a certain distance. RWS experiences several obstacles like politics, the EU regulation, lack of supplier management, and "More with less" in role of a helpless victim. At RWS nobody seems really directly responsible to manage these obstacles in the projects. RWS lacks of clear responsibilities and accountabilities of their performances and the networks' performance. Yet the commercial companies did not acknowledge the obstacles of RWS as an actual obstacle. The commercial companies mention that these obstacles, which they see as occurrences, can be managed. They did acknowledge the existence of these "risks", but it is also their responsibility to manage these obstacles on behalf of the company's interest. The commercial companies have to manage these obstacles because their right of existence is mostly depended on the profit and continuity of the company.

How do these companies and organizations deal with those obstacles?

All the interviewed companies act in a professional directing role. However, the tasks and responsibilities each company executes differ on some aspects. The commercial companies were quite similar in their work methods and strategies, but differed from RWS and ProRail (section 7.3). The commercial companies implement several similar strategies and/or tools in their projects. The latter were validated whether or not these are opportunities for the organization of RWS (chapter 9).

The commercial companies:

- Think, work, and steer from their network and its needs;
- Define, continue monitor, and evaluate a business case with several qualitative KPI's, which is leading in the projects;
- Centralized the procurement organization high in the organization and "deliver" centralized and qualified procurers towards the projects;
- Have a proper base organization and invest in knowledge transfer, development, and evaluation by the procurement departments;
- Invest in a clear frontend-scoping (the "what" is clear before the project is set on the market);
- Implement standardized quality norms and criteria (LCC/TCO thinking is common knowledge) and quality is a qualifier, not a differentiator;
- Invest and focus on multidisciplinary thinking, working, and decision-making;
- Work result oriented, are responsible, and employees are assessed based on performances;
- Invest in relation management, incentives for contractors, and supervises the contractor especially in the most strategic elements. They know what they need and can test whether the contractor delivers that need;
- Perceive contracts just as a mean and the contract type is chosen based on the projects' needs;

10.2 Conclusion

RWS can learn from the commercial companies. The analysed strategies of RWS (see chapter 4 and 5), found obstacles (see chapter 7), and measures of the commercial companies (see chapter 7) were discussed in the discussion in chapter 8. Most of the analysed obstacles of RWS were recognized, but are not acknowledged as an obstacle by the commercial companies. RWS improved compared to the start of the OP2008 in 2003, but the goals of the OP2015 are by far not completed yet (Rijkswaterstaat, 2011c). Along the OP2015 RWS invests many efforts in again changing the organizational structure. Yet, the past has proven that this is not enough because RWS is changing for more than ten years. RWS wants to be a professional principal and the latter requires a certain expertise, knowledge, and competences of RWS as a whole. RWS should understand the expected output and should strive for the best or "sufficient" quality for the network. RWS should collaborate more and better with partners, has an integral structure and works multidisciplinary, and finally is flexible and relates uniformity with diversity (Rijkswaterstaat, 2011c). The latter statement is not achieved yet.

RWS has insufficient insight in the critical elements and the required end-results of their projects, their functioning, and its required knowledge. RWS still focuses too much on the work processes instead of the quality itself. Compared to the commercial companies RWS is lacking in managing several critical elements during the realization of projects. RWS invests insufficient in knowledge relations with their contractors and suppliers. Their goals are vague and not objectively measureable. The approach of RWS is bilateral. It is about the organization versus the projects' interest. RWS could adapt several procurement "tools", that are used by the commercial companies even as a public principal. RWS should focus on how they could organize their organization and their processes in a way that the network needs can be fulfilled as best as possible. RWS could do so by learning from other companies and organizations.

RWS wants to exploit synergy advantages, invest more in the improvement and extension of the current relations, and focuses more on alliances. Yet the latter are still experienced from the viewpoint of a project. RWS needs to think and act professional from their network and as one organization to achieve their goals. The latter involves taking responsibilities and accountabilities in order to achieve the company's goals. Yet, most important is that both RWS and the politicians think from the network needs (e.g. incorporating more LCC/TCO thinking). They should understand what they procure. Procurement should be considered as all encompassing and strategic. Procurement is not just one of the realized activities that are defined in a contract. Procurement is interwoven in both organizational as operational aspects and relates to a supporting and complementing role (see also Figure 26 in section 7.3.4). The improvement of the procurement processes is not only related to the procurement organization and/or the procurers in the projects.

On a strategic level RWS knows very well what they want, but RWS should act according one in operational levels as well. The latter is not achieved by only focussing on good work processes. Working every day better sounds promising, but is not measureable and depends on many extrinsic variables. Working every day better should focus on the assets' quality approach, the required input, and expected output. Assets should be improved step by step (evolutionary product thinking). Like the market RWS should focus on proven technology, preferred suppliers that work in competition, continue improvement of their assets, minimal disturbances, and last but not least it should be functional. In the end it is about a piece of infrastructure and not only about plans and processes.

Table 8 Conditions for a professional principal. When answered "no" on the question whether RWS complies does not suggest that RWS does not take into account this aspect, but that there is room for improvement.

Condition for a successful professional principal:	RWS complies?
Works with clear objective and measureable goals and strategies.	No
Is supported by a firm base organization that truly stimulates result oriented and multidisciplinary working and thinking in the projects.	No*
Defines and understands the strategic "work processes" and translates these towards measureable/physical tactical and operational criteria/tools in the projects.	No*
Searches towards an optimum between network, purchase, and control by clear project, process, and procurement management.	No
Has a competent workforce that is in control, acts efficient and effectively, and takes responsibility and accountability by thinking from the viewpoint of the network functioning.	No
Understands their assets and network performances, recognizes the needs of the users, clients, and RWS and translates these in a clear demand towards the market.	No
Invests in knowledge in both internal as external relationships and stimulates competition.	No
Value for Money is stimulated when the expected quality is common knowledge, both external and internal in the organization and contractors are stimulated by incentives to improve the organizations assets.	No
Controls the contract financially and juridical and steers where necessary based on clear trade-offs between cost and benefits (business case) that complies with the interests of the users and client.	No
Knows, understands, monitors, and assesses the market parties and their performances.	No
Learns from mistakes by evaluations and best practises.	No

**The introduction of the new organizational structure per 01-04-2013 is not taken into account in this conclusion*

10.3 Recommendations

RWS should stay in control, knows what needs to happen, and should test the contractor whether he is doing what he has to do. The key to success lies within RWS. The research questions relate to improving the procurement processes. However, procurement is comprehensive and relates to different subjects. Yet, it seems that RWS focuses mainly on new work processes. The knowledge of using processes is considered more important than the actual physical realization, which is not good. RWS should understand their assets and its performances. In the end RWS has to control and maintain their network. The commercial companies have to work along a business case while RWS, as a public agency has not to strive for profits. However, RWS is responsible for efficient and effective behaviour towards the ministry and actual users. RWS should invest in their organization and employees (Table 9).

Table 9 Recommendations RWS

Subject	Measure RWS
Politic	RWS should learn to work along the new requirements and conditions set by the ministry. Politics and regulation etc. are manageable occurrences, not obstacles.
	RWS should anticipate, inform, and convince the politicians about proposed solutions. RWS employees should propose clarity about the network needs, quality, and performances.
	The politicians, the ministries' decision-making, and their budget system should be managed from the viewpoint of the network needs (usability and availability of the network).
Strategic	The strategy of RWS should focus more on defining, monitoring, and controlling clear and measurable goals. RWS should think from the networks functioning instead of only "Market, unless" ("Markt, tenzij") and "More with less" ("Meer met minder").
	The management should stimulate and create the conditions for an integrated way of decision-making by making a deliberate balance between the needs for project, process, and procurement management.
	RWS should work with a business case in the interaction between principal, project manager, and contractor to evaluate/assess/understand scope changes and decisions in projects, even in the realization process.
	RWS should invest in the "function", a clear frontend-scoping, LCC/TCO thinking, and choose the level of control and management based on the uncertainty and the needs of the project.
	RWS should acknowledge the importance of clear information/ICT management and invest sufficient resources in the latters' system to efficiently and effectively support the whole organization and its projects.
	Procurement should be considered as strategic, part of the line and complements the project teams. Procurement is all encompassing and should be experienced and penetrated in the mindset of the employees.
Organization	RWS should create an integrated way of decision-making and stimulate knowledge (re)development, sharing, and improvements both in internal as external relationships.
	RWS should "strengthen" the procurement organization high in the organization. The latter should deliver qualified procurers towards the projects and invests in both internal as external relationships.
	RWS should reconsider the distribution of roles and responsibilities in the IPM model by taking into account the importance of procurers and asset managers. Contract management is a part of procurement management.
	Invest in (knowledge, training) and stimulate (incentives, bonuses, promotion, qualification) a result-oriented approach by the employees. Not only the "hero's", but also good performances should be awarded. The HRM policy should be in line with the organizational goals and the needs in the projects.
	RWS should invest more in the need for multi-disciplinary decision-making. Multidisciplinary working is more than "asking" people to collaborate and communicate.
Operational procurement	RWS should invest in a clear frontend-scoping. Is the scope not clear? Do not go to the market!
	Keep it simple and keep the projects manageable in size for both RWS and the contractors.
	The market should dictate itself and RWS should provide a framework, conditions, and incentives to stimulate developments that improve the assets in the network of RWS.
	Procurers should have a prominent role in the project teams from the start. Procurers are early involved during the frontend-scoping, during market consultation, and complement project managers in decision-making.
	RWS should have the competences to understand, follow, and redirect the outsourced processes in a well-informed way. RWS should improve contractor and supplier performances by monitoring, evaluating (learning from best practices), and assessments (past performance) and enhance quality through proactive activities.
	RWS should not interfere with the quality system of contractors, but should stimulate and discuss "professional management" by qualitative incentive steering mechanisms to stimulate the contractors to work on behalf of RWS. Quality is a qualifier, not a differentiator and is clear when the contract is awarded.

In Table 9 the recommendations are organized in the four subjects of politics, strategy, organization, and operational procurement. The most important and related recommendations are clustered in some more “practical” subjects and are presented below.

Managing obstacles

Politics, regulation, legislations, and organizational changes are occurrences that RWS have to manage just as risks. These are not only obstacles that obstruct the efficient and effectiveness of an organization.

Business case

RWS should adopt their financial (budget) system based on the network needs. Even as a public principal RWS should define, monitor, and control a clear business case in the projects for the interaction between the principal, the IPM team, and the market. Even though the result is negative RWS should demonstrate what they are doing and what the consequences are for the business case.

The demand

RWS should focus on a clear frontend-scope that includes the networks current state, strategic network needs, quality requirements, functions, and performances. The scope and end-result are clear when the project is put on the market. This information must be available at any time for the market to improve or innovate their assets in future projects. If the scope is not clear do not go to the market!

Procurement

Procurement should be a centralized strategic process and is more than defining a contract and the realizing a tender. Procurement should be a primary process that is part of the line organization, should focus on better relationships with the market, and forms the basis for knowledge development, sharing, and evaluation during all project phases. RWS should invest in strategic elements of the network where managers direct on knowledge.

Behaviour

RWS and the politics should take their responsibility and accountability to work, think, and decide efficient, effective, and multidisciplinary from the viewpoint of the network performances. Managers stimulate and create the conditions for an integrated way of decision-making by making a deliberate balance between project, process (environment), and procurement management.

11 RECOMMENDATIONS FURTHER RESEARCH

This research provides input for several other future researches. The report focuses on a broad scope and is related to several different coherent subjects. The results of the interviews contain a certain amount of "by catch" ("bijvangst"). Research is always necessary because organizations and projects are always moving. The main recommendations for further research are described below.

11.1.1 Politics & strategy

The ministry is responsible for the functioning of the network. The ministry takes important decisions about several infrastructures (e.g. the realization of the programme SAA, the blankenburgtunnel). Yet it seems that decision-making at the ministry does not think from the viewpoint of the networks' functioning. What is the real return of investment for the ministry of Infrastructures and Environment? Do they acknowledge and appreciate the current performances of RWS? If not why does RWS cannot optimally comply with those expectations? Who is in control and who has the professional know-how to decide what is necessary, the politicians or RWS? Now the politicians influence the decision-making of projects. RWS can invest in the problems and make optimal trade-offs between costs and quality on behalf of the whole network performance. However, when the minister chooses for an alternative design the latter effort of RWS is put aside. It was mentioned that it is almost impossible to define an interesting and objective business case.

The ministry is sensitive for public opinions, rumours, opposition, and media attention. It should be interesting in what way project managers or even RWS as a whole could obtain more freedom within the current regulation and legislation framework for decision-making in projects. New innovations and products put pressure on the government to change relevant legislation, but this process is not as easy as it sounds. The politics stated that RWS was too large, expensive, and not efficient. As a result RWS should outsource more to the market and should do more work with less people (reorganization). RWS focuses on the improvement of their work processes, which is a good thing. However, the output will never comply with the expectations whenever the process is good and the input is still not sufficient/optimal. Currently, it was mentioned in the interviews that RWS invests more time and effort in preventing/correcting failures instead of searching for opportunities. Yet, the governments need to perform different and complex work, but lack of sufficient resources (time, capacity, competences). They have to take more responsibilities to work more efficient and effective. The government is in need for tools to control their activities and the market by using less effort.

The political impact of the current "governance structure" should be critically reassessed on its efficiency and effectiveness. From the interviews is concluded that policies like "Market, unless" ("Markt, tenzij") and "More with less" ("Meer met minder") are suggested to hamper RWS in acting as a professional (more business oriented) principal that works efficient and effective. It is questioned whether the Market, unless policy only leads to outsourcing tasks and activities or also leads towards more market mechanisms ("marktwerking"). RWS should organize their current work processes differently as well. RWS should invest in the opportunities for the ministry and RWS in such a way that several efficient and effective (project) tools/measures (e.g. business case and relationship management like past performance) could be implemented within the frameworks of the current politics. The focus is not on the short-term position of the minister, but the latter should be approached from the viewpoint of the network. The networks' functioning should be leading.

- *What are the possibilities for RWS to implement business cases, relation management, and a network steered decision-making within the current political and legislative framework?*

11.1.2 From management towards the projects

Another mentioned aspect in the interviews is the interwoven culture of directors in the construction industry. Several fields of forces are present in this "high regions". It was mentioned in the interviews and by Metze (2009) that in higher management "power" is not experienced as better profitability. Budget savings flow back towards the ministry ("kasritme" system) and not towards the organization of

RWS. Non-performance is not directly related to the survival of the company or that of the ministry (lack of positive incentives). The impact of a "power-game" can have major consequences on the projects' decision-making. Furthermore, projects (legal) discussions with contractors can be pretty "hard" and difficult when both RWS and/or the contractor upscale the discussions up to directors' level. Decision-making becomes diffuse, discussions on director level are about project elements, and the projects' production hampers. A DG is not always aware of all the project related details. The latter discussions on higher management level hamper the process of realization and should be prevented. However, this research did not provide enough input to describe and evaluate the processes by higher management. The long organizational change supports the suggestion that the implementation from higher management towards tactical and operational management is not optimal.

Moreover, several observations in this research are not new information. The latter suggests that even after a couple of years after these observations or obstacles were already acknowledged they seem to be neglected. It could be concluded from the interviews that the implementation of several measures hampers from strategic towards operational levels. The latter is supported by several researches as well (Oliedam, 2010) (Wiendels, 2010) (Uil, 2006) (Leeuwen, 2009) (Gazelle, 2011) (Jütte, Balt, Zanen, Boer, & Croon, 2011) (Rijkswaterstaat, 2012c). It seems that this link between these two levels consists of a certain hurdle for employees. Different kinds of policy levels require different kind of interaction, coordination, and assessment. The management seems to focuses more on the processes of management instead of the actual realization of the work in the projects. An assessment on the efficiency and effectiveness about the transfer and implementation of strategies could be valuable. These outcomes could provide insight in obstacles of the current qualitative steering mechanisms in projects.

People can write as many as they want, but what if only 10% of this paper, useful or not, is used? In the end paper is patient and humans realize the actual production. The latter assumes the presence of a though tension between the strategic and operational departments of RWS. RWS focuses on work processes and plans, but the real implementation in the projects is lacking. The latter is acknowledged throughout the report, the interviews, and several sources of literature. It is suggested that the people in the projects do not understand/act according to the plans and processes of the management. The management should acknowledge that the processes alone are not enough. In the end it is still about the product. Processes are important, but the actual end-result is more important. The end-result should be clear. Yet, the "new" innovative contracts are not mature yet and require several "new" competences to efficient and effectively manage these projects. RWS should invest in identifying (strategic) knowledge. Without a sufficient amount of knowledge RWS is not capable to control their assets and network in an efficient and effective way. *"We as a principal keep in control, we know what needs to happen, and we can test the contractor whether or not he is doing what he has to do."* (Biesboer, 2012)

- *What kind of management is required in order to decrease the distance between the strategic and operational levels at RWS that improves the efficiency and effectiveness of the projects?*
- *In what way do the investment in the work processes of RWS comply with the need from the projects and do really result in more efficiency and effectiveness of projects?*
- *What are the opportunities for project directors to optimally stimulate an efficient and effective behaviour of employees, an integrated way of decision-making, and how could they make deliberate trade-offs between project, process, and procurement management?*
- *What kind of quality and knowledge is required for RWS to keep in control, to know what needs to happen, and to test the contractor whether he is doing what he has to do?*

11.1.3 The behaviour in relation to the line management

The reactive behaviour of RWS employees seems also to be related to the distribution of responsibilities in the organization. Project employees work for different "managers". These are the functional managers (projects) and line managers. In the interviews was mentioned that line managers do not always assess employees fairly on production. They do not always understand the content of the daily work and steer hierarchically, which makes it hard for employees to take responsibilities. Employees often choose for the easiest way and avoid discussions and conflicts. Several employees mention that career opportunities are related to an employees network and not to its skills. It was mentioned that the

current reward structure aims to reward “the firefighters that save the day”. Employees in crucial functions should be assessed based on actual performances. At RWS there is still a need for heroes. RWS employees are responsible to perform a task and are not accountable for the final result. It was observed that it is not always clear who is responsible in case when something goes wrong (also mentioned in the validation, see chapter 9). Of course, managers are responsible for their tasks and strive for the best results, but the projects’ mandate does not always lies in the project itself. There is a risk of inefficient discussions and many compromises. RWS its behaviour is characterized as the “pap bij nat houden” culture. The lack of clear responsibility and accountability is experienced to be an obstacle. Line managers do not act according to perform their “real” job over the projects.

- *What are the consequences of the performances/functioning of the HRM policy in relation to the efficient and effective behaviour of the employees in the projects?*

11.1.4 IPM roles

The IPM model origins from 2006. The latter is based on a principal that is still involved in several design aspects. In the OP2015 RWS focuses more to an outsourcing role as a professional principal. The latter requires different competences from RWS their project teams. In the discussion and validation especially the role of procurement was questioned. The IPM model should be reassessed based on the current views and strategies of the OP2015 related to asset management and the required changes of procurement. These views should be distributed and implemented in the projects. It should be investigated how RWS should strengthen the procurement pillar in the organization and the projects (IPM model). Also the distribution of roles and responsibilities should be critically reassessed such that it is clear who is in control over the project and the whole commercial process. Otherwise, the projects realization phase will always remain a different “world” that works along its own interests.

- *What kind of project management model fits the needs of RWS according to the OP2015 to become a leading project manager, a public oriented network manager, and a professional crisis manager and how does this relate to the current IPM model?*

11.1.5 Relationships

It was mentioned in the recommendations (see 10.3) that RWS should invest in relations and networks. A continue process of identifying and developing relations on the right level with suppliers is an important criterion for success in the realisation of procurement advantages. Building on partnerships could also improve the position in the market of the companies and could provide better opportunities for the future. Short-term profits are no guarantee for long-term success. Markets and target groups are dynamic, competitors do not stand still, and the clients are demanding more quality. It is important to built up relations with suppliers and buyers to strive for a continue income. The latter is not preferred from the viewpoint of a public principal, but could be preferred from the networks functioning. Partnerships could lead to innovations or improvements that would not be realised on your own. Providing opportunities for R&D stimulates innovation. R&D provides better insight in the wishes and demands from the market. Making use of each other networks could open new opportunity “windows”.

Companies invest in knowledge development, transfer, and evaluation to strive for higher successes in the future. Developments do not stand still so learning and evaluating how to act in new circumstances is necessary to sustain project successes in the future. On the longer term knowledge investments could result in more optimal processes and finally in successes. Information systems play a crucial role in this knowledge development, transfer, and evaluation. A company structure and code system is a strategic decision and is one of the basic and key factors required to make an ICT system work successfully in an organization (Zaal, 2009). Information systems provide clear structure models and training of employees is necessary to make optimally use of the system. It is important that RWS should invest in strategic knowledge in places where is steered on knowledge. Investments in strategic knowledge seems to conflict with the strategies of market, unless and more with less people.

- *How can RWS implement and stimulate relationship management within the current boundaries and conditions of their political and legislative framework?*

11.1.6 Contracts & incentives

RWS wants to be relieved. However, is it sensible to provide the market more freedom? It was mentioned that RWS specifies a preferred solution in functional specifications in such a way that the contractor should come up with the same solutions' form and specification as was defined by RWS in the TB procedure. The additional value of the innovative contracts D&C and DBFM are not known yet. On the other hand, why did RWS dismiss the traditional Bid-Build contracts? Something that works pretty well should not be dismissed just like that. The choice for a particular contract form is not objectively chosen (e.g. PPC is about D&C and DBFM). RWS has no reference framework to assess whether projects with innovative contracts are cheaper or more expensive than bid-build contracts.

Why is RWS so naïve to transfer all the design, build, (maintenance), (and finance) components towards a construction contractor? Are these contracts really more efficient and effective or are they just a consequence of political decisions like "More with less" ("Meer met minder")? In DBFM projects RWS "invests" in uncertainty for more than 20-30 years. How does anyone know what will happen in the next 20-30 years? The latter is unpredictable and so is the demand for road infrastructure for the next 20-30 years. There is a risk that RWS will stay behind because they become dependent on the market. It was mentioned in the interviews that DBFM contracts are put on the market because of the pressure of the government. Yet, are they not more or less another way of throwing problems over the wall? Why should the market be better equipped to deal with such large complex and long-term projects when RWS is not even ready herself?

It was mentioned that contractors complain about the high transaction costs in the current long tender processes. RWS expects the contractor to deliver in three to nine months at least the same quality as RWS produced in five to ten years. The question for long-term contracts is who is really in control? RWS worked with ISO certification and the bid-build model was mature and understood well. Are these new projects actually evaluated, and if so based on "less costs" or really on "more Value for Money" on the longer term (thus more efficient)? Since the start of the changes several RWS employees did not experience real "beneficial" changes in the projects. Several mistakes are still made over and over again, lessons learned are not common, and projects still reinvent the wheel. The impact on the contractors' side is not even mentioned yet.

Currently, RWS uses a fine structure of "high trust, high penalty". However, in the interviews was stated that negative incentives (fines and penalties) do not stimulate contractors to deliver additional value. It even decreases the chances for exploiting opportunities and risks a tensioned principal-agent relation. The question is whether or not positive incentives lead to better results then a fine structure? For RWS the harmony with relevant actors is necessary to create win-win situations. By creating a common interest with market parties it is also important that implement profit incentives. According the external interviews providing incentives are very important to stimulate contractors to invest in additional value. The latter decreases the risk of opportunistic behaviour. Even semi public companies like Schiphol gained many experiences with these strategies in their service-providing role.

To sum up, RWS spends millions of euros, but what is really spent in favour of the users? Furthermore, current prices of contracts are influenced by the though market conditions (economic crisis). Do these contracts really provide the answers, solutions, and Value for Money that was expected? The focus lays on new plans, processes, and contract types, but in the end improvements at operational levels are not clear upfront. Further research in the consequences of these current contract models is necessary to make objective contract choices possible for different kind of projects.

- *How could RWS choose the level of control based on the projects' uncertainties and needs?*
- *What are the possibilities for RWS to provide incentives to challenge the market to deliver the best possible performance within the available budget from the viewpoint of the users?*
- How could RWS provide incentives for cooperative behaviour?

11.1.7 Engineering contractors' responsibility

The lack of contract management of ECs was another mentioned deficiency during the interviews. Investments in contract management of ECs are underestimated. It was mentioned in the interviews that RWS acts corrective towards these parties instead of directive. ECs are known as "hour factories". The more they write the more they earn is often heard. However, these statements lack a firm underpinning, but the message is clear. According several interviewees the ECs steer on work hours and deliver a lack of quality in the construction industry. Problems of the promises and sorry department are also present at these ECs. Prices are under pressure and ECs faces planning issues as well. It was generally mentioned in the interviews that ECs lack of responsibility towards the final result/performance. The latter seemed not to be an issue at the interviewed commercial companies in this research. ECs are often working on behalf of the principal or are responsible for the realization of the asset. Yet, in August 2012 RWS started past performance for engineering contractors. RWS should investigate and monitor their experiences with this new past performance approach of ECs. Moreover RWS can learn from the distribution of roles and responsibilities at companies like Shell, DSM, FrieslandCampina, ProRail, and Schiphol Group.

- *What are the possibilities for RWS to distribute the roles and responsibilities towards the market (ECs and construction contractors) compared to the strategies implemented by Shell, DSM, FrieslandCampina, ProRail, and Schiphol Group?*

12 PERSONAL EXPERIENCES

This chapter briefly describes my personal experiences during the research in two parts. The first section is separated in four subjects related to attitude, organization, roles, and collaboration with the market and is related to the content of the thesis subject. The section elaborates briefly an evaluation of my research process.

12.1 Personal experiences thesis content

Business attitude

The conclusions and recommendations in this report are not all-new information. The fourteen key principles to managers for transforming business effectiveness (Hedeman, Van Heemst, & Riepma, 2008) (The Deming System of Profound Knowledge) and several researches under scribe the importance of the recommended activities/tools in chapter 10 (S. Laudy, 2005) (M. Noordhuis, 2011) (Molen, 2008) (Schoenmaker, 2011) (Dang, 2011) (Jacobs T., 2012) (Rijkswaterstaat, 2012c) (Zaal, 2009) (de Ridder, LEGOlisering van de bouw, 2011) (G.A. Rummler, 1995). Moreover, several observations or obstacles were already acknowledged, but seem to be neglected or adapted to “fit” the current organization of RWS at best. Take for example the implementation and centralization of procurement (see also section 9.3.1). It can be concluded from the interviews that the implementation of several measures hampers from strategic towards operational levels. The latter is supported by several researches as well (Oliedam, 2010) (Wiendels, 2010) (Uil, 2006) (Leeuwen, 2009) (Gazelle, 2011) (Jütte, Balt, Zanen, Boer, & Croon, 2011) (Rijkswaterstaat, 2012c). It seems that this link between these two levels consists of a certain hurdle for employees. Different kinds of policy levels require different kind of interaction, coordination, and assessment. Again the management seems to focuses more on the processes of management instead of the actual realization of the work in the projects. It seems that RWS does not sufficiently listens or learns from their early mistakes.

RWS and ProRail seem to have a lot of similarities compared to the other companies, both in organization as in behaviour. In first instances the companies like Shell, DSM, FrieslandCampina, and Schiphol Group look like the perfect examples for an organization like RWS in order to become more business orientated. However, a perfect organization does not exist, but the basic things should be done perfectly. Doing the basic things right at once seems one of the biggest obstacles. The latter aspect seems “business as usual” in normal life as well. For example, consider the politics. It seems that politicians are not learning from their mistakes as well. Discussions about national subjects seem a never-ending story. Considering that this dynamic organization is the principal of RWS questions the possibility for RWS to act as a business from the beginning. The ministry cannot go bankrupt because of their mistakes. When ministers lack of performance they will pay the price in the coming elections, but most of the people at the governmental organizations do not loose their job or whatsoever. More important seems the position of the minister. The opposition tackles statements like more budgets for better Value for Money as budget overruns.

This real “need” to perform efficient or to survive as an organization was often not present at the RWS interviews. The differences between the governmental organization and the commercial companies were observed in the character of the employees. The interviewees at the companies mentioned the importance/dependency of the business case very often. The latter is also understandable because these companies have to make profits for their shareholders, to remain “healthy”, and to stay competitive in the market. People are often assessed based on their performances. Yet, it seems that with RWS people do not want to be responsible for things outside their power. They know that the latter can have major consequences because of who they are. However, even a public organization like RWS should work efficient despite their task culture. That is their responsibility towards the inhabitants of the Netherlands. The latter required efficient behaviour is not always absent at RWS. Yet the system as a whole hampers such efficient and effective behaviour (“pap bij nat houden”).

"One" organization

One of the observations during the interviews is that the professionals seem to be well aware of what improvements could contribute to the project performances of RWS. However, they do not apply these improvement actually it in the projects. Probably something keeps them at a distance. Working as one RWS seems not pretty clear yet. Project teams mentioned that the work they perform is "corrective". There is a large gap between the plan study and realization phases. Several employees have different visions about the current organization, strategy and work approach. At the strategic level it seems all very clear. The rough outlines of the new organization ("houtskoolschetsen") focus on reorganizing the whole top organization of RWS. The latter was observed in the informal discussions during the internship. It seems that these strategies more or less provide room for multi interpretation. Multidisciplinary working is mentioned as informing instead of collaborating in the interviews. In projects people do not understand the changes as a result of the organizational change per 01-04-2013. Working every day better seems reasonable, but the question that remains is: What does the individual has to do in order to change? Furthermore, in the past ten years RWS defined so many different documents/strategies/contracts that it became a bit vague. Several research groups investigated the opportunities for the organization for a specific subject. Examples are IMG, Asset management, SE, SCB, BIM, DBM, Best Value Procurement, alliances, and PPS. However, the coherence between the different groups is questioned. For example, during the introduction of SE several experienced obstacles are still mentioned in the interviews in the repositioning of procurement. Evaluation between groups, departments, and projects seem to miss. Many people still think from their own (project) frameworks. Managers still acknowledge that projects "reinvent the wheel over and over again". All in all it is important to focus on the actual function and to keep it simple. In het end it remains a men's job.

Another remarkable finding was that the information system of RWS about their current assets is not complete. Most of the large projects (e.g. SAA) are situated in already existing infrastructures. It is really unrealistic that RWS is not capable to deliver the right information about the assets current performances and quality. As a service provider RWS should know their products functioning and needs 24/7. RWS should approach the network not as a piece of asphalt, a steel bridge, or a concrete tunnel. RWS should manage their network as an integrated system. The concrete part could consist about 80% of the scope and budget, but the risk lies in the systems functioning. The asphalt quality of the roads is most of the time more than sufficient. The automation and electronica elements seems to be the problem. Being a professional principal as RWS means that it is not only about concrete boxes anymore.

Procurers

Another remarkable aspect was the perception of procurement. In the interviews procurers are considered an important role in the companies of Shell, DSM, FrieslandCampina, and Schiphol Group. At RWS the term procurer is sometimes still understood as "secondary process", "contract manager", or as "tender manager". At RWS and ProRail the term "contract manager" and "the contract" are often mentioned when talking about procurement. The "purchasers" seem to be considered as administrative workers and just another task. The technique is still were it is all about. The "procurement" aspects should be defined in the contract. In the interviews was mentioned that when something would be unclear then the contract is not good enough. Yet this focus on the contract is not what procurement is about. The latter was also supported in the validation round (see chapter 9). Moreover all the interviewees (except RWS) were very reticent towards outsourcing the finance component. They mentioned the importance of the in-house finance component related to the dependency of the market parties. Who is really responsible for these finances when the effects of DBFM contracts prove to be negative compared with the current D&C or traditional contracts?

Collaboration with the market

Finally the last described experience is related to the relation RWS – contractor. It seems from the interviews that the "being relieved" strategy clashes with the partnership ideology. RWS wants to take their distance in the projects design and realization processes and leaves the work to the market. RWS focuses on processes and when the process is right the product should be better as well (SCB). On the other hand RWS aims for more collaboration with their partners (PPS, alliances). This seems a bit confusing. The question is whether the project teams still understand what their role is. The danger of too close collaboration is that RWS falls in a funnel and remains involved and responsible. Especially

when the demand is not clear enough. Responsibilities could be transferred back to RWS and raise the project costs. The market is complaining about the different approaches by different contracts in different projects as well. In SAA RWS tries to uniform these contracts. However, the risk of “cutting and pasting” is present and should not be underestimated. It seems that the contract became again a goal on itself. The question that remains is whether RWS underestimated the changes and their consequences in the projects? In my opinion RWS should do a step back towards the simplicity. In the end RWS still just provides a piece of infrastructure. RWS should focus more on their relationships instead of their thick contracts. RWS should act more with a business attitude towards their suppliers.

12.2 Personal experiences process

After almost a year of hard work I am glad with my final result. Conclusively I expected a bit more practical result from the beginning, but after four months I realized that I am not capable to solve an issue that keeps the whole construction industry captured for many years. I underestimated the amount of work, but learned to go back to the basics and make trade-offs between the important and less important findings. Every committee meeting resulted in new insight and required flexibility to deal with several scope changes. Moreover a broad topic like this will always have interesting aspects to investigate more into detail. I have learned many new things about different kind of interesting topics related to the construction industry. I have gained a lot of experiences in setting up my own scientific research. From the beginning I have chosen an interesting, but little bit vague subject. However, along the process things became more clear and clear. Yet, because of the broad and little bit vague scope at the beginning I had to restructure the research structure a couple times. It was hard to define the problem en main research question right from the beginning. The latter evolved a couple times as the research progressed. It was a valuable experience to verify and validate my work progress over and over again. In addition I have gained a far better insight in the work processes of a governmental organization. The latter differs a lot from the commercial companies where I have had earlier internships, but broadened my knowledge.

I have gained insight in the day-to-day processes of a large organization. I have learned and experienced that words can be promising, but in the end it are the humans that perform the real job. Moreover, the current organization of RWS is far from perfect. RWS is currently involved in a large reorganization. Yet, they are changing for more than ten years and this has several impacts on the behaviour of the employees. RWS is a large organization and many people have their own opinions about several subjects. This does not make it easier and makes it hard to define a clear baseline situation. The current organization faces several hurdles and deficiencies in the day-to-day operations and support. An example was related to my contract. I have waited for three months till my contract was correctly processed in the system. Furthermore, my contract extension is after more than four months still not correctly adjusted. The latter deficiencies and confusions are in my opinion also involved in other day-to-day operations. The latter does not improve the efficiency and effectiveness of the RWS employees, but requires a lot of corrective and weary behaviour.

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PART F. APPENDICES

A. RWS ORGANIZATION & PROCESSES

RWS works according to the guideline of the OP2015 towards the implementation of the new organization. The realisation of this new organization is processed through several rough outlines of the new organization ("houtskoolschetsen"). These sketches are formed in 2012. The goal is to implement the new organization in 2013. The organization of RWS changes drastically compared with the current structure. The different sections below are translated from internal RWS documents about the new outlines for RWS future organizational structure. (Rijkswaterstaat, 2012d) (Rijkswaterstaat, 2012e) (Rijkswaterstaat, 2012f)

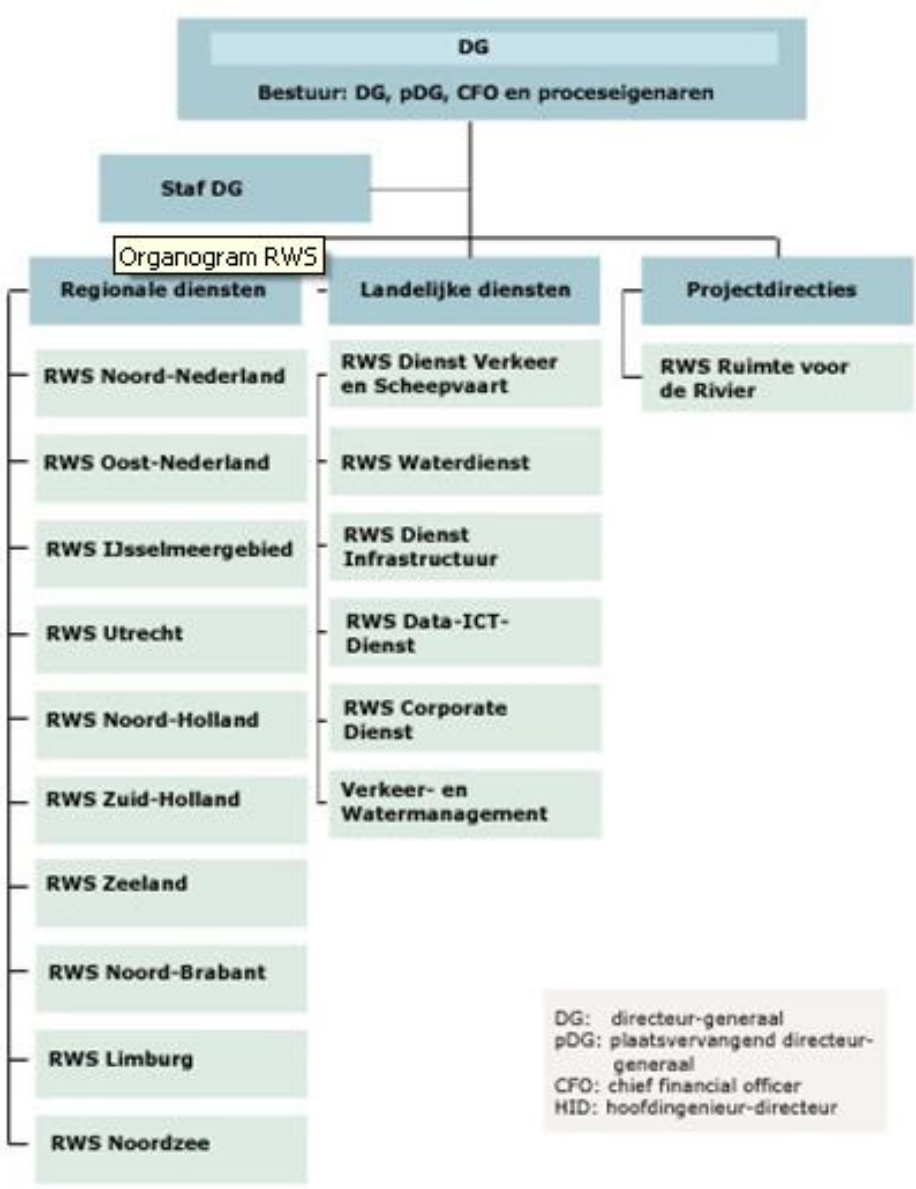


Figure 33 Current RWS main organizational structure (source: RWS intranet)

A.1. Board

The board of RWS focuses on strategic steering and decision-making. Not every department is represented in the board. The board remains small, strategic oriented, and strengthens their decisiveness. The primary processes represented in the board are:

- Traffic, shipping, and water management;
- Information management;
- Framework Development;
- Realisation construction and maintenance;
- Asset management, environment management, and crisis management

All HID's and the board will together form a "groepsraad". The latter will exchange information and strives for coordination. Smaller administrative staffs facilitate the connection between RWS and the politics, policies, and external environment on a corporate level. The specific and final structure of the board will be defined later on in 2012. (Rijkswaterstaat, 2011c)

A.1.1. Current organizational structure

The DGs' staff management (SDG) primary supports the board of RWS. Its core tasks are:

- Orientation on, and first point of contact for relevant environmental issues;
- The definition of framework and priorities for management and development of RWS;
- Monitoring and improving the performance of RWS.

Figure 34 Current organizational structure RWS board (Rijkswaterstaat, 2012d)

In all areas, but especially in the areas of production and HRM there is a support or help function to position the organization elements. The SDG is the principal for the "PPS pool" and performs the chain management on HRM, administrative-legal, housing, communications, procurement, and facility management. The current staff is approximately 120 FTE and is composed of seven directorates, which are networking & strategy, production, HRM, control & monitoring, market & procurement, Information management (IV) and Communication. In 2011, the management IV is merged with the management of production and communication anticipating on the new situation. The unit communication was defined, without a separate staff director, but with a head of communications.

A.1.2. Future organizational structure

The staff will change from seven to four directorates, which are: (1) Environment, Communications & Strategy (OCS), (2) Primary Process (PP), (3) Finance and Control (F & C) and (4) HRM & Organization (HRMO). Staff Directors are besides their managerial role also foreman and thus in person a direct advisor to the Board. It also requires a departmental and interdepartmental field of force to position at director level.

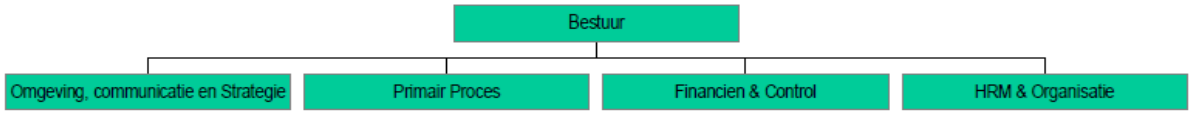


Figure 35 New organizational structure RWS board (Rijkswaterstaat, 2012d)

A.2. Processes “Aanleg & Onderhoud”

A.2.1. Current organization “Aanleg & Onderhoud”

The realization of “construction and maintenance” is currently divided over the regions, DI, and other national services (“Waterdienst”, “Data-ICT-Dienst”, “Dienst Verkeer en Scheepvaart”). In Figure 36 and Figure 37 the current organizational structures of both DI and RI are presented.

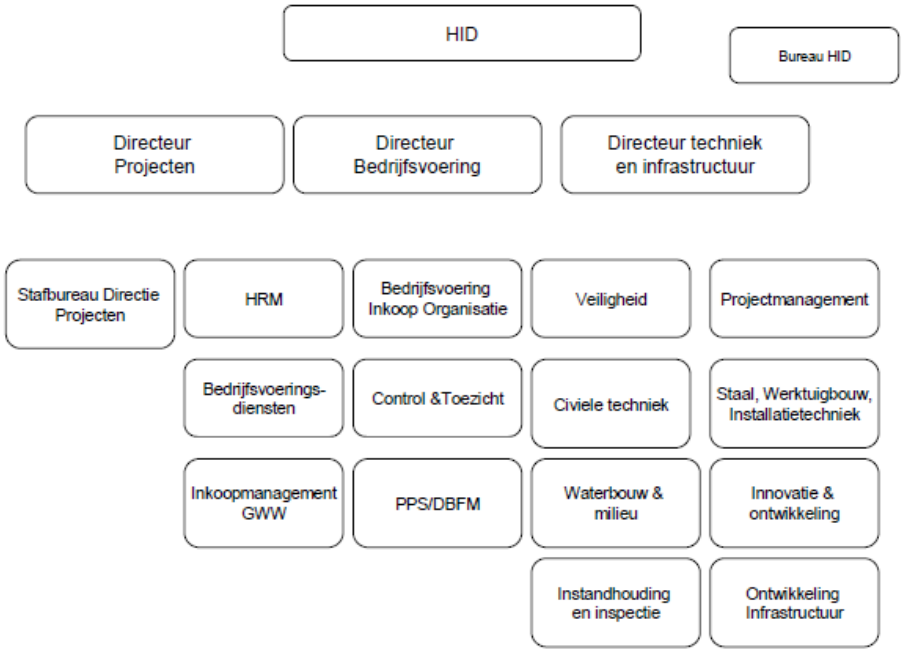
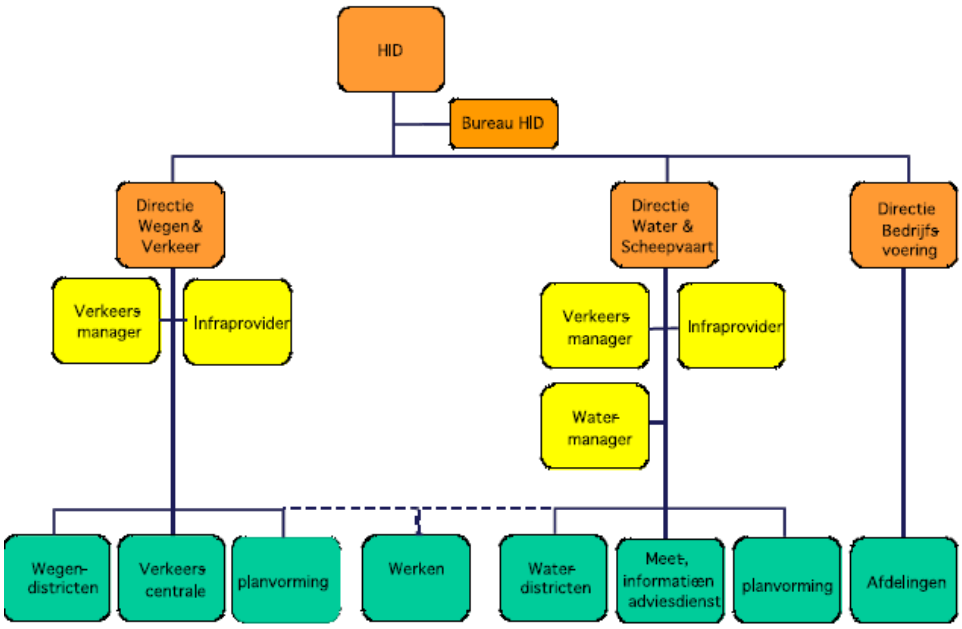


Figure 36 RWS DI current organizational structure (Rijkswaterstaat, 2012e)



[2] Operationeel verkeersmanagement is reeds organisatorisch vanuit de regionale diensten naar VWM verplaatst inclusief de regionale verkeerscentrales.
[33]De regionale Meet- en informatiediensten maken reeds onderdeel uit van de DID

Figure 37 RWS RI original organizational structure (Rijkswaterstaat, 2012e)

From October 2011 to March 2012, a series of improvements in the current construction and maintenance processes are mapped by using the methodology KR8 (lean management (Liker, 2004)). In the current situation construction and maintenance are separate processes. The relationship between the two processes in the chart below is defined prior to the analysis of these processes.

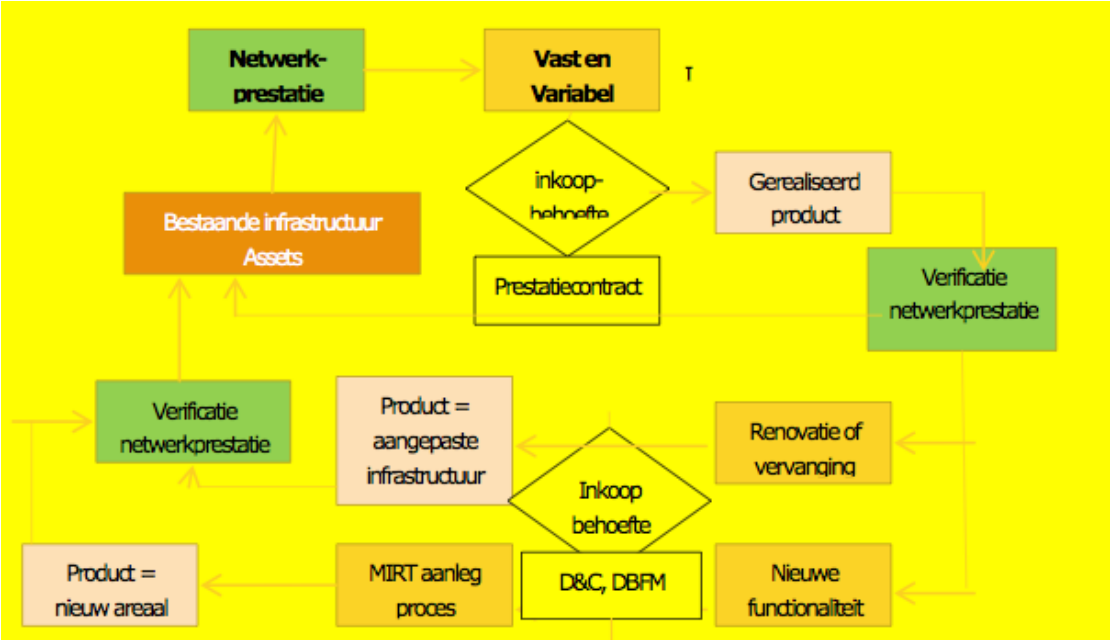


Figure 38 Relation between Realisation and Maintenance (Rijkswaterstaat, 2012f)

In the new organizational outlines several research is realised to find the spills in the current organizational processes. The main solutions that contribute substantially to increase the efficiency (and thus to achieve the required savings) are described as well in: "Globale Houtskoolschets: Rijkswaterstaat Landelijke Projecten en Onderhoud". The most obvious ones are (Rijkswaterstaat, 2012f):

- A better integral programme for construction and maintenance;
- A better procurement structure;
- More standardization and reliable information;
- The improvement of relation management and collaboration with the market.

A.2.2. Future organization "Aanleg & Onderhoud"

The realisation process of construction and maintenance is divided into two new divisions under the work titles: National Projects and Maintenance (LPO) and Regional Projects and Maintenance (RPO). A large part of the people that currently works at the Department of Infrastructure (DI) and Regional Infrastructure (RI) departments in the region will be housed in these two new divisions LPO and RPO.
The process realization of RWS is separated in seven subjects (Rijkswaterstaat, Werkwijzer aanleg deel 2 herzien, 2012i):

- Project management;
- Project control;
- Market;
- Design, effects, and technique;
- Preconditioning;
- MIRT and administrative decision-making;
- Public participation and communication.

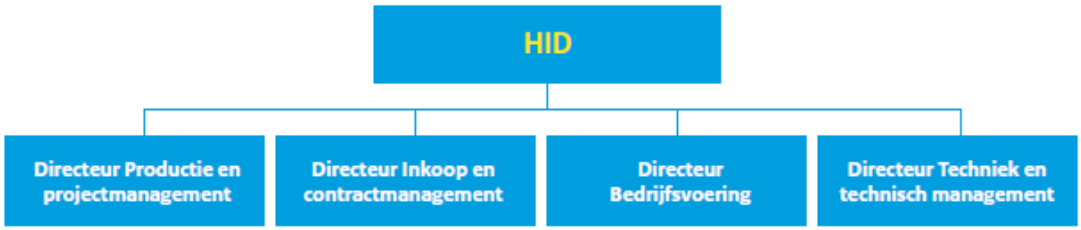


Figure 39 Head structure LPO and RPO in OP2015 (Rijkswaterstaat, 2012f)

- The Director Production is responsible for the realization of programs and projects. He is also responsible for the HRM for project managers and works on the relationships with the regions, VWM and IV. There is an assumption that the principal-agent relationship has one point of contact from the region for the Directors production of LPO and RPO.
- The Director procurement & contract management and technique & technical management are responsible for the projects preparation phase. They are also guardian of the qualitative input that RPO and LPO deliver to the regions.
- The Managing Director (Operations director) and Project control has the responsibility of both the business affairs as the HRM for managers and consultants of project control ("projectbeheersing"). The Director is also responsible for the quality of the project control discipline.

With this setup, all directors are faced with a line task. This provides a balance in the interpretation of the roles in the management teams.

Every Director operations, national or regional, receive the same structure consisting of two parts. The first part, RWS as a company, is responsible for the support of the management cycle, reporting and control of production. In other words all activities related to the control of the organizational unit. The other part, the project portfolio, focuses on a qualitative process between principal and agent. This process requires clear process agreements, good records, monitoring of current projects and the reporting cycle, and updating source systems. In other words all activities that contribute to the production of RWS.

In 2013, most employees start in the same place as they have been started in 2012. However, there are a lot of changes. In 2013 and 2014 the improvements in the processes are gradually implemented and spills are removed. Operational management colleagues (and HID's) help implement the improved processes. The operational business process itself is also optimized. All employees will experience themselves what new skills they need, what kind of additional training is required for certain jobs, and/or whether or not RWS has too many manpower on several jobs. Eventually, coordination of qualities and tasks of staff will improve. The end result is an efficient process and an employee that acts in his/her power. The main principles of the process construction and maintenance are represented in (Rijkswaterstaat, 2012f).

A.3. Tender procedures in the construction industry

The procurement or tender procedures are based on the European Directive 2004/18/EG. This is because construction projects are tendered conform several EU procedures for projects with estimated worth of € 5.150.000 or higher. According to the "Leidraad Aanbesteden" the construction organization, the demand specification, and the contract form have to be defined before the tender process can start. In the Netherlands the ARW2005 is published to provide practical support for the tendering of projects. The ARW2005 consist of practical policies and the national government is obliged to apply the ARW2005. Other governments and municipalities are not obliged. (Jansen, 2009)

A tender procedure is a procedure by which the contracting authority is trying to award a contract in a competitive way to a market party. Different aspects can characterize a tender procedure. The first is

that the contracting authority approaches two or more market parties to participate in the tender at the same time. Common terms for procurement and tendering are the American terms Request for Information (RFI), Request for Proposal (RFP), and Request for Quotation (RFQ). In a RFI the different suppliers are asked what capacities, products and services they have available to comply with the wishes and needs of the client. In a RFP suppliers are invited in a tender process to provide an offer for delivering a specific service or product. Sometimes parties are asked to do a Best and Final Offer (BAFO). The latter is a final offer. Thirdly, the RFQ is a request for quotation, an offer based on pre-defined specifications. Price is then the (most important) award criteria. Sometimes a RFQ is used to request a supplier unit prices to select a final supplier in the RFP phase.

A.4. The transformation of RWS

A.4.1. Introduction

Currently, the Dutch government invests a lot of money in infrastructure. Although due to recent negative experiences with cost overruns of billions of euros and lots of traffic jams people became suspicious whether or not this money is spend well effectively and efficient. Examples are the construction and/or operation of HSL, the Noord/Zuidlijn in Amsterdam, tunnel A73, and the Betuwe route. The current construction sector still “suffers” from traditional Bid-Build collaboration models. Often mentioned disadvantages in literature are fragmentation, a “fighting” culture (lowest cost price war), and a lack of innovation, sub optimization, unclear responsibilities and accountabilities, high failure costs, low Value for Money, distrust, legal conflicts, and project delays (see appendix B).

In 2001 the revealed suspicious fraud events in the construction industry increased the pressure on the government to reorganize its construction activities and organizations. After the revealed fraud the reputation of Rijkswaterstaat and the construction contractors suffered enormously with the inhabitants of the Netherlands. RWS “lost” its supreme status of being innovative, professional, and reliable. Relation management became almost taboo. RWS directors and HID’s did not even talked to contractors anymore. Together with a lot of political pressure something had to change to prevent RWS from facing a separation of the “Waterstaat”. The politics stated that they demanded a “clean-up” (“daar moet eens flink de bezem doorheen”). Directed by the new DG Bert Keijts RWS faced an enormous challenge. After his appointment Bert Keijts was told by the former minister Gerrit Zalm that RWS was too large, too expensive, and perform too many jobs internally and in an inefficient way. RWS was obsessed by internal affairs, they did not listen correctly to politicians, and political alternatives were not taken into account. (Metze M. , 2009/2010)

In his search for change Keijts was confronted with two possible ways of organizational change, which are the “Rijnlandse” and pragmatic bottom-up change (preferred by Schwarz and his companions) and the fundamental Anglo-Saxon top-down change (preferred by Lambarts & Keijts). In the end the “Anglo-Saxon, autocratic, controlling, restrictive” top-down approach was applied. However, remarkable was that the behaviour of Keijts was not so “Anglo-Saxon”. After many discussions and meetings Keijts stated: *“the organizational change did not meant reorganization”* (Metze M. , 2009/2010). Keijts was afraid to create commotion at his directors. The RWS-9000 model was chosen as the least intensive and drastically changes. Several advisors warned for the “pap bij nat houden” attitude risk. The model does not mean 11000 employees minus 2000 results in 9000, but it should be understood as 11000 minus 4000 and plus 2000. The RWS culture was characterized with friendliness, discretion, and lots, lots of consultation related to the smallest details. Fast, hard, and clear top-down measures do not fit such a careful talk culture (“praatcultuur”). (Metze M. , 2009/2010)

A.4.2. Business plan 2004-2008

The pressure to reorganize was one of the reasons for the set up of the business plan 2004-2008 (“Ondernemingsplan 2004-2008”, OP2008) by the former director-general Bert Keijts in 2003. Several authorities were revoked in “lower” management levels due to the chaos in RWS project portfolio and its financial system. Metze also mentioned the mission of the former DG to decrease the powers of regional directors. RWS became an agency and its goal was to become a public oriented network manager. In 2008 RWS should be released from its technocratic industrial culture and should act like an

efficient, coherent, public oriented, and service providing company. The business plan was also the start up of the “Market, unless” (“Markt, tenzij”) policy. RWS wants to do more with less people (“Meer met minder”). RWS had to cut in their workforce and should decrease their expenses. The market was more involved in complex projects and RWS distributed some of their tasks and responsibilities to the market. Innovation was one of the essential aspects in the industry to be improved. RWS developed more uniformity into their work processes and focussed for a more directing role as principal. RWS wants to become a professional principal that focuses on the public.

A.4.3. Agenda 2008

In 2008 the Agenda 2012 (AG2012) was published. The AG2012 concluded that the broad goals of the OP2008 were not achieved yet. The workforce became smaller and productivity rose. A lot of things changed, but it was not enough. RWS was especially lacking in exploiting the creativity of the market. In addition, uniformity should be improved in working together as one RWS. The collaboration with other operators and partners should be improved as well. In 2006 RWS was only halfway in becoming an independent agency. RWS has its own budget for overhead, maintenance, and control, but was dependent on the ministry for larger infrastructural projects. In the past RWS determined the policy of national roads and waterways, but now RWS is only the executive part of the Ministry of Infrastructure and the Environment. The latter event had an enormous impact on the ego of RWS of being THE professional executive organization in the Netherlands.

The mission in the AG2012 was *“WE PAKKEN DOOR”* (“we build further”) (Rijkswaterstaat, 2008) on the OP2008. The goal remained almost the same, which is becoming the leading, public oriented, and sustainable executive organization of the government in 2012. The focus of RWS transformed more towards a “procurement manager” (“Inkoopmanager”) and a new code of conduct was defined. Integral contracts were stimulated more and more. The internal statement “D&C, unless” stimulated the implementation of integral contracts. The transformation resulted in the further introduction of DBFM(O) projects in the Netherlands. Incentives for the market to participate more closely and to exploit their creativity were put high on the agenda. In addition, RWS introduced the IPM model. The key idea behind IPM entails of providing a project-thinking organization with an enterprise-wide approach to establish an efficient project management system.

To sum up, inspiring, disciplining, and learning should bring the AG2012 back to life and the role of RWS should change (Wermer, 2009):

- From manager to director and from performer to controller;
- Distribute as much as possible to the market;
- Provide enough attractive design freedom to the market;
- More with less;
- Citizens want Value for Money;
- Service provider, fast, and uniform;
- Users central;
- Recognizable to the public.

Evaluating the Agenda 2012

RWS has improved immensely since the start of the OP2008. Still, RWS did not fulfil their goals for 100% by the end of 2011. The need to really change the work processes is obligatory for success. Uniformity by providing “one face” to the market is mandatory. According to the market RWS lacks of commonly acknowledged structures in infrastructural projects. Every project has its own language and project specific ordering. The collaboration with market parties must evolve even further.
The OP2015 also states that at particular subjects the goals are not reached yet. RWS wants to be:

- An organization that controls and maintains their network from its national functionality. Physical safety in the Netherlands is an important corner stone.
- A reliable productive executional part of the ministry of Infrastructure and the Environment that brings aspects of infrastructure, spatial planning, and the environment together.
- A partner that connects with other partners in the managerial environment, in knowledge institutions, and with market parties to improve mutual performances.

- An organization that builds further on their rich historical reputation and experiences, but also evolves with modern technologies.

This means compact, being an example model, an organization where personnel is the key to success, and is influential on and stimulated by their own work. These goals have not been reached yet.

Expectations of politicians, users, market parties, partners, and personnel are dynamic and sensitive for change. They expect more from RWS every year. Politicians want a flexible and compact government, users ask for a better service provider, market parties want more uniformity in assignments, market partners want to collaborate even further, and personnel wants the recognition that they deserve and need to keep up improving their businesses. It is important to act as one RWS that breaks down the different walls between internal and external organizations. Only continue improvements will lead to a future proof organization.

Sources: (Rijkswaterstaat, 2004) (Rijkswaterstaat, 2011c) (Rijkswaterstaat, 2008)

Asset management

In 2008, RWS started the programme “Asset Management” and is based on the goals and objectives in the AG2012. Asset management provides the opportunity to represent the to be realized network performance with its related costs and risks. Multi annual agreements are made with the ministry of Infrastructure and Environment (see subsection 4.1.2). Asset management stimulates transparent and business agreements with the ministry to realize projects against marginal hinder for the user and optimal use of the market skills. The “implementation plan asset management” mentions that asset management is crucial to act as an effective (the right activities) and efficient (performing activities as good as possible) agency. Asset management stimulates a better decision-making process for now and in the future. With asset management the minister can better choose, steer, and prioritize its decisions over and within the networks. (Rijkswaterstaat, 2011a)

The goal of the programme asset management is to achieve the following objectives in 2012:

- The assets information of RWS is up to date to support an optimal SLA steering;
- RWS programming is realized transparent, uniform, and based on the maintenance needs of three networks;
- RWS makes clear SLA’s between the ministry (SG) and RWS (DG) and these agreements are uniformly translated towards the realization (e.g. RAMS and SE);
- The collaboration with the market is optimized and the conditions for RWS as asset manager are guaranteed by procurement;
- Life Cycle Costs are common knowledge.

Some of the main concerns for the successful implementation of the asset management thinking are a lack of support and insufficient qualitative and quantitative capacity. This capacity is related to information management, programming, procurement, and LCC. On the asset management congress “Time to Maintain” on the 11th of October 2012 it was mentioned that asset management grows steadily, but that a lot of work has to be performed in the future.

A.5. IPM model roles

The different roles in the IPM model consist of conflicting interests. Together they should strive for maximum quality of the (partial) products. The sum of the whole is bigger then the sum of the parts. The different roles are elaborated briefly below (Expertgroep Projectmanagement Rijkswaterstaat, 2008):

- Project manager
  The project manager is primary responsible for the accomplishment of the project results inside the boundaries of time and money. The project manager steers the project team, secures the mutual interfaces in the team, and makes sure that the teams’ performance is well organized.
- Control manager
  Good project management means that project managers have insight in the current status of quality, budget, time, and scope of the project. Integral project control takes care of the control of

time, budget, and quality during the project life cycle by means of risk management. The control manager role is based on testing the functionality of the system and is also a supportive role. The control manager is responsible for the related risk processes and not for the related control measure.

- Environmental manager
  The environmental manager is responsible for the social embedding of the project. The environmental links the project and its environment. The environment of a project consists of different stakeholders and the environmental manager interacts with these stakeholders. Public oriented management is a leading topic for the environmental manager.
- Technical manager
  The technical manager is responsible for the technical part of the project. Not detailed design knowledge is required, but more important is generalized professional process knowledge. The technical manager is responsible for the technical scope by means of (functional) specifications for the market parties. A systems engineering approach is the leading tool for this design process. The technical manager is responsible for the technical input to the processes that fell under the responsibility of the contract, environmental, and control manager. Continue attention for risk management is required.
- Contract manager
  The contract manager is responsible for the process-oriented control of the procurement. Aspects such as defining procurement needs, procurement plans, contract preparation, and tender and contract control within the limits of time, budget, quality and risks are crucial tasks. The contract manager is the daily contact person with the market parties.

A.6. Procurement organization RWS

The RWS purchasing policy is implemented by the purchasing organization. Through the organization there are three bodies that are concerned with purchase, these are Market and Purchase (“M&I = Markt en Inkoop”), IMG (Inkoop Management GWW), and BIO (Bedrijfsvoering Inkoop Ondersteuning). Roughly these bodies are concerned with the purchase on strategic, tactical and operational level respectively. M&I and IMG are centrally organized and the BIO is represented at regional offices. However, the project management makes the actual purchase decisions. The different purchasing departments and functions concerned with purchase will be elaborated hereafter and are based on information on the RWS intranet.

A.6.1. M&I

M&I is the body that functions on the strategic level. It supports the board of directors in developing the policy and practical implementation of the purchasing strategy, which is principally defined as “Market, unless” (“Markt, tenzij”). The strategic ambitions of RWS are elaborated in section 4.3, but here are some key aspects M&I is concerned with:

- Becoming a professional principal with the right expertise;
- Protecting the interest of the public;
- Stimulating the market to come up with innovative products and work methods.

A.6.2. IMG

IMG (“Inkoop Management GWW” or “Purchasing Management Ground- and Waterworks”) contributes to the targeted purchase of the road and water infrastructure-portfolio and related services, like engineering. IMG its main task to anchor the purchasing strategy within the organization, through developing and implementing strategies, monitoring and evaluation purchase on operational levels, providing the right market information for policy development on strategic and operational level and to adapt the purchasing tools on new developments and implement them (best value procurement, “contractenbuffet”). The scope of IMG stretches from exploration phase to realization, operation and maintenance of infrastructure assets. The ambitions of IMG could be described as follows:

- Being a constructive and critical reflection board for DI, principals of the regional bodies, and BIOs and M&I with the development and implementation of the purchasing strategy;

- Being a consultative body for relevant market information for board of directors, M&I, and principals of the regional bodies, as support for the market approach;
- Monitoring and evaluating the purchasing costs (analysis procurement results, after calculations);
- Being a bridge between the policy and application of model-contracts and contract control;
- Advising on legislative matters during procurement and other RWS project activities.

A.6.3. BIO

BIO ("BedrijfsvoeringInkoopOndersteuning" or "Corporation Purchasing Support") is primarily responsible for advising and support of the line- and project management regarding the involvement of market parties primarily on operational projects level. Therefore the following tasks are assigned to BIO (Intranet Rijkswaterstaat, 2010):

- Advising and contributing to project plans;
- Leading of the purchasing process;
- Determining of the market approach strategy;
- Setting up of contract;
- Doing costs estimations and cost-benefits analyses, and contributing to cost management;
- Providing of selection and appraisal documents;
- Managing the procurement;
- Providing of legislative advise with contractual conflicts.

Further the BIOs are also responsible for further professionalizing of the purchasing processes. Examples are: unifying purchasing processes, gaining better understanding of market, contributing to risk assessments, building up of financial knowledge and reducing the transactional costs.

A.6.4. Purchasing manager/advisor

Within the organization of BIO there is a crucial position of the purchasing manager/advisor. This person, as only BIO employee, supports the project team and has in this team a total overview of the purchasing process. The purchasing process could mainly be considered as the determination of the purchasing need and purchasing plan, the decision about a particular market approach, and the preparation of contractual matters. In essence the main task of the purchasing advisor is determining 'what' and primarily 'how' should be purchased under the conditions of the RWS purchasing objectives. Further the purchasing advisors are the main contact person for the BIO during a particular project. They take the lead of the purchasing team and aim to find the right balance of different perspectives for the eventual purchase. Therefore they arrange the involvement of different experts, with right skills and knowledge, and satisfy the needs of the contract manager.

A.6.5. Obstacles

There is a divorced collaborative relationship between the department IMG and the regional BIOs. This has led to the following main issues (Dang, 2011):

- IMG cannot identify and take into account all the needs of BIO for its policies;
- The support and guidelines of IMG are theoretical and lack of practical measures in projects;
- There is little involvement of the BIO, in particular purchasing advisors, in developing of purchasing policy at IMG;
- IMG is passed when advise about the market is needed;
- IMG is only approached on occasional base for advice regarding purchase;
- The information IMG and BIO exchange with each other is not valuable enough for strategic analyses or improvement management.

A.7. Procurement roles NEVI

The NEVI defined seven new roles for purchasers/procurers. These roles are defined and described below (Bellekom, Arsath Ro'is, & Marcelis, 2011):

- The procurement professional in the role as purchaser is responsible for the procurement and hold the (primary) process running;

- The procurement professional in the role of analyst has strong analytical skills and analysis the relationships;
- The procurement professional in his role as relationship manager is a networker pur sang. In this role, the procurement professional maintains relationships with suppliers and customers;
- The procurement professional in the role of consultant brings solicited and unsolicited advice to customers and suppliers;
- The procurement professional in the role of performance manager is the result-oriented contract manager;
- The procurement professional in the role of director has an excellent helicopter view. He oversees the total and directs the entire purchasing process;
- The procurement professional in his role as leader inspires its employees and brings his vision over to the employees.

Role 1 purchaser: provides procurement
Description:
The procurement professional in the role as purchaser is responsible for the procurement and keeps the (primary) process running. He strives for operational excellence. This means that he is responsible for the entire process from purchase to aftercare. The purchaser is during the purchasing process the first point of contact for customers and suppliers. The purchaser can be both a generalist and a specialist and depends on the organization. In this role, the procurement professional focuses mainly on operational and tactical levels. From the operational and tactical level the purchaser translates the preparation and organization of the procurement process (tactical) and directs the procurement policy (strategic) from the procurement process.

In the role of purchaser the procurement professional can overview the entire purchasing process and understands how the entire purchasing process proceeds. In this role it is primarily about the acquisition of quality products and services on favourable terms for the organization. The buyer applies its knowledge in the implementation of the procurement process and exposes the underlying relationships in the primary process. The buyer searches for new solutions regarding the primary process in close collaboration with customers and suppliers. He makes recommendations to promote the quality and efficiency of the procurement process.

Role 2 the analyst: provides information
Description:
The procurement professional in the role of analyst has strong analytical skills. He defines a good analysis based on the relationships between the causes and effects of situations, decisions and actions. In his analysis the analyst is also able to manage all aspects and implications for the organization. He combines "though" market and product analysis with customer needs and opportunities within the organization. The analyst is an expert in gathering relevant information and translating them into concrete actions and procurement strategies. He performs benchmarks and maps financial and suppliers risks. The focus of this role is to develop strategic purchasing. The analyst implements also analysis at the tactical and operational level and provides these levels with analysis and information.

The analyst collects relevant market and customer information and displays these in a clear way. Based on information and data the analyst exposes the underlying relationships in the collected market information and translates them into the purchasing process. The analyst can motivate mapped opportunities and threats and contributes to efficient decision-making. He or she understands and assesses the value of information. The purchaser display advices on new markets and/or product categories at central and decentralized levels within the organization.

Role 3 relationship manager: develops and maintains relationships
Description:
The procurement professional in his role as relationship manager is a networker pur sang. In this role, the procurement professional is responsible for the relationships with suppliers and customers. The relationship manager is a respected partner at business level and sensitive for environmental signals. He or she builds and maintains relationships with customers and suppliers at operational, tactical and

strategic level. The relationship manager is responsible for managing customer satisfaction. The relationship manager adds value by creating an internal and external network and anticipates on future developments. The relationship manager is sensitive for (cultural) differences between organizations, regions and countries, and is capable to bring several parties together.

The relationship manager can identify the various stakeholders and has insight into the (internal) supplier list. The relationship manager is in contact with stakeholders and can weight their different. He aims to create a win-win relationship and uses multiple styles of communication between different business levels. The relationship manager can bring the information from and about stakeholders together and relate this to the entire procurement or organizational policy. The relationship manager makes proposals for the procurement policy related to relationship management and the supplier lists.

Role 4 advisor: he advises various stakeholders
Description:
The procurement professional in the role of consultant brings solicited and unsolicited advice to customers and suppliers. The consultant thinks along with the customer and takes into account the broad business context. The procurement professional has advisory skills and uses all kind of advice techniques. He is a partner for the business and advises clients to procure as efficiently and effectively as possible. The procurement advisor adds value to the organization from a professional role by advising on operational, tactical, and strategic levels within and outside the organization. The consultant has relevant knowledge of procurement laws and regulations and he can interpret this knowledge correctly. The consultant can use his knowledge and skills in his advice and in for example the development of business cases. The consultant has the ability to apply his knowledge and skills together and come up with new solutions. He or she can add value to its analysis and customers, but also to decision makers in the organization.

Role 5 performance manager: highlights performances and steers them
Description:
The procurement professional in the role of performance manager is the contract manager who is focused on “Meten = weten”. In this role, the procurement professional constantly searches for improvements in performances. The Performance Manager monitors, manages, and monitors supplier contracts with a high degree of perseverance. These are quality products and services and agreements on delivery of products and services. The performance manager works with challenging and realistic targets and informs stakeholders about relevant performance indicators.

The performance contract manager can monitor contracts, compare performances through benchmarking, and translates customer requirements into concrete performance indicators. He can combine information and can identify possible improvements that customers need. The performance manager can give value to the performance indicators and steers on results. He develops new performance indicators where necessary in close cooperation with customers and suppliers. He reports his findings to the structural management of the organization.

Role 6 director: organizes and monitors the entire process
Description:
The procurement professional in the role of director has an excellent helicopter view. He oversees and directs the entire purchasing process. With his organizational skills he guarantees the continuity of the entire procurement process and guarantees that everyone knows what he must do in the process. The director harmonises with stakeholders both inside and outside the procurement discipline and manages the various interests. He ensures that objectives in terms of quality, satisfaction and reliability of deliveries are met. The director is an expert in process-oriented thinking: a complete process manager.
The director recognizes and understands the processes that take place within and outside the organization. The procurement professional as director identifies possible bottlenecks in processes and can relate these to procurement. He recognizes the conflicts of interest of stakeholders. The director may merge his analysis and relate the procurement process with other processes. He initiates, develops, and implements improvements for the procurement process and underlying systems. He advises the organization to promote the efficiency of processes.

Role 7 manager: manages procurement
Description:
The procurement professional in his role as manager inspires his employees and distributes his vision towards the employees. He builds on the purchasing organization and ensures that existing capacities are fully utilized. In this role, he knows to “move” at all levels within and outside the organization. This daily supervisor may lead a purchasing team and formulates purchasing objectives derived from the organization's objectives. He aligns the purchasing organization with the purchasing policies and ensures that procurement adds value to the organization. This manager’s role can be implemented functional (projects) or hierarchical (department).
The supervisor may recognize the competence of its employees and understands the vision of the entire organization. The manager can manage his team and is signalling the development needs of his employees. He challenges his employees to fully utilize their talents. The manager can improve the department (synergy) by connecting employees with the vision of the department. The supervisor may value the performance of his department based on performances, evaluations, and feedback and adjust his management to these values.

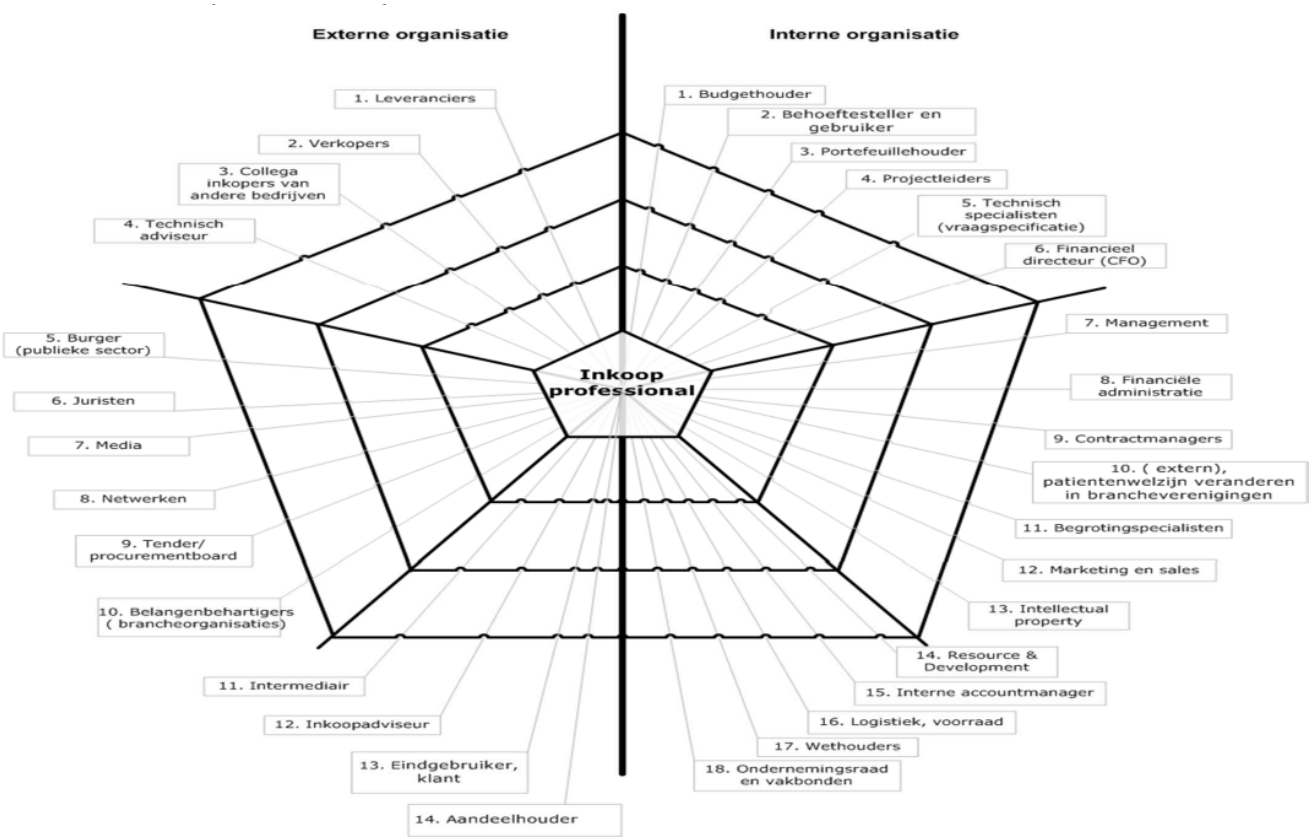


Figure 40 The procurer, “a spider in the web” (Bellekom, Arsath Ro’is, & Marcelis, 2011)

B. CASE: PROJECT SCHIPHOL – AMSTERDAM – ALMERE (SAA)

In this thesis research the project “A9/A10/A1/A6 Schiphol – Amsterdam – Almere” (SAA) is not used as a real case study. However, most of the interviews were held with employees currently working or that are in some way involved in this project. RWS expands the road network between Schiphol, Amsterdam, and Almere in order to improve the accessibility of the area. The broad goals of this project are:

- A better accessibility of this important economic region;
- Reducing the congestion of traffic;
- Shorter and more reliable travel times.

Figure 41 Overview project A9/A10/A1/A16 Schiphol - Amsterdam - Almere (source: Rijkswaterstaat http://www.rijkswaterstaat.nl/wegen/plannen_en_projecten/a_wegen/a9/planstudie_schiphol_amsterdam_almere/index.aspx)

SAA consist of five projects. It can be considered as a matrix organization and differs from a traditional project organization (Brache & Rummler, 1995). The first D&C contract of the programme SAA, A10-Oost / A1 Diemen, is granted to the consortium of Cadicom, which consist of Dura Vermeer Division Infra, Besix SA België, and Cofely Energy & Infra. The contract has a contract value roundabout €100 million including taxes (BTW). In earlier 2012 the consortium will start with the realisation of the project. The construction activities consist of expanding the current capacity, realizing a “parallel” road, and improving or placing sound barriers. After completion the improved road will be used as an alternative route for traffic during construction activities of the A9. The work should be finished in the beginning of 2014.

C. EXTERNAL COMPANY PROFILES

Five companies are interviewed to get a better picture of procurement/business strategies in other industries. These industries are chosen on their scale and relevance with big construction works. The companies are Shell, DSM, FrieslandCampina, Schiphol, and ProRail. ProRail and Schiphol are unlike Shell, DSM, and FrieslandCampina mostly owned by the Dutch State. The five companies differ in some of their sourcing aspects and some are similar. An interesting remark is that none of the five companies work “similar” compared to RWS. Firstly a short introduction based on research of T.C. Berends (2007) is given to highlight the current gas/oil industry. Here below the five companies are described very briefly to introduce the core business of the companies. Further on in this section the results of the interviews are compared and analysed.

C.1. History oil and gas sector

The construction industry differs from other industries. Shell, DSM, and FrieslandCampina utilise the EPC(m) contract. The history of these contracts in the oil and gas sector is briefly described in order to provide a better insight in the developments of this EPCm contract.

The oil and gas sector is a technical complex industry compared to road infrastructure. Berends (2007) illustrates the technical complexity by a high level of the assets’ technical availability (typically over 95%) during the lifetime of the facility (typically 20-25 years). Until the 1970s the international oil companies executed most of the EPCm work themselves and only the construction part was contracted out. During the 1970s the EPCm capabilities started to shift to international engineering and construction contractors (ECs). During the 1980s the profits of the oil companies dropped. The oil companies were conflicted with the need for cost reduction and focus on core competencies. As a result the oil companies contracted out all detailed design work to ECs. Over time, the ECs expanded their businesses more towards the current EPCm activities. International construction companies frequently execute Large Engineering Construction Projects (LECPs). Such international contractors integrate several technical disciplines and are specialized in the construction of complex facilities.

Remarkable is that many ECs are licensors for certain process technologies. Berends also mentions that the number of ECs capable of taking on LECPs is quite small. Several ECs usually work together in the form of a Joint Venture (JV) to share risks. The two latter aspects have significant impact on the strategic and tactical contracting options available for the owners (oligopoly). (Berends, Engineering and construction projects for oil and gas processing facilities: Contracting, uncertainty and the economics of information, 2007)

A sellers market, such as the one prevailing at the moment, results in higher bid prices due to: a) higher overall cost levels and delivery times for materials and equipment as well higher cost of construction work. B) Higher optimum bid prices due to less competition between EC’s and c) a reduced willingness of EC’s to accept/price risk. These changing market conditions should induce owners to explore different strategies and tactics such as cooperative forms of contracting. (Berends, Contracting Economics of Large Engineering and Construction Projects, 2007)

C.2. Company profiles

Shell

The Royal Dutch Shell is originally a Dutch-British multinational and is also categorised as one of the "super majors" in the oil industry. In the Netherlands Shell is the most profitable enterprise and in addition it is one of the worlds biggest companies as well. Shell is active in oil and gas and mainly focuses on crude materials and oil products.

Figure 42 Shell logo (source: www.shell.com)

Shell is a global group of energy and petrochemicals companies. With around 90,000 employees in more than 80 countries and territories, Shell helps to meet the world's growing demand for energy in economically, environmentally and socially responsible ways.

Shell activities are split up in upstream and downstream businesses. Upstream explores for and extracts crude oil and natural gas. Downstream refines, supplies, trades and ships crude worldwide, manufactures and markets a range of products, and produces petrochemicals for industrial customers. In addition Projects & Technology manages delivery of Shell's major projects and drives the research and innovation to create technology solutions. Our core values of honesty, integrity and respect for people form the basis of the Shell General Business Principles. Here below some facts are represented from the year 2011:

- Revenue: $470.2 billion
- Income: $31.2 billion
- Capital investment: $31.1 billion
- Investment in research and development: $1.1 billion
- 48% of our production is natural gas
- 18.8 million tonnes of LNG sold during the year
- 3.2 million barrels of gas and oil we produce every day
- 43,000 Shell service stations worldwide
- 30+ refineries and chemical plants we run

(Source: http://www.shell.com/home/content/aboutshell/)

At Shell the term project manager is considered a bit misleading. Most of the work is being outsourced. However, some years ago Shell considered themselves as pure purchasers as well. The problem they encountered was the lack of control as a result of their procurement strategy. At a certain point Shell did nothing "in-house" anymore and the focus lie on managing contracts instead of projects. Yet Shell considered control as a too important feature in the process to be outsourced.

DSM

DSM was formally founded owned by the Dutch State in 1902. In 1996 the Dutch State sold their last shares to the market. Since 2007 DSM stopped with activities in the bulk chemistry. Their main focus lies on food processing, health, automotive, paint and construction industries.

Figure 43 DSM logo (source: www.dsm.com)

Royal DSM is a global science-based company active in health, nutrition and materials. By connecting its unique competences in Life Sciences and Materials Sciences DSM is driving economic prosperity, environmental progress and social advances to create sustainable value for all stakeholders. DSM delivers innovative solutions that nourish, protect and improve performance in global markets such as food and dietary supplements, personal care, feed, pharmaceuticals, medical devices, automotive, paints, electrical and electronics, life protection, alternative energy and bio-based materials. DSM's 22,000 employees deliver annual net sales of around 9 billion euro. DSM divided its businesses in Nutrition, Pharma, Performance Materials, Polymer Intermediates, and Innovation Center. The company is listed on NYSE Euronext.

DSM transformed into a purchasing organization since a couple years. Procurement was considered as an administrative service, but transformed more into a strategic function in the company strategy. Procurement is centralized to support the businesses and has a regional focus. DSM is not focussed at a cost exercise, but DSM is focused on a value exercise. Value for Money is very important. Projects do not decide about their own purchase. Procurers have become an integral part of the project teams. The division of tasks in a project team is made very clear and knowledge transfer stands high on the agenda.

(Source: http://www.dsm.com//en_US/cworld/public/about/pages/Our_company.jsp)

FrieslandCampina

Royal FrieslandCampina is a multinational dairy company wholly owned by the dairy co-operative Zuivelcoöperatie FrieslandCampina, which has 14,391 member dairy farms in the Netherlands, Germany and Belgium. Our products are for sale in more than 100 countries. Key regions are Europe, Asia and Africa. Ingredients are sold all over the world.

Figure 44 FrieslandCampina logo (source: www.frieslandcampina.nl)

FrieslandCampina is founded in 2008 after a fusion of Friesland Foods and Campina whose roots go back to 1879. In 2011, sales amounted to over 9.6 billion euros. The company employs 19,000 people in 25 countries. We want to help people move forward in life with natural dairy nutrition. With milk we can respond to the growing demand on the world market for healthy food that is produced in a sustainable manner. Our target for 2020 is a substantially higher performance premium for milk than in 2009 as well as a higher dividend in the form of equity registered in the name of members via member bonds.

FrieslandCampina carries out commercial activities via four market-oriented business groups: Consumer Products Europe, Consumer Products International, Cheese & Butter and Ingredients. In the field of consumer products we're active in many European countries, in Asia and in Africa. Sales to industrial customers take place worldwide. In 2011 the net revenue was 9.6 billion euro.

FrieslandCampina organizes their project as a project organization. Procurement is centralized and is organized high in the organization. Procurers have a particular role during a couple phases of the project. The purchaser steps out after contract awarding. FrieslandCampina keeps a lot of activities in the preparation of the project in-house. The latter is men and time consuming, but is considered necessary to realise complex projects in current and new plants. One of the risks for the near future is that they cannot comply with the increasing need for new assets/projects due to a lack of personnel capacity. Therefore also FrieslandCampina transforms their demand specifications more and more into functional specifications and let the market do the design work.

(Source: http://www.frieslandcampina.com/english/about-us/frieslandcampina-and-you.aspx)

Schiphol

Schiphol Group is an independent commercial enterprise and mostly owned by the Dutch State (69,77%), municipality of Amsterdam (20,03%) and Rotterdam (2,2%), and Aeroports the Paris S.A. (8%). Schiphol Group aims to rank among the world's leading airport companies, creating sustainable value for its stakeholders and positions Amsterdam Airport Schiphol as Europe's preferred airport.

Figure 45 Schiphol Group logo (source: www.schipholgroup.nl)

Amsterdam Airport Schiphol is our largest and most important asset. Amsterdam Airport Schiphol - a hub airport with a leading hub carrier - is a pioneer of the successful AirportCity formula. This formula is part of our Mainport strategy, which links the growth of the airport to the development of our network of destinations and the competitive power of the region.

Amsterdam Airport Schiphol is Europe's fourth-largest airport in terms of passengers and third largest in terms of cargo. In addition to our Dutch operations (Amsterdam Airport Schiphol, Rotterdam The Hague Airport, Eindhoven Airport and Lelystad Airport), we are active directly and indirectly in the United States, Australia, Italy, Indonesia, Aruba and Sweden. Moreover, in 2008 we took a strategic 8% stake in Aéroports de Paris S.A.. Schiphol Group is structured and run as a commercial enterprise with a socio-economic function. The operation of airports and the development of AirportCities involve three inextricably linked business areas: Aviation, Consumers and Real Estate. In 2011 the net revenue was 1.2 billion euro. In 2011 Schiphol Group was responsible for more then 53 million of passenger movements and 1.5 million tons of cargo.

Schiphol Group is a service provider and typical outsource organization. They are characterized as primary dealmakers and purchases services and processes and (almost) no products anymore. Schiphol Groups' main focus lies on procuring services as high as possible in the organization. There is a project organization and when procurement is required the purchasers will be involved in the project. In the project procurers are in lead during their involvement. The procurers put time and effort in knowledge transfer with the market in aspects in which they lack knowledge. Ex-ante investments and orientation leads towards a better set of needs, answering on the why question, and a better interpretation of the needs. Schiphol stays in control and keeps their level of knowledge updated.

(Source: http://www.schiphol.nl/SchipholGroup/Company1.htm)

ProRail BV

ProRail BV is a privatised company that has a concession to maintain the Dutch railways for the next 10 years (2005-2015). Formally ProRail is a subsidiary company of Railinfratrust BV. The latter is owned by the Dutch State and in a legal sense owner of almost the whole railway network in the Netherlands.

Figure 46 ProRail logo (www.ProRail.nl)

ProRail is the economic owner of this railway network. ProRail is responsible to maintain, exploit, and when commanded by the State to extent this railway network. Every day 4000 employees make sure that 24/7 one million train journeys are realised and 115000 tons of goods are transported over 7000 km railway. The operating revenues in 2011 were over €1.6 billion. ProRail its strategy is being a public service provider in rail mobility that strives for more train traffic, a more robust railway system, and works against substantial lower costs.

ProRail is like Schiphol formally owned by the state. ProRail is a typical project organization and unlike the commercial companies procurement is still a secondary process. ProRail has many purchasers, but most of them are focused at deliveries and services for framework contracts. For building and infrastructural works ProRail is still a project organization. Procurement is only involved in the preparation of the contract and the tender phase. ProRail outsourced almost all their activities to engineering companies and contractors. ProRail only works out a customer requirements specification and is in lead over the whole process. Inspection, assessment and control activities are outsourced, but decisions are taken at ProRail. Tender managers are considered as contract awarders and not “real” procurers. However, the recognition for better procurement is growing.

(Source: http://ProRail.nl/English/Pages/NetworkStatement.aspx)

D. INTERVIEWS

D.1. Interviewees

D.1.1. RWS SAA/DNH

- Interview Jan Slager, directeur productie SAA, 18-09-2012
- Interview Rob Bongers, clustermanager techniek SAA 16-05-2012
- Interview Martin Anneeze, clustermanager inkoop/contractbeheersing SAA 19-06-2012
- Interview Ruud van der Putte, technisch management SAA 26-07-2012
- Interview Michiel Kool, former manager projectbeheersing A10 oost - A1 09-05-2012
- Interview Andre Sluiter, projectleider planfase SAA 16-05-2012
- Interview Eelco Mulder, senior beheerder kunstwerken DNH 24-05-2012
- Interview Gerard de Vries, sr. inkoper BIO DNH, 03-05-2012

D.1.2. RWS IMG/DI

- Interview Carlita Vis and Lotte Keur, (sr.) Adviseur/specialist IMG 14-05-2012
- Interview Frits Houtman, IMG 14-05-2012
- Interview Mireille Götz, IMG 29-08-2012
- Interview Eldert van der Lee, senior adviseur-specialist project management DI 14-05-2012
- Interview Rob Peters, senior financieel economisch adviseur, PPS pool DI 06-06-2012

D.1.3. Other

- Interview Lex Sips, hub director purchase indirect spend DSM Northern Europe 23-05-2012
- Interview Kees Berends, manager CP Projects Shell 04-06-2012
- Interview Diederik Biesboer, Corporate Procurement, Schiphol Group 14-06-2012
- Interview Paul Norbart, senior tendermanager AKI ProRail 21-06-2012
- Interview Jaap de Slegte, Program manager Domo Technology Friesland Campina, 03-07-2012
- Interview Joost Merema, PRO6 managers 16-05-2012
- Interview Daan Stuit, voorzitter MKB Infra 21-05-2012

D.2. Interview questions

D.2.1. Brainstorm session interview questions

Wat wil ik weten:
Problemen: Wat gebeurt er, waar, wanneer, hoeveel, en wat niet, waar niet, wanneer niet en hoeveel niet?

Wat voor organizatie is RWS? Wat is het doel? Wat gebeurt er echt?

Ervaringen samenwerking om het probleem uit te zoeken?
Hoe bevalt het?
Wat willen ze?
Waar lopen ze tegenaan?
Wat weerhoudt ze?
Wat is belangrijk voor ze?
Zien ze verandering?
Wat “kost” de huidige samenwerking?
Hoe meet je je doelen, en welke doelen?

Wat is de insteek van het contract?
Wat is een inkoopmanager/professioneel opdrachtgever?
Wat is project management en voor wie is het bedoelt?

Wie ontwerpt?
Wie neemt de verantwoording?
Wat wordt er van de ander verwacht?
Hoe zou je het zelf doen als de ander?
Wanneer is iets een success?
Wat zijn belangrijke performance indicators?
Hoe zou je dat kunnen toetsen?

Waarom die dikke contracten?
Hoe stimuleer je de markt in het genereren van meer waarde/innovaties?
Belemmeren de D&C contracten de markt tenzij principe?
Waar gaat het vaak mis met contracten van projecten?

D.2.2. Used interview questions

Basic questions interviews

- Wie bent u en wat is u rol binnen RWS intern en in relatie tot de marktpartijen?
- In het ondernemingsplan 2015 wil RWS doorgroeien naar een professioneel opdrachtgever. Wat is een professioneel opdrachtgever in uw ogen en in hoeverre past dit bij RWS?
- Wat typeert een inkooporganizatie en waarom verandert RWS van een projectenmachine naar een inkooporganizatie?
- Hoe ziet het “inkoopproces” van een project er bij RWS volgens die visie precies uit?
- In het ondernemingsplan 2015 wordt gesproken over het eerder betrekken van de markt. Hoe realiseert RWS deze doelstelling en hoe ziet dat “inkoopproces” van een project er bij RWS volgens die visie uit? Wat specificeer je wel en wat niet? Is schaalvergroting van projecten wel of niet gunstig?
- Hoe wordt de markt geprikkeld opdat de markt acteert in lijn met geformuleerde verwachtingen (duurzaam concurrerende markt, prijs/kwaliteit verhouding)?
- Verloopt dat proces naar wens, en zo nee, waar loopt u dan tegenaan en wat zouden de oorzaken hiervan kunnen zijn?
- Ziet u een verandering in de huidige manier van werken en zo ja waar gaat deze dan heen?
- Hoe zou RWS zich moeten gedragen in de toekomst?
- Heeft u nog op- en/of aanmerkingen?

Basic questions IPM/Cluster management interviews

- In het ondernemingsplan 2015 wordt gesproken over het eerder betrekken van de markt. Hoe realiseert RWS deze doelstelling en hoe ziet dat “inkoopproces” van een project er bij RWS volgens die visie uit? Wat specificeer je wel en wat niet? Is schaalvergroting van projecten wel of niet gunstig?
- Op welke manier zou je de vraag moeten stellen om in de uitvoeringsfase te voorkomen dat je voor verrassingen staat als opdrachtgever?

Extra questions Planfase

- Hoe ziet het “inkoopproces” van een project er in de planfase van projecten bij RWS er precies uit?
- De planologische procedure is een spel tussen verschillende bestuurslagen. Is het mogelijk om in de huidige context van de Nederlandse dichtbevolkte samenleving mogelijk om die oplossingsruimte zo breed te specificeren en om die ruimte zo vrij te houden in samenspraak met de omgeving?

Extra questions IMG

- Wat zijn de verschillen tussen inkoopstrategie, aanstedingsprocedure en contractbeheersingsstrategie?
- Hoe wordt de inkoopstrategie bepaald?
- Belemmeren de D&C contracten de markt tenzij principe? Zo ja waar gaat het dan vaak mis?
- Wat zijn de “performance” criteria op basis waarvan werken worden ingekocht? En hoe meet je deze?

Basic questions Shell/DSM/Campina/ProRail/Schiphol interviews

Voor mijn afstudeeronderzoek richt ik mij op het evalueren van het inkoopproces bij Rijkswaterstaat in relatie tot de uitvoering van de infrastructurele werken. Ik onderzoek of de bedrijfsstrategie ook daadwerkelijk is terug te vinden het operationele project niveau. Het doel van dit interview is dat de student inzicht krijgt in verschillende inkoopprocessen in andere branches naast de bekende inkoopprocessen van infrastructurele werken bij Rijkswaterstaat (bestekken, innovatieve contracten). Zo kunnen vergelijkingen/referenties worden gedaan en wordt getracht de student van een bredere kijk op de “inkoopprocessen” te voorzien. Het doel is daarom vooral gericht op kennisverbreding.

- Wie bent u en wat is u rol binnen het bedrijf intern en in relatie tot de markt?
- Wat typeert een inkooporganizatie en wat voor plek heeft inkoop in de organizatie en/of het primaire bedrijfsproces (hoog in organizatie inkopen of laag in projecten)?
- Welke strategische gedachtegang is leidend in de inkoopstrategie en wordt er gebruik gemaakt van een inkoopmodel?
- Hoe zit inkoop verweven in relatie tot het planvormingsproces van een project?
  (hoe ziet de uitvraag bij projecten eruit, denk aan bijv. wat voor contracten, long-term/ short-term, samenbundeling/versnippering producten, gespecificeerd/ oplossingsruimte)
- Hoe vindt de scheiding van kerntaken en verantwoordelijkheden plaats (ontwerp, uitvoering, toetsing, onderhoud)?
- Wat zijn de “performance” criteria op basis waarvan producten worden ingekocht? En hoe wordt deze kwaliteit geborgd (wat voor “Systeemgerichte Contract Beheersing” wordt toegepast)?
- Hoe wordt de markt geprikkeld opdat de markt acteert in lijn met geformuleerde verwachtingen (duurzaam concurrerende markt, prijs/kwaliteit verhouding, betrokkenheid inkoopmodel/supply chain)?
- Wat zijn de voor en nadelen van een dergelijke inkoopstrategie?
- Op wat voor manier kunnen slecht presterende bedrijven (tijdelijk) worden geweerd?
- In hoeverre denkt u dat een dergelijk inkoopproces relevant is voor een organizatie als Rijkswaterstaat?
- Heeft u nog op- en/of aanmerkingen en kunt u mij misschien nog iemand aanbevelen om mee te gaan praten omtrent dit onderwerp?

D.3. Data structure interview analysis

The different interviews are analysed and categorized in eight subjects. The different subjects are (1) Strategy, (2), Business, (3) Organizational structure, (4) Procurement, (5) Relationship, (6) Contract, (7) Organizational culture, and finally (8) Politics. In this sub section the subjects are described.

Strategy

The strategy pillar is based upon several "general" subjects. It contains the companies mission, vision, strategy, goals, context, environment, complexity, and core business. The strategic part explains something about the company's philosophy and tries to explain the current context. It explains the current direction the company strives for, their strategy, and their core values. The input for this subject is derived from the companies' websites and from the interviews.

Business

The business pillar consists of several subjects related to a business case. It elaborates some of the underpinnings for project approaches and decision-making. It discusses the related business attitude of actors and their profits vision. The Business Case is the key document that allows the Project Board to clarify and, where possible, quantify, the estimated costs, risks and expected benefits of the project. The Business Case is developed firstly in outline form when starting up the project, is then refined in more detail during the initiation stage, and is updated at the end of each subsequent stage except the final stage. It is the key document that will enable the Project Board to decide if the project remains worthwhile investing in. (Office of Government Commerce, 2009)

Organizational structure

The organizational structure distinguishes several aspects related to a company's organization, but also their project organizations. This subject explains how the company is organized and what kind of structure is implemented. A company often consist of an organizational chart. This organization is however dependent on several aspects. Program, portfolio, and multi-project management are often used under the same meaning, but they quite differ (Hedeman, Van Heemst, & Riepma, 2008). The interpretation of the "procurement organization" in the base organization is described because of the procurement context in this research. In addition several roles and responsibilities are described as well. What are the company's in-house roles and tasks? What about evaluation and learning? Such questions are discussed during the several interviews.

Procurement

Procurement is the main subject of this thesis research. Procurement is related to the base organization, project organizations, roles and responsibilities of employees. Procurers become more and more important in current businesses. Procurement was understood as purchasing pens and pencils, but nowadays a project success is dependent on the skills of a procurer. Procurement is often underestimated and especially in the construction sector. Procurement involves selection and award criteria, and is closely related to the other subjects.

Relationship

The pillar "relationship" focuses on the relation client-supplier. It involves the coordination, cooperation, and collaboration between these parties. The subject involves aspects of relation management, supply chain thinking, and contract management. Relation management is related to monitoring and past performance measurement.

Contract

Contracts are related to the two earlier pillars of procurement and relation. Often the contract is the whole of agreements agreed upon between client and supplier. In this pillar the different contract forms are analysed together with the several outsourced roles by the client, and the specification input for the contracts. In addition several incentives and risk distribution are elaborated. Currently, the integral contracts like the Design & Construct (D&C) or Design & Build (D&B), Design, Build & Maintain (DBM), Design Build Maintain & Finance (DBFM), and Design Build Maintain Finance & Operate (DBFMO) are

a hot issue in the construction marker. Commercial companies like Shell, DSM, FrieslandCampina use often international standards like EPC or EPCm contracts.

Organizational culture

The organizational culture describes the cultural related aspects of an organization. It is related to the motivation and behaviour of employees. An organizations culture has several impacts on employees their deeds and acts. Organizational changes also impact the employees' behaviour. Culture is based on common norms and values from a group of people and results in the way people understand, they think and how they act on certain circumstances or situations. A strong company culture contributes to standardizations and uncertainty reduction. However, a strong company culture is often also hard to change. Changing such organization results in a culture shock (Bennett, 1998). In the book of Meredith and Mantel it is mentioned that management theorists have been writing about "corporate cultures". The impact of an inter-industry, inter-firm and intra-firm corporate cultural diversity on the project manager is significant (Meredith & Mantel, 2006). The project manager has many interfaces with both intern and external personnel. When changing organizations managers should be aware of the consequences of such changes in the companies' culture and their employees.

Politics

The final subject is titled as politics. The politics exercise several influences on the construction industry. Especially on governmental organizations like RWS. The politic (ministry) define and/or appoint the frameworks and legislation. Internal politics are related to relations within a company. Mintzberg defines the political organization as an organization that is dispersed by power games and "backstabbing" actions (Mintzberg, 2004). However, like it or not, our world is a politicized world, government or entrepreneur are no different. Important decisions involving resources are made by bargaining and deal making. It is a power game where strategic behaviour is inevitable. Project managers must learn to use such political system to their advantage. Any change in the organization asks for conflicting interests. Finding a political sensitive balance in project implementation is a key success factor.

D.4. Interviews content tables

An analysis of the listed aspects of the interview content tables is presented in appendix E. The content of the tables is divided between commercial and semi public companies/organizations. The numbers of the rows are similar for both tables. Empty spaces do not suggest that these companies do not have an answer on these topics. The broad scope of the interview questions resulted in wide-ranging answers and made it not possible to fill in all the squares directly from the interviews.

D.5. Main obstacles and proposed solutions interviewees

In the interviews comments were given about the currently faced obstacles. The table below provides insight in the experienced obstacles. Table 11 describes the proposed solutions by the interviewees.

Table 10 Experienced obstacles RWS by interviewees

Obstacles RWS	Explanation	Remarks
History	The acknowledgement of mistakes is not always present. Are there any problems? The roads are all open right? Who is complaining? Everything is all right. Our history is our biggest obstacle.	RWS lacks of a "sense of responsibility for the user". "Who cares" attitude.
Accountability	The politics and ministries are held too little accountable for escalations; RWS lacks a business thinking mind-set; Project members and IPM managers face decision mandate issues that hamper the process; In big projects a common goal between different "project entities" is not always present.	Who is accountable?
Politics	RWS is steered by politics. RWS ego of "we can do everything" affects relation RWS-politics; The fragmented government TB policy limits design freedom; In combination with the "more work with less people" policy RWS its contracts/specifications are often too detailed, contain weaknesses and lack of quality ; SE is not understand right; functional requirements are multi interpretable and not SMART; Thick contracts ≠ good contracts.	The impact of the politics is related to RWS its organisation, their work processes and their mentality; What RWS does is pretty uniform so it is remarkable that there are so many mistakes made every time again
Management	Project interest are often not well balanced with organizations interest. Projects are steered on production, realising what we buy in. Project managers already know what they want and procurement seems a obligatory process to fulfil.	RWS is still a project machine who tenders projects
Close supervision	Contractors complain about our close involvement in the projects; RWS and ProRail mention that both strive for earlier market involvement, but the Dutch legislative framework still is a impregnable fortress. Also uncertainty and distrust result in interferences by the principal. RWS, ProRail, Shell, and FrieslandCampina mention that both experience a lot of complaints about their close involvement.	Contractors complain about to closely involved (governmental) principals, but we just want to be sure to get the quality we want; Opportunism of the contractors is a serious issue
Procurement thinking	Lack of a procurement thinking in plan study phase (late purchaser involvement); Purchasers are often recognized as tender managers; There is an almost unhealthy tension between legitimacy and effectiveness in projects; Hard to objectively choose a partner in early phases based on equity principle and legislation; Inefficient communication lines. Plan study and realisation phase are two different worlds;	Purchasers should be earlier involved in projects. Clear and short communication lines and an integral approach of the whole project are crucial elements
Past performance contract awarding	Lack of past performance ratings; We still do not tender on quality; EMVI criteria have too little impact on the end results (subjective and paper is patience); We call for "focus on quality", but we do not show our appreciation for contractors "tendering on quality"; The government is not ready to abandon tender awarding procedures based on lowest cost price.	Quality control is too much focussed on plans and responsibilities of the contractor; RWS lacks of a past performance system to judge these contractors;
Scope	There are many scope changes and RWS acts slowly with scope changes; RWS lacks of decision mandate in the project teams to deal with these scopes fast and efficient (High transaction costs); It is almost not possible to change the demand specification after the contract awarding because of a better idea/innovation/improvement proposed by the contractor, and if so it would be against high costs or against severe delays.	The impact of uncertainty in projects should not be underestimated and earlier investment in problem and scope definitions are crucial
Partnership	In true partnerships the contract should be much less important then the collaboration; At RWS the contract is often seen as a goal itself.	The contract at RWS is often seen as a goal itself in stead of a mean because it should reduce uncertainties for the principal
SCB	SCB is theoretically oke, but in practice its shows different outcomes. Their is no capacity to deal with obstacles and problems. Warranty conditions do not comply with performance maintenance contract conditions.	SCB is theoretically oke, but in practice its shows different outcomes
Knowledge drain	RWS faces a knowledge drain as a result of current organizational changes and cutbacks; Personnel changes in staff also have negative impacts on continuity and knowledge development; ProRail mentions that they are too much dependent on a engineering company because of their own knowledge drain.	Knowledge lies with the humans in the projects, don't underestimate their impact
Changing but not learning enough	Since 2002, RWS changes continue without really learning from early mistakes in the projects, we are often reinventing the wheel in new projects; There is a lack of uniformity inside the framework of the contracts and demand specifications.	Since 2002, RWS is constantly changing, but the learning curve is still not closed
Communication	There is a lack of a clear internal communication. "If I do this, I expect this from you" is not common knowledge; Decisions in earlier trajects are hard to trace back; Who is responsible?; Operator talks to IPM team, IPM team to construction contractor, this is not an optimal collaboration (lack of technical coordination); RWS project members often have two bosses (project manager and line manager) with (sometimes) conflicting interests.	Different project phases and even roles are characterized as separate entities with multiple bosses instead of an integral process
Understaffed for PPP	RWS is not yet sufficiently well equipped for DBFM and "vervlechting" and especially not in combination with the vision that RWS has to work faster and better; Because time pressure people often choose for an "shortcut" or "easy way"; It is very fragmentized and lessons learned are unknown; A lack of quality of the contractual relation could be managed if such contracts where not so huge and complex; it seems that DBFM is not a form of better collaboration, it is more a "throw it over the wall" principle.	RWS is not equipped for innovative large programmes/projects like SAA
Who is in control?	Who is in control in the longer term: The man with the technical know-how or the accountant who has responsible for the money?	Consequences the concepts like more DBFM are underestimated by politics
Self interest	At RWS (and ProRail) the "projects" and/or employees think from their own viewpoints ("frameworks") with a conflict and risk averse attitude; There is friction between IPM roles, but also between the procurement manager and the contract manager.	RWS and ProRail face problems with "framework" visions and risk averse thinking of employees
Attitude	"We control the market" attitude; RWS thinks too much from the viewpoint of RWS and ahead for the contractor instead of together with the contractor; Feeling of distrust is available and construction companies are perceived as unreliable." (uncertainties and fear).	RWS faces a extreme transformation in both their internal as external thinking as well as the work culture
Opportunism	Construction contractors do not understand administrative and dynamic political environment; Earlier contractors involved makes it hard to justify a reference point for payments; Opportunism of the contractor is often a serious issue. Therefor DSM never lets a construction contractor do the design part.	Contractors underestimate the complex legislative and juristic procedures and lack of an "integral mind-set". DSM even mentions that construction contracts are not put in control over the integral project processes
Promises vs. sorry department	"Wrong" incentives are incorrectly used by contractors; promises and sorry department, "I know we promised, but we are sorry because it is not our fault or its unforeseen"; Contractors should act more like entrepreneurs, but contractors are often not ready to cope with a projects integrality.	Dutch contracts consist of too much "redelijkheid & billijkheid"
Quality bench marking	Bench marking of contractors performances and quality is not executed well.	Lack of market/supplier research/analysis and monitoring

Table 11 Solutions/activities for RWS mentioned by the interviewees

Proposed solutions	Explanation	Remarks
More a business attitude	We have to deliver better work by better quality control; Our attitude should be more business like; RWS is not a social service provider; RWS should act much more in a withdrawing role for the government, more control, and much harder contract management; In what perspective does RWS look to their projects? For the market it's a case of life and dead. In crises "the survival of the fittest" principle is visible.	Market faces a matter of life and dead attitude. They have an attitude of what we do has to be correct (survival of the fittest); Not ready to go to the market, don't go!
Be smart	The integral strength lies in the internal tension between environment, technology and contracts; First check whether you are not buying something that is not of any additional value (smarter scope). Secondly check whether you are not buying something that is over specified or lacks of specification (what do you buy). Both are expensive. After that you should check whether there are some procurement advantages.	Invest upfront in the projects problem definition and analysis; Top level requirements must be clear and hard. Lower level requirements must be flexible.
Act firmer	RWS should act firmer against politicians; Take in the beginning a better look at what is really necessary. Invest in the "function" and find out what fits around best; The end result is what matters. Decision making should acknowledge the importance of decisions related to the functioning of the end result in the whole perspective.	The end result is what matters. Decision making should acknowledge the importance of decisions; Act firm and act deliberate to politicians.
Strong base organisation	An fundamental strong BIO / IMG should deliver good purchasers for the project organizations. Purchasers should be implemented as project members; With different price structures, different kind of qualities can be enforced. Procurement is an art; A major advantage of purchasers in a project team is related to the ability to capture mistakes from the project team; "Without us Shell would not be the one that they are right now".	Procurement is an art itself. With different price structures different kind of qualities can be enforced; Purchasers have to be integrated in the project teams; Projects are dependent on the quality of the base organisation.
Quality standards are the norm	An procurement organisation has its own standards and quality aspects to control their specialism. The most important is good project management. How do you control your time, quality and budget in the right way and with what balance? "There are no cut in corners in project management".	Quality should not be a differentiator, but a qualifier.
Earlier useful consultations	Invest in earlier consultations with the contractors. Not only about their competences but also about their feelings about the problem approach; Procurement should be implemented earlier in the process. Put a lot of effort in thinking upfront what you exactly need and what you want to have; RWS should keep the administrative and environmental responsibilities in-house because contractors cannot cope with these uncertainties in time and money.	The positive effects of a "good purchase" are created upfront together with the market, not by letting the construction contractor do all the work.
Seek the discussion	A clear separation between the procurement process and the scoping by external contractors seems logic; Scope discussions should be held in advance of the tender; If RWS is not ready to go to the market, don't go! Ask for proof instead of only prescribing the rules of the game; Keep projects scopes manageable in size.	Keep opportunities for discussions upfront in projects open; If you are not ready to go to the market, don't go! Keep projects manageable in size.
Quality means what is sufficient	In functional specifications project teams strive for a "10" as a quality mark, even if this is not necessary. A satisfactory level of quality should be fine enough. The performance of the network as a whole should be more important then the performance of a solo project.	A satisfactory level of quality should be fine for RWS; Companies like Shell strive because of technical complexity and dependencies of delivery contracts towards what's best.
RWS not dictates but collaborates with the market	Important is how the market organizes itself and that is depended on how RWS defines its demand; RWS dictates the market how they should organize and perform instead of a market that organizes itself;	The market should dictate itself and RWS should provide a framework to stimulate such developments.
Risks means opportunities	Contractors should not be contracted based on lowest price, but more based on well performed and smart risk distributions and their competences.	Risk distribution is considered extremely important; Lowest price is fine when preferred.
Sustain competitive environment	DBFM contracts are only successful whenever you steer completely on product performances. If not, prices probably increase in DBFM contracts; In long term contracts it is very important to consider how parties are still being motivated to compete; Such contracts are only put on the market for 20-30 years whenever the demand is not clear and hard enough to manage.	"wie houdt wie scherp" in long term DBFM contracts.
Past performance	Hard (external) past performance pays off;	
Who is in charge in a project?	In the earlier days RWS hired a project management organisation to manage their projects, why did they transfer this role towards the construction company?	
New role engineering companies	Contracting an engineering contractor is just as important as contracting an construction contractor; Give a engineering contractor an integral contract and steer him with budget incentives to make him feel responsible; You'll have to invent a way of payment leaving less risk at the engineering companies and such that RWS keeps control over the budget; DSM cannot imagine that construction contractors become responsible for the whole EPC process	DSM mentions that a construction contractor would never get the responsibility to design and Shell contracts a "contractor" like Fluor to design and/or manage their project. If the construction contractor gets all the responsibility, who keeps the construction contractor in control? FrieslandCampina does not see many differences in approaching engineering & construction contractors. They just have to do what we ask them to do.

E. INTERVIEW RESULTS

The different results from the interview analysis (see appendix D.4) are elaborated in this section. A definition about a professional principal is given before the four main subjects (see subsection 6.1.3) of the interview results are elaborated

E.1. Professional principal

To be a professional principal is one of the core pillars of RWS. In broad sense all the given definition in the RWS interviews are partly similar. Several definitions by the interviewees are described to provide a better understanding of the term professional principal:

"Projects are the core business of RWS. It is important that RWS clearly specifies its demand and that RWS can assess whether or not the output complies the requirements. So it is about the definition of a good demand specification, procure the right supply, and control the whole management to do so. RWS realizes the above by good project management." (Bongers, 2012)

"A professional purchaser analysis and searches for the optimum between the three aspects of user, market, and RWS. So it is about network, purchase, and control." (Anneeze, 2012)

"A professional principal clearly organizes its own organization in such a way that it is clear to everybody what lines are followed to strive from a procurement need towards realisation. It is important that the principal knows and understands the market." (Putte, 2012)

"As a professional principal RWS transforms from a project machine that procures projects towards a more procurement orientated organization that realises projects." (Vis & Keur, 2012)

"A professional principal understands the "hot items" in the market. He maximizes effort and provides incentives to challenge the market to deliver the best possible performance within the available budget." (Peters, 2012)

To summarize their statements:
A professional principal understands the needs of both clients and RWS, knows the markets competences, is supported by a firm base organization, and search towards the optimum between network, purchase, and control by clear project management.

E.2. Politics

E.2.1. Political influences

RWS faces several congruent roles. The roles of a purchaser, builder, operator, and road director conflict on several clients' interest. RWS works for the ministry and directly for the minster, which again works for the "Tweede Kamer" and thus indirectly for the inhabitants of the Netherlands. There are several conflicting interests related to the incumbent political party in the "Tweede Kamer". The client is not like Shell, DSM, and FrieslandCampina one board of directors that demands for example shareholder value. **RWS is depended on the ministry's policy directorates**. The minister has direct influences and control over RWS instead of only indirect influence as a shareholder at for example ProRail and Schiphol Group. Politicians have a lot of (indirect) influence of RWS its project portfolio and work processes (e.g. implementation of D&C and DBFM). It is difficult to keep the politics at distance when the latter wants to be involved. RWS its budget system is regulated by the "kasritme systeem" (see section 4.1). From a business perspective an optimal budget distribution for multiple years is not possible. RWS is responsible for the project budget, but not for the cost/benefit ratio. When there is a budget surplus it flows directly back to the ministry and not into RWS its own cash flow.

Commercial companies could be confronted with international politics and corruption, which are often more complex then the EU procurement directives. Large countries could "consume" whole oil plants

just like that. Projects are confronted with fluctuating environments (e.g. exchange rates, raw material pricing, oil prices, etc.). These commercial companies also face “political influences” from their board of directors (internal politics). The company works for the board and the board decides just like the ministry. However, in general the board of directors often has a similar vision about profits. “For this project, there was pressure from the business department to deliver faster/cheaper” is not a rare comment in commercial companies. An example given in the interview was that the internal competition at RWS’s management is characterized as a “power game” and not on project results like in commercial companies (also observed by Metze (2009/2010)).

E.2.2. (EU) Regulation

In the Netherlands governmental institutes are confronted with strict (EU) regulations, legislation, and tender procedures (BAO) during design, procurement and construction. For several specific special sectors like the rail network and airports like Schiphol there are different regulations (BASS). Governmental companies/institutes are confronted with the BASS whenever a special or exclusive right is granted (e.g. monopoly). RWS does not fall under the BASS unlike that it seems they also have a "monopoly". Consequently RWS faces “more” strict regulations concerning tenders. Under the BASS the special sectors have only a marginal additional freedom in implementing a negotiated procedure without prior publication. The commercial companies on the other hand are not bounded with tender regulation. They can contract every party under every condition they want. From a viewpoint of RWS the market can “cheat”.

EU regulations do not hamper procurement. Transparency and objectivity contribute to a good procurement process. However, the legal procedures (“Tracé- and Planologische Kern Beslissingen” procedures) and internal RWS regulation hamper the possibilities of functional specification and earlier contractor involvement. The BASS provides some additional freedom in implementing negotiated procedures without prior publication, but those procedures do not do the trick. Nonetheless, commercial companies are confronted with strict regulations and procedures concerning safety and environment. They are in control over their cash flow, but they deal with supervisors that demand tight planning and budgets as well. The comment that EU directives prevent good procurement is not justified. Regulations are not bad, but more important is that people understand how to handle them with care. A good procurer should underpin the importance of for example regulations for transparency and objectivity in a transaction. A more important cause of project “failures” is the continue change of the rules of the game. **The government should be capable enough to deal with these “rules of the game” changes.** However, changes in regulation and legislation make it for long-term projects impossible to take risks into account in cost estimations. Contractors cannot reasonable price these risks. That is pure politics. A contractor should be smart on his own profession, which is most of the time the technical part not politics.

E.2.3. Summary

- RWS is depended on the ministry’s policy directorates.
- Companies like Shell and DSM etc. are confronted with international politics and corruption and are often more complex then EU tender directives.
- In general the board of directors often has a similar vision about profits.
- The internal competition at RWS’s management is characterized as a “power game”
- In the Netherlands governmental institutes are confronted with strict (EU) regulations, legislation, and tender procedures (BAO) during design, procurement and construction.
- EU regulations do not hamper procurement.
- The government should be capable enough to deal with these “rules of the game” changes.

E.3. Strategy

E.3.1. Goal setting

It seems RWS its **goals are experienced as a bit vague and are sensitive to attitude changes**. Working as one team, improving every day, and appreciation of the public, partners, and politics are not

really objective criteria. The goals of Shell, DSM, FrieslandCampina, Schiphol Group are more related to efficiency, client demand, and sustainability. RWS its goal seems focussed at “showing their improvements” to the public. Working as one organization, together with others and improving every day seem “just as usual” activities for a commercial organization. A company like for example Shell is characterized as one organization, with one working culture, one vision, and one firm base organization despite of their international cultural impact. In the Netherlands, RWS and the construction consortia still lack of a common characterization and do not strive for one common goal.

E.3.2. Profit versus non-profit

RWS and ProRail are non-profit oriented organizations. Both works for the ministry, but at ProRail the minister is, as shareholder, only indirectly capable to influence ProRails’ policy. In the vision of RWS it is noticed that **RWS want to be the best executing organization of the government**. RWS focuses on a leading project manager, a public oriented network manager, and a professional crisis manager. As an agency RWS is not directly responsible for their profitability, but the project teams are responsible for their received budget and SLA’s just like the commercial companies. In the commercial companies it is all about profit and continuity. The commercial companies are responsible for their own budget, profitability, and its own cash flow.

E.3.3. Procurement strategy

Almost all companies use different procurement strategies. Procurement is a strategic function at DSM, but underestimated at ProRail, subordinate to technicians at Shell, and just a project activity at Schiphol Group, FrieslandCampina, and RWS. However, there are some very important similarities. The most important similarity is that all procurement managers are in control during their involvement. The second is that a procurers’ role is important for a projects’ success. However, RWS and ProRail often experience procurers still as tender managers instead of “procurers”. Thirdly, procurement managers are involved and/or implemented in the project organization.

Furthermore, all companies face several decision-making moments in their design process. The difference between RWS and the commercial companies is related to the function of these decision points. Ex-ante in projects the ministry executes a MKBA analysis (on policy level and often in combination with a MER). RWS experiences a “Track Decision” (TB) as a complex and obligatory process to realize infrastructures. The several “sub-decisions” are filled in as best as possible and are supported by (environmental) studies. However, the decision to realize the project is often already taken by the ministry. **The awareness of these “business principles” often disappears and the “technique” becomes leading in the project after the regions or the project teams are involved.**

The other companies Shell, DSM, and FrieslandCampina mention that a projects’ business case is continually updated and assessed whether or not the project is still profitable. The commercial companies attach more value to the outcome of the different decision points. **The commercial projects are all dependent on the business case.** Investments are taken with care. There is a trade-off between cost and benefits. There is an investment (costs), the asset “runs” and realizes income (benefits/cash flow) and after some time the investment realizes profits for its investors (Return of Investment (ROI)/positive NPV value). Without a positive cost/benefit ratio (short and/or long term) the market can refuse further investments. A project will be realised after a “positive” Final Investment Decision (FID).

A “positive” business case is not always possible for organizations like RWS and especially not for the whole national road infrastructure. These road projects can be financial disasters while they are socially a success. That is why society needs governments. Commercial companies will not invest in society without a positive correlation with the company’s interest. From the start, the market parties mention that a principal must invest in what is really necessary. **Invest in the "function" and find out what fits around that best.**

E.3.4. Competition

Important is to realize who RWS is in the market. **RWS is not a market leader, but RWS has a "monopoly" on the Dutch highways**. RWS is nationally oriented and does not face any direct form of competition. RWS is the executive agency of the ministry of Infrastructure & Environment. RWS its "right of existence" is different in relation to the other compared commercial companies. Shell, DSM, Schiphol Group, and FrieslandCampina strive to become/sustain market leaders in a competitive environment. Their projects are runned in a highly competitive market and risk management is considered extremely important in relation to a projects' success.

Currently, RWS reforms the market with the new innovative contracts. Up scaling projects provide opportunities for market oligopolies for large infrastructural works and affects the level of competition between contractors. Competitive behaviour is not always present between the suppliers of FrieslandCampina because this sector is rather specialized. In general the construction industry generally lacks of such specialization, especially in infrastructures. The market for infrastructures is pretty broad. **Competition between contractors will always be present and offer opportunities for opportunistic behaviour.**

E.3.5. Technical complexity

One of the technical differences between a factory of Shell and a highway of RWS lies in the difference between line and point infrastructures (Eijgenraam, 2004). On the top-level road infrastructure is characterized by line infrastructure compared to the (often) point infrastructures at Schiphol (airport), Shell, DSM, and FrieslandCampina (plants). Especially in urban areas line infrastructure is related to dynamic environments and risks many scope changes before, during, and after project construction. Point infrastructures are often situated in much more predictable environments. Line infrastructure management requires contract flexibility to deal with uncertainties. Technically speaking RWS faces simpler "line technology" related to the more complex "point or plant technology", but requires more "environmental management". Complex technology is not considered as an issue for RWS projects' success. **The difference between RWS and the market parties is that the market parties exactly know what they want. They know "what" their assets have to perform. The FEED packages consist of functional and performance related requirements. At RWS it is all about the processes.** In the interviews it is mentioned, "When the process is right, the product is right". The latter statement is questionable.

The commercial companies their strategy to specify projects into detail is often related to the technical complexity, but also suggests that those companies were not satisfied by their earlier "outsource" strategies. Especially Shell and FrieslandCampina mention their investments in internal technical knowledge development to keep updated with the newest assets technology and optimizations. Both Shell and FrieslandCampina realize/manage FEED packages intern. An advantage of the pre defined FEED packages is the solutions' clearness just like the traditional Bid-Build models used by RWS. The contractor has the freedom to do what he wants, but uncertainties about the "what" and "why" is taken away. Such specifications are made "hard and clear" in Anglo-Saxon contracts and offer opportunities for lump sum prices. Output (quality) discussions are only likely whenever the demand is not clear enough or when the contractor received too much "freedom". The market is the perfect mirror of what RWS asks. Therefore, the result may be unsatisfactory.

E.3.6. In-house activities

Almost all organizations/companies have similarities and differences related to their "in-house" strategy. **They all act in an oversight-directing role in the process**. All invest in some way in the in-house initial scoping and remain operator of their assets. Outsourcing several other tasks and activities is very common. Unlike RWS (DBFM), the market keeps the Finance component in-house. DBFM is implemented for maximal 25% of the road network (Rijkswaterstaat, 2012g). The market mentions that the "finance" component keeps them in control over the assets and independent from contractors.

All carry full responsibility over their assets performance related to availability. However, **RWS lacks of a clear distribution of responsibilities for availability/project failures besides the DG.** Since 2002,

RWS (regional) departments and managers lost many of their decision mandates. Project managers receive a particular budget and they manage the project within budget and time and against the expected quality just like RWS. The differences are related to the project managers' scope, mandate, and behaviour. "Large" decisions are up scaled towards the management board and are discussed "outside" the project environment. At the market the project manager is responsible for the project and is also the one that will be assessed after the projects' delivery. Large budget overruns have to go through the board. The latter aspect is also true for RWS, but differs in reality on several aspects. Project managers at RWS are affected by a lack of decision mandate and the organization its "friendly" internal culture (e.g. "pap bij nat houden" and "hoge heren politiek" as defined by Metze (2009/2010)). In section 8.4 and the discussion these latter cultural aspects are explained further in detail.

E.3.7. Summary

- RWS its goals are experienced as a bit vague and are attitude sensitive.
- RWS and ProRail are non-profit oriented organizations.
- RWS want to be the best executing organization of the government.
- Almost all companies use different procurement strategies.
- After the regions or the project teams are involved the awareness of these "business principles" often disappear and the "technique" becomes leading in the project.
- The commercial projects are all dependent on the business case.
- Invest in the "function" and find out what fits around that best.
- RWS is not a market leader, but RWS has a "monopoly" on the Dutch highways.
- Competition between contractors is always present and risks of opportunistic behaviour.
- The difference between RWS and the market parties is that the market parties exactly know "what" they want. They know what their assets have to perform in terms of functions and performances. At RWS it is all about processes.
- The companies' strategy to specify projects into detail is often related to the technical complexity, but also suggests that the companies were not satisfied by earlier "outsource" strategies.
- The market is the perfect mirror of what RWS asks.
- They all act in an oversight-directing role in the process.
- RWS lacks of a clear distribution of responsibilities for availability/project failures besides the DG.

E.4. Organization

E.4.1. Organizational structure

The organizational structure of RWS is characterized by its hierarchical structure from the past (see also section 1.1). **RWS is an agency, steered top-down, and projects face cyclic processes**. **Procurement is decentralized** in the regions and IMG provides frameworks for these regions. Each region often works according to its own standards within the frameworks. In the interviews, RWS its complex and multitiered organization was often mentioned as an obstacle to act in an effectively and efficient way. RWS its current **project organization is structured in a complex and multi layered way and lack of clear responsibility and accountability** (e.g. SAA is a matrix in a matrix organization). Every project member works for a project manager and a line manager.

A commercial company like Shell is one organization, with one working culture, one vision, and one firm base organization and works for one direct client (the board). Yet, these multinationals work in different kind of countries with conflicting interests and different cultures, politics, corruption etc. RWS its organization is relative simple compared to the large multinationals Shell, DSM, Schiphol Group, and the corporation FrieslandCampina. A complex organization is not an excuse for non-efficient behaviour.

E.4.2. Procurement organization

The procurement organization is centralized high in the organizations in all companies besides RWS and ProRail. RWS has IMG, but IMG differs from the procurement organizations as mentioned in the interviews with Shell, DSM, FrieslandCampina, and Schiphol Group. The centralized procurement should be part of the "line". Yet, there are some differences regarding their importance in the

organization. Shell states brilliant purchasers are not as important as a brilliant engineer. At FrieslandCampina and Schiphol Group procurement is considered as a project activity, but both also acknowledge the importance of procurers during their involvement in earlier phases. The procurer is in control over the procurement related topics and project managers are clearly in control over the whole project. At DSM the procurement managers complement the project managers. Procurers are early involved in a project to provide advice and support if necessary. At RWS procurers are involved to define the contract and to execute the tender procedures for the project teams. The contract manager takes over control about the contract related issues after the award of the contract.

E.4.3. Knowledge development

RWS is characterized by **lots of external hired staff because they do not posses enough capabilities to deal with the new forms of contracts themselves**. A lot of knowledge drains away towards the market as a result of cost savings and the organizational change. **The knowledge lies with the individuals in the projects and is not enough shared among other individuals in other projects**. New projects often involve new teams with new staff members. **RWS lacks of organizational learning capabilities and evaluation loops**. Currently, several projects invent the wheel over and over again. RWS employees mention the lack of time and possibilities to evaluate and to learn from current and earlier experiences. Intern RWS personnel does not always occupy important roles to sustain experiences within the organization. Along with the latest trend of “removing old knowledge” RWS faces several project/task interruptions and delays.

Shell and FrieslandCampina mention their investments in technology knowledge. **The whole product/design can only be optimally improved when the director understands the total picture.** Internal knowledge and evaluation are important criteria for improvements. Lots of personnel changes are not advantageous for the projects’ continuity and knowledge development. ProRail mentions that they are a typical outsource organization with a lack of technical knowledge. As a result they are dependent on the knowledge of the ECs and contractors. ProRail indirectly warns to keep in control of some level of technical knowledge to direct the market at best.

E.4.4. Organizational culture

RWS its culture is based on informal hierarchy, caution, closeness, avoidance, and not on contact. In such a culture it is hard to improve, to apply changes, and to stay developing. RWS must be competent enough to assess whether or not a contractor fulfils its responsibilities. **Act transparent in what is supposed to be important because else the market will guess what RWS thinks is important.** Several frameworks/conditions are multi interpretable and even employees work within the frameworks in different ways. The market companies also acknowledge the latter mentioned risks. However, they cannot be used as an excuse.

E.4.5. Business case thinking

A lack of a “business case thinking” mindset was observed and mentioned in several interviews by RWS. However, this conclusion should be taken with care and in close consideration of the absence of a particular form of control over the cash flow in these industries. People should realise that **RWS works in a different context**. Different kind of conditions/criteria are important compared to the market were a business case is crucial. **Commercial companies have a need to survive,** while in infrastructural projects there is a attitude that is experienced as “just as usual”. Disadvantageous changes/obstacles in the business case are “fatal” for commercial companies. Infrastructural projects are characterized by discussions and uncertainties during the ex-ante legislative and administrative processes. Each party traditionally acts and thinks in its own interests. However, excuses for the lack of a business case mentality are not realistic. To work efficient and effective are normal standards.

E.4.6. The organizational change

The organizational change of RWS is based on efficiency gains (RWS was too large, too expensive). RWS its strategy seems to aim for the improvement of their public behaviour. Along the years RWS changed a lot, but most of the changes are related to the management organization and not directly in

the work processes. New directors and new departments are established, but a clear result on project level is questionable. It was observed that **the sense of urgency for the organizational change is (often) not present at (lower) operational levels.** After ten years of change several employees have an attitude of “eerst zien dan geloven”. Irritation about the continue changes was observed (e.g. “only changes related to new directors and new departments”).

In the interviews several different kinds of changes were mentioned. In the commercial industry organizational changes are (often) based on efficiency gains. ProRail and Shell acknowledged the obstacle of a lack of technical knowledge. In the past they act as outsource managers and were dependent on the knowledge of the (engineering) contractors. ProRail contracted several kinds of specialists to assess contractors on risks, systems engineering, etc. During the nineties Shell outsourced almost all their tasks and activities to third parties. Shell discovered that the role of “outsource manager” did not lead to the expected benefits. For Shell it became more advantageous to invest in the internal technical knowledge departments to improve the systems as a whole. Shell its strategy is explainable. Shell faces more complex and integrated technology then RWS does. Investments in technology can have a positive effect on the whole business case.

Since a couple years the businesses of DSM procured their projects in different ways. DSM had supplier lists with hundreds of supplier. In order to procure more effectively and efficient DSM centralized their procurement organization and put the procurement manager in an equally ranked role next to the project manager. The latter change at DSM was realized top-down, drastically, and was implemented roundabout two years ago. Schiphol group is changing not as much as an organization but focuses more on result obligations instead of task obligations.

FrieslandCampina foresees a change as well if the company growth is sustained. The project and engineering department cannot cope with much more projects because of a lack of capacity. Several technical engineering tasks are still performed internally. Whenever nothing changes FrieslandCampina foresees a more outsourcing role by EPCm contracts like DSM. So **the issue of “More with less” (“Meer met minder”) is more or less acknowledged by commercial companies as well.**

E.4.7. Behaviour

RWS behaviour is related to legitimacy and effectivenesss. The question is whether these two subjects diverge with RWS its commercial interests. Currently, there is an almost unhealthy tension between these aspects of legitimacy and effectiveness. Several decisions are made between optimal and suboptimal solutions by taking into account the present (economic) environment and circumstances. The latter is process is not traceable in the procurement strategy of RWS. RWS implemented a fine structure, “**high trust, high penalty”**. However, what happens if the contractor cannot pay the fine and risks to go bankrupt? In such cases RWS feels themselves responsible as a social service provider (“pap bij nat houden”). Almost all interviewees mentioned the importance of acting professional (“zakelijk”). **This relates to defining clear boundaries and act strictly and obvious.** “Deal is a deal” and the contractors should deliver what is agreed upon. It should not matter whether it is a construction or an engineering contractor. It seems that these commercial companies do not suffer from a lack of “specification quality” or did not mention them in the interviews. On the other hand the commercial companies stimulate these contractors to deliver quality. Their results have impact on the opportunities for future assignments (past performance and list of preferred contractors).

FrieslandCampina mentions, “We prevent ourselves from being one step behind”. Their contract manager “puts the contract in the closet” and works together with the contractor to realize the project. RWS focuses on better-restricted contracts while FrieslandCampina mentions that **the contract is just a mean. It is all about scope**. When the scope is not clear the project manager should keep asking until the scope is clear again. Taking into account the contract as a goal is also in conflict with opportunities for discussions, but discussions are very common in infrastructural project environments. Especially upfront there is a lot of administrative and political uncertainty in infrastructural projects. An example given was that from a viewpoint of justified commercial interests some very strict RWS employees would mostly avoid confrontations and discussions and refer to the contract. However the contract is just a mean and should not be the goal of the process.

The innovative D&C and DBFM market is not mature, "contracts are still learning", and parties often fall back on traditional behaviour. The latter situation is also present at ProRail. Due to a traditional work approach projects designed as D&C are still executed according to the “UAV1989 behaviour”. The other commercial companies all work with the international EPC(M) contracts. In all the interviews the contract was never mentioned as a cause of obstacles. It is suggested that not the contract, which is just a mean, but the implementation of the contract by RWS is questionable. The latter refers to the arguments of the construction contractors that RWS does not act transparent because in every project the contracts are completely different. Another observation that supports this argument is that in several interviews the definition of the contract is experienced as an important goal.

E.4.8. Summary

- A professional principal understands the needs of both clients and RWS, knows the markets competences, is supported by a firm base organization, and search towards the optimum between network, purchase, and control by clear project management.
- RWS is an agency, steered top-down, and projects face cyclic processes
- Procurement is decentralized in the regions and IMG provides frameworks for these regions.
- The procurement organization is centralized high in the organizations in all companies besides RWS and ProRail.
- RWS is characterized by lots of external hired staff because they do not posses enough capabilities to deal with the new forms of contracts themselves.
- The knowledge lies with the individuals in the projects and is not enough shared among other individuals in other projects.
- RWS lacks of organizational learning capabilities and evaluation loops.
- The whole product/design can only be optimally improved when the director understands the total picture.
- Act transparent in what is supposed to be important because else the market will guess what RWS thinks is important.
- A lack of a “business case thinking” mindset was observed in the RWS employees’ attitude.
- RWS works in a different context.
- Commercial companies have a need to survive
- The sense of urgency for the organizational change is (often) not present at (lower) operational levels.
- Drastic, fast, and top-down changes can be “successful”.
- The issue of “More with less” (“Meer met minder”) is more or less acknowledged by commercial companies as well.
- Shell its “change” is based on an improvement of the whole process/product and to reach their goals more efficient and effectively.
- RWS behaviour is related to legitimacy and effectiveness.
- “High trust, high penalty”.
- This relates to defining clear boundaries and act strictly and obvious. RWS must act much harder against the contractors and needs to accept “bleedings” if they make a mistake. “Deal is a deal”
- The contract is just a mean. It is all about scope.
- The innovative D&C and DBFM market is not mature,

E.5. Operational procurement

E.5.1. Distribution of roles

Projects still have freedoms to elevate the projects’ interest above the organizational interest. There is **an internal tension between the network and operational management**. The network strives for production, which is to deliver what we buy. The second strives for uniform and unilateral procurement. RWS procurers, operators, and “partners” are often lately involved in the design processes and are not part of the IPM team. Decisions/changes are not made with "everybody involved on the table" like for

example with Shell. Several interviewees mention the need for integrated decision-making, especially in large complex projects.

The current role of "relieved" principal (RWS) does not match with results from the interviews. Interviewees mentioned the long and complex unclear projects processes. Currently earlier market involvement does not result in the expected "distance". **Governments are not used to meet deadlines, but contractors are.** Due to uncertainties several discussions about scope and quality remain an issue even after contract awarding. Also the commercial companies want to be relieved by the market, but they invest a lot more in the initial phase, a clear demand, and supervision/quality control of projects. A principal **must be competent enough to assess whether or not a contractor fulfils its responsibilities. *"We keep in control, we know what needs to happen, and we can test the contractor whether or not he is doing what he has to do"*** (Biesboer, 2012). In the end it is their asset so it should be realised as best as possible. Whenever the demand is unclear the principal faces a higher risk of opportunistic behaviour. A company like Shell will invest in internal knowledge when this is more profitable on the long term. At RWS it seems that the political pressure to become a smaller governmental agency is more important then to comply with the projects actual needs.

RWS also wants to upscale their projects scope as a result of the "More with less" ("Meer met minder") policy. Downscaling projects would result in a need for more steering on the lower operational levels like at ProRail. **RWS wants to transfer a large part of the responsibilities** towards the construction contractors and remains involved in some of the integral project aspects. RWS wants to be relieved. The risk is that the market narrows towards a few contractors. RWS "reforms" the market and RWS its power on the national market should not be underestimated. Shell and FrieslandCampina are very closely involved at the work processes (monitoring) of the contractor to prevent risks. Operational experts are involved during earlier project phases. They are also in control over the integral project relations/interfaces. DSM also mentions close collaboration with suppliers, but the management component of EPCm contracts often still lies with the contractor. DSM mentions that they remain responsible for the large strategic parts complex assets, while the smaller less strategic parts are the responsibility of the contractors. From the governmental companies ProRail is closely involved and attaches lot of importance to acceptancy checks and reviews. Schiphol Group is less involved in the contractors' processes, but demands "open price books" and monitors the contractor with several SLA and KPI's. Conclusively **close involvement, supervision, and/or monitoring is experienced as a crucial activity for professional principals.**

E.5.2. Procurers' role

Recently the procurers' importance grows in organizations. This trend is related to the implementation of outsource strategies in large multinationals like Shell and DSM. **Third parties perform almost all work of thinking, designing, and construction. The commercial companies state that procurement is an art, just like technique is a different art as well**. A good procurer will most certainly lack of detailed technical knowledge and the other way around a good technician lacks of a clear procurement mindset. However, in the current role of RWS several technicians are responsible for functional abstract specifications, procurement, and contract management. Some of these aspects are not a technicians core business. In the interviews the importance of qualitative good personnel on crucial roles is considered important for a successful project.

A procurer focuses on negotiations, to suppress of prices, and/or to increase quality. The project management makes sure the scope, design, and specifications are clear. Where it is performed, with what partners, and under what prices, terms, and conditions is the responsibility of the procurer. **The term project manager is actually misleading.** In the end all project managers are some sorts of "procurers". RWS seems to acknowledge the importance of these procurers role. Currently, the procurement role is part of the activities of the contract manager. However, procurement is still experienced as a secondary process. Except RWS and ProRail, all interviewed companies **integrate procurers in the project teams**. Information is shared by the integrated involvement of the procurement function in project teams.

Shell states brilliant purchasers are not as much as important as a brilliant engineer. The importance of "smart/innovative" techniques in repetitive technical aspects is more profitable than a good purchase agreement with a supplier. However, procurers are crucial, are integrated in project teams, and contribute in a large part to the current successes of Shell. The most important is that they are in some way directly involved. The business provides a demand and the procurer makes sure the demand is delivered against the proposed terms & conditions. Contract specifications are defined in close collaboration with the purchasers. DSM procurement managers complement the project managers. DSM has integrated purchasers into project teams because these purchasers gain technical knowledge and vice versa. Purchasers formed a very wide network outside the company to gain knowledge. Mutual understanding provides opportunities for benefits and knowledge transfer, but the project team must be open-minded for the added value that procurement can bring.

E.5.3. Procurement versus contract management

There is a **lot of friction between procurement and contract management**, but both are also closely related. RWS, ProRail, Schiphol Group and FrieslandCampina suggest that after the contract awarding the role of these "procurement managers" stops and are taken over by the contract managers. However, this is not true since underlying reasons for decisions are required for future decision-making as well. FrieslandCampina even mentions that the contract manager "puts the contract in the closet" and works together with the contractor to realize the project. The contract is consulted only in case of "emergency". Schiphol Group states that they are primary dealmakers, not contract managers. The tension between both roles is related to the "nonsense discussion" of buying a product versus a process because both strive for the same purpose. **Ex-ante integration of both roles is assumed to be important, but several interviewees mention the need for a "different" kind of RWS employee.**

E.5.4. Relation management

RWS aims on short and long term (DBFM 25-30 years) project relations and (often) not on supplier relations. **These short-term relations are** not periodically assessed. The commercial companies focus on long-term supplier relations and short-term project relations. For them **supplier relations are valuable and are used to understand and combine the best knowledge of both**. Market analysis and relation management are considered important. Nevertheless, the term market analysis is poorly understood in the current construction industry. Clearly separated segments and lots of competitive behaviour characterize this industry. The commercial companies structured the "preferred" contractors in long and short lists based on experience and knowledge. The job of the procurer is to invest in these relationships and to make sure that only the "best" parties are selected for particular projects.

RWS does not have much insight in the supply chain of the contractors. However, supply chain thinking is not crucial for the role of a directive principal. **The commercial companies mention that a supply chain approach is only preferred when this is advantageous.** Sometimes the latter "supply chain" thinking should be performed by the contractors. **More important for a principal is the statement to "keep in control". Communication about "if I do this then I expect that from you" is understood to be crucial by the commercial companies.**

E.5.5. Specification

A similarity in the interviews (except ProRail) was that functional specifications are preferred, but detailed specifications are made when it is considered necessary in relation to risk management. "We need to know what we want" is important to keep in control. The organizations and companies outsource most of the design/specification work. When the demand is clear it should generally not matter what parties performs the tasks.

Still, RWS its scope/specification level of detail is in many ways dependent and restricted by the Infrastructural Planning Act. The projects' plan study team prescribes a "flat" design, which is afterwards transformed back into functional requirements by the projects' realization team (see section 4.5). These functional requirements are input for the "obliged" D&C or DBFM contracts. **RWS aims on the "complete insuring" of their design (functional) requirements in the contracts to keep their distance during realization**. RWS wants to be relieved by contractors ("Markt, tenzij"). Early dialogue

sessions with contractors are often not what RWS expects and a “grey area” of uncertainty remains present. Several issues and obstacles mentioned and observed are that even after contract awarding RWS is still involved in several design processes/discussions.

However, in the interviews the commercial companies stated that there is nothing wrong with keeping the distance between principal and agent. It is crucial to understand and define what you need. The “what” question should be clear. Shell and FrieslandCampina offer a complete FEED package towards a construction contractor that is even more detailed then RWS its specifications. **The biggest difference is that the commercial companies ask for a certain performance in their demand.** They know what kind of factory they want and how it should perform. **They have the knowledge about the assets’ functions and performances. However, how it should be build and in what order is the responsibility of the construction contractor.**

E.5.6. Selection and award procedures

RWS uses a long pre selection phase based on general subjects and is regulated by EU procurement law. RWS prefers the “top of the bill” contractors. Others are often excluded due to a lack of capacity or experience. RWS works towards one contacted party according to ∞ -> 5 -> 3 -> 1. Especially in the large contracts the selection phase can took several months or even years per project. Every time again new consortia/contractors sign up and the whole process is started again. The latter goes along with high transaction costs. Compared to the market RWS does not work with accreditations or **pre qualification processes with long and short lists** of preferred contractors based on past performances. Basically “everybody” is allowed to participate in a large tender, but the contractor will have to survive the first “capacity” assessment as well.

Since August 2012, RWS started a past performance pilot for ECs, but the latter results are unknown. This system should stimulate contractors to improve their performances, but also should make it possible to refuse (temporarily) weak and underperforming companies. The latter process of rejecting contractors is experienced as complex and hard to legally underpin unless the company really committed fraud. RWS is far from being able to successfully choose contractors only based on quality or Value for Money, but several trends (e.g. EMVI, past performance pilot, best value procurement, DBFM, alliances) show that RWS invests in “better” quality and relationships. However, in the past several trends like past performance etc. were already proposed, but were neglected by higher management and/or HID’s.

So a “**preferred supplier policy” is limited by RWS its public character** or dependencies. Contractors must be expelled out of a tender with good and legally underpinned arguments, but this seems normal. Companies like Shell etc. also select suppliers based on good arguments. The problem is not the presence of arguments, but its content. Projects are awarded mostly on costs, planning, and quality. Costs and planning are objective criteria, but quality is often related to subjectivity. **From RWS its viewpoint commercial companies can “cheat” in their choice for a supplier based on quality.** FrieslandCampina mentions that they often award a contract based upon “the best feeling” given by several managers. For RWS this is forbidden by EU regulation and should be assessed based on objective criteria (as a consequence RWS implements EMAT criteria).

One of the most often heard criticism on EMAT in the interviews is that RWS basically still selects on price. However, companies like Shell and DSM also attach value to the cost price, but a trade-off is made based on LCC and risks related to the impact on the business case. RWS its award criteria are often related to “safety plans”, “risk plans”, “vehicle hours lost”, and planning (see also subsection E.3.5). It is about processes to realize the product, not the product itself, and not directly related to quality. RWS does not always ask for a design from its subscribing contractors. RWS basically chooses the lowest bid (lowest price angle) while the commercial companies can choose more expensive proposals if they want to.

Another aspect is related to the responsible “main” contractor in large projects. Large construction contractors (like BAM, Boskalis, DuraVermeer, Volkerwessels, etc.) often manage RWS its large infrastructural projects. DSM mentioned that they would never award their EPCm contracts towards a

construction contractor. A commercial contractor probably never performs any work whenever this is not advantageous for the company now or in the future. It was mentioned that in some projects construction companies never perform the integrallity aspects and basic engineering. Therefor the companies mention the importance to remain in control over the contractors. In several interviews it is mentioned that **construction contractors should do what they are good at, which is building. A construction contractor often lacks the competences of good design manager**. This requires both a change in thinking at the contractor as well as the principal. In fact, RWS reforms the current market drastically. The other commercial interviewees mention that ECs often are in charge of the EPC(m) contracts on behalf of the principal. In case of RWS these ECs are the consortia themselves.

E.5.7. Quality

Quality is not a differentiator for the commercial companies, but it is a differentiator for RWS. For example, the lifetime of a product like asphalt. The contractor has to guarantee the products quality for seven years. However, RWS expects a top layer with a lifetime of seven years and an asphalt construction with a lifetime of twenty years. The contractor avoids such maintenance guarantees when the latter is not in the interest of the company. So it seems that the current infrastructural market is not ready for functional requirements. In a tender the principal should always build upon his baseline of quality and price. Benchmarking of quality is still a complex process. Currently, projects mostly focus on production and project directors focus on time, costs, and quality (triple constraint, see 3.3.1). RWS projects mostly aim for cost and/or planning and this often results in less quality. **RWS focuses on social values against lowest costs and contractors mainly focus on minimal quality for maximum profits. Quality is not equally experienced.** Shell, DSM, Schiphol Group, and FrieslandCampina mention that contractors have to obey with several predefined internal quality norms. Quality checks are very common (e.g. acceptance tests) especially in the process industry. They underpin the importance of well-defined quality incentives to strive for additional quality. **RWS insufficiently understand a clear way to monitor provided services in order to control the contractors and its quality.** Quality in infrastructures still leads to many discussions. In the traditional Bid-Build contracts RWS prescribed the whole design and its related quality. The contractor sets the “quality standard” in the new functional specifications. When the demand is unclear or lacks of quality the delivered quality by the contractor can be disappointing.

E.5.8. Contract forms

All analysed companies use different kind of contracts. RWS does not use the typical Anglo-Saxon models with clearly defined responsibilities, but created their own contracts. RWS uses the Dutch D&C and DBFM contracts. Shell, DSM, and FrieslandCampina use two types of contracts: Turnkey or EPC(m) contracts. In large projects the principal needs an engineering contractor (EC’s) not particularly for the purchase of a product, but more for the procurement of services like engineering, procurement, and construction management (EPCm). ProRail uses traditional Bid-Built contracts and D&C (light) contracts. Schiphol Group (service provider) implements short-term (5-8 years) maintenance contracts with options for additional work with a maximum budget (open price books). Both Shell and DSM mention the use of lump sum projects were the contractor delivers the key of the factory after construction. Both principals remain only involved in a directing role.

E.5.9. Incentives

Companies and organizations like RWS and Shell create their own market. This market reformation should not be underestimated as an incentive. Contractors/suppliers are stimulated in several ways to innovate their products. Good incentives will lead to better product development/ improvements. Still, **RWS lacks of budget and past performance incentives t**o stimulate contractors to perform at best on behalf of the principal. In contrast with the market RWS does not use bonus incentives for contract renewals based on performances. RWS does not work with hard and clear rules for a black list. Even high contractual penalties at RWS are not experienced as realistic. The "claiming" behaviour of the contractors is not related with their "preferential" status for future projects. The commercial companies continually monitor the actual performances (e.g. by KPI’s and SLA’s) of their suppliers and stimulate improvements. Non-performance is being penalized and could hamper further collaboration. These relations are based on trust, reciprocity, and earlier experiences.

Risk distribution offers opportunities for both RWS as the market. Risks are only transferred if this is "profitable", but often the principal still has the biggest problem when things go wrong. Given the high level of risk transfer the employer must allow sufficient time in its procurement programme for the market to obtain and consider all relevant information before signing the contract.

E.5.10. DBFM

The financial accountability in DBFM projects should make the contractors more responsible of the realized assets quality and performance. DBFM contracts provide incentives for earlier availability and less maintenance during operation of infrastructures. The long-term DBFM contract is in contrast with the contract strategies of the commercial companies that attach lots of value to stay independent of a particular contractor, especially for the long term. A DBFM contract is based on a stable environment for 25-30 years. RWS is the only principal that outsourced the design, build, maintain, and finance component in one contract. The commercial companies mentioned that the finance component is kept in-house because of the experienced independency relevance of finance.

Another aspect is the availability of assets. Roads, waterways, railways, factories etc. are all related to availability. In a DBFM contract the payments are related to the availability of roads. An assets' availability is very important and involves lots of responsibilities. Shell for example demands a factory availability of 95-98%. This availability is related with the made delivery contracts of Shell. The plant must produce. However, the difference between a plant and for example a road is that a plant is situated in a clear fixed environment (point infrastructure). The roads (line infrastructures) are depended on its administrative and social environment. The latter involves certain (political) uncertainties and risks scope changes. However, unscheduled scope changes are risky because these interfere with the DBFM payment system of the contractor. Flexibility clauses are used to deal with these changes, but every change in a contract often means higher costs. RWS uses differentiated performances that are the recovery times for asphalt, constructions, and DVM maintenance and also steering aspects for the performances of planning and duration of maintenance (working hours / time windows / working during the day).

E.5.11. Summary

- Projects still have freedoms to elevate the projects' interest above the organizational interest.
- There is an internal tension between the network and operational management.
- Governments are not used to meet deadlines, but contractors are.
- A principal must be competent enough to assess whether or not a contractor fulfils its responsibilities. *"We keep in control, we know what needs to happen, and we can test the contractor whether or not he is doing what he has to do"* (Biesboer, 2012).
- RWS wants to transfer a large part of the responsibilities
- Close involvement, supervision, and/or monitoring is experienced as a crucial activity for professional principals by the market.
- Third parties perform almost all work of thinking, design, and construction. The commercial companies state that procurement is an art, like technique is a different art as well.
- The term project manager is a bit misleading.
- Except RWS and ProRail, all interviewed companies integrate procurers in the project teams.
- There is a lot of friction between procurement and contract management,
- Ex-ante integration of both roles is important, but asks for a different kind of RWS employee.
- The short-term supplier and project relations are not assessed periodically by RWS.
- Supplier relations are valuable and are used to understand and combine the best knowledge of both.
- The commercial companies mention that a supply chain approach is only preferred when this is advantageous. More important is to "keep in control". Communication about "if I do this then I expect that from you" is crucial.
- Functional specifications are preferred, but detailed specifications are made when it is considered necessary in relation to risk management.

- RWS aims on the complete “insuring” of their design (functional) requirements in the contracts to keep their distance during realization.
- The biggest difference is that the commercial companies ask for a certain performance in their demand.
- They have the knowledge about the assets’ functions and performances. However, how it should be build and in what order is the responsibility of the construction contractor.
- RWS acknowledged the importance of these new LCC trends as well.
- LCC is assumed to be part of the business case at the commercial companies. They expect that contractors deliver these “LCC qualities” as a standard, not a differentiator.
- RWS does not work with accreditations or pre qualification processes with long and short lists
- A “preferred supplier policy” is limited by RWS its public character or dependencies. From RWS its viewpoint market companies can “cheat” in their suppliers’ choice.
- RWS cannot “cheat” in their choice for a supplier based on quality.
- Construction contractors should do what they are good at, which is building.
- Quality is not a differentiator at the commercial companies, but is differentiated at RWS.
- RWS focus on social value against lowest costs and contractors mainly focus on minimal quality and maximum profits.
- RWS insufficiently understand a clear way to monitor provided services in order to control the contractors and its quality.
- RWS does not use the typical Anglo-Saxon models (Turnkey or EPC(m)) with clearly defined responsibilities, but created their own contracts (D&C and DBFM).
- RWS lacks of budget and past performance incentives to stimulate contractors to perform at best on behalf of the principal.
- Risks are only transferred if this is "profitable", but often the principal still has the biggest problem when things go wrong.
- The financial accountability in DBFM projects should make the contractors more responsible of the realized assets quality and performance.
- A DBFM contract is based on a stable environment for 25-30 years and that is exactly were RWS is not prepared for.

F. LINK OBSTACLES RWS AND INTERVIEWS

In the table below the different analysed obstacles from section 7.1 are linked with the interview content tables in appendix D.4.

Table 12 Obstacles RWS from section 7.1 linked with the interview results from appendix D.4

Subject	Obstacle	Nr. table
Politics	(In-) direct dynamic political and environmental influences in the decision-making process.	20, 21, 47, 66, 67
Strategic	A business-case related mindset is not leading in the entire projects' life cycle.	13, 14, 15, 24, 32, 33
	The principal is not relieved by contractors, but is still involved in several scope/design discussions with the contractors during realization.	40, 46, 52
Organization	The organization lacks of well-qualified human/organizational resources to deal with and to learn from current project activities and experiences.	10, 11, 25
	The organization lacks of a clear and strong base procurement organization that provides procurement managers in the projects.	6, 11, 25, 27-29
	There is uncertainty/lack of clarity between the strategic and operational levels.	22, 23, 59, 60
	Employees often lacks of responsibility and accountability to act professional from a business-oriented viewpoint.	8, 17, 20, 24, 62, 63
	The lack of good and clear incentives hampers the multidisciplinary thinking and efficiency and effectiveness of projects.	19, 20, 23, 24, 29, 31, 55, 62, 67
Operational procurement	The principal is not ready (yet) to cope with the unpredictable contractor market and lacks of defining a clear and fixed demand specification to procure projects against lump sum prices.	36, 37, 38, 41, 46, 54-57, 62-64
	Contractors are not motivated to act according to interests of the principal.	5, 33, 34, 36, 53-57, 62
	The capacity of the project teams and the employees are overestimated, while complexity and the need for more competent control rises.	22, 23, 29, 47, 62
	Procurement is experienced as a secondary process.	27-29, 37
	Principal does not assess contractors based on actual quality, but focuses mainly on process plans on paper.	37, 40, 41, 43, 53, 54
	A lot of attention is given to the contract forms instead of creating the "best" conditions to procure what is really needed.	47-57

G. LINK MEASURES MARKET AND INTERVIEWS

In the table below the different analysed obstacles from section 7.3 are linked with the interview content tables in appendix D.4.

Table 13 Measures commercial companies (excluding ProRail) from section 7.3 linked with results of appendix D.4

Subject	Measure commercial companies	Nr. table	Mutual consensus
Politics	Manage politics as a risk by choosing to Take, Treat, Transfer, or Terminate in the most optimal way.	66, 67	Yes
Strategic	Business case is leading in projects and includes LCC/TCO thinking.	13, 14, 15, 24, 32, 33	Yes
	Commercial companies are relieved in less strategic subjects and contractors decide about the how and when during realization. FID not clear/sufficient? Do not go to the market.	39, 40, 41, 46, 52	Yes
Organization	Proper base organization, investments in knowledge transfer, development, and evaluation. Knowledge based steering.	10, 19, 25, 29, 36, 37	Yes
	Centralized procurement organization high in the organization that invests in relationships, knowledge, and evaluation. “Delivers” procurers towards the projects.	23, 27-29	Yes
	Organizational changes are based on clear efficiency gains and are implemented top-down, fast and clear towards the operational levels.	59, 60	No, 2:2
	Hard and business oriented behaviour (survival of the fittest). Multidisciplinary decision-making by creating a common understanding between different roles and disciplines.	1, 13, 17, 19, 20, 24, 29, 32-34, 53-55, 62, 63	Yes
	Business case and multidisciplinary decision-making are leading in projects. Employees are assessed based on their performances.	1, 13, 19, 20, 23, 24, 32, 33, 61, 63	Yes
Operational procurement	Invest in a clear frontend-scoping. Decisions take into account risk management and quality control by clear criteria, norms, and procedures. Invest in the "function" and find out what fits around that best.	14, 19, 40, 41, 45-47, 51, 57, 62	Yes
	Focus on better relationships with enough competition by past performance tools and relationship management. Long term relations and short term contracts.	5, 25, 30-42, 47, 49, 51, 53-57, 62	Yes
	Invests with sufficient resources and knowledge in strategic positions	18-20, 22, 23-28, 37, 38, 40, 41, 44-46, 61, 62	Yes
	Procurers are part of the line, involved during frontend-scoping and complement project managers in projects. Procurers are in lead during involvement.	23, 27-33, 37	Yes
	Principal is closely involved (supervision) and keeps in control of the quality aspects.	19, 20, 37, 40, 41, 57	Yes
	When the scope is clear the contract should not be the issue. Contracts are just a mean. Invest in a clear frontend-scoping.	47-57	Yes

H. VALIDATION

The validation was structured in five themes. Each theme consists of one or more statements from the market parties:

- Business case;
  - Thinks, works, and steers from their networks and its needs;
  - Defines, monitors, steers, evaluates, and assesses projects based on a business case with several KPIs;
- Demand;
  - Invests in a clear demand specification and otherwise there is not project (the what should be clear before the project decision is taken);
  - Focus on multidisciplinary decision-making;
- Procurement;
  - Has a centralized procurement organization high in the organization and delivers well qualified procurers for the projects;
  - Invests in knowledge sharing, evaluation, and learning from best practices;
  - Invest in the relations with contractors and suppliers and remains closely involved in the strategic complex procured elements of the asset/project;
- Quality;
  - Quality is not a differentiator;
  - Delivers positive incentives to stimulate contractors to offer more quality or beneficial business cases;
- Behaviour.
  - Works result oriented, takes his responsibility and assesses on actual performances;
  - Works efficient, effective, and multidisciplinary.

The RWS managers were asked to react on these statements whether these are recognized and feasible for the organization of RWS. If so, the question why RWS did not implement the subject/aspect/tool yet and/or what would be the cause were asked. If not, the discussion focused on why the market implements this and how RWS deals with these aspects now. The results of the validation are presented below in the different subjects as mentioned above.