

Thesis

Optimising the usability of the innovation partnership procedure for contracting authorities

Gerben Hofmeijer

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“The world we have created today as a result of our thinking thus far has problems which cannot be solved by thinking the way we thought when we created them.”

A. Einstein, 1946

PREFACE

This thesis has become more than a research into the possibilities for sustainable procurement, as it was intended half a year ago. It has become a plea for a change of behaviour of public clients, to alter their tendering process as to stimulate the development of sustainable innovations. Equipped with this thesis, I will be visiting everyone who still needs convincing that public procurement of innovation and, specifically, tendering of sustainable innovations is possible in this day and age. Both companies and governments need to realise that the steps envisioned by global leaders in the Paris Agreements can be taken now, that there is no need to wait. I'm not saying that tendering of innovations will change the world, but it can be an important step in the right direction.

Acting with a social motive and exploring ways to gain societal benefits brought along interesting challenges with respect to the scientific value of this thesis. The gains are not numerical, financial profit was not a focal point, so how can the significance of an action be determined? What is best for people, for the world? There was no clear numerical distinction between right or wrong, between better and best. This research concerned explorations of new territory, namely this new tendering procedure that became available only two months before the graduation period started. It resulted in a project in which the viewpoints from different actors were explored, requiring knowledge from their individual practice. These explorations brought me to parts of The Netherlands I didn't know before and brought me into contact with fields of study I was unaware existed. The largest challenge I faced was to validate my findings, while no innovation partnership procedures have been finished nor evaluated. Here, my tutors at AT Osborne saved the day. The questionnaire and validation panels were sufficiently insightful to validate the findings. Maybe logical, for my research into innovation, making use of a novel procedure, I needed an innovative research project.

I started the graduation period August 1st, expecting to graduate in May. However, on September 4th my girlfriend and I found out that we are expecting a little lady. She accelerated the process. Still, I was keen to reach the quality I had set my mind to. Looking back, I'm glad that I accelerated the process as it forced me to focus and to be decisive in my actions and choices. Needless to say, I'm glad with my results.

The results themselves, specifically the innovation partnership roadmap, can in my opinion be a contribution to the fields of construction management and procurement law. While I created no new elements, I used known elements to formulate a novel process. In other words: using known ingredients I created a new dish. Hopefully my thesis shows that tendering is not an obstacle for innovation, it can be a driver.

Lastly, I owe much gratitude to the people who helped me to carry out my graduation research. My examination committee: Monika Chao, Ronald van Warmerdam, Leon Hombergen, Hans Wamelink, who gladly could attend the last two meetings, Ernest and Rudolf, who guided me through the project in my new environment at AT Osborne. My colleagues at AT Osborne, who were almost always available to answer even the easiest questions (“Does anyone know what EMVI is?!?”). Denise Roggeveen, who checked my English and was relatively kind to me afterwards. Lastly, my family: my mother who paid both attention and bills, my father who unfortunately couldn’t experience the last six years of my education, my sister who checked everything while understanding nothing and finally my wife, burdened with the task to read every word, listen to every consideration, and rehearse every presentation, while doing her own studies on the side. Thank all of you.

Gerben Hofmeijer, March 2017

MANAGEMENTSAMENVATTING

Dit onderzoek is uitgevoerd in een veranderende wereld. In Europa wordt klimaatverandering gezien als een urgent probleem dat snelle oplossingen behoeft. De Europese Commissie (2010) heeft in beleidsplan EU2020 een strategie geformuleerd om een duurzame omslag te realiseren. Er zijn nieuwe technologieën nodig om duurzaamheidsdoelen te kunnen behalen. De overheid heeft een belangrijke rol bij deze transitie en kan het versnellen, onder andere door duurzame innovaties in te kopen. Dat vraagt echter een nieuwe manier van aanbesteden. De Europese Commissie heeft in richtlijn 2014/24/EU een procedure opgenomen om dit mogelijk te maken: het innovatiepartnerschap. Sinds 1 juli 2016 kan de procedure in Nederland worden gebruikt, maar de angst bestaat dat aanbestedende diensten dat niet zullen doen omdat er nog veel onduidelijkheden bestaan rondom de procedure. In dit afstudeeronderzoek is geprobeerd de bruikbaarheid van de procedure te optimaliseren door de sterkten, zwakten, mogelijkheden en gevaren van de procedure in kaart te brengen en een strategie te formuleren om er optimaal gebruik van te kunnen maken.

Het innovatiepartnerschap is een aanbestedingsprocedure waarin marktpartijen kunnen reageren op de behoefte van een aanbestedende dienst aan een innovatief product. De marktpartijen doorlopen in een reeks door de aanbestedende dienst geformuleerde fasen een ontwerp- en ontwikkeltraject, waarna de aanbestedende dienst kan overgaan tot aankoop van een of meerdere van de ontwikkelingen (Aanbestedingswet 2012 (2016), artikel 2.126 sub b-d). De procedure is een aanvulling op de eerder beschikbare procedures omdat het voldoet in de behoefte om een innovatie in dezelfde procedure aan te kopen, wat juridisch niet eerder mogelijk was.

De eigenschappen van de procedure zijn ontleed aan een theorieonderzoek en interviews met ervaringsexperts. De onderzochte theorie bevatte onder meer de richtlijn 2014/24/EU van de Europese Commissie, de Aanbestedingswet 2012 (2016), ondersteunende juridische literatuur van Essers (2013), en literatuur aangaande productinnovatie voor een publieke klant: de Oslo Manual van de OECD door Mortensen and Bloch (2005). De gevonden eigenschappen zijn getest door middel van een vragenlijst, verspreid onder professionals. Het praktijkonderzoek omvatte een reeks interviews met professionals van aanbestedende diensten, adviesbureaus en marktpartijen die met de procedure werkten of er in de toekomst mee kunnen werken. De hieruit volgende bevindingen zijn gevalideerd door een panel van experts.

De bevindingen zijn gebruikt om een strategie mee te op te stellen die bruikbaarheid van de procedure zal vergroten. Deze zijn gevalideerd door een validatiepanel. De strategie ten behoeve van aanbestedende diensten bestaat uit de volgende punten:

- Zorg dat de aanbestedende diensten op de hoogte zijn van de mogelijkheden die het innovatiepartnerschap schept voor het stimuleren van innovatie;
- Betrek andere aanbestedende diensten met hetzelfde probleem bij de aanbesteding om risico's en kosten te delen en te zorgen voor een algemene oplossing;
- Zorg voor intern draagvlak zodat de procedure optimaal bemand wordt;
- Neem expliciet de rol van 'launching customer' aan om de ontwikkeling en verspreiding van innovaties te versnellen;
- Betrek en begin de samenwerking met marktpartijen al direct na de probleemstelling is geformuleerd door een marktconsultatie. Hierbij kunnen marktpartijen en technisch competente adviseurs helpen met de formulering van specificaties, selectiecriteria, gunningscriteria, de R&D fasen, de project scope en de verdeling van kosten en risico's;
- Formuleer uitdagende functionele- of prestatie-eisen en toekenningscriteria, gebaseerd op de probleemdefinitie, om creatieve oplossingen te stimuleren;
- Stimuleer een 'technology-push' om radicale innovaties mogelijk te maken door startups te betrekken, wetenschappelijke doorbraken te gebruiken en uitdagende eisen en criteria te stellen;
- Betrek innovators zoals kunstenaars en startups in de procedure om hun creatieve krachten uit te buiten;
- Gebruik de procedurele vrijheden zoals de vorm van de R&D fasen om het creatieve proces van een marktpartij te faciliteren; en
- Gebruik succesvolle innovatiepartnerschappen om de industrie aan te moedigen te innoveren en om het imago van de aanbestedende dienst te verbeteren.

Daarnaast moeten aanbestedende diensten rekening houden met:

- De contracten moeten op maat worden gemaakt, op basis van de projecteigenschappen, marktsituatie en de situatie van de dienst zelf;
- Het al dan niet behouden van het te produceren intellectueel eigendom;
- Concurrentie in de procedure zal het proces en de uitkomst vaak verbeteren;
- Een monopolist moet worden vermeden door aan meerdere partijen te gunnen of door te zorgen dat meerdere partijen de ontworpen oplossing kunnen leveren;
- Een grotere investering in de procedure zal zorgen voor een beter resultaat; en
- Innovatie vraagt wederzijds vertrouwen tussen marktpartij en klant, een vroegtijdige 'exit' door een aanbestedende dienst beschadigt dit vertrouwen.

In het onderzoek is aangetoond dat er mogelijkheden zijn voor publieke partijen om (duurzame) innovaties aan te besteden, en hoe deze mogelijkheden benut kunnen worden. De resultaten kunnen gebruikt worden door aanbestedende diensten bij het afwegen van verschillende opties voor aanbestedingsprocedures. Daarbij is laten zien dat de procedure kan worden gebruikt om de ontwikkeling van duurzame innovaties in de gehele industrie te stimuleren.

EXECUTIVE SUMMARY

This research project has been conducted in a changing world. In Europe climate change is considered a problem in need of urgent solutions. The European Commission (2010) formulated a strategy, EU2020 to realise a sustainable transition. New technologies are needed to achieve sustainable targets. Public parties have an important role in this transition and can accelerate the process, for instance by procurement of sustainable innovations. However, therefor another manner of tendering was required. The EC has included a new procedure in Directive 2014/24/EU to make this possible: the innovation partnership. The procedure has been set in motion in The Netherlands since July 1st, 2016. The threat exists that contracting authorities will not use the procedure because there are still many uncertainties considering its use. In this research project has been tried to optimize the usability of the procedure by identifying its strengths, weaknesses, opportunities and threats as well as formulating a strategy to make best use of these properties while taking away uncertainties by clarification.

The innovation partnership is a tendering procedure in which market parties can react to a tender invitation expressing the need for an innovative product. The market parties go through a number of predetermined R&D phases, after which the contracting authority can procure one or multiple of the developed innovations (Tendering Act 2012 (2016), article 2.126 subs b-d). The procedure is considered an addition to the available procedures as it fulfils the need for a procedure that combines R&D phases with direct procurement, which was legally impossible before.

The procedure's SWOT-properties have been derived from literature and interviews with professionals. The research literature included amongst others Directive 2014/24/EU, Tendering Act 2012 (2016), supporting legal literature by Essers (2013), and theory on product innovation with a public client: The OECD's Oslo Manual by Mortensen and Bloch (2005). The found properties are validated by means of a questionnaire that was distributed to professionals. The field research consisted of a series of interviews with professionals at contracting authorities, advisory firms and market parties, which were working with the procedure, or will potentially be working with it in the future. The findings from these interviews were validated by a panel of experts.

All properties that were found have been used as input to form a strategy to optimize the usability of the innovation partnership procedure, which has been validated by a validation panel. The innovation partnership procedures properties can be employed by a contracting authority by adopting a strategy consisting of:

- growing awareness of the possibilities for projects offered by the innovation partnership and its use for the stimulation of innovation;

- finding other contracting authorities to procure together, sharing risks, costs and ensuring a mutually beneficiary result;
- creating internal support in the contracting organisation(s) will ensure allocation and engagement of human resources needed in the procedure;
- explicitly taking the role of launching customer to accelerate the development and diffusion of innovations;
- involving (and cooperating with) market parties and technically competent advisors directly after the problem definition in a market consultation to help formulating specifications, selection criteria and award criteria, the R&D phases to be followed, the project scope (ensuring a profitable business case for the market parties), and the distribution of risks and costs;
- setting challenging functional or performance-based specifications and award criteria, based on a problem definition, to stimulate creative problem solving;
- stimulating a technology-push to develop radical innovations by involving start-ups, using university spillovers, and formulating challenging specifications and award criteria;
- involving innovators like artists or start-ups in the procedure to exploit their creative strengths by decreasing procedural barriers;
- using procedural degrees of freedom like the number and length of the R&D phases to accommodate the market parties' creative process; and
- using successful innovation partnerships to stimulate the industry to innovate and to enhance the image of the contracting authority.

Furthermore, a contracting authority should consider the following:

- Tailor-made contracts for an innovation partnership, depending on project characteristics, market situation and the client's situation;
- A strategy should be formulated for the allocation of the produced intellectual property, mitigating a possible threat of providing state aid;
- Ensuring competition between tenderers can improve the process and outcome;
- A vendor lock-in should be avoided by awarding the contract to multiple parties or by making sure that the developed solution can be supplied by multiple parties;
- An investment in the procedure can result in a better outcome; and
- Innovation requires mutual trust between market parties and clients, a contracting authority 'boldly' exciting an innovation partnership will take away trust for future projects.

Demonstrated in this thesis are possibilities for public parties to tender (sustainable) innovations, along with how these possibilities can be exploited. The results can be used by contracting authorities to regard different options for tendering procedures. Moreover, it is shown that the procedure can be used to stimulate the development of sustainable innovation industry-wide.

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ABBREVIATIONS

ARW:	Aanbestedingsreglement Werken
CA:	Contracting Authority
CD:	Competitive Dialogue
CPN:	Competitive Procedure with Negotiation
DBFM:	Design Build Finance Maintain
EC:	European Commission
EU:	European Union
MaaS:	Mobility as a Service
MEAT:	Most Economically Advantageous Tender
NL:	The Netherlands
OECD:	Organisation for Economic Cooperation and Development
PCP:	Pre-Commercial Procurement
R&D:	Research and Development
RWS:	Rijkswaterstaat
SBIR:	Small Business Innovation Research
SER:	Sociaal-Economische Raad

1. INTRODUCTION

1.1 Topic

1.1.1 Context

Climate change is currently one of human kind's main challenges. The earth's temperature is rising with disastrous consequences. Polar ice shields are melting, the sea is rising and weather conditions are becoming more extreme. At the same time conventional energy sources are used up rapidly and the need for land to grow the food we need outgrows the actual availability of land. This is all happening due to human acts. We know what to change to solve these issues, the time to make these changes is now.

New solutions are currently rapidly being developed, offering sustainable alternatives for commodities. These product innovations require less or sustainable energy, or make sure the raw materials used are less polluting and reusable. The Netherlands needs to stimulate these innovations to reach the targets set in the Paris Agreement of 2015 (Sociaal-Economische Raad, 2013, 2015; United Nations, 2015). The SER advocates an ambitious transition agenda whereby the Netherlands can become a global leader in a number of industries. However, they argue, public procurement should be changed as well, as many public entities still choose for established options and not for sustainable alternatives (Sociaal-Economische Raad, 2016).

The tendering procedure considered in this thesis can be a solution that takes away the barriers that exist for contracting authorities to tender sustainable innovations. The research is crucial to exploit the opportunities that are offered nowadays.

1.1.2 Motive

The driver for the topic of this research is *sustainable growth*. Sustainable growth is one of three priorities stated in the Europe 2020 strategy (European Commission, 2010, p. 5). An important ambition of this strategy is to change the *energy* system from dispensable to renewable sources (European Commission, 2010, pp. 5 - 6). This research focusses on the *accessibility* sector, which entails both mobility and infrastructure. The energy transition also takes place within accessibility, such as electric vehicles, public loading docks, and mobility as a service (MaaS) (Sociaal-Economische Raad, 2013, pp. 99 - 104). Mobility is rapidly innovating, and many of the new means of mobility need a supporting infrastructure. Investments in infrastructure annually surpasses 10 billion euros in the Netherlands. This money can be invested in innovative sustainable solutions for future mobility. The *public sector* has an important role in this transition, through for example stimulating sustainable developments and taking responsibility in the *public procurement* of works. In fact, Aschhoff and Sofka (2009) found that public procurement is the best tool

to stimulate market parties to innovate. *Product innovations* are crucial, the Europe 2020 goals cannot be achieved with the technologies currently available (European Commission, 2010, p. 17; Labandeira, 2015). The new *innovation partnership* procedure was specifically designed for the procurement of innovations, at the request of contracting authorities (Telles & Butler, 2014, p. 24).

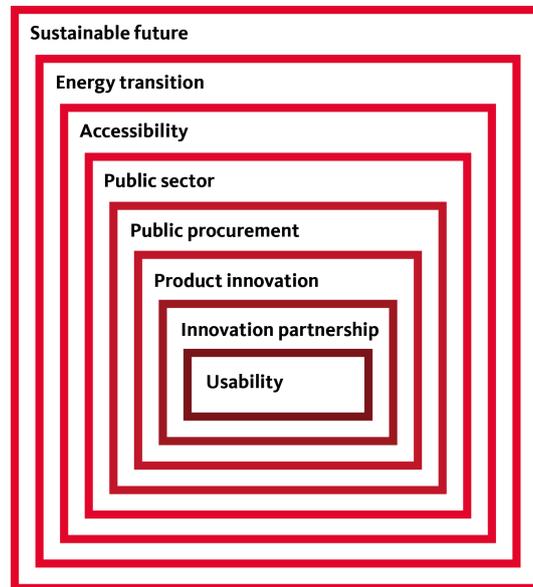


Figure 1: Research framing

1.1.3 Problem

The new innovation partnership tendering procedure has just become available since July 1st of 2016. Not more than a handful of current projects are known to use the procedure. Opinion multipliers in Dutch news sources have reacted to the new procedure with doubts, suggesting potential problems (Beukema, 2015; De Koning, 2015; De Wijs & Van der Kooi, 2016; Velthuisen, 2014).

The uncertainty amongst contracting authorities regarding the application of the innovation partnership causes hesitation to use it. This hesitation might in turn lead to the procedure not being used to its full potential, missing its inherent opportunity to stimulate innovations.

1.1.4 Objective

The goal of this thesis is to take away hesitation to choose the innovation partnership by optimising its usability by finding its strengths and potential pitfalls and use these to develop a strategy for the optimal use of the procedure. Uncertainties of a contracting authority can be taken away by finding and presenting the procedures' properties and the following strategy in a clarifying graphical model.

1.2 Research questions

The main research question is:

What strategy allows for the optimal utilisation of the innovation partnership's properties, in order to maximize its usability for contracting authorities regarding product innovations in the accessibility industry in The Netherlands?

'Properties' in this case entails the helpful and harmful effects the procedure has on the internal process of procurement and its external stakeholders: strengths, weaknesses, opportunities and threats.

'Utilisation' in this case indicates that both negative and positive properties can serve a purpose in forming the strategy.

The sub-questions to be addressed in order to answer the main research questions are:

1. What are the SWOT-properties of the innovation partnership that can be derived from literature?
 - i. What is the innovation partnership procedure in the field of procurement law?
 - ii. Which factors determine the choice of a contracting authority for a tendering procedure?
 - iii. What is the context in which the innovation partnership is used?
 - iv. What is product innovation in the construction industry?
2. What are the SWOT-properties of the innovation partnership that professionals foresee?
 - i. Which policy instruments are used to stimulate innovations?
 - ii. How are new tendering procedures adopted into practice?
 - iii. What are professionals' predictions concerning the innovation partnership procedure?
3. What can be learned by comparing the theoretical SWOT-properties with the SWOT-properties found in practice?
4. How can the SWOT-properties of the innovation partnership procedure be exploited in order to optimise its usability?

1.3 Scope

This research covers multiple fields of interest: tendering law, public policymaking, innovation management and construction management. Therefore, it is important to have a clear scope. First of all, this thesis is written as a graduation project for construction

management and engineering and focusses on working with the EC directive and Tendering Act as would a project manager in that field. Because the recommendations in this research are intended for executive services, guidelines concerning the innovation partnership are studied but seen as a given, not to be potentially altered. Only Directive 2014/24/EU and the current version of the Tendering Act 2012 (July 1st, 2016) have been studied for the sake of this research, directive 2014/25/EU (for utilities) and the ARW are outside of this scope.

Furthermore, the research entails public organisations in the Netherlands, concerned with accessibility issues: Rijkswaterstaat, the Ministry of Infrastructure and the Environment, provinces, water boards, municipalities and other similar authorities. Accessibility is chosen as a focal point because an innovation partnership is currently being used for an accessibility issue in The Netherlands, and this offers a rare opportunity to study a running case. However, the scope of the research is broader than this project alone and other projects and actors in the accessibility industry have been researched. Accessibility issues in this thesis entail 'mobility'- and 'infrastructure'-projects.

1.4 Structure of the report

This report follows the sub-questions from chapter 1.2. in chapter 2 the research methodology is presented. Chapter 3 is a literature study, answering questions 1.i to 1.iv. The results of the literature study are presented in a SWOT analysis in chapter 4, herewith answering question 1. Questions 2.i to 2.iii are addressed in chapters 5: field research and chapter 6: practical SWOT answers question 2. In chapter 7 the two SWOT analyses are combined and compared, answering question 3. Furthermore, chapter 7 to 9 answer question 4 and the main research question by showing how the properties can be exploited in the form of a strategy as well as recommendations for use of the procedure. In the discussion, chapter 10, the conclusions are interpreted and the method and recommendations for further research are shortly reflected upon.

2. RESEARCH METHODOLOGY

2.1 General

The objective in this exploratory research project is to support the usability of the innovation partnership procedure by diagnosing its properties, designing a strategy to exploit these properties and presenting the procedure and its flexibilities in a graphical roadmap. The beneficiary is a governmental agency planning to procure an innovative solution for an accessibility issue.

It is an empirical research project with descriptive, qualitative results. An exploratory research carries the risk of losing focus, because every exploration in the matter brings new considerations and research questions (Saunders, 2011, pp. 139 - 140). This was avoided by setting and sticking to a clear goal. With this goal in mind, every research exploration could be assessed based on expedience.

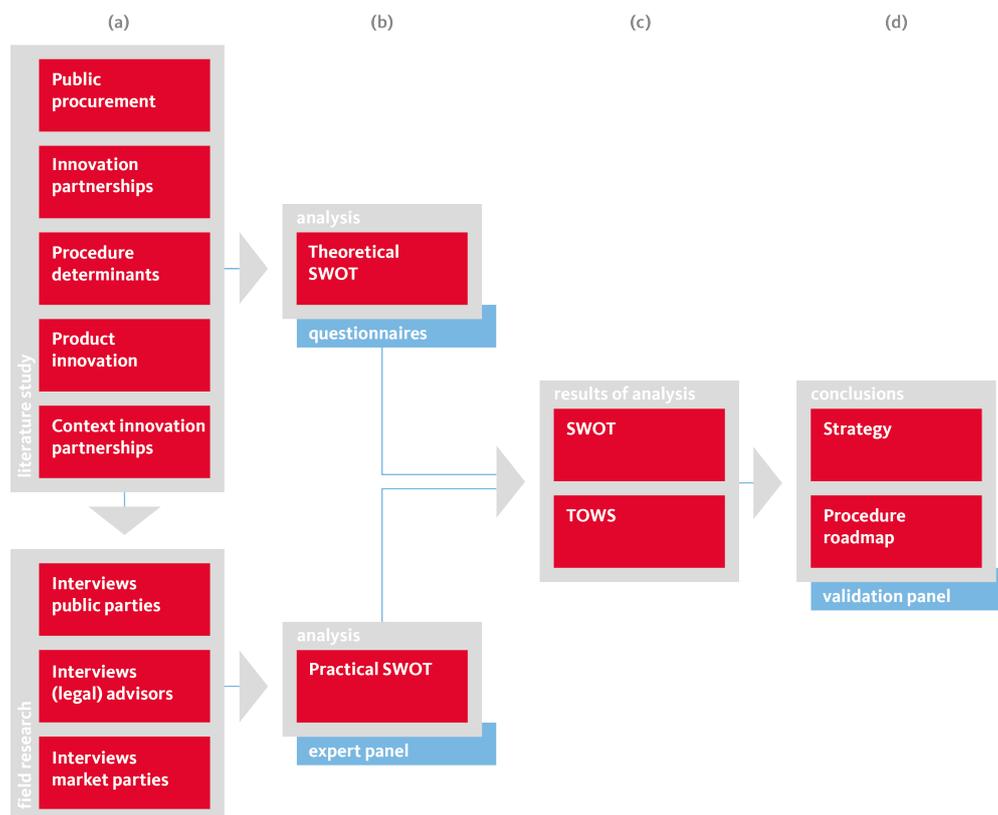


Figure 2: Research framework

The research is structured according to Figure 2. It starts with a literature review, in which theoretical strengths, weaknesses, opportunities and threats of the innovation partnership are identified and presented in the theoretical SWOT analysis. These findings are complemented by collecting experiences from professionals in the field by a series of interviews with market parties, public parties and advisors. The interviewees have either

worked with, know or could be involved in the procedure. The interview approach was adapted to suit the experience of the interviewee. The interviewees' perceptions of the strengths, weaknesses, opportunities and threats were derived and incorporated into the practical SWOT analysis. The theoretical SWOT analysis is validated by means of a questionnaire that was distributed to the interviewees and their direct relations, as well as other professionals familiar with the procedure. The practical SWOT analysis was nourished and validated by an expert panel. The findings from the theoretical SWOT, practical SWOT and questionnaire were used to comprise an all-inclusive SWOT/TOWS analysis. This analysis reflects the explored findings and was used to find strategies for optimal usability. Based on this last step, conclusions and recommendations including the graphical roadmap were made. The outcomes of the research project were validated using a validation panel. The research steps are further elaborated on in this chapter.

The fact that there is very little data available on the implementation of the innovation partnership is a complication in this research. Only 3 projects making use of the procedure have started: Dehydration monitors for the elderly in Denmark; sustainably powered trains in Germany (PIANOo, 2017); and the smart mobility project 'Talking Traffic' in The Netherlands (Ministry of Infrastructure and the Environment, 2017). Only the latter has been considered, for it was both within the scope of the research and available to study. The challenge was to test the hypotheses without actual (completed and evaluated) cases.

2.2 Literature study

The main purpose of the literature study is to help the researcher and reader develop an understanding and insight into the topic, the legal writings and trends surrounding the research subject in a broader context. For the literature review a deductive approach is used, in which a theoretical framework is developed that is subsequently tested using empirical data (Saunders, 2011, p. 61). However, only little scientific literature is written on the topic of the innovation partnership and none at all is written about the usability of the procedure for contracting authorities. Therefore, the theoretical framework is developed by combining the law on the innovation partnership with literature from bordering areas of knowledge: tendering in general; product innovation in the construction industry, determinants for the use of a tendering procedure; and the context of the innovation model, using Porter's (1979) five forces model.

2.2.1 Porter's five forces model

Porter's (1979) five forces show the interactions that make up the competitive context of an industry. The model is still commonly used by business strategists, and helps businesses to assess their context, develop a strategy, and achieve their goals within this context. It is suited as a guide for assessing the context of the innovation partnership when it is adjusted to fit the purpose: it should concern the usability of the innovation partnership

procedure. The five forces from Porter's model: new entrants, customers, substitutes, suppliers and competitors, are respectively renamed: new entrants, contracting authorities, substitutes, contractors and alternatives. For the analysis, the impact of each of the five forces was assessed using applicable literature.

2.3 Field research

The (preliminary) properties derived from the theoretical exploration form the basis of the research in the field. Via semi-structured interviews and questionnaires (Saunders, 2011, pp. 320 - 323), professionals from the field were asked about their experiences and forecasts regarding the innovation partnership. In case a professional has no prior experience with the procedure, these interviews are prescriptive, asking 'what if'-questions. The goal of these case study interviews is to test the findings from literature and to acquire new insights. The questionnaires serve as a quantifiable check of the literature study findings. An overview of the interviewees can be found in appendix A. The interviewees equally represent (legal) advisors, market parties and public parties.

In this sub-chapter the sequence and method of the field research activities is introduced in chronological order, starting with preparation, the interviews, the questionnaire and lastly the processing of the generated data.

2.3.1 Preparation

At least one week prior to the interview, the interviewee received a letter with information on what he or she could expect during the interview. This letter can be found in appendix B, and gives an introduction to the interview as well as a short summary of relevant information.

2.3.2 Interviews

The interviews are semi-structured and divided into two phases. First, during the introduction the subject is introduced. Then the points from the preparation letter are checked again. Next, a number of standard questions introduces the reader to the interviewee, to provide a clear overview of his or her professional context.

The discussed themes were:

1. Public procurement in the interviewees practice;
2. Innovation in the interviewees practice;
3. Stimulation of innovation;
4. The adoption of a new tendering procedure; and
5. Experiences and predictions concerning the innovation partnership.

The interviews lasted approximately 30 minutes. During the interview the interviewer made use of a manual, found in appendix C. However, the manual merely served to guide the interview, the questions were used freely.

2.3.3 Grounded theory

After conducting the interviews, the records made of the interviews have been verbatim transcribed into extended text. The extended texts were approved by the interviewee. The analysis of the extended text into properties for the SWOT is done following the grounded theory (Saunders, 2011, p. 509). The grounded theory is as follows: the extended text is analysed and every relevant part in the text is highlighted and given a code, this is called an 'open code'. All open codes are cross-referenced with all the other codes to find common denominators, called 'axial coding'. Lastly, the axial codes are cross-referenced to find the core-variable, called 'selective coding'.

As can be found in appendix F, in this project the grounded theory was executed as follows: the interview transcripts were analysed to find statements concerning the needs and wishes of the interviewee concerning an innovation partnership. In this step all relevant parts of the interview were kept, resulting in most cases in only half of the text because of the semi-structure approach. The open codes were a summarised version of the statement in the verbatim transcript. This resulted in 231 open codes. For the second step, all of these lines of open code were printed and cut out. The 231 strings of paper were randomly spread out on a table and sorted to find common denominators. This process was iterated five times over two days to find 24 axial codes. The common denominators were the 'theme' of the statements by the interviewees. Each axial code contains 2 to 22 open codes. As the axial codes are impartial to their function in the usability of the innovation partnership, the selective codes are used to link the interview findings to the SWOT framework. For the selective coding, the open codes within an axial code were reconsidered to find a general impression whether it concerned harmful or helpful, internal or external factors. This resulted in the selective code 'strength', 'weakness', 'opportunity', or 'threat'.

2.3.4 Questionnaire

The findings resulting from the literature study to form the theoretical SWOT were tested by means of a questionnaire. Each finding was first rephrased as a statement for which the respondent could indicate whether he or she respectively disagrees or agrees on a scale from 0 to 5. The questionnaire can be found in appendix D and an example is shown in Figure 3.

The questionnaire was distributed to the interviewees after the interview-period, so the questions would not be answered with the interview fresh in mind. In order to collect enough responses, interviewees were asked to share the questionnaire with their contacts.

The questionnaire was also promoted through an internet forum for public procurement professionals. This resulted in a total of 15 responses. The results from the questionnaires were used to test the findings in the theoretical SWOT.

Aanbesteden is een stimulans voor de ontwikkeling van incrementele innovaties.

0 1 2 3 4 5

Absoluut niet Absoluut

Figure 3: Screenshot of questionnaire

The results of the questionnaire were scores for the truth of the theoretical SWOT properties. Based on these scores, falsehoods could be excluded from the theoretical SWOT and remaining research process.

2.4 Analysis

As is shown in Figure 2, the analyses phase consists of two SWOT analyses and one SWOT/TOWS analysis. In the diagnostic phases (a) and (b) of the research project, a variety of findings were expected. The SWOT methodology helps assessing whether a finding is of influence to the objective of the research (Verschuren & Doorewaard, 2010, p. 76); the usability of the innovation partnership procedure. The SWOT provides an overview of findings that can be used in developing a strategy to increase the usability of the procedure.

2.4.1 SWOT

The acronym SWOT stands for Strengths, Weaknesses, Opportunities and Threats. A SWOT analysis consists of four quadrants and was developed in the 1950's at Harvard Business School as an interpretation-step in case studies. A strength is an internal quality of the object of analysis which is helpful to the project; a weakness is an internal quality which is harmful, an opportunity is an external helpful feature and a threat is an external harmful feature, see Table 1.

The SWOT analysis method was used on two accounts during the research: for analysis of the theoretical findings and for analysis of the interview findings. The theoretical and practical SWOTs were composed by analysing all information found in respectively literature and interviews. The interviews were analysed using the grounded theory, elaborated on in paragraph 2.3.3. The literature study was reviewed to find aspects that influence the usability of the innovation partnership procedure. These aspects were found through the whole literature study and used as input for the SWOT analysis. The SWOT properties are discussed in chapters 4 and 6. The short descriptions in the two SWOT

	Helpful	Harmful
Internal	Strengths <ol style="list-style-type: none"> Strength 1 Strength 2 Etc. 	Weaknesses <ol style="list-style-type: none"> Weakness 1 Weakness 2 Etc.
External	Opportunities <ol style="list-style-type: none"> Opportunity 1 Opportunity 2 Etc. 	Threats <ol style="list-style-type: none"> Threat 1 Threat 2 Etc.

Table 1: Explanation SWOT quadrants (Wehrich, 1982)

frameworks, Table 3 and Table 4, are only summaries. To understand the presented findings, the reader will have to read the explanations.

2.4.2 SWOT/TOWS

The SWOT/TOWS analysis was first presented by Wehrich (1982) and is developed to formulate strategies based on the findings in a SWOT analysis. Ultimately, the SWOT quadrants are rearranged to form four new quadrants, SO, WO, ST and WT, shown in Table 2. In the four new quadrants, the strengths, weaknesses, opportunities and threats are matched in order to find strategies related to the previously set goal. For instance,

	Strengths <ol style="list-style-type: none"> Strength 1 Strength 2 Etc. 	Weaknesses <ol style="list-style-type: none"> Weakness 1 Weakness 2 Etc.
Opportunities <ol style="list-style-type: none"> Opportunity 1 Opportunity 2 Etc. 	SO Exploit strengths Exploit opportunities	WO Minimise weaknesses Exploit opportunities
Threats <ol style="list-style-type: none"> Threat 1 Threat 2 Etc. 	ST Exploit strengths Mitigate threats	WT Minimise weaknesses Mitigate threats

Table 2: Explanation SWOT/TOWS (Wehrich, 1982)

strengths and opportunities can be combined in order to exploit both, or a weakness can be minimized by exploiting an opportunity (Wehrich, 1982).

For the SWOT/TOWS analysis, the theoretical and practical SWOT properties were combined without those that were excluded after analysing the questionnaire results. The properties were checked for integrality, compared and doubles were merged and marked (*). The remaining properties constitute the final SWOT matrix and serve as input for the TOWS analysis. In the TOWS analysis, ways to utilise strengths, minimise weaknesses, exploit opportunities and mitigate threats are explored by cross-reference. This analysis step was done on a large TOWS framework on paper. All 299 possible cross references were indicated by drawing a matrix. Then the researcher searched for possible strategies for all of these individual points, approximately 80 were found. These were combined to form comprehensive, meaningful strategies which can be found in chapter 7. This exercise has been iterated 4 times in order to ensure completeness.

2.4.3 Expert panel

The practical SWOT was nourished and validated by an expert panel consisting of: 3 advisors from AT Osborne; a Rijkswaterstaat employee; a Be-mobile executive; a Twynstra Gudde advisor; and an employee of PIANOo, the centre of expertise on public procurement. During a one-hour meeting, the panel discussed the findings from the practical SWOT. Where falsehoods were found, these were resolved in a vivid discussion, and properties that were not found already were subjected to the panel by individual members and debated. As a result, the open spaces in the practical SWOT were filled and the findings validated.

2.5 Conclusions and recommendations

The results from the SWOT/TOWS analysis provide the input for the conclusions of the research. The conclusions answer the research question, giving a series of actions that constitute a strategy to optimize the procedure's usability. The recommendations take matters one step further by organizing all learnings from the research in a procedural roadmap, presented in a graphic. The roadmap was created based on the law and the strategies presented in the conclusions. A number of procedural parameters were found, these can be set in a way that stimulates the fit between project and tendering procedure.

2.5.1 Validation panel

Similar to the expert panel, the conclusions and recommendations were validated by a validation panel, consisting of an expert from PIANOo and a team of 7 legal experts. Their role in the validation panel was to critically review the results of the research to find possible mistakes, shortcomings or otherwise errors.

3. LITERATURE STUDY

The literature study consists of five subchapters. In the first subchapter, the relevant concepts of public procurement in the Netherlands will be introduced. Next, the innovation partnership itself is studied by giving a description of the procedure as it is written in Directive 2014/24/EU and the Dutch Tendering Act 2012 (2016). Important for answering the research question on the usability of the innovation partnership procedure is to find determinants for the choice for a tendering procedure. After this product innovation in the construction industry is introduced. Lastly, the external forces acting on and with the innovation partnership will be introduced.

The goal of the literature study is to find a theoretical basis for this graduation research project. The studied literature is used to develop an understanding of the matter and the findings will be presented in a theoretical SWOT-analyses and will serve as input for the field research. The method is introduced in subchapter 2.2.

3.1 Public procurement in The Netherlands

In this subchapter relevant concepts of public procurement are described. This is done by showing a definition of tendering, presenting who are contracting authorities, and giving an overview of the basic principles of procurement law. Lastly, the steps in a tendering process are described. The subchapter follows, but is not solely based on Essers (2013), because it is the most recent work written for public parties on how to work with tendering law, which is also the object of this thesis.

3.1.1 Definition

In the directive, 'tendering' is not defined. Throughout literature multiple definitions are used. Prier and McCue (2009) even speak of a 'muddled definition'. To avoid problems this incoherence could induce, it is necessary to give a satisfactory definition for this thesis.

Brackmann and Verlinden-Bijlsma (2011, p. 17) uses the following definition:

“Tendering is a process of procurement in which the client transparently and objectively awards the contract to a contractor who meets certain requirements and made the best offer.”

Tendering is, according to Brackmann and Verlinden-Bijlsma (2011), nothing more than the act of asking several parties for offers and objectively assessing the offers. Because of the regulations concerning procurement of public works, goods and services, public tendering has got a specific charge. This definition will be used for this thesis because it comprises the different elements of tendering, namely:

- A client and contractor;
- The requirements made by the client;
- The awarding based on an offer; and
- The transparency and objectivity of the process.

3.1.2 The necessity of procurement law: basic principles

Total public procurement in the EU is estimated at about 19% of the Union's GDP. The necessity of rules and regulations concerning public procurement is evident as it means more competition, safeguards against corruption, equality for similar contractors, and better value for money for taxpayers (Essers, 2013, pp. 26 - 27). The tendering directives are based on four basic principles, of which two are stated in the same article of the Dutch procurement law: non-discrimination and equality (2014/24/EU art. 1.8), transparency (art. 1.9), and proportionality (art. 1.10). In this paragraph these principles will be briefly introduced.

The *non-discrimination* and *equality* principles are closely related. The former implies that a contracting authority is prohibited to make distinctions based on nationality. The latter is broader and obliges the contracting authority to ensure that similar cases are handled similarly. The *transparency* principle arose from the equality principle and consists of two components. Firstly, the contracting authority has to exercise publicity at the start of the tender and secondly the awarding has to be motivated. The *proportionality* principle implies that, during the preparation of the tender, the contracting authority can only set requirements, prerequisites and criteria proportionate with the object of the contract. When a contracting authority fails to comply with these basic principles, the consequences are determined by a civil judge (Bergevoet, Essers, & Ruigewaard, 2013, p. 38; Essers, 2013, pp. 28 - 31).

Brackmann and Verlinden-Bijlsma (2011, pp. 21 - 22) presents three additional principles, as they are found in practice: publicity, objectivity and competition.

Furthermore, the general principles of proper government also apply to Dutch procurement practice.

3.1.3 Scope of procurement law

The scope of procurement law is determined in the European directive and Dutch Tendering Act. Within the scope an objective and subjective scope are distinguished by Essers (2013, p. 82). This distinction is important because the Tendering Act is only applicable when the conditions for both the objective and subjective scope are met. The subjective scope entails the entities that are subject to procurement law, the so-called contracting authorities. The objective scope includes the procurements that are subject to procurement law (Essers, 2013, pp. 82 - 83).

Subjective scope

The first group of contracting authorities is composed of the traditional state authorities: the state and regional authorities or territorial bodies (Essers, 2013, p. 85). These include the provinces, municipalities, and water boards (Pijnacker Hordijk, Van der Bend & Van Nouhuys, 2009, p. 37).

The second group is composed of bodies governed by public law: legal personalities; bodies established for the purpose of meeting needs in general interest not having an industrial or commercial goal; institutions financed by the state; public bodies; institutions subject to management supervision; and bodies with an administrative, managerial or supervisory board composed of a contracting authority by more than 50% (Essers, 2013, pp. 85 – 89; PIANOo, 2016a; Pijnacker Hordijk et al., 2009, p. 39).

Partnerships, formed between members from the first two groups, form the last group of contracting authorities (Essers, 2013, pp. 104 - 105). What these partnerships are is essentially open for interpretation (Pijnacker Hordijk et al., 2009, p. 59).

Objective scope

A threshold of contract value determines whether the contracting authority needs to comply with EC-regulations. Currently this threshold is set at € 5.225.000 for works, and € 209.000 for goods and services, with a number of exceptions (PIANOo, 2016b). Not all goods, works or services below these thresholds can be procured outside EU legislation. In cases with cross-border interests, for example a tender for a contracting authority close to the border, European rules should be applied (Sundstrand, 2015).

3.1.4 From European Committee to Dutch legislation

Procurement law is a European initiative aimed at eliminating barriers to ensure free movement of people and goods in all member states to improve economic well-being in all member states. Procurement law is not recorded in EC treaties, but in directives. These directives have to be adopted by a member state's legislative body within a predetermined period (Essers, 2013, pp. 27 - 28, 37 - 38).

3.1.5 Tendering procedures

Directive 2014/24/EU and the Tendering Act 2012 (2016) describe a total of 14 tendering procedures. In this paragraph the 4 procedures and one additional procedure offered by

the EC, compared in this thesis, will be introduced¹. The innovation partnership is described in subchapter 3.2.

Competitive procedure with negotiation (CPN)

The CPN (Tendering Act 2012 (2016) art. 2.30-2.31) is a European tendering procedure in which a contracting authority negotiated with the tenderers after a selection. The negotiations concern contractual conditions and the offers made by the participants (Essers, 2013, p. 182).

A procurement following the CPN starts with a request for tenders by a contracting authority. Market parties can appeal to participate. After a selection of participants, the contracting authority negotiates the conditions of the contract with the participating market parties. The results of the negotiations are assessed on the basis of earlier determined award criteria and the contract is awarded to the market party with the best offer (Essers, 2013, pp. 183, 185 - 186).

The application of the CPN is limited to a number of circumstances including cases in which determining the total price is impossible or all tenderers are irregular (Essers, 2013, pp. 186 - 187).

Competitive dialogue (CD)

The CD (Tendering Act 2012 (2016) art. 2.28-2.29) is a European tendering procedure that enables a dialogue between the contracting authority and potential tenderers. This is needed when substantive knowledge of market parties can improve the specifications and conditions (Essers, 2013, pp. 533 - 534).

The CD entails that a contracting authority asks one or multiple market parties for advice on the content of a procurement. This is done by publishing a notice to which market parties can respond. These parties are selected and invited to participate in a dialogue in which they can propose solutions for the problem at hand. After the dialogue the participants are asked to submit a tender. The tenders are assessed based on predetermined criteria and the contract is awarded (Essers, 2013, pp. 536 - 539).

A disadvantage is that the CD can only be used for projects that are particularly complex (Essers, 2013, p. 534). It is regularly used, for instance by Rijkswaterstaat, for DBFM projects (Wolswinkel, 2015, p. 29).

Design contests

¹ The SBIR procedure (Small Business Innovation Research) is not discussed as it is similar to the PCP. Both instruments are used to tender the development of a prototype. The only difference between the two is that the PCP procedure incorporates a testing phase after the development of the prototype (Innovatiekoffer, 2017).

For design contests a special procedure exists (Tendering Act 2012 (2016) art. 2.42-2.43). The procedure is used to select one or multiple plans or designs by a jury. This can lead to subsequent purchase of the design by the contracting authority (Essers, 2013, p. 529). Design contests are generally used in the fields of spatial planning, city planning, architecture, civil engineering and electronic data processing (Brackmann & Verlinden-Bijlsma, 2011, p. 146).

In a design contest, market parties are asked, by means of a notice, to join the contest by filling out a selection form. After exclusion of the contestants who do not meet the criteria for selection, the remaining market parties are invited to submit a design or plan. A jury assesses the plans anonymously after which there is an opportunity for a dialogue between contestants and jury. After the dialogue the jury makes its decision and makes it known (Brackmann & Verlinden-Bijlsma, 2011, pp. 147 - 150; Essers, 2013, pp. 531 - 533).

Pre-commercial procurement

Lastly, the pre-commercial procurement (PCP) is an additional procedure, described by the EC in COM(2007)799. PCP relies on using the R&D exemption in article 14 of Directive 2014/24/EU not to conflict with the principles in the EU treaty as well as with EU state aid rules. It concerns the R&D phase of an innovation process, before commercialisation. All market parties are invited to tender for a solution for a contracting authority's problem. Together, the contracting authority and the selected partners go through the R&D process having a goal of designing and engineering a solution. The market-parties are paid for deliverables of successive phases: product idea, solution design, prototype and first test product. After the test product the procedure ends. The contracting authority determines whether to procure the development (European Commission, 2007).

3.1.6 Tendering process steps

In this paragraph the steps of the tendering process are discussed. For this exercise the Tendering Act is compared with four main sources, namely Essers (2013) and Pijnacker Hordijk et al. (2009) because of their scientific value; PIANOo (2016e), because of its practical guidelines and Wolswinkel (2015), because of added insight into the process and the use of theory in a similar context.

The tendering process is followed through a sequence of steps. These steps are published before the process start, because of the transparency principle. The steps are described in Tendering Act 2012 (2016) art. 2.58 – 2.131, and visualised by Wolswinkel (2015, p. 25) as a roadmap, shown in Figure 4. The process steps are structured the same for every individual tendering procedure, but are adjusted with respect to focus on and length of each step.



Figure 4: Tendering roadmap, after Wolswinkel (2015, p. 25)

Question

Before a tender invitation in any form can be sent out, the contracting authority needs to formulate a wish. In public projects, this wish will concern adding value to the domain for which the authority is responsible, this can be a creation like a road or building. The procurement need will be assessed with the help of the internal end user. What are its characteristics? When is it needed? What will be the costs? Additionally, a stance is taken in matters like sustainability and social responsibility (PIANOO, 2016d).

Orientation

During the orientation-phase the proposed question is further specified and is consolidated in a statement of requirements. There are three ways to specify the requirements, namely: technical-, functional- and performance-based specification (Tendering Act 2012 (2016) article 2.76 lid 1 subs a & b). Functional- and performance-based specifications are less restrictive for a tenderer and as such leave more room for innovation than technical requirements. The alternative solutions that the contractors can come up with are potentially of better quality or create long-term improvements. In expressing requirements, the contracting authority should give enough of a framework to help the market understand the requirement, without restricting creativity (OGC, 2015, pp. 16 - 17; Schoenmaekers, 2016, pp. 5 - 6)

There are several other ways to find possible solutions to the question during the orientation phase. *Market exploration* is a tool that enables the contracting authority to find out what is available in the market by conducting desk research, field research, which may include contacting knowledge institutes, and interviews with entrepreneurs. After market exploration, an assessment takes place to determine whether the question can be answered by procurement of an available work, good or service or if, alternatively, there is a need for new development. Other than the basic principles of procurement law, market exploration is free of guiding rules (Innovatiekoffer, 2016b)

A *market consultation* is a way for the contracting authority to propose its question to the market to see if market parties can come up with innovative ideas; if its goals are achievable and ambitious enough; what would be an optimal formulation of the tender invitation; and what would be necessary to include requirements for the tender in the design (Innovatiekoffer, 2016a; PIANOO, 2016e). It allows the contracting authority to exploit the innovative strengths of the market (Essers, 2013, p. 167). A market consultation can be: open for all entrepreneurs or restricted; written or oral; interactive or active. The first step for the contracting authority in a market consultation is to choose its form. The next steps are to prepare and have the meeting in which the contracting authority knows

what it wants to achieve and who it needs to achieve these goals. It is important to keep in mind the basic principles of procurement law and the information act. After the meeting it is important to publish all relevant information (Essers, 2013, p. 168) and to draw conclusions from this information. These conclusions can be used for the tender invitation (Innovatiekoffer, 2016a).

Lastly, a *testing ground* can be used by the market to test innovative solutions. It can be physical or digital, and can be used by a contracting authority during the orientation phase to challenge the market in order to find possible answers to a question (demand-pull), or by entrepreneurs to invoke a wish for their products (technology-push) (Innovatiekoffer, 2016c).

Tender invitation

The tender invitation (Tendering Act 2012 (2016) articles 2.58-2.74b) is an (electronic) document that calls upon market players to apply for a tender. The invitation announces that a contract will become available and what the contract entails exactly. It further needs to contain the contracting authorities' requirements for the selection and awarding of the contract. The market players can decide whether to apply based on this information. European tender invitations need to be published via TenderNed (Essers, 2013, p. 332; PIANOo, 2016e). Publishing this information ensures equal opportunities and transparency (PIANOo, 2016e; Pijnacker Hordijk et al., 2009, pp. 245 - 246).

Selection of participants

Pijnacker Hordijk et al. (2009, p. 265) describe three categories of criteria for the selection of participants: grounds for exclusion, minimum demands, and selection criteria. Grounds for exclusion (Tendering Act 2012 (2016) art. 2.86-2.88) are circumstances of the market player that justify his or her exclusion from participation in the tender. A distinction is made between 'forced' and 'facultative' ground for exclusion. Forced grounds are determined by law, the contracting authority has to exclude applicants based on these grounds. Facultative ground for exclusion are a choice of the contracting authority. The minimum demands are prepared by the contracting authority and need to be unambiguous (Tendering Act 2012 (2016) art. 2.90 – 2.97). The selection criteria enable the contracting authority to regulate the number of participants in the tender, however, this number needs to be sufficient to ensure competition (Tendering Act 2012 (2016) art. 2.99 – 2.100) (Essers, 2013, pp. 340 - 341). The contracting authority needs to formally give a reason for rejection (PIANOo, 2016e).

Information exchange

During this phase, information about the project will be exchanged. The extent to which this happens strongly differs between the different procedures. For instance, in an open procedure there will be an opportunity for written questions and an information meeting

in which all participants collectively get the opportunity to ask questions and collect the answers. In contrast, the CD and innovation partnership have multiple phases of bilateral information exchange between the client and contractors in which the whole project can be discussed. During this process the principle of equality needs to be guaranteed (Essers, 2013, pp. 343 - 344; PIANOo, 2016c)

Assessment

The criteria for awarding are predetermined in the tender invitation. During the assessment, the best offer made by a participant is chosen by the contracting authority based on these criteria. The criterion is the most economically advantageous tender (MEAT) (Tendering Act 2012 (2016) art. 2.114). All tenders are awarded scores for all MEAT criteria, after which the tenders are ranked and the tender with the highest score wins the contract (Brackmann & Verlinden-Bijlsma, 2011, p. 94). An exception is made when a contracting authority motivates why the choice will be based solemnly on the lowest price (Tendering Act 2012 (2016) art. 2.114 lid 4).

Award

The award has two phases. First, the provisional award of the contract is expressed by the contracting authority. The choice not to continue the project with one of the contractors is also seen as an award decision. During a standstill period of 20 days contractors can fight the decision, after which the actual award can be done, when no objections are raised or those raised have been dealt with by summary proceedings price (Tendering Act 2012 (2016) art. 2.127 – 2.131) (Essers, 2013, pp. 483 - 484; PIANOo, 2016e).

3.1.7 Summary

An overview of the relevant concepts of tendering in The Netherlands is presented by giving a definition and an overview of the basic principles. It is clarified by more in-depth information on the different procedures that are used, who they are used by, and the process of tenders.

The definition being used in this thesis is formulated by Brackmann and Verlinden-Bijlsma (2011, p. 17):

“Tendering is a process of procurement in which the client transparently and objectively awards the contract to a contractor who meets certain requirements and made the best offer.”

Procurement law is a European initiative aimed at eliminating barriers to ensure free movement of people in all member states to improve economic well-being in all member states. The tendering directives are based on four basic principles, of which two are stated in the same article of the Dutch procurement law: non-discrimination and equality (art.

1.8), transparency (art. 1.9), and proportionality (art. 1.10) (Ministry of Economic Affairs, 2016). The rules from the European directive are implemented in the Dutch law by the affiliated ministry of The Netherlands (in this case the Ministry of Economic Affairs). (Pijnacker Hordijk et al., 2009, p. 24).

The Dutch Tendering Act 2012 (2016) and Directive 2014/24/EU describe a total of 14 tendering procedures. The EC provided the pre-commercial procurement procedure.

The tendering process is followed through a sequence of steps. These steps must be published in order to ensure transparency. These are, in chronological order: question, orientation, tender invitation, selection of participants, information exchange, assessment and award (Tendering Act 2012 (2016) art. 2.58 – 2.131) (Wolswinkel, 2015, p. 25).

3.2 The innovation partnership procedure

In this subchapter the innovation partnership is described using the European Directive 2014/24/EU and the Dutch Tendering Act 2012 (2016). The description includes remarks by authors on the directive, the changes in the Tendering Act 2012 (2016) and affiliated documents. The information in the directive is graphically shown in Figure 5, which is a graphic interpretation of the theoretical procedure.

3.2.1 The innovation partnership in the European directive

Article 31 of Directive 2014/24/EU of the European Commission (2014, pp. 112-113) describes the innovation partnership. The guidelines concerning works are:

Art. 31 lid 1. In innovation partnerships, any market party can request to participate in response to a notice by providing the information that is requested by the contracting authority. The contracting authority can only request works that are not (yet) available on the market and must set minimum requirements for tenders. The information in the notice must be precise enough for the market parties to be able to determine scope and nature of the assignment;
The contracting authority can decide whether to set up the innovation partnership with one or multiple partners, conducting their R&D activities parallel;
The contracting authority must select participants for the procedure from the received tenders;
The contracts shall be awarded on the sole basis of the award criterion for the most economically favourable tender.

Art. 31 lid 2. The innovation partnership shall aim at the development of works and the subsequent purchase of the resulting works, provided that they correspond to

the performance levels and maximum costs agreed between the contracting authorities and the participants;

The innovation partnership shall be structured in successive phases following the sequence of steps in the research and innovation process. The innovation partnerships shall set intermediate targets to be attained by the partners and provide for payment of a remuneration in appropriate instalments;

After each phase, based on the targets, the contracting authority can terminate the innovation partnership or individual contracts.

Art. 31 lid 3. After each but the last tender submission, the contracting authorities shall negotiate with tenderers. The minimum requirements and the award criteria shall not be subject to negotiations.

Art. 31 lid 4. The basic principles of procurement law apply, which means that:

- a. the contracting authority shall not provide information in a discriminatory manner which may give some tenderers an advantage over others;
- b. they shall inform all tenderers whose tenders have not been eliminated of any changes to the technical specifications or other procurement documents other than those setting out the minimum requirements; and
- c. contracting authorities shall provide sufficient time for tenderers to modify and re-submit amended tenders, as appropriate.

The contracting authority shall not reveal confidential information of one tenderer to the others without its agreement.

Art. 31 lid 5. Negotiations during an innovation partnership may take place in successive stages in order to reduce the number of tenders to be negotiated by applying the award criteria specified in the contract notice. This must be indicated beforehand.

Art. 31 lid 6. The selection criteria applied by the contracting authority shall concern the candidates' capacity in the field of research and development and of developing and implementing innovative solutions;

In the procurement documents, the contracting authority shall define the arrangements applicable to intellectual property rights.

Art. 31 lid 7. The contracting authority is responsible for the structure of the partnership and in particular ensures:

- a. the duration and value of the different phases reflect the degree of innovation of the proposed solution and sequence of the research and innovation activities required;

- b. the estimated value of supplies, services or works shall not be disproportionate in relation to the investment required for their development.

3.2.2 Comments on the innovation partnership in the directive

Reflecting on the directive, Chao (2014, pp. 224 - 225) and Europa Decentraal (2012) state that with this directive the European Commission aims to stimulate procurement of innovation and to help the member states achieve targets of innovation. Furthermore, the provision on the design of the partnership and word choices such as ‘contracting authority’ suggest that the partnership is a procurement process during the research and development phases, while other word choices like ‘partner’ indicate a contractual phase. Therefore, it is unclear whether the European legislator views the innovation partnership as a pre-contract tendering phase or a contractual phase, which is relevant for the application of the procurement law (Chao, 2014, p. 228).

The innovation partnership can only be used when there is a need for a new or significantly improved solution. Significantly improved solutions entail solutions that cannot be found without extra research and development. The improvements can be achieved on all aspects, including functionality, sustainability, life cycle costs, reliability or safety (PIANOo, 2016c).

3.2.3 The innovation partnership in Dutch law

The innovation partnership is included in the Dutch Aanbestedingswet 2012 (BWBR0032203) (Ministry of Economic Affairs, 2016), to be referred to as ‘Tendering Act 2012 (2016)’, applicable since July 1st, 2016. This is the Dutch transposition of the directive. Tendering Act 2012 (2016) includes a definition as well as guidelines for the innovation partnership procedure.

In article 1.1², the procedure for the innovation partnership is defined as: “Procedure in which all entrepreneurs can propose a request to participate after a notice of a contract aimed at the development and procurement of an innovative supply, works or service that is not already available on the market and in which is worked towards definitive tenders by means of negotiation with one or multiple of them.”

² “*procedure van het innovatiepartnerschap*: procedure waarbij alle ondernemers een verzoek tot deelneming mogen indienen naar aanleiding van een aankondiging voor een opdracht die is gericht op de ontwikkeling en aanschaf van een innovatief product of werk of een innovatieve dienst welke niet reeds op de markt beschikbaar is en waarbij door middel van onderhandelingen met een of meer van hen naar definitieve inschrijvingen wordt toegewerkt;”

In article 2.31b³, the procedure steps are listed as follows. “The contracting authority:

1. publishes the notification of the public contract;
2. assesses whether a candidate complies to the grounds for exclusion;
3. assesses whether a non-excluded candidate complies to the, by the contracting authority formulated suitability requirements;
4. assesses whether a non-excluded and non-rejected candidate complies to the, by the contracting authority formulated selection criteria;
5. invites selected candidates to propose a first tender;
6. negotiates the first and successive tenders with the tenderers, retaining the definitive tender, to improve the content of the tender, while not negotiating award criteria and minimal requirements;
7. assesses the definitive tenders based on award criteria and minimal requirements to the most economically advantageous tender;
8. makes a record of the commissioning;
9. announces the award decision;
10. can close the deal; and
11. publishes the announcement of the awarded public contract”

Article 2.99 lid 1 specifies in that the contracting authority can limit the number of parties it will invite to tender for a public contract. Art. 2.99 lid 3 states that at least three parties must be invited. All parties must be invited in written fashion at the same time (art. 2.105 lid 1).

The contracting authority selects the winner of the public contract based on the best price-quality ratio (art. 2.114 lid 1 & 2.126b lid 1). The criteria are related to the public contract and can cover, inter alia (art. 2.115 lid 1-2):

³ “De aanbestedende dienst:

- a. maakt een aankondiging van de overheidsopdracht bekend;
- b. toetst of een gegadigde valt onder een door de aanbestedende dienst gestelde uitsluitingsgrond;
- c. toetst of een niet-uitgesloten gegadigde voldoet aan de door de aanbestedende dienst gestelde geschiktheidseisen;
- d. beoordeelt de niet-uitgesloten of niet-afgewezen gegadigden aan de hand van de door de aanbestedende dienst gestelde selectiecriteria;
- e. nodigt de geselecteerde gegadigden uit tot het doen van een eerste inschrijving;
- f. onderhandelt met de inschrijvers over hun eerste en daaropvolgende inschrijvingen, met uitzondering van de definitieve inschrijving, om de inhoud ervan te verbeteren, met dien verstande dat niet wordt onderhandeld over de gunningscriteria en de minimumeisen;
- g. beoordeelt de definitieve inschrijvingen aan de hand van door de aanbestedende dienst gestelde minimumeisen en het door hem gestelde gunningscriterium de economisch meest voordelige inschrijving op basis van de beste prijs-kwaliteitverhouding en de nadere criteria, bedoeld in artikel 2.115;
- h. maakt een proces-verbaal van de opdrachtverlening;
- i. deelt de gunningsbeslissing mee;
- j. kan de overeenkomst sluiten;
- k. maakt de aankondiging van de gegunde overheidsopdracht bekend.”

- (technical) quality;
- esthetical and functional characteristics;
- accessibility;
- fitness for use;
- social, environmental and innovative characteristics;
- the organisation;
- customer service and technical aid;
- delivery conditions.

Articles 2.126b to 2.126d in the Dutch Tendering Act 2012 (2016) cover the information described in Directive 2014/24/EU, art. 31.

3.2.4 Comments on the innovation partnership in the Tendering Act

Essers and Van Blaaderen (2015, p. 205) state, in response to the concept bill to alter the Tendering Act, that the difference between the innovation partnership procedure and the competitive procedure with negotiation is minimal. Differences found are e.g. the tenders in an innovation partnership procedure are aimed at participation in the partnership; the procedure can be followed with a single participant and the mandatory award criterion is best quality-price ratio.

Jansen (2016, p. 157) argues that the innovation partnership procedure is actually not a tendering procedure: “It is a way to divide a scarce privilege, namely participation in a partnership with a contracting authority with possibly a contract as result”. As Essers and Van Blaaderen, he considers the procedure similar to the competitive procedure with negotiation.

3.2.5 Visualisation of the innovation partnership procedure

- A. A contracting authority needs works that are not (yet) available on the market (Directive art. 31 lid 1)
- B. The contracting authority must decide whether to set up the innovation partnership with one or multiple partners (Directive art. 31 lid 1)
- C. The contracting authority publishes a request for proposal (Directive art. 31 lid 1; Tendering Act art. 2.31b)
- D. The contracting authority assesses whether a candidate complies to the ground for exclusion (Directive art. 31 lid 1; Tendering Act art. 2.31b)
- E. The contracting authority receives tenders (Directive art. 31 lid 1)
- F. The contracting authority assesses whether a candidate complies to the suitability requirements (Directive art. 31 lid 1; Tendering Act art. 2.31b)
- G. The contracting authority assesses whether a candidate complies to the selection criteria (Directive art. 31 lid 1 & 31 lid 5; Tendering Act art. 2.31b)

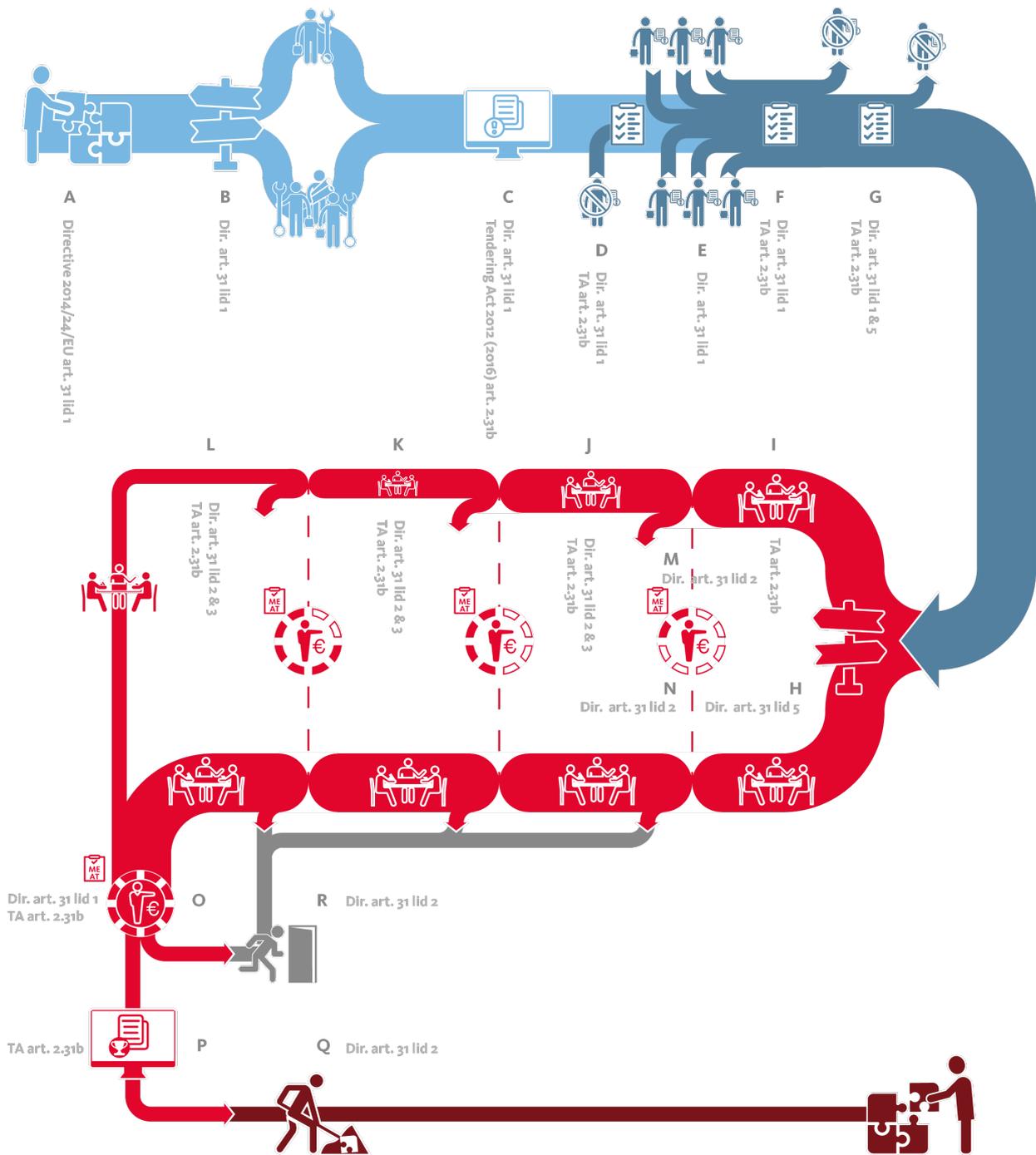


Figure 5: Visualisation of the innovation partnership procedure

- H. The contracting authority chooses whether to reduce the number of tenders in successive stages (Directive art. 31 lid 5)
- I. The selected tenderers propose a first tender (Tendering Act art. 2.31b)
- J. Negotiation round to improve the content of the tender following the innovation process (Directive art. 31 lid 2-3, Tendering Act art. 2.31b)
- K. See J
- L. See J
- M. After each phase the contracting authority can terminate individual contracts (Directive art. 31 lid 2)

- N. The innovation partnership shall set intermediate targets to be attained by the partners and provide for payments when these targets are achieved (Directive art. 31 lid 2)
- O. The contracting authority shall award the contract based on the criterion for the most economically advantageous tender and announce the decision (Directive art. 31 lid 1; Tendering Act art. 2.31b)
- P. The contracting authority publishes the announcement of the awarded public contract (Tendering Act art. 2.31b)
- Q. The contracting authority purchases the works resulting from the procedure (Directive art. 31 lid 2)
- R. The contracting authority may decide after each phase to terminate the innovation partnership (Directive art. 31 lid 2)

3.3 Choosing a tendering procedure

In this section, currently used tendering procedures are examined as well as the determinants that lead to the choice for a certain procedure. This in turn will help find determinants for the usability of the different procedures which will be used to determine the usability of the innovation partnership.

3.3.1 Often used procedures

The tendering procedures discussed in this thesis are to fulfil the need for works with a non-recurring nature. For these cases two kinds of tendering procedures are widely used: the open procedure and the restricted (Brackmann & Verlinden-Bijlsma, 2011, p. 87). The restricted procedure lets the contracting authority pre-select the tenderers and is therefore used in cases where a larger number of tenderers leads to significantly higher transaction costs or when the number of market players expected to tender is relatively high (Twynstra Gudde, 2016).

An examination of TenderNet (2016) shows that of all available notifications and tender invitations for works available on the site published between September 8th, 2015 and September 8th, 2016 (a total of 1553):

- 835 are open procedures;
- 637 are restricted procedures;
- 42 are negotiated procedures;
- 39 are competitive dialogues;
- 0 are negotiated procedure without prior publication; and
- 0 are innovation partnerships.

The key factors that lead to the choice for one of the procedures are presented in the next paragraph.

3.3.2 Determinants of influence to the choice of tendering procedures

Determinants that influence the choice for a particular tendering procedure are found in several sources: scientific decision support models by Okunlola and Olugbenga (2010), Gordon (1994), Mohsini (1993) and Alhazmi and McCaffer (2000); and practical guidelines by PIANOo (2016f) and Twynstra Gudde (2016).

The decision support models and practical guidelines show a total of 43 determinants that influence the choice for a tendering method, which can be divided into 6 categories: law and regulations, project characteristics, market situation, 'cost, time and scope', degree of risk avoidance by the contracting authority, and the situation of the contracting authority. These are presented in appendix E. The table shows the determinants the researchers found and to which extent they correspond to a category.

Most frequently mentioned by researchers are factors related to *project characteristics*, including the nature and type of the project (Alhazmi & McCaffer, 2000; Mohsini, 1993; PIANOo, 2016f), the degree of project complexity (Mohsini, 1993; Twynstra Gudde, 2016) and the possibility of making specifications (Gordon, 1994; Twynstra Gudde, 2016).

The situation of the client is mentioned second most frequently, by five out of the six researchers. Within this category the type of client is an important factor. Contracting authorities come in different shapes and sizes. The frequency in which a contracting authority procures is important, as more experience with procurements of certain types of works, goods or service leads to different behaviour towards tendering and a better availability of staff for tendering (Alhazmi & McCaffer, 2000; PIANOo, 2016f). Also important for the choice for a tendering procedure is the degree of control of design the client is planning to take (Alhazmi & McCaffer, 2000; Mohsini, 1993). The capabilities of the contracting authority is also an important factor, as this entails among other things the staffing of the contracting authority and the level of administrative burden it is willing to take (Gordon, 1994; PIANOo, 2016f). One other factor that can be important in deciding a tendering procedure are the policies the contracting authority must abide by. Policies are formed in political proceedings and imposed on a contracting authority (PIANOo, 2016f).

Cost, time and quality constitute the third most frequently mentioned category of determinants. Especially lead time relative to the expected project duration is considered important (Okunlola & Olugbenga, 2010; PIANOo, 2016f; Twynstra Gudde, 2016). Furthermore, Okunlola and Olugbenga (2010), also mention relative costs (certainty) and quality of the product as essential determinants.

The *Market situation* is the fourth most frequently mentioned category. Two important factors are dominant in this category: market supply (Alhazmi & McCaffer, 2000; PIANOo, 2016f; Twynstra Gudde, 2016) and competition (Okunlola & Olugbenga, 2010; PIANOo, 2016f). This means that a contracting authority will assess, prior to choosing a tendering strategy, whether there are many market players who can solve its problem and their potential to compete for the contract.

The degree to which the client is willing to take risks, or *risk avoidance* is mentioned as a determinant by Gordon (1994), Mohsini (1993) and specified in time and cost by Okunlola and Olugbenga (2010).

The last detectable category, mentioned in 5 of the 43 determinants is *'laws and regulations'*. The factors all state that the contracting authority is bound to choosing a tendering strategy that meets requirements concerning rules, regulations and restrictions (Alhazmi & McCaffer, 2000; Gordon, 1994; Mohsini, 1993; PIANOo, 2016f).

3.3.3 Implications for this research

The goal of this research project is to make recommendations that will increase the usability of the innovation partnership procedure for contracting authorities. The determinants found in the last paragraph imply that these recommendations should consider the project characteristics and situation of the client first and foremost, as these largely determine which procedure will be used. Essentially the choice for an innovation partnership should be made when the procured project is suitable for an innovation partnership and the contracting authority initiating the tender is willing and able run an innovation partnership. Cost, time and quality, as well as market situation must also be taken into account. A contracting authority should consider the procedures' costs and lead time and whether there are enough market parties to stimulate competition in an innovation partnership. Lastly, a contracting authority should assess the risks concerned with an innovation partnership procedure and should stay within the regulatory framework.

3.4 Product innovation in public construction projects

3.4.1 Introduction

The construction industry is less innovative than other industries in The Netherlands (De Bruijn & Maas, 2005) and the adoption of previously developed concepts is more common practice (Ozorhon, Abbott, & Aouad, 2013). Nevertheless, a number of scholars have been researching innovation in the construction industry. Their findings are used to substantiate the concept of product innovation in the context of this thesis. The chapter follows the Oslo Manual by Mortensen and Bloch (2005), issued by the Organisation for

Economic Cooperation and Development (OECD). The OECD is a cooperation of 30 governments addressing the economic, social and environmental challenges of globalisation. The Oslo Manual is useful as a starting point as it is, like this thesis, written to benefit public organisations and provides a complete overview of the different aspects of innovation applicable to the field of construction. It does however discuss innovation in a broad sense, all types of innovation in all market-oriented economic sectors, so work by other authors will be used to focus the research on product innovation in the field of construction.

The subchapter starts with a definition of innovation where after product innovation, the types of product innovations, respectively the innovation process and diffusion of innovation will be introduced. The subchapter ends with an introduction of demand-pull and technology-push of innovations.

3.4.2 Definition

Two definitions of innovation are presented. Firstly, the OECD (Mortensen & Bloch, 2005, p. 46) defines innovation as:

“An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.”

As this study directly concerns Directive 2014/24/EU, the definition from this directive will be used for the purpose of this thesis. Article 2 lid 22 gives the following definition:

“...the implementation of a new or significantly improved product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations inter alia with the purpose of helping to solve societal challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth.”

3.4.3 Product innovation

The definition shows that there are different kinds of innovations: product, service, process, including marketing methods, organisational methods, organisation or external relations (European Commission, 2014). This thesis focusses on product innovation.

The OECD categorizes innovation based on international research across a number of industries. Mortensen and Bloch (2005, pp. 47 - 52) describe innovation as being either ‘technical’, ‘organisational’ or ‘marketing’. Technical innovation can be a ‘product’

(material) or 'process' (intangible) innovation, whereas organizational innovation includes changes to organizational structure, introduction of advanced management techniques, and implementation of new corporate strategic orientations. Marketing innovations are process innovations aimed at increasing sales volumes or market share.

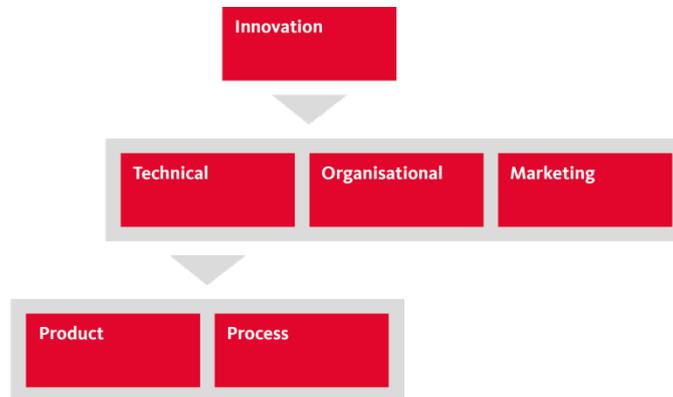


Figure 6: Categorisation in kinds of innovations (Mortensen & Bloch, 2005, pp. 47 - 52)

Product innovation is, in accordance to the directive's definition for innovation defined as:

...the implementation of a new or significantly improved technical artefact.

3.4.4 Types of product innovation

The theoretical framework by Slaughter (1998) can be used to further distinguish the types of product innovations that exist the OECD model. Slaughter defined a set of models of construction innovation, containing five types of innovation that are found in construction practices. These models are still regularly used in construction innovation theory today (Blayse & Manley, 2004). These are organised in Figure 7 from left to right based on two principles: the magnitude of change from current state-of-the-art associated with the innovation and the expected linkages of the innovation to other components and systems.

In this thesis incremental and radical innovations will be the focus. Incremental innovations are small changes based on current knowledge and experience. Incremental innovation occurs constantly and its impact can be predicted relatively well (Slaughter, 1998, p. 227). A radical innovation is a scientific breakthrough that is capable of changing an industry. Radical innovations are rare and hard to predict, and all previous linkages are irrelevant, both in systems and organisations (Slaughter, 1998, p. 227). Garcia and Calantone (2002, p. 120), in a literature review of technological innovation typology, explain that radical innovations are new technologies that change the market. A radical product innovation will cause other products to be discontinued. Radical innovations are generally based on technologies that have been developed outside of the industry where they are deployed. Developments from knowledge institutes are also used. This means

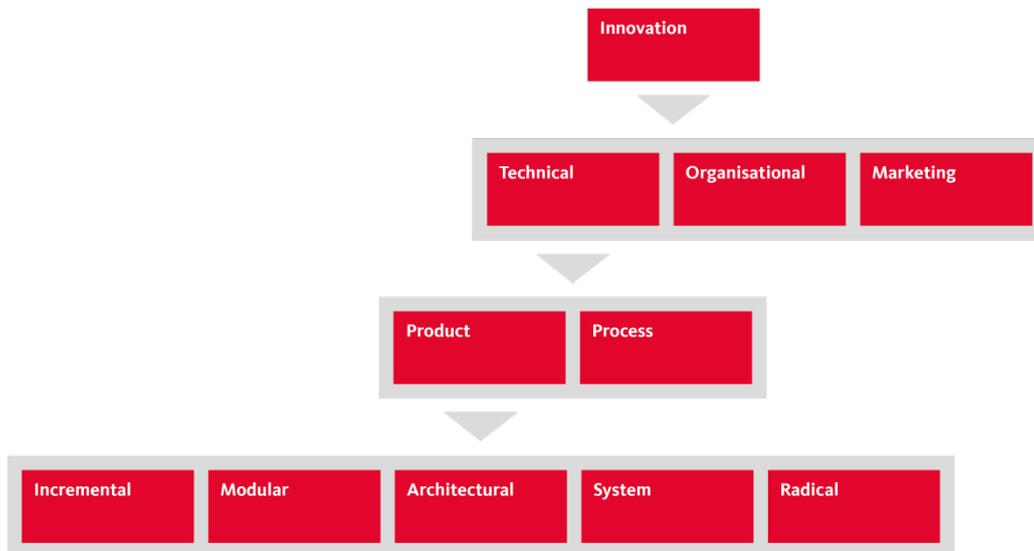


Figure 7: Categorisation in kinds and types of innovations (Mortensen & Bloch, 2005; Slaughter, 1998)

that radical innovations are almost never the result of a client’s wish, while the client can be a force in the adoption of a radical innovation (Garcia & Calantone, 2002; Slaughter, 1998). Henderson and Clark (1990, p. 12) give a clear overview of the differences, see Figure 8.

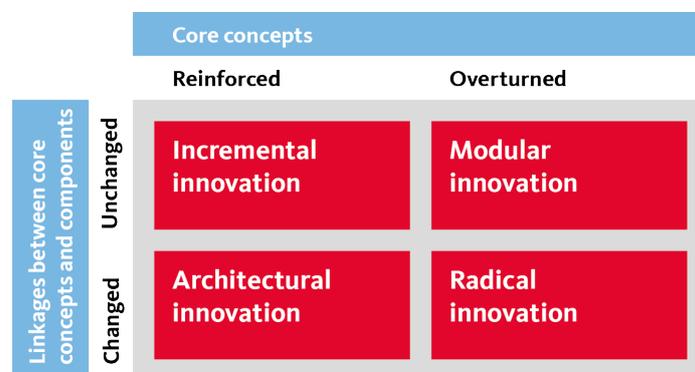


Figure 8: Framework for defining innovation (Henderson & Clark, 1990, p. 12)

3.4.5 Innovation phases

Directive 2014/24/EU (art. 31 lid 2) prescribes that the successive phases in an innovation partnership procedure should be structured following the sequence of steps in the research and innovation process. Therefore, it is important to gain insight into the innovation process. Aside from the Oslo Manual on innovation, the OECD also published the Frascati Manual on R&D activities (OECD, 2002). These two manuals combined give a comprehensive overview of the phases of the generation of an innovation. In short, their viewpoint is that innovation phases are the R&D phases combined with the production and diffusion of the development (Mortensen & Bloch, 2005). The phases followed in the

manuals are more explicitly presented by Cooper's (1983) process model. This model will be presented and compared to models and theories by Kline and Rosenberg (1986), because they opposed the linearity of the model proposed by Cooper; Nam and Tatum (1989) and Tatum (1987), because they presented models for the innovation process in the construction sector. These relatively old articles were produced in a time in which authors wanted to understand the innovation process, nevertheless these articles are still commonly used. Bygballe and Ingemansson (2014) presented modern viewpoints on the subject, focussing on construction.



Figure 9: Innovation process model (Cooper, 1983)

Figure 9 shows Cooper's seven stages. This so-called linear model has been a popular view on the innovation process since the second world war (Kline & Rosenberg, 1986). The first step is the generation of an *idea*. An idea can spark when technological possibilities are matched with the expected market demand and opportunities are seen. This can be done on request of the client (demand-pull) or by proactive actions of the developer (technology-push). By means of a screening the decision is made whether to continue development and turn the idea into a project (Cooper, 1983, pp. 6, 8). Nam and Tatum (1989, pp. 523 - 525) write that in construction projects, stages one and two are conducted by the client.

During the *preliminary assessment*, the technical and economic feasibility and attractiveness of the project are assessed in terms of expense and time (Cooper, 1983, p. 8).

The results of the preliminary assessment are used to begin formulation of the *concept*. This is done in three steps: concept identification, concept development and concept testing. The results of this phase are drawings, models, sketches or descriptions of the proposed product, that can influence market acceptance of the new product (Cooper, 1983, pp. 8 - 9).

Stage four is *development*. In this phase the concept is developed into a detailed plan (Cooper, 1983, p. 9). Nam and Tatum (1989, p. 526) call stages three and four the "designers bank of technology" in which an engineer or architect is hired by the client to form a concept and develop it.

After development, the new product can be *tested* (stage five) and *trailed* (stage six). In these phases the product is improved by creating solutions for found problems (Cooper, 1983, p. 9). This 'problem solving' is also explicitly addressed by Nam and Tatum (1989, p. 523). Tatum (1987, p. 650) calls these stages "experiment and refine". When the product is sufficiently tested, it is *launched*, or executed in the case of constructions.

While Cooper (1983) describes the innovation process as a linear process in which one stage follows the other, other researchers argue against this view. They state that, while they mostly see the same stages in the process, the stages overlap. Also it is rather a rule than an exception that multiple steps are iterated until the product is completed (Bygballe & Ingemansson, 2014, p. 519; Kline & Rosenberg, 1986, p. 290; Nam & Tatum, 1989, pp. 523 - 524; Tatum, 1987, p. 650).

Furthermore, Cooper (1983) describes the innovation process from the viewpoint of industrial product development where all steps are executed by a single actor. This is in contrast with the traditional construction processes, where the stages are handled by a number of actors: stages one and two are done by the client and concept and development are done by an architect and engineer. In the last three stages the contractor has a prominent role in the problem solving phase (Nam & Tatum, 1989).

3.4.6 Diffusion of innovations

Diffusion is the geographical and/or economical spread of an innovation. It leads to information on the use of an innovation and therefore stimulates the quality of the innovation (Mortensen & Bloch, 2005, pp. 78, 86). Theory on the diffusion of innovations was first published by Rodgers (1983), and is still used today. This theory is in turn compared to articles by Blayse and Manley (2004) and Nam and Tatum (1997) for their construction-perspective.

Rogers' (1983, p. 164) conceptual models for the adoption of an innovation consists of five stages:

1. Knowledge, when the adopter is exposed to the existence of the innovation;
2. Persuasion, when the adopter forms a favourable or unfavourable attitude toward the innovation;
3. Decision, when the adopter engages in activities that lead to a choice to adopt or reject the innovation;
4. Implementation, when the adopter puts the innovation to use; and
5. Confirmation, when the adopter seeks for reinforcement of an innovation-decision already made.

In public procurements, the client is a contracting authority. Contracting authorities are, in addition to manufacturers, the key industry participants in the stimulation of innovation (Blayse & Manley, 2004; Nam & Tatum, 1997). The more demanding a contracting authority is, for instance in its selection and award criteria, the more innovative the solutions that will be produced by a contractor. Also, a contracting authority experienced with innovation is more likely to stimulate innovation in its procurements (OGC, 2015). Nam and Tatum (1997) found that contracting authorities who are "technically competent" are most likely to set the preconditions for innovative behaviour in projects. Technically

competent clients, according to Nam and Tatum (1997, p. 265), are those that: maintain internal construction management groups; conduct internal R&D or design projects themselves; seek to supplement their technical competence; have a history of innovation; are professional; and / or maintain long-term relationships with the same designers and contractors.

Public procurement can accelerate the diffusion of innovations. By using a particular innovation, a contracting authority can show its approval of the technology and increase awareness of its existence. The contracting authority then functions as ‘launching customer’. This is the first step in Rodgers’ (1983) conceptual model for the adoption of innovations. In this way a publicly procured innovation can spill over to the private market (Aschhoff & Sofka, 2009, pp. 1243 - 1244; Rothwell, 1984).

The effect of a public launching customer can be illustrated by a graph displaying the rate of awareness-knowledge of the market of an innovation and the rate of its adoption (Rodgers, 1983, p. 204), Figure 10.

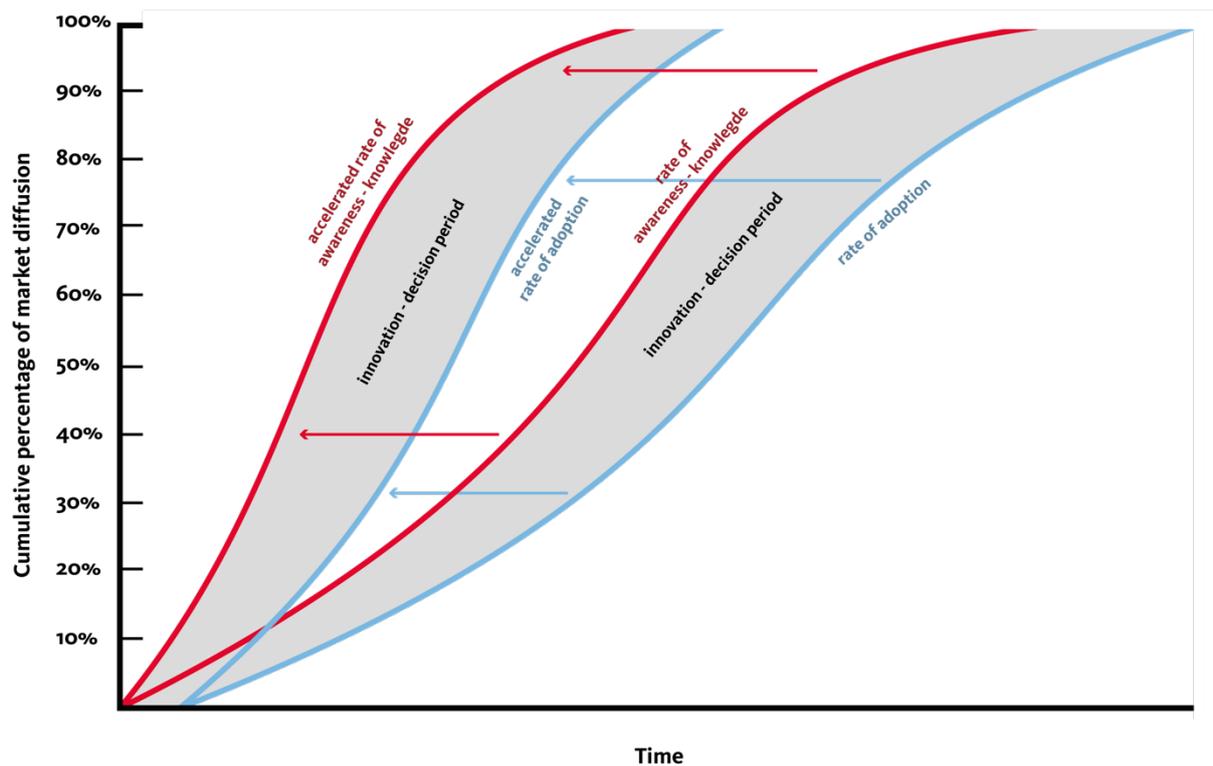


Figure 10: Acceleration of diffusion after Rodgers (1983)

3.4.7 Demand-pull and technology-push in construction context

Lastly, a mechanism is presented that is not discussed in the Oslo Manual, while it does impact the subject of this thesis: ‘demand-pull’ versus ‘technology-push’. The terms ‘demand-pull’ and ‘technology-push’ have already been used a couple of times but in this paragraph their differences will be discussed.

According to Rothwell (1994, pp. 7 - 8), the technology-push innovation process is as follows: basic science forms the foundation of design and engineering of a product, which is manufactured, marketed and sold, depicted in Figure 11. This process is driven by a private party, who develops and sells the products.

In other cases, the innovation process starts with a need expressed by the eventual buyer or user, called demand-pull. In Rothwell's (1994, pp. 8 - 9) terms: A market need leads to development, manufacturing and sales of the product, as shown in Figure 12. A tendering procedure is typically a demand-pull process, where the contracting authority formulates the market need.



Figure 11: Technology-push (Rothwell, 1994, p. 8)



Figure 12: Demand-pull (Rothwell, 1994, p. 9)

The implication of this difference in accessibility issues is that radical innovations are unpredictable and usually originate in a context other than the client's. That makes it nearly impossible to generate radical innovations in response to a tender, a demand-pull construction. This can however be a stimulant for incremental innovation (Garcia & Calantone, 2002, p. 123; Slaughter, 1993, pp. 542 - 544; 1998, p. 230). The innovation partnership is currently the only tendering procedure that offers opportunities for technology-push and therefore radical innovation (Wolswinkel, 2015, p. 71).

3.4.8 Summary

Product innovation in the construction industry can be described with respect to the topic of this thesis by giving a definition of innovation and more specifically product innovation, and focussing on the innovation process, diffusion of innovations and the innovation mechanisms demand-pull and technology-push.

In this thesis, innovation is defined as (Directive 2014/24/EU, art. 2.22):

“...the implementation of a new or significantly improved product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations inter alia with the purpose of helping to solve societal

challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth.”

In this thesis product innovation specifically is addressed. It is accordingly defined as:

...the implementation of a new or significantly improved technical artefact.

Five types of product innovations are distinguished: incremental, modular, architectural, system and radical. Incremental and radical innovations differ from each other since incremental innovation improves a concept without affecting the linkages with its components while radical innovation replace a concept, completely overhauling linkages (Slaughter, 1998).

The innovation process exists of seven steps, that overlap and do not follow a chronological order, but however do exists in the process: Idea; preliminary assessment; concept; development; testing; trail and launch (Cooper, 1983).

When an innovation has been developed it can be adopted by the public. This is called diffusion of innovation and follows five stages: knowledge, persuasion, decision, implementation and lastly confirmation (Garcia & Calantone, 2002, p. 123; Slaughter, 1993, pp. 542 - 544). A contracting authority as launching customer stimulates innovations by accelerating the diffusion of innovations. This happens when a public organisation implements innovative technologies (on a large scale) (Aschhoff & Sofka, 2009; Rothwell, 1984, 1994).

Lastly the main difference between demand-pull and technology-push is that the client is the initiator of a demand-pull innovation process, and mostly incremental innovations will be developed, while the manufacturer initiates a technology-push which is a viable process for creating a radical innovation (Rothwell, 1994). The contracting authority must be aware of the differences between an incremental or radical innovation, to decide what tendering strategies to adopt. All tendering procedures can generate a demand-pull of innovations, resulting in incremental innovations. Only the innovation partnership can potentially create a technology-push, and therefore radical innovations (Garcia & Calantone, 2002; Slaughter, 1993, 1998; Wolswinkel, 2015).

3.5 External factors impacting the innovation partnership

The context of the innovation partnership will be described by a model based on the five-forces of Porter (1979), as was introduced in chapter 2.2.1. Using the model, the analyst can anticipate external opportunities and threats. Instead of a company or product, for which

the model is commonly used, it is adapted to fit the innovation partnership procedure, as shown in Figure 13. In the situation of the innovation partnership ‘suppliers’ are contractors, who are assessed based on their opportunities abilities to be involved in the procedure. Porter’s ‘buyers’ are in this model the contracting authorities and where Porter speaks of ‘rivals’, ‘alternatives’ would fit this context better: other tendering procedures that can be used in order to reach the same goal.

The five forces represent external powers that form the context in which the innovation partnership is used. New entrants, substitutes, contractors, contracting authorities and alternative tendering procedures will be assessed based on their influence on the usability of the innovation partnership.

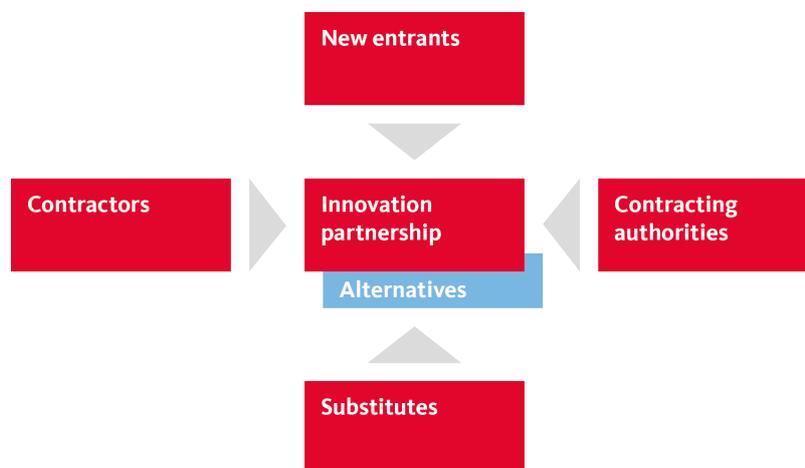


Figure 13: Adaption of the five-forces model

3.5.1 New entrants

New entrants are new tendering procedures that can be potentially used instead of the innovation partnership. Since the revised Tendering Act was adopted July 1st, 2016, there is no pressure on the innovation partnership from possible new entrants. It is a new entrant itself.

3.5.2 Substitutes

Substitutes are means other than procurement that can be used for the same goal: the development of innovations in public accessibility projects. Aschhoff and Sofka (2009) analysed the effect of public procurement on innovation with respect to other forms of public support: regulations, R&D subsidies and basic research at universities. Their results show that only knowledge spillovers from universities have an equally strong positive effect on the market success of innovations. Neither regulation nor public funding seem to have a significant impact.

The Sociaal-Economische Raad (2013, 2015) drafted the energy agreement with 47 signatories in 2013. These corporations, governments and institutions promised each other to limit the use of energy, increase the share of sustainable energy and create jobs. To stimulate the developments that lead to this goal in mobility the government uses a mix of regulations and financing strategies, aimed at supporting private innovation initiatives. Public procurement is not considered a tool for the development of new technologies in the agreement and is only mentioned for three energy-related projects. This means that in practice other tools are generally preferred over public procurement, which poses a threat to the use of the innovation partnership for the stimulation of sustainable developments.

Lastly, an unsolicited proposal can in some cases substitute the innovation partnership as a driver of innovation (OGC, 2015). The contracting authority can create an invitation to tender based on the proposal, making sure not to jeopardise the proposer's intellectual property.

3.5.3 Contractors

On the supplier-side of the partnership there are two kinds of contractors: conventional contractors (builders and manufacturers) and unconventional contractors.

Concerning conventional contractors, Slaughter (1993) argues that builders and manufacturers can be a fruitful source of innovation. Builders make use of experience and expertise creating innovations based on integration of different parts of the assignment, while manufacturers of building supplies only focus on the element itself. Manufacturing firms do however have a large share in convention innovation in the construction sector. These firms operate in a more stable market and are therefore able to maintain R&D programmes. Manufacturers are constantly improving their products and their innovations have shown to improve the performance of the industry (Anderson & Manseau, 1999; Blayse & Manley, 2004).

Unconventional contractors differ from contract to contract. As the capacity to solve problems is a selection criterion in the innovation partnership (Directive 2014/24/EU, art. 31 lid 6), it allows for all kinds of companies, including start-ups, to participate in the partnership. Telles and Butler (2014) warn that a lack of experience of an unconventional contractor or start-up is a barrier when responding to a tender invitation. They fear the contracting authority will choose more experienced tenderers with less capacity to solve the problem because they know more about how to formulate a tender.

3.5.4 Contracting authorities

The contracting authorities potentially making use of the innovation partnership are the same as those in the description of public procurement in paragraph 3.1.3 and as stated are

divided into three groups: traditional state authorities, bodies governed by public law and combinations of the first two.

Contracting authorities operate in complex institutional contexts, on multi-level arrangements, which constrain their responsiveness. They are subject to rules and regulations, policy, budgets of public funds and sometimes, for instance in the case of water boards, to direct political decision-making (Head, 2011).

The risks and costs affiliated with the innovation partnership is predicted to lead to its use merely by central contracting authorities like Rijkswaterstaat (Velthuisen, 2014, p. 44; Wolswinkel, 2015).

Innovation undeniably involves risks. The culture of contracting authorities tends to be risk-averse, as they are held accountable by law. However, without a fair distribution of the risks among parties that participate in innovation, an optimal innovation process is impossible. Also, innovators need to be rewarded for taking risks. If the reward is in place, contractors will have incentives to adopt new ideas and propose potential innovations to the client Winch (1998, p. 274). The OGC (2015, p. 5) argues that risks can be embraced as long as they are effectively assessed and managed.

3.5.5 Alternatives

Similarities and differences of four alternative tendering procedures will be discussed: The PCP, competitive procedure with negotiation (CPN), competition and CD. These procedures were introduced in chapter 3.1.5, but are in this paragraph compared to the innovation partnership procedure. The alternatives are discussed based on the following Figure 14, which is based on Sample (2014).

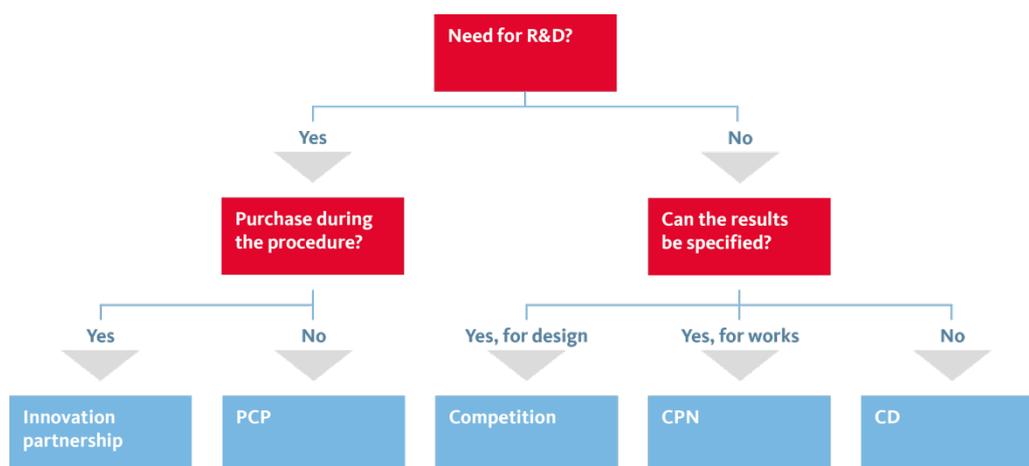


Figure 14: Decision model for PPI procedure, based on Sample (2014, p. 18)

Pre-Commercial Procurement

The Pre-Commercial Procurement procedure (COM(2007)799), in contrast to the innovation partnership, is not used for the purchase of innovative products or services, but for the research and development of said products or services. The PCP procedure follows the same route as the innovation partnership up until the final tender. In the innovation partnership, after the negotiation rounds the works that were conceived during the R&D phases is awarded. The PCP procedure on the other hand stops after the R&D phases and leaves the contracting authority the possibility to issue a tender invitation to the market. The parties that participated in the R&D phases, amongst all others can respond with their tender. Similar to the innovation partnership, a PCP may not result in state aid. This is prevented in the communication (COM(2007)799) provided that the R&D project has public interest. (Sample, 2014; Van Nass, 2015)

A difference between the PCP and the innovation partnership addressed by Telles and Butler (2014, p. 29) is that COM(2007)799 does give an overview of the R&D phases. This is depicted in Figure 15.

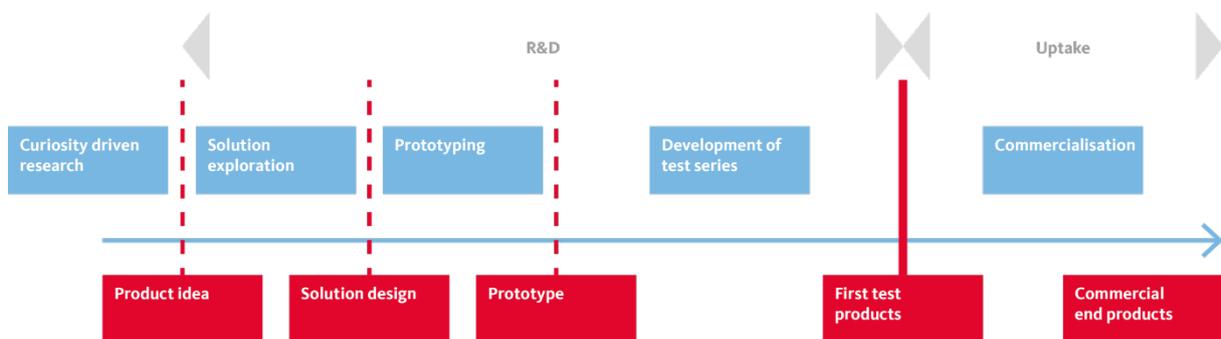


Figure 15: PCP process (European Commission, 2007, p. 3)

Competitions

Competitions (Directive 2014/24/EU, art. 32 lid 4) can lead to innovations, as the tenderers are free to choose a design they seem fit (Essers, 2013, p. 533). The competition makes use of the creativity that exists in the market and focusses on the diverging activities in the beginning of the R&D process. The innovation partnership has a different aim, as it follows the whole R&D process. The competition is ideally suited for architectural and engineering firms while the innovation partnership is, depending on the project, open to all kinds of entrepreneurs (Essers, 2013, p. 533; Wolswinkel, 2015, p. 28).

Competitive Procedure with Negotiation

The procedure of the competitive procedure with negotiation (CPN) (2014/24/EU, art. 29) is similar to the innovation partnership regarding the process of selection, negotiation rounds and awarding of the contract. The main difference is the motivation for using the procedure. The CPN is used for purchasing goods, works and services for which design,

adjustments or innovation are needed. The CPN is only applied in cases where the contracting authority knows what changes or innovations are needed, as opposed to the innovation partnership, where these changes are unknown (Sample, 2014, pp. 22 - 23). Other differences are that in a CPN the negotiation phases do not explicitly have to be aligned with the innovation phases, while in the innovation partnership negotiations can be done with a single party and tenderers in the procedure of the innovation partnership aim to eventually participate in the partnership. (Essers & Van Blaaderen, 2015, p. 205; Sample, 2014, pp. 22 - 23)

Competitive dialogue

Lastly, the competitive dialogue can only be used in the letting of complex contracts (Essers, 2013, pp. 534 - 535; OGC, 2015, p. 12). This range of use is specified in Directive 2014/24/EU art. 26 lid 4, and matches the CPN. The main difference between the CD and innovation partnership are the need for R&D in order to solve the problem. Similarities include the possibility to structure the negotiations into rounds and the possibility to offer payments for deliverables during negotiations (Sample, 2014, pp. 21 - 22). Wolswinkel (2015, p. 62) furthermore concludes that the CD and innovation partnership are both good tools for the development of incremental innovations.

4. THEORETICAL SWOT ANALYSIS RESULTS

Following the methodology described in paragraph 2.4.1, in the theory that has been studied for the literature study a number of strengths, weaknesses, opportunities and threats have been found. These are presented in the theoretical SWOT analysis (T-SWOT). First, an overview of the T-SWOT will be given. The findings are clarified under the corresponding SWOT-category. The T-SWOT is tested in practise by means of a questionnaire, presented at the end of this chapter. The T-SWOT serves as input for the SWOT/TOWS analysis in combination with the results from the questionnaire.

4.1 T-SWOT overview

<p>Strengths</p> <ol style="list-style-type: none"> 1. Tendering is a stimulant for incremental innovations; 2. Possibility of technology-push; 3. Flexible procedure; 4. Possibility of tendering a new type of project; 5. A tool for development and direct purchase of innovations; 6. Possibility of contracting a single partner; 7. Exploit creative strengths of market. 	<p>Weaknesses</p> <ol style="list-style-type: none"> 1. Little practical experience; 2. Muddled definition of 'tendering'; 3. Ambiguous guidelines; 4. R&D phases are not elaborated; 5. The preferred supplier is chosen before the project scope is determined; 6. Ambiguities concerning cost and duration; 7. High administrative costs.
<p>Opportunities</p> <ol style="list-style-type: none"> 1. Cooperation of public and private partners; 2. A launching customer accelerates innovation diffusion; 3. Functional and performance-based specifications leave the option of creative ideas for tenderers; 4. University spillovers can be used; 5. Joint procurement by multiple contracting authorities; 6. Image improvement of contracting authorities; 7. MEAT-criteria can stimulate sustainable developments. 	<p>Threats</p> <ol style="list-style-type: none"> 1. Radical innovations are unpredictable; 2. Risk-averse contracting authorities; 3. Overregulation; 4. Usage of other tools to stimulate innovation; 5. Procedural risks; 6. Limited range of application; 7. Creating a monopolist who owns the intellectual property.

Table 3: Theoretical SWOT analysis

4.2 Strengths

1. When in response to a tender an innovation is developed, this is essentially a demand-pull construction. This can *stimulate incremental innovation* when it is aimed at the improvement or substitution of an existing product (Garcia & Calantone, 2002, p. 124; Slaughter, 1993, 1998). The same mechanism is expected for the innovation partnership.

2. Wolswinkel (2015, pp. 71 - 72) found that the innovation partnership procedure differs from others in offering opportunities for the *tendering of radical innovations*. There are options to encourage a technology-push process, creating opportunities for the development of radical innovations
3. Directive 2014/24/EU stipulates that the structure of the partnership has to follow the innovation phases, but doesn't specify how. This leaves *flexibility* for the CA to adjust it to their specific needs. Chao (2014, p. 229) states that the new procedure offers the contracting authority more flexibility than other procedures to stimulate the market to come up with innovative solutions for complex projects.
4. The innovation partnership is considered potentially helpful in cases where there is a specific need for works that are not yet provided by the market (Chao, 2014, p. 227; Jansen, 2016, p. 157; PIANOo, 2016c). The innovation partnership opened the possibility of *tendering a new type of project*, which was found to be the most important determinant for the choice for a tender procedure in subchapter 3.3. The potential to tender a new range of projects is considered a strength.
5. The fact that a contracting authority is enabled to *directly purchase the innovation* that is being developed in the partnership is considered a strength. This can increase the willingness of the market party to invest in the R&D phase (Petit, 2014, p. 9; Wolswinkel, 2015, p. 71). Also, innovation is not only stimulated as a demand-side policy instrument by using public procurement, it is also stimulated in practice (Van Nass, 2015, pp. 214 - 215).
6. In the innovation partnership procedure, *a single partner can be contracted*, which addresses the need for a very particular solution only being offered by a single market party (Petit, 2014, p. 9).
7. Concerning contractors, the innovation partnership could *exploit the innovative capabilities* of builders as well as manufacturers and unconventional contractors (Telles & Butler, 2014, p. 28).

4.3 Weaknesses

1. The revised Tendering Act 2012, which contains the innovation partnership has only entered into force on the July 1st, 2016, a month before this research project started. Only a handful of European projects have started and none finished. This means there still exists *little practical experience*.
2. In the directive, *'tendering' is not defined*, throughout literature multiple definitions are used. Prier and McCue (2009) even speak of a 'muddled definition'. This is a weakness, not only of the innovation partnership but for all tendering procedures. In the case of the

usability of the innovation partnership itself it could be a threat that the actors who are new to the procedure have a distorted image of what tendering is.

3. Multiple authors remark that the regulations on the innovation partnership contain *ambiguities* concerning R&D, requirements and specifications and the definition of innovation (Chao, 2014, p. 228; De Koning, 2015; De Wijs & Van der Kooi, 2016; Petit, 2014, p. 9; Telles & Butler, 2014, pp. 29-31). This is a weakness for the usability of the procedure because it possibly induces uncertainties for the users.

4. Not one clear sequence of innovation process-steps is agreed upon by the researchers. However, Directive 2014/24/EU, art. 31 lid 2 states: “The innovation partnership shall be structured in successive phases following the sequence of steps in the research and innovation process, which may include the manufacturing of the products, the provision of the services or the completion of the works.” Telles and Butler (2014, pp. 27 - 28) find these instructions unclear. *The directive neither gives a definition of the R&D process, nor research, prototyping or manufacturing.* Furthermore, the directive does not make clear whether the phases correspond to the PCP phases.

5. In an innovation partnership the *preferred supplier is chosen before the R&D is conducted*, when no information is available on what the supplies will entail. This brings in, according to Telles and Butler (2014, p. 28), the risk that tenders will not be compared based on who can deliver the best solution but based on broader selection criteria and negotiations.

6. The directive is poorly drafted with respect to *cost and duration* of the innovation partnership and how development costs can be divided amongst the partners (Petit, 2014, p. 9; Telles & Butler, 2014, p. 29). This will create uncertainties for both a contracting authority and market parties in using the procedure.

7. Schoenmaekers (2016, p. 7) foresees impracticalities concerning the *high administrative costs* that the innovation partnership is bound to have, being a new tendering procedure.

4.4 Opportunities

1. The *partnership*-element of the innovation partnership could be beneficial to the result and usability of the procedure. Bygballe and Ingemansson (2014) stressed that the shift from competitive tendering to partnering in procurement stimulates innovative behaviour. Within a partnership, risk and gains are shared, rewarding an innovator when he takes risk. This reward is an incentive to adopt new ideas to propose better solutions to the client. The innovation partnership can create a long-term collaboration between public and private parties. This influences the parties' capacity to produce high-quality results (De

Koning, 2015; Goudt, 2016). This is considered an opportunity for the usability of the procedure because it is a potential encouragement for CA's.

2. In public procurements, the client is a contracting authority. Contracting authorities are the key industry participants in stimulating innovation in addition to manufacturers (Blayse & Manley, 2004; Nam & Tatum, 1997). The more demanding a contracting authority is, for instance in its selection and award criteria, the more innovative solutions will be produced by a contractor. Also, the more a contracting authority is experienced with innovation, the more likely it is to stimulate innovation in its procurements (Barlow, 2000; OGC, 2015). Nam and Tatum (1997) found that contracting authorities who are “technically competent” are most likely to set the preconditions for innovative behaviour in projects. Rodgers (1983, p. 204) showed that the diffusion of innovations is accelerated when a public party procures an innovation, or functions as *launching customer*. This is considered an important opportunity for a CA that is in the process of procuring innovation.

3. As discussed in subchapter 3.1.6, creative solutions will most likely be achieved when the contracting authority makes use of *functional or performance based specifications*. These forms of specifications leave flexibility for the contractor to find other ways of meeting requirements. The alternative solutions that the contractors can come up with are potentially of better quality or create long-term improvements (OGC, 2015, pp. 16 - 17). The innovation partnership can be used in cases where the contracting authority has a problem but no solution. Specifying the problem rather than the solution in an outcome specification would take away the weakness foreseen by De Koning (2015) and De Wijs and Van der Kooi (2016) concerning setting up requirements and specifications for a product that has not yet been designed.

4. *University spillovers* can have an equally positive effect on the market value of innovations as procurement of innovations (Aschhoff & Sofka, 2009). These spillovers could potentially be exploited through innovation partnerships by involving universities or university-start-ups in the partnerships.

5. Contracting authorities can tender out an innovation partnership *collectively*. In this manner a central government can start a tender in cooperation with a water board and for instance a province in order to get a multi-beneficiary result in which all interests are integrated (Beukema, 2015).

6. Goudt (2016) argues that by making use of the innovation partnership, contracting authorities could *improve their image* as innovative public authority.

7. The set-up of the innovation partnership offers opportunities for *sustainable developments*, as it can set sustainability demands as award criteria and can integrate these as a key factor during the whole R&D process (Schoenmaekers, 2016, p. 7).

4.5 Threats

1. Generating radical innovations in response to a tender is practically impossible, as radical innovations are *unpredictable* and usually originate in a context other than the clients (Garcia & Calantone, 2002; Slaughter, 1993, 1998).
2. & 3. The British Office of Government Commerce sees *risk-averse contracting authorities* and *overregulation* as two of the biggest threats to tendering of innovation. It argues that risks can be embraced as long as they are effectively assessed and managed (OGC, 2015). Although the OGC paper concerned all manners of public procurement, these threats are concerned applicable to the innovation partnership procedure.
4. A theoretical threat is that current policies focus more on *regulations and subsidies* to stimulate innovation than on tendering (Sociaal-Economische Raad, 2013, 2015).
5. Since the directive was published, authors have reacted on the *financial and practical risks* of using a new procedure for the contracting authorities. These risks bring the threat that contracting authorities won't be willing to use the innovation partnership at all (De Koning, 2015; De Wijs & Van der Kooi, 2016).
6. The *range of application* poses a threat, as in The Netherlands only a handful of contracting authorities is best suited to use the innovation partnership. When these authorities won't take the first step the innovation partnership will not build up status as a practical or useful procedure (Velthuisen, 2014, p. 44; Wolswinkel, 2015).
7. Lastly, *intellectual property* is discussed in the Tendering Act 2012 art. 2.126b lid 6. The article states that the contracting authority determines which rules apply concerning intellectual property. Holding the intellectual property as contracting authority can pose problems as third parties may try to claim this property. Giving the intellectual property to the contractor can in its turn create the weakness addressed by Petit (2014, p. 9): the contracting authority needs to avoid becoming subject to a *self-created monopolist*.

4.6 Questionnaire

Following the methodology described in paragraph 2.3.4, a questionnaire was send out to test the T-SWOT.

4.6.1 Respondents

The questionnaire was sent out to the interviewees, to be shared internally. The same questionnaire was published on the 'Procurement Forum' via PIANOo. This resulted in a total of 15 responses. The goal of the questionnaire was to test the T-SWOT to practice, as

was discussed in chapter 2.3.4. The questionnaire can be found in appendix D. The responses to the questionnaire came from people in the following fields: see Figure 16.

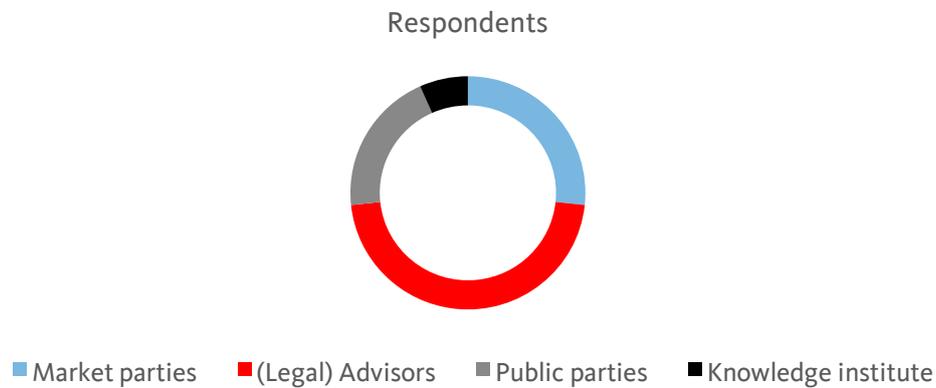


Figure 16: Respondents

The level of professional expertise was assessed by asking whether the respondent was frequently occupied with tendering and innovation and in what way he or she knows the innovation partnership procedure, shown in Figure 17.

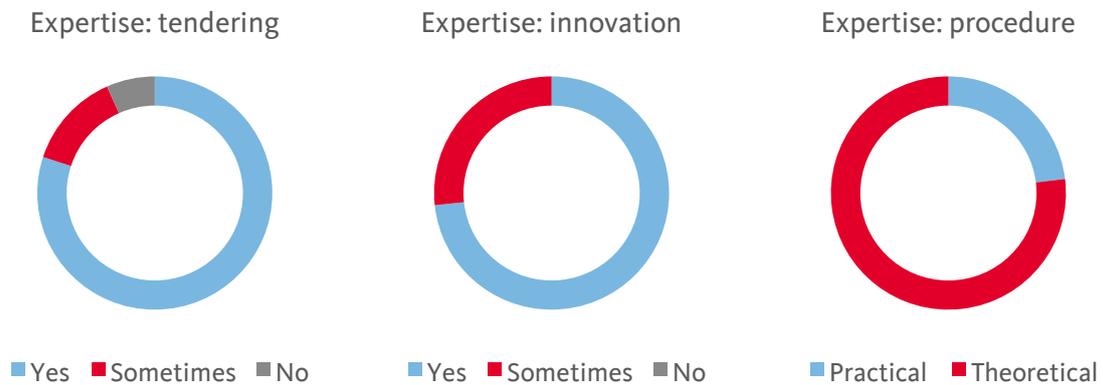


Figure 17: Expertise of respondents

4.6.2 Questionnaire data

The respondents were asked to give each statement in the T-SWOT a score between 0 and 5; a 0 indicates they did not agree with the statement and 5 indicates they do agree with the statement.

Figure 18 shows the results.

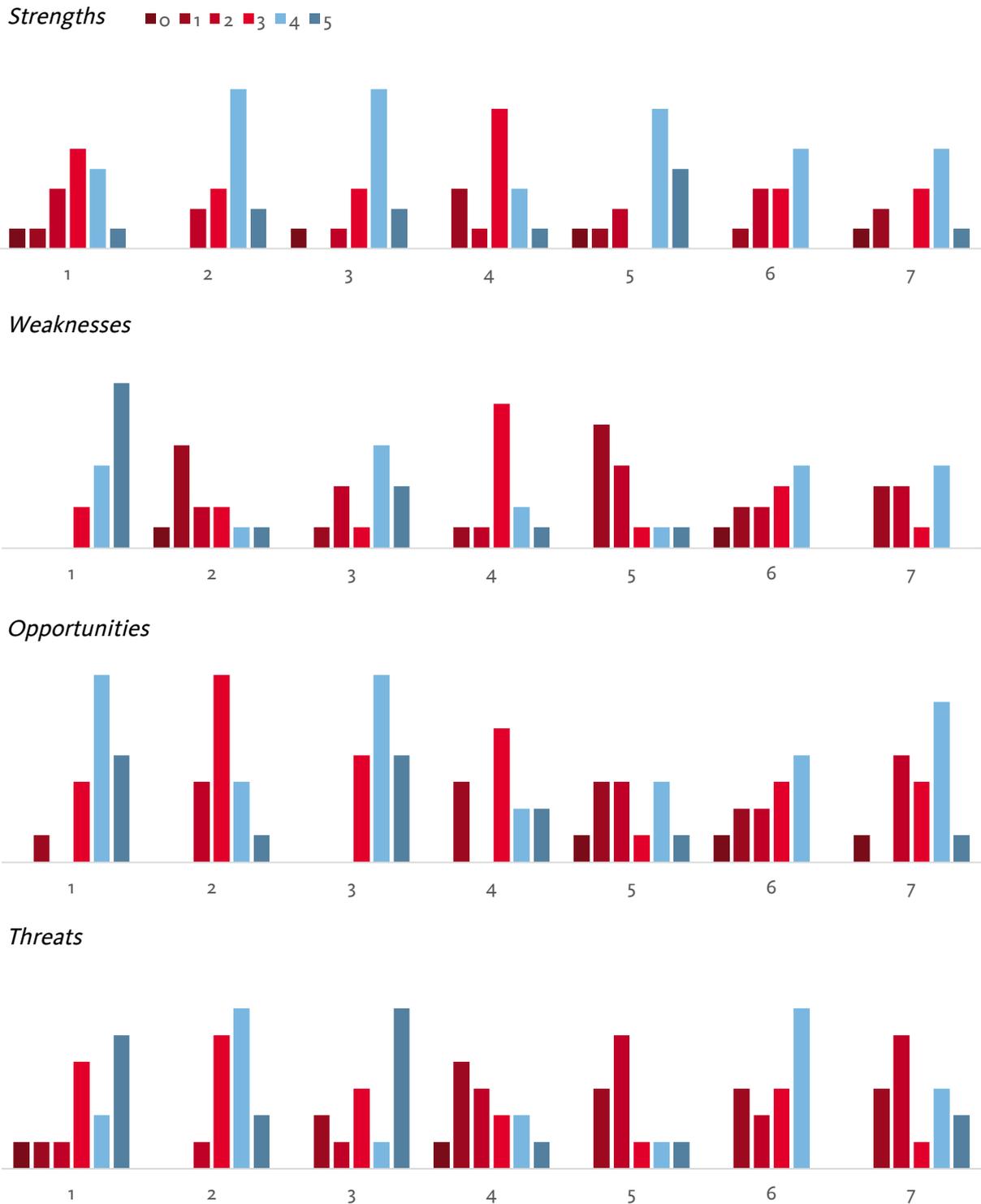


Figure 18: Questionnaire results

4.6.3 Questionnaire findings

The questionnaire results are quantitative and as such the analysis has been done in a straightforward numerical manner: SWOT properties with a mean score below a numerical limit will be discarded for further research, as the respondents disagree with the

theoretical findings. The numerical limit of the average score is set at 2 because scores 0, 1 and 2 indicate that the respondent is negative towards the truth of the finding. The properties scoring an average of 2/5 or lower:

- Weakness 2: Muddled definition of 'tendering'; and
- Weakness 5: The preferred supplier is chosen before scope is determined.

Possible explanations for these discrepancies are that 'tendering' is a commonly used term with a definition defined on a national scale, for instance in the Tendering Act or by authors like Brackmann and Verlinden-Bijlsma (2011), and that the preferred supplier is chosen at a moment when the contracting authority is aware of its needs and knows what the suppliers need to be able to do, even when the scope is not determined yet.

5. FIELD RESEARCH

Following the methodology described in paragraphs 2.3.1 and 2.3.2, for the field research in this research project a series of interviews was conducted. In this chapter an overview of its results is given.

5.1 Interviewees

A total of 18 interviewees have been met over the course of a month. The goal of the interviews was to find the strengths, weaknesses, opportunities and threats of the innovation partnership procedure as they are perceived in practise. The list of interviewees can be found in appendix A. The interviewees were chosen from three groups of field experts, corresponding to the groups in a tender procedure: Public parties, market parties and (legal) advisors. The three groups were portioned evenly over the total number of interviews, shown in Figure 19.

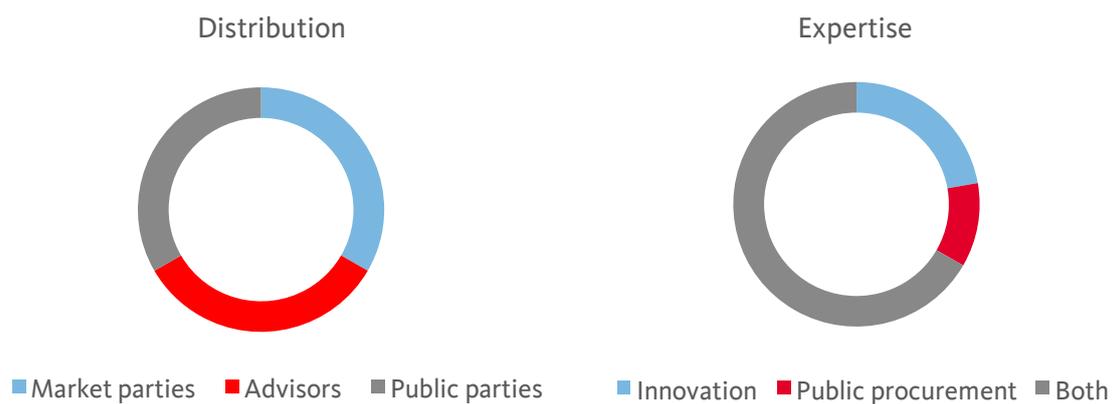


Figure 19: Distribution and expertise of interviewees

Each interview started with the question whether the interviewee is generally occupied with public procurements, innovation or both, as shown in Figure 19. The figure shows that most interviewees had experience with both which was important for the interview as the interview manual, appendix C, contained questions on public procurement, product innovation and procurement of innovations.

5.2 Results interviews

Following the methodology described in paragraph 2.3.3, all interviews were recorded and transcribed into extended text. In this extended text, statements concerning the research object have been highlighted and these are coded following the grounded theory, as

presented in appendix F. The axial codes that were found are presented in the SWOT framework in chapter 6.

5.3 Other activities

Lastly, during the research project multiple meetings were attended to gain insight into tendering, the innovation partnership procedure and the perspectives of public and private parties during tendering procedures. The three most valuable experiences were:

- the fair 'Verkeer, mobiliteit en parkeren', where the innovation partnership 'Talking Traffic' had its public kick-off;
- the evaluation of the PCP 'CHARM' at Rijkswaterstaat, where insight was gained into the value of a procured R&D project for a public entity; and
- a day-long working session of the innovation partnership 'Talking Traffic' where the cooperation of the public and private partners during the procedure could be experienced, as well as the effort that is taken to run the procedure.

6. PRACTICAL SWOT ANALYSIS RESULTS

Following the grounded theory (Saunders, 2011, p. 509), described extensively in paragraph 2.3.3, the qualitative interview data have been coded, see appendix F. The axial codes that were found are presented in the P-SWOT and elaborated on in the following paragraphs. The SWOT methodology is described in paragraph 2.4.1.

6.1 P-SWOT overview

<p>Strengths</p> <ol style="list-style-type: none"> 1. A tool for development and direct purchase of innovations; 2. Exploiting market strengths; 3. Specific usability. 	<p>Weaknesses</p> <ol style="list-style-type: none"> 1. Little practical experience and jurisprudence; 2. Procedural barriers for innovators.
<p>Opportunities</p> <ol style="list-style-type: none"> 1. MEAT-criteria can stimulate an innovative approach; 2. Image improvement; 3. Mobilise internal support; 4. The contracting authority as launching customer for promising innovations; 5. Involving start-ups; 6. Balance competition and cooperation; 7. Cooperation of public and private partners; 8. Specifications as a framework. 	<p>Threats</p> <ol style="list-style-type: none"> 1. The nature of innovation conflicts with tendering; 2. Technically incompetent actors; 3. The conservative industry and risk averse contracting authority; 4. Vendor lock-in; 5. Little willingness of public entities; 6. Innovations bring risks; 7. Selection criteria can be an obstacle for innovators; 8. Lack of mutual trust; 9. Limited range of application; 10. Unusable standard-contracts; 11. Lack of profitable business opportunities.

Table 4: Practical SWOT analysis

6.2 Expert panel

Following the methodology described in paragraph 2.4.3, the P-SWOT was validated by an expert panel consisting of representatives from different actors in an innovation partnership. The panel consisted of:

- Maarten de Mos, Rijkswaterstaat
- Dik van Manen, Twynstra Gudde
- Andy Berkouwer, Be-Mobile
- Floris den Boer, PIANOo
- Fanauw Hoppe, AT Lawyes
- Tim Beukema, AT Osborne (Legal)
- Ineke Meijer, AT Osborne (Infrastructuur, Gebiedsontwikkeling en Milieu)

The P-SWOT was presented to the expert panel during the meeting. The goal was twofold: to validate the analysis as it is and to complement the findings. The panel-meeting gave a critical review of the complete P-SWOT. The outcomes were included in the analysis as presented in Table 4.

6.3 Strengths

1. In a total of 21 statements by the interviewees is stated that the innovation partnership is an addition to the instruments that can be used to *procure innovations*, fulfilling a need or solving a problem a public entity is concerned with. Interviewees stated that contracting authorities are increasingly looking for innovations, both incremental and radical, especially for sustainable projects. Public entities should not try to innovate themselves, for tendering is a good instrument to pull the best goods, works or services from the market. Primarily, the innovation partnership procedure is the only procedure that combines the R&D phases with commercial procurement. The procedure is perceived to have a number of other strengths: it enables a contracting authority to procure something that has not yet been defined, it is a tool to procure radical innovations, it lets a contracting authority actively anticipate innovations, and it even enables a contracting authority to stimulate innovative market behaviour in a broader social spectrum. Hence the innovation partnership can help a public entity to achieve their societal goals. The expert panel stated that a market consultation should determine whether a sought solution is available already.

2. Both market- and public parties see as prominent strength of the innovation partnership that the *abilities of market parties can be better exploited* in the procedure in respect to conventional procedure. Firstly, a market player can respond to an innovation partnership tender with an innovation that was already on its roadmap. Secondly, market parties are involved earlier in the process to think of a solution than in other procedures. This early involvement will enable the contracting authority to steer the innovation process with respect to its needs and to accelerate the process of development and exploitation. Consequently, given that the innovation partnership can be structured as a drop-out race, a market party can continue an innovation process after it is excluded from the partnership, two interviewees remarked.

3. The last strength perceived by the interviewees is *the specific usability*, which is based on the findings, seen as both a strength and a threat (#9). The strength being that the choice for a tendering procedure follows the nature and characteristics of the project, as is discussed in subchapter 3.3, and the innovation partnership has opened up the possibility to procure a new range of works, goods or services. A practical example discussed in the interviews was a project which was initiated before the innovation partnership was available. The tender was published shortly after the innovation partnership procedure

could be used. The management in this case had to wait until the revised Tendering Act was active because the project could be executed optimally in an innovation partnership.

6.4 Weaknesses

1. Mostly (legal) advisors suggested that the *little practical experience and jurisprudence* on the innovation partnership procedure is a weakness at this moment. Contracting authorities need comfort in using the procedure, knowing what they are able and not able to do. Without comfort the fear is that the procedure will be meticulously followed, which won't be stimulating innovative behaviour of the participants. One important remark echoed by multiple interviewees is that the innovation partnership needs a success story, to show that the procedure can work. However, the expert panel stated that one should anticipate the option of failure when innovation is concerned, also considering the application of the innovation partnership procedure.

2. Mostly market players, especially start-ups, stated on 12 separate accounts *that a legal procedure for innovation interferes with the creative innovation process*. This goes for tendering procedures in general, not solely for the innovation partnership. The procedural aspects take a lot of time, and induce the fear of doing it wrong for both public and private partners. Also, many creatives cannot enter the procedure due to overly strict selection criteria. Others remarked that a tendering procedure is too often used as a guide rather than a legal framework, while innovation needs regulatory space. One procedural barrier mentioned by the expert panel was that the intensive dialogue phases in an innovation partnership required a lot of investment of time which is an obstacle for small firms.

6.5 Opportunities

1. Directive 2014/24/EU art. 31 lid 1 states that the tenders are to be assessed using the most economically advantageous tender criteria. Three interviewees said that *MEAT-criteria can be a good instrument for stimulating an innovative approach* to reaching the goal. Criteria like 'energy efficiency' for 'level of auspiciousness' can be used. However, innovation itself is never the goal of a tender procedure. An advantage of the innovation partnership procedure with respect to the use of open criteria is that bids can be compared to one another in order to find for instance the 'most promising' idea.

2. Use of the innovation partnership or procurement of innovations generally can *improve the image* of a public entity, two interviewees stated.

3. The choice for the procurement of innovation is, according to 5 interviewees, a management decision made by an executive higher in the organisations hierarchy than a contracting authority. *Mobilising internal support* in the public entity can stimulate the

innovation partnership because the procedure needs management and groundwork to optimally run the process. Having the contracting organisation fully engaged will assure full cooperation towards a beneficial result.

4. There is an important opportunity for a public party to explicitly *act as a launching customer for promising innovations*. The contracting authority can use a number of incentives, interviewees and experts find, to stimulate relevant innovations in that role. Firstly, a public party can invest in a development. With a (co-)investment the contracting authority ensures that the innovation will be developed with their needs in mind, while the investment made by the market party will ensure quality of the product and the ability of the market player to carry on the exploitation phase after the innovation partnership is finished. Secondly, for many innovations in accessibility the physical space to test prototypes is an important incentive. Thirdly, the possibility to use knowledge spillovers from universities is considered an impulse for innovations. Lastly, the cooperative behaviour of the launching customer is desired by market parties. In many cases that were discussed during the interviews, market parties experienced an unhelpful governmental body. The interviewees generally expect that in an innovation partnership the public party will be more willing to cooperate. Incentives during the partnership can be a supervisor from the contracting authority issued to the partners. This supervisor can help the partners to learn the core business and context of the public entity. A negative incentive for market players is the possibility of dropping out when the procedure is structured as a drop-out race, although this was disputed by the expert panel. The competition a drop-out race brings can improve the result of the R&D phases and not dropping out gives a positive signal to future buyers.

5. The expert panel and interviewees see an important role for *start-ups* in the innovation partnership procedure, when it is used for mobility and infrastructure procurements. A contracting authority should consider creating opportunities for start-ups to enter the procedure. This could for instance be done by connecting previously unconnected market players. This can induce cross-sectoral innovation. The most frequently encountered expected consortia are combinations of conventional tenderers like builders and unconventional parties like app-developers, start-ups or artists.

6. Expected is that *competition* between market players in an innovation partnerships will improve the products. The procedure is structured accordingly. However, *knowledge sharing* is considered beneficiary to the result as well by the interviewees. A number of interviewees mentioned that the innovation can gain value when the partners inspire each other. The expert panel remarked that this can be the case, but it will be done in informal gatherings. A contracting authority can also connect two individual potential tenderers to form a consortium in the phases prior to the start of the procedure.

7. The *cooperation of public and private partners* can be exploited in the innovation partnership. Public parties can facilitate and drive the process, and deliver input of for instance data. In a partnership of equals market parties can suggest organisational changes to make to process more efficient. Also, market parties can cooperate in the formulation of the specifications is the experience of the interviewees.

8. The largest share of the findings from the interviews, approximately 1/10th of the statements, concern *tender specifications*. The general experience of the interviewees is unambiguously that contracting authorities should present a well-analysed problem rather than a solution-direction, accompanied by functional or performance-based specifications. This method will create flexibility needed for creative problem solving by the market players, who are selected on the sole criteria of their ability to do so. A number of interviewees, among whom two contracting authorities, stated that contracting authorities generally like to think of solutions themselves. Smaller public organisation will do so more, one interviewee remarked. However, the civil servants should try to avoid this in innovation partnerships. This frame of specifications can be optimised in the preparation phase of the procurement in an open dialogue with prospected tenderers, one interviewee suggested.

6.6 Threats

1. A number of interviewees have remarked on the *nature of the innovation process*. This poses a threat as the statements on the innovation process conflict with the practice of public procurement. Interviewees remarked that the best part of the innovations fail; that innovation is a continuous process without definitive product; that the spark for an innovation starts with an individual or a brainstorm; and that an innovator needs time, funds, space and trust.

2. Innovative projects need competent people at the right places. One interviewee remarked that contracting authorities become *less technically competent* and that that is dissimulating in innovative projects.

3. Market players, public organisations and advisors all consider the construction industry as a whole as well as contracting authorities specifically *conservative*. The construction industry does not know radical innovations, one interviewee stated. Contracting authorities are accustomed to working with 2 or 3 tendering procedures and are not easily willing to adopt a new procedure, like the innovation partnership. Contracting authorities are focussed on procuring what they need for the smallest budget, inducing competitive behaviour of market players based on *minimalizing risks* rather than improving results. This forms an obstacle for innovation.

4. Contracting authorities see a possible threat of the innovation partnership that a *monopolist* is created in the procedure when a single market player owns the intellectual property to a product that the contracting authority needs. It will prevent this from happening, for instance by awarding the contract to multiple parties or ensuring that multiple parties will be able to supply the developed solution by keeping the intellectual property and awarding licences to use it.
5. Public entities are seen as important stimulators for the development of innovations by almost all interviewees, especially in a role of launching customer. However, a number of interviewees have experienced *little willingness of public entities to stimulate innovation* through public procurement. One mentioned that a municipality will more easily start a pilot, in which no long term agreements are made and in which all parties are relatively free as opposed to an innovation partnership which is seen as a commitment. While public policies speak of stimulating innovation, this is rarely reflected in public procurements.
6. Innovation and large public works don't go together, one interviewee stated, as *innovation always brings risks* no one is willing to bare. A number of other interviewees remarked that every project brings risks and that these risks have to be managed and appointed to the party that is best suited to bare the individual risk.
7. The *selection criteria* are seen as a large barrier for innovative market parties, start-ups and small entrepreneurs, to enter an innovation partnership. One interviewee states that a contracting authority must think of the optimal tenderers before making the selection criteria, as not to exclude the parties best suited to solve the problem beforehand. A number of interviewees argue to make the selection criteria as small as possible to reduce the work it takes to enter into the partnership. Another solution is to tender in combination with a 'solid' consortium-partner.
8. Four interviewees stated *a lack of trust* in the innovation partnership between public and private parties or between private parties themselves as a threat. The partnership will only work optimally with mutual trust between all parties. A contracting authority not procuring the developed solution by using the exit option of the procedure would harm market parties' trust.
9. The innovation partnership is only *usable in a limited range* of projects, interviewees find. Furthermore, only central governments are expected to use the innovation partnership, which will establish a niche-situation.
10. Addressed by the expert panel and on several accounts by interviewees was the expectation that *standard-contracts will prove unusable for innovation partnerships*. Custom contracts will be needed because standard procurement conditions won't suffice; contractual agreements will have to be made concerning the intellectual property of the products; and state aid must be avoided in accordance with article 33 and 34 of the

Framework for State aid for research and development and innovation. These contractual obstacles form a direct threat to the usability of the procedure for contracting authorities.

11. A final threat was introduced by the expert panel: the *lack of profitable business opportunities* for market players. The innovation partnership is perceived as a time-consuming procedure and market players will not tender when they believe that the projected profits will not outweigh the costs. This can for instance be the case when the market for the commercialised R&D outcome is relatively small or saturated. This is the responsibility of the market parties, but can be helped by the contracting authority to ensure a higher number of tenderers, which would mean more choice for the partnership.

7. SWOT/TOWS ANALYSIS RESULTS

The SWOT/TOWS analysis (Wehrich, 1982) is used in this chapter to formulate strategies for the utilisation of the innovation partnership procedure, based on the findings in a SWOT analysis. The methodology is described in paragraph 2.4.2.

For this SWOT/TOWS analysis, first all properties from the T-SWOT and P-SWOT were combined, without those that were excluded after analysing the questionnaire results. The properties were checked for integrality, compared and doubles were merged and marked (*). The remaining properties constitute the final SWOT matrix and serve as input for the TOWS analysis. In the TOWS analysis, ways to utilise strengths, minimise weaknesses, exploit opportunities and mitigate threats are explored by cross-reference. This exercise has been iterated 4 times in order to ensure completeness.

The chapter follows the structure of the article by Wehrich (1982), who developed the method. It starts with an overview of the SWOT/TOWS matrix, followed by respectively the 'WT strategy', 'WO strategies', 'ST strategies', and lastly the 'SO strategies'. The individual SWOT-properties as well as the strategies from the TOWS matrix serve as input for the conclusion and recommendations.

7.1 SWOT/TOWS overview

	Strengths	Weaknesses
	<ol style="list-style-type: none">1. Tendering is a stimulant for incremental innovations;2. Possibility of technology-push;3. Flexible procedure;4. Specific usability*;5. A tool for development and direct purchase of innovations*;6. Possibility of contracting a single partner; and7. Exploiting market strengths*.	<ol style="list-style-type: none">1. Little practical experience and jurisprudence*;2. Procedural barriers for start-ups.3. Ambiguous guidelines;4. R&D phases are not elaborated;5. Ambiguities concerning cost and duration; and6. High administrative costs.

* Originate from both the T-SWOT and the P-SWOT.

<p>Opportunities</p> <ol style="list-style-type: none"> 1. Cooperation of public and private partners*; 2. The contracting authority as launching customer for promising innovations*; 3. Functional and performance-based specifications leave the option of creative ideas for tenderers*; 4. University spillovers can be used; 5. Joint procurement by multiple contracting authorities; 6. Image improvement of contracting authorities*; 7. MEAT-criteria can stimulate a sustainable innovative approach*; 8. Mobilise internal support; 9. Involving start-ups; and 10. Balance competition and cooperation. 	<p>SO strategies</p> <ol style="list-style-type: none"> 1. Set challenging specifications and award criteria to stimulate competition and incremental innovation; 2. Create opportunities for a technology-push with specifications, award criteria, university spillovers and start-up involvement; 3. Grow awareness of the possibilities for new projects; 4. Start cooperation with market parties early in a market consultation; 5. Act as a launching customer; 6. Use the procured innovation as marketing tool to accelerate innovations by other parties; and 7. Utilise the full potential of start-ups as innovators. 	<p>WO strategies</p> <ol style="list-style-type: none"> 1. Tender collectively as CA's to share costs and risks; 2. Open up the procedure for innovators to find the best innovations; 3. Create internal support to better manage costs and risks; and 4. Share tasks and risks with private partners.
<p>Threats</p> <ol style="list-style-type: none"> 1. Overregulation; 2. Usage of other tools to stimulate innovation*; 3. Procedural risks; 4. Limited range of application*; 5. Vendor lock-in*; 6. The conflicting nature of innovation*; 7. Technically incompetent actors; 8. The conservative industry and risk averse contracting authorities*; 9. Innovations bring risks; 10. Selection criteria can be an obstacle for innovators; 11. Lack of trust; 12. Unusable standard-contracts; and 13. Lack of profitable business opportunities. 	<p>ST strategies</p> <ol style="list-style-type: none"> 1. Use the procedural flexibility to accommodate market parties' innovativeness; 2. Recognise the innovation partnership as an advantageous tool for stimulation of innovation; 3. Involve market parties to design an optimal procedure; 4. Use the procedure to change the industry; and 5. Create opportunities for lucrative business by involving market parties and being open to radical innovations. 	<p>WT strategy</p> <ol style="list-style-type: none"> 1. Use procedural liberties to accommodate the innovation process.

Table 5: SWOT/TOWS matrix

7.2 Weakness / Threat strategy

By combining weaknesses and threats is sought after strategies that will minimise weaknesses and mitigate threats. One strategy was found: the liberties in the legislation, the 'R&D phases are not elaborated' and 'ambiguous guidelines', can be used as degrees of freedom for the innovation process that will be followed during the procedure. The phases not being elaborated on in the Tendering Act is a positive property when it is used in the partnership to create a fit with the project. The same goes for other ambiguities. Following this strategy, the threat of overregulation is mitigated as well.

7.3 Weakness / Opportunity strategies

The approach is, based on the SWOT findings, to minimise the weaknesses by exploiting opportunities. The analysis provided four strategies.

1. A CA can use a joint procurement strategy to share costs and risks with one or multiple other CA's. Apart from the development of an integral solution, this strategy would minimise the risks following 'ambiguous guidelines', 'ambiguities concerning cost and duration', and 'high administrative costs'.
2. The procedure can be opened up for innovators, for instance start-ups, small innovative firms or artists, who do not usually tender. This can be done by matching the selection requirements and award criteria to the desired tenderers and the desired innovative results. This can be an important strategy for CA's as launching customers, who's function is to accelerate the diffusion of promising developments from for instance these start-ups. In its turn this strategy would exploit another opportunity as is would improve the image of a CA.
3. A contracting authority can mobilise internal support in order to minimise the weaknesses 'administrative costs' and 'ambiguous guidelines', as well as the risks that the lack of experience and other ambiguities bring. When highly ranked public officials are invested in the procedure, extra means will be provided to appropriately manage the risks of the procedure, minimising the mentioned weaknesses. This will build practical experience and possibly enhance the image of the affiliated public entities.
4. Tasks and risks can be shared with market parties in the innovation partnership. The owner of each risk should be the party best equipped to manage it. Also, the R&D phases of the procedure can be defined on cooperation with the market parties, who have to go through then in the procedure and who know best what their innovation process looks like.

7.4 Strength / Threat strategies

The approach is, based on the SWOT findings, to mitigate threats by utilising strengths. The analysis provided five strategies.

1. The flexibility of the procedure can be utilised to accommodate the innovation process and otherwise innovative behaviour from market parties. The steps in an innovative process are generally not linear, as has been shown in subchapter 3.4. The actions overlap, are iterated, and there is no clear start or end. The innovation partnership, in particular of the negotiation rounds, can be designed accordingly.
2. The innovation partnership must be recognised by public entities as an advantageous tool for the procurement of innovations and in more general terms for the stimulation of innovation in construction. The fact that the innovation partnership is the only procedure that combines the R&D phases with purchase means that the process is less regulated than with for instance a PCP, respectively one tender is needed versus two. This also means that a market party will be more invested in the process, as the chance of an awarded contract is offered. These mitigations mean that possibility of purchase without a new tender proves the innovation partnership has added value as a tool for the stimulation of innovation and therefore mitigates the threat of other tools being preferred.
3. The (creative) strengths of the market parties in an innovation partnership can be utilised in order to run the procedure optimally. Market parties can carry procedural and innovation-related risks and have a better perspective on the innovation process than CA's. Also, the threat of a lack of profitable business opportunities for market parties can be best mitigated by involving the market parties early in the procurement process.
4. The innovation partnership can be exploited as a step towards a less conservative industry. This is possible by utilising the procedures properties of stimulation both incremental and radical innovations.
5. The possible lack of profitable business opportunities for market parties can be mitigated by involving market parties from the beginning, by the purchase of the development and by exploiting the opportunities of a technology-push, creating new markets for the tenderers.

7.5 Strength / Opportunity strategies

The approach is, based on the SWOT findings, to exploit opportunities by utilising strengths and vice versa. The analysis provided seven strategies.

1. The development of incremental innovations can be stimulated by functional and performance-based specifications and challenging award criteria. These must be based on a problem definition. Also competition will lead to incremental innovation because it challenges market parties to find a smarter solution.
2. A technology-push cannot be forced, but the procedure can be open to it by incorporating university spillovers and setting functional or performance-based specifications and challenging award criteria. Furthermore, to stimulate a technology-push, start-ups can be involved and the procedure can be designed to stimulate informal inspiring cooperation between tenderers.
3. Awareness of the possibilities the innovation partnership offers would stimulate its use in the small range it is predicted to be used. The procedure creates, for instance, opportunities to further develop promising ideas from universities.
4. Market strengths can be exploited by starting the cooperation with market parties from an early stage of the process, for instance in a market consultation. For the market consultation the intended market players and technically competent advisors from knowledge institutes like TNO or Deltares should be invited. This will help to design an innovation partnership procedure with optimal specifications, selection criteria, R&D phases, and award criteria to prevent substantial changes during the tender.
5. A CA's can act explicitly as a launching customer by stimulation incremental and radical innovations, and directly procuring these developments. Market parties will appreciate a launching customer as they see an unhelpful client as an obstacle for innovation. This can also be done in a partnership with a single partner, making it possible to actively look for promising innovations to launch as launching customer.
6. The procurement of (radical) innovations, rather than a pilot or subsidies could be used as a marketing instrument to improve the image of a CA. This in its turn can stimulate other market parties to accelerate innovations, as the proposed client is showing that it is willing to think outside of the box.
7. Involving start-ups and other innovators in the procedure can strengthen the innovativeness of the results. The strength of an innovative market party is that it uses a new perspective and creativity in problem solving, which can result in incremental innovation. Also an innovator can bring a new technology, for instance from another market, resulting in a radical innovation. The start-ups can be utilised in their full potential by a CA as launching customer and by utilising the procedures flexibility.

8. CONCLUSIONS

This research is done in order to optimise the usability of the innovation partnership procedure for contracting authorities in The Netherlands, focussing on accessibility issues. The researched procedure is part of the Tendering Act, active since July 1st of 2016. Uncertainties concerning the procedure are detrimental to its use. Optimizing the procedure's usability will support the reaching of its full potential, being a useful tool for stimulating sustainable innovations.

The primary research question was to find what strategy allows for the optimal utilisation of the innovation partnership's properties in order to maximise its usability for contracting authorities, regarding product innovations in the accessibility industry in The Netherlands.

This research question was answered by first finding potential properties in relevant theory: The Tendering Act, Directive 2014/24/EU, supporting legal literature and scientific literature concerning (procurement of) product innovation. These were tested to practise by means of a questionnaire. The theory findings were used as input for a series of interviews to find properties that professionals in the field perceive and predict. These were tested by means of an expert panel. Following a series of SWOT analyses, strategies were proposed to benefit the procedures usability by conducting a SWOT/TOWS analysis.

The critical literature review resulted in a variety of properties in the fields of procurement law, product innovation and public policies. The most relevant strengths were the novelties of the innovation partnership relative to other procedures that can be used to tender innovation: this is the only procedure that combines the R&D phases with direct procurement. The found weaknesses addressed the ambiguities in the legal texts. In addition, there were opportunities regarding the tailoring of the procedure to a proposed innovation process and stimulation and acceleration of innovation by having a launching customer.

Properties found in practice fitted the properties found in theory. The interviewees stressed that it is important to open the procedure up for innovators (for instance start-ups or artists) and to stimulate innovation during the procedure by creating a problem-solving framework with functional or performance-based requirements and setting challenging award criteria. Also the 'partnership'-element of the innovation partnership procedure is expected to be an opportunity: cooperation between public parties, between market parties and between public and market parties. However, in practice the conservative industry and risk averse contracting authorities are seen as a threat, as innovation will bring risks and requires mutual trust between market and contracting authority. Furthermore, the contracts for an innovation partnership must be tailor-made, mainly with respect to intellectual property, because standard procurement conditions are not compatible with this procedure.

All properties that were found have been used as input to form a strategy to optimise the usability of the innovation partnership procedure. The procedure's properties can be employed by a contracting authority by adopting a strategy consisting of:

- growing awareness of the possibilities for projects offered by the innovation partnership and its use for the stimulation of innovation;
- finding other contracting authorities to procure together, sharing risks, costs and ensuring a mutually beneficiary result;
- creating internal support in the contracting organisation(s) will ensure allocation and engagement of human resources needed in the procedure;
- explicitly taking the role of launching customer to accelerate the development and diffusion of innovations;
- involving (and cooperating with) market parties and technically competent advisors directly after the problem definition in a market consultation to help formulating specifications, selection criteria and award criteria, the R&D phases to be followed, the project scope (ensuring a profitable business case for the market parties), and the distribution of risks and costs;
- setting challenging functional or performance-based specifications and award criteria, based on a problem definition, to stimulate creative problem solving;
- stimulating a technology-push to develop radical innovations by involving start-ups, using university spillovers, and formulating challenging specifications and award criteria;
- involving innovators like artist or start-ups in the procedure to exploit their creative strengths by decreasing procedural barriers;
- using procedural degrees of freedom like the number end length of the R&D phases to accommodate the market parties' creative process; and
- using successful innovation partnerships to stimulate the industry to innovate and to enhance the image of the contracting authority.

Furthermore, a contracting authority should consider:

- The contracts for an innovation partnership are tailor-made, depending on project characteristics, market situation and the client's situation;
- A strategy should be formulated for the allocation of the produced intellectual property, mitigating a possible threat of providing state aid;
- Ensuring competition between tenderers can improve the process and outcome;
- A vendor lock-in should be avoided by awarding the contract to multiple parties or by making sure that the developed solution can be supplied by multiple parties;
- An investment in the procedure can result in a better outcome; and
- Innovation requires mutual trust between market parties and clients, a contracting authority 'boldly' exiting an innovation partnership will take away trust for future projects.

9. RECOMMENDATIONS

Figure 20 shows nearly all recommendations embedded in the procedure as visualised in Figure 4. In the elaboration, seven ‘procedural parameters’ are introduced. These parameters can be influenced to fit the procedure to the individual project characteristics, client’s situation and market situation of each project. For each of the parameters, the benefits and threats of the extremes are presented. This gives the reader an indication of the impact of a decision for each of the procedural parameters. A walkthrough, with corresponding legal texts:

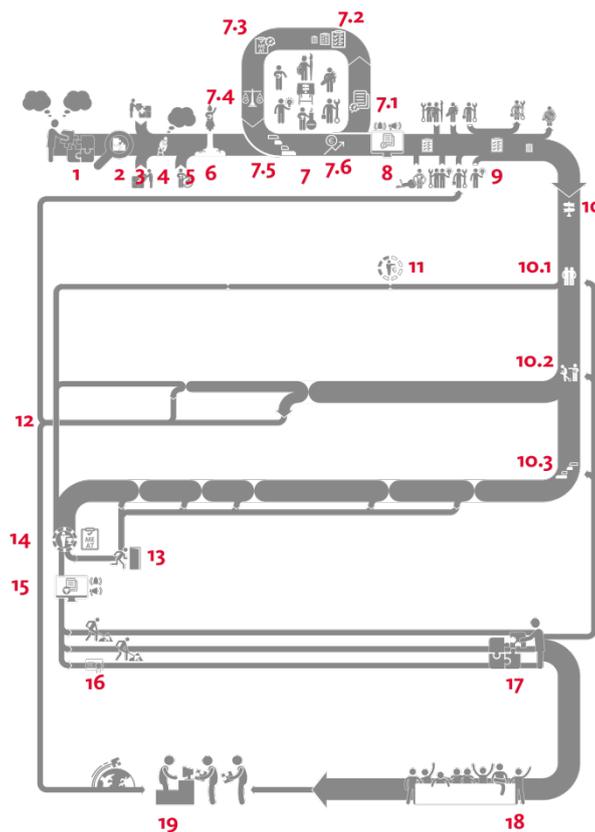
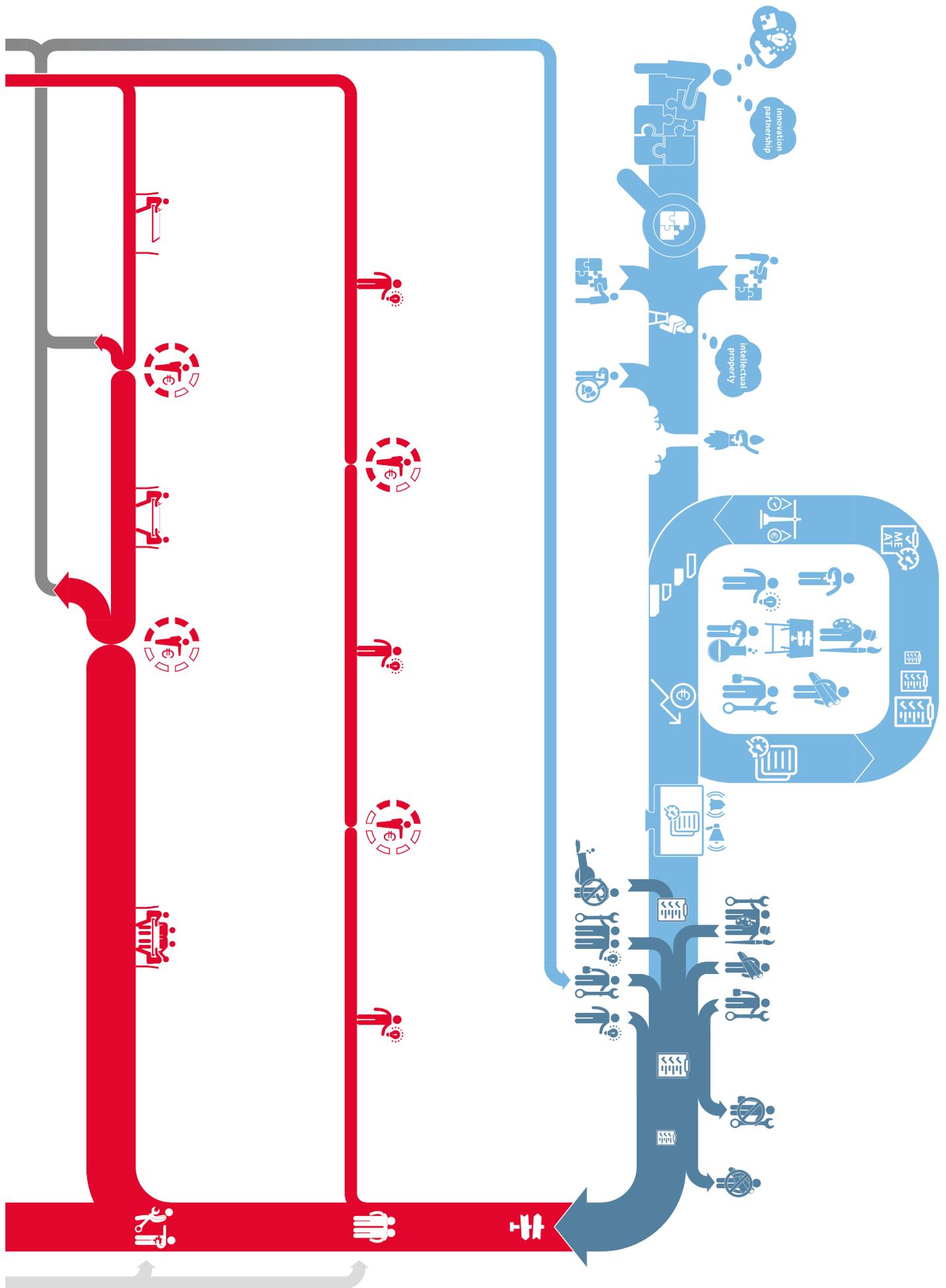


Figure 20: Legend for Figure 20

1. When a contracting authority experiences a problem, it should be aware of the range of possible solutions and that the innovation partnership procedure is a tool to find these solutions in the market. 
2. The contracting authority must carry out a thorough problem-analysis to find out where the problem arises, what causes it and whether solutions are already available in the market. If an acceptable solution is available, the innovation partnership procedure cannot be used according to the Tendering Act. The innovation partnership procedure will be shaped to fit the project characteristics, the client’s situation and the market situation. 
3. An option for the contracting authority experiencing the problem is to find other contracting authorities with a similar problem and procure together. The 



number of contracting authorities that cooperate for the procedure is the first of seven procedural parameters, with which the procedure can be influenced to fit the project.

No joint procurement	Multiple contracting authorities
Costly, all transaction costs for a single contracting authority	Transaction costs are shared
The solution will be designed specifically for the problem	A more general solution for multiple similar problems
limited market for the developed innovation	Larger market for the developed innovation

Table 6: Procedural parameter 1 – joint procurement

4. At this point, the contracting authorities should formulate their desired output concerning the ownership of the produced intellectual property. Do the market parties keep the intellectual property? In that case, how will the risk of providing state aid be avoided? Will the contracting authorities hold the intellectual property? In that case, how will the innovation progress? See also Table 12. The allocation of intellectual property should be discussed during the market consultation (step 7).
5. It is wise to get internal management and staff involved in an innovative tendering strategy. The innovation partnership brings risks which will have to be managed, the risks for the contracting authority can be analysed and mitigation measures must be formulated. Having internal support will make it easier to allocate and engage human resources to running the procedure.
6. Profile the tender as an innovation-stimulating measure and profile the contracting authority as a launching customer. The procedural strengths will support these profiles as the developed innovation is possibly directly procured and implemented.
7. In a market consultation, discuss the design of the procedure with the market parties that are expected to be interested to tender and technically competent advisors. This is in accordance with Directive 2014/24/EU, articles 40 & 41, and Tendering Act 2012 (2016), article 2.25. The market consultation will increase the chance of a successful procedure because it will make the tender known to potential tenderers and engages tenders in an early stage of the process.
 - 7.1. Set up functional or performance based specifications as a ‘problem-solving-framework’, in which there is room for market parties to explore different solutions for the problem definition. This is the second procedural parameter, table 7 shows the extremes between which a position can be taken. In this stage the contracting authority should also think about who will gain the intellectual property of the innovation and how to avoid giving state aid when the market party gets the intellectual property.



Detailed functional specifications	Abstract performance-based specifications
Can be used for procuring a 'known' solution	Open to any solution
Only open to a small group of market parties that already have the innovation on their roadmap	Open to many differing possible market parties
Will most likely result in incremental innovation	Will potentially result in radical innovation

Table 7: Procedural parameter 2 – specifications

- 7.2. Set selection criteria with the desired kinds of tenderers in mind, when start-ups are desired, create selection criteria that allow for start-ups to enter into the procedure. This is procedural parameter 3.



Strict selection criteria	Soft selection criteria
Mostly conventional parties will tender	Open to unconventional tenderers
Will ensure feasibility of the project	Risky with respect to tenderers being unable to finish the procedure up to standard
Experienced market parties	Unexperienced market parties may need extra guidance during the procedure

Table 8: Procedural parameter 3 – selection criteria

- 7.3. Contracts are awarded based on the MEAT criteria (Directive art. 31 lid 1; Tendering Act art. 2.31b). It is recommended to create challenging award criteria. Innovativeness is never a goal in itself, but abstract criteria like 'level of auspiciousness', 'sustainability' or the 'contribution to an ambition' can be criteria that will stimulate market parties, as opposed to specific award criteria that are generally used. The abstraction of the award criteria is the 4th procedural parameter.



Specific award criteria	Abstract award criteria
Will most likely result in predictable solutions	Creativity is stimulated, potentially leading to unpredictable solutions
Incremental innovations	Potential for radical innovations

Table 9: Procedural parameter 4 – award criteria

- 7.4. Innovation will always bring risks. When these risks are inventoried, mitigation measures are formulated and risks are managed prior to the start of the project, threats will quickly be managed during the project. Allocate risks to risk-owners best suited to carry the risks, these can be market- as well as public parties. This will be based on the risks found in step 5.



- 7.5. Design the R&D phases based on the phases the market parties predict. The R&D phases are open to interpretation by the contracting authority (Directive art. 31 lid 2 & 3; Tendering Act art. 2.31b). Each industry or market party has its own creative process which it knows best itself. To fully facilitate this process, the procedural phases must always be tailor-made. 
- 7.6. Discuss the intended output. Form a strategy to enable profitable business cases following from the procedure. This will stimulate the market parties to be fully invested in the procedure and will generate spin-off from the viewpoint of the launching customer. The value and volume of the intended output will influence the R&D process. The larger the value and volume is, the more competition will exist between tenderers and they will be more willing to invest to win the contract. Furthermore, an output with a higher value and volume allows for a more thorough procedure with more intermediate goals to be achieved. 
8. Publish the request for proposal (Directive art. 31 lid 1; Tendering Act art. 2.31b). Tenderers can be found through TenderNed, but via other channels as well, therefore it is important to make the tender publicly known, for instance via industry-specific news channels. The more radical the innovation is, the more publicity it is likely to generate. This can be used to find tenderers and to improve the image of the contracting authority. 
9. Partners for the innovation partnership are selected based on a sequence of selection requirements: grounds for exclusion; suitability requirements; and selection requirements. These must be set with the desired competences in mind (Directive art. 31 lid 1 & 5; Tendering Act art. 2.31b). Small innovative firms often do not have enough experience or financial stability to enter into a tender but can create a lot of added value. The selection requirements must be formulated to be open to these innovators, for instance in a consortium with a 'stable' partner. 
10. There are three decisions that influence the shape of the procedure during the R&D phases: the number of partners, whether to make it a dropout race and the length and number of R&D phases. The choices should be based on the problem definition and desired output. 
- 10.1. In accordance with Directive 2014/24/EU, art. 31 lid 1, for the procedure the contracting authority may enter into a partnership with one or multiple partners. This is the 5th procedural parameter. 

A single partner	Multiple partners
Launch a specific innovation	Launch a selection of offered innovations
Use the competences of a specific market player	Ability to select a range of competences from a saturated market
No competition	Competition

Table 10: Procedural parameter 5 – number of partners

10.2. The 6th procedural parameter is the option to let competing tenderers drop out of the procedure (Directive art. 31 lid 2 & 5). The positive and negative effects of both options are shown in table 11.



No dropouts	Dropout race
Cooperation between tenderers	Competition between tenderers
Higher transaction costs (remuneration)	Saving remuneration

Table 11: Procedural parameter 6 – dropout race

10.3. The R&D phases must be tailor-made, following the market parties' predetermined creative process (Directive art. 31 lid 2 & 3; Tendering Act art. 2.31b). A pilot or prototype can be embedded in the procedure as one of the final R&D phases.



11. After each R&D phase, the tenders of each partner are assessed a weighed to predetermined MEAT-criteria and when the work is according to agreement tenderers will be remunerated, in accordance with Directive art. 31 lid 2. In the jury assessing the results should be technically competent advisors.



12. When the phases are structured as a drop-out race, tenderers who drop out can develop their idea further to commercialize it themselves or can be kept in mind for future innovation partnerships.



13. Contracting authorities have, after each phase, the option to stop the procedure altogether by discontinuing the partnership with all partners (Directive art. 31 lid 2). An exit-strategy should be prepared; this strategy should include measures to minimise harm of trust of market parties towards the contracting authority. When this trust decreases market parties' willingness to tender for future innovation partnerships will be minimized.



14. After the last R&D phase is concluded, all tenders will be assessed, based on the predetermined MEAT-criteria.



15. The awarding of the contract(s) must be publicly published (Tendering Act 2.31b). This will again be accompanied by gaining publicity as to improve the image of the contracting authority.



16. A vendor lock-in is created when a single market party holds the intellectual property of a solution which is unbridgeable ahead of other solutions. As to prevent a vendor lock-in, if possible the contract can be awarded to multiple parties or opportunities can be created for the developed solution to be supplied by multiple parties. The latter can be achieved by giving out licences as contracting authority. In that case the contracting authority would keep the intellectual property rights, which is a negative incentive for creatives to tender. This is the 7th and last procedural parameter.



Award the contract to multiple parties	Award licences
Intellectual property for market player	Intellectual property for public party
Positive incentive for market parties	Negative incentive for market parties
Risk of state aid	No risk of state aid

Table 12: Procedural parameter 7 – Awarding

17. The developed innovation is implemented, solving the contracting authorities' problem(s). At this point, the innovation partnership procedure must be evaluated, publishing the learnings for the benefit of actors preparing new innovation partnership procedures.



18. To stimulate other market parties affiliated to the contracting authorities to innovate, the innovation partnership and its results can be used to gain publicity. In a publicity campaign, the contracting authority shows that it used an innovation to solve a previously unsolvable problem. Market parties that are not actively looking for ways to innovate will see that there is a market for innovations. Such a publicity campaign will enhance the image of the contraction authority and will positively change the conservative construction industry.



19. The spin-off generated by the procedure is valuable for the stimulation of innovation. The procedure should be aimed to generate as much spin-off with respect to the commercialisation of sustainable developments. The diffusion should also be extended to other countries and markets.



10. DISCUSSION

10.1 Interpretation

The procedure can be perceived useful by contracting authorities when they are open to the possibilities that it offers, it can be perceived usable now the procedure's points of attention are mapped. Within the Netherlands, central contracting authorities will most likely make use of the procedure first (apart from the currently running project). Still, it takes a 'leap of faith' to use a new instrument, especially for the smaller public entities. These, for instance municipalities or water boards, however can make a big change in the industry because small-scale local projects can attract smaller and more innovative market parties. When innovators get the chance to prove their concept on a small scale, their innovations can be rapidly diffused. In this thesis is shown that there are chances for smaller contracting authorities to make optimal use of the innovation partnership by joint procurement, functional requirements and sharing risks and investments.

Furthermore, it is demonstrated that innovative market players and their creative processes can be accommodated in the procedure by making use of the procedural flexibilities. Currently, innovating market players face discomforts in selling their products to public clients. The perception of being unable to sell to public parties threatens to prohibit the developments that are needed. Public parties can alter this perception by showing that this procedure can be adjusted to fit particular needs as well as give opportunities for accelerated diffusion of the developed innovations.

The conclusions in this thesis can be used to develop a workshop for contracting authorities in which can be assessed whether the problems they own can be solved by making use of an innovation partnership. This workshop can be used to show the range of possibilities the procedure offers and how the procedure can be designed to fit the needs of a particular project. For example, when an incremental innovation is needed, the procedure could be structured like a drop-out race to stimulate competitive behaviour. When radical innovations are desirable, a knowledge-institute holding the needed scientific breakthroughs can be involved.

Sustainability related targets (like CO₂ reductions) are imposing a new range of challenges on contracting authorities. By following the proposed strategies, the innovation partnership can be used to accelerate the development of solutions for these challenges, making optimal use of the procedures opportunities.

10.2 Method

The method that was used for this research project was determined by the nature of the project. It was a diagnostic research project, which practically involved a SWOT-analysis. However, the fact that there were no evaluated cases available posed a problem. Therefore 3 extra measures were taken in order to validate the findings: a questionnaire was sent out to professionals in order to test theoretical findings, an expert panel debated on the findings from practice and a validation panel looked over the final results. This method for validation served its purpose. The expert- and validation panel were a helpful instrument to, besides from improving and nourishing the findings, find the value of certain findings with respect to others. The questionnaire-results however had little impact, less people than expected had the knowledge that was needed to score the statements or were unwilling to spend the required time to do so. The available results only changed 2 out of 30 findings.

10.3 Further research

This thesis is partly based on an earlier graduation work: “The legal possibilities for innovation using European tendering procedures”, by Wolswinkel (2015). The innovation partnership was one of the four procedures he researched. This thesis is one of the first additions to the available body of knowledge on the procedure since it is in action.

Two challenging recommendations for further research are proposed. Firstly, to research and develop a tool to make use of the procedural parameters for accommodation of a particular creative innovation process or innovative project. What are the differences in creative processes, which factors do these differences depend on, and how can the procedure be altered to facilitate these processes? Secondly, one of the most important recommendations in this thesis was to involve innovative market parties, for instance start-ups or artists, if possible. How can these parties be involved and how can their strengths be exploited? Starting February 2017, a graduation student has started this research based on the findings presented here.

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APPENDIX D: QUESTIONNAIRE

De vragenlijst bestaat uit stellingen die een respondent kan scoren op een schaal van 0 tot 5 naar gelang hij of zij het met de stelling eens is.

- Ik ben werkzaam bij...
 - Een adviesbureau
 - Een advocatenkantoor
 - Een overheid
 - Een creatief bedrijf
 - Een aannemer
 - Een onderzoeksbureau
 - Een kennisinstelling
 - Een startup
 - Een aanbestedingsplichtige organisatie
 - Een niet hierboven gespecificeerd bedrijf / instelling / organisatie / etc.
- Ik kom regelmatig in aanraking met publieke aanbestedingen
 - Ja
 - Soms
 - Nee, nooit
- Ik kom regelmatig in aanraking met innovatie
 - Ja
 - Soms
 - Nee, nooit
- Ik ken het innovatiepartnerschap...
 - Niet
 - Niet, maar ik kan me er iets bij voorstellen
 - Van horen zeggen
 - Een beetje, bijvoorbeeld als toeschouwer
 - Wel, ik heb het bestudeerd
 - Wel, ik heb ermee gewerkt

- Aanbesteden is een stimulans voor de ontwikkeling van incrementele innovaties.
- Het innovatiepartnerschap biedt kansen voor ingrijpende innovaties gedreven door technologische doorbraken.
- Juist een aanbestedende dienst stimuleert als 'launching customer' innovatie in hoge mate.
- De procedure van het innovatiepartnerschap is ten opzichte van andere procedures flexibel in de mogelijkheid tot het ontwikkelen van innovaties.

- Het innovatiepartnerschap is de oplossing voor het inkopen van technologieën die nog niet beschikbaar zijn in de markt.
- Het uitzicht op aanschaf van de ontwikkelde innovatie in een innovatiepartnerschap zorgt voor bereidheid van marktpartijen om te investeren in de ontwikkeling.
- Een innovatiepartnerschap leidt tot een lange-termijn samenwerking tussen marktpartij en aanbestedende dienst wat de kwaliteit van het resultaat positief beïnvloed.
- De procedure van het innovatiepartnerschap biedt kansen om 'duurzaamheid' als onderscheidend criteria op te nemen in het R&D-proces.
- De theoretische procedure van het innovatiepartnerschap sluit aan op de praktijk.
- De mogelijkheid om een innovatiepartnerschap met een enkele partner aan te gaan om bijzondere innovaties in te kopen geeft gehoor aan een behoefte in de praktijk.
- Het innovatiepartnerschap is nog erg theoretisch en heeft ervaringen in de praktijk ter verbetering.
- Voor de toepassing van het innovatiepartnerschap in de praktijk is er behoefte aan een goede definitie van 'aanbesteding'.
- De instructie voor de procedurele stappen van het innovatiepartnerschap moet worden verduidelijkt ter ondersteuning van de toepassing.
- De vertaling van de stappen in een innovatieproces naar dialoofasen in de innovatiepartnerschap procedure is onduidelijk.
- Het is nadelig dat aanbieders worden geselecteerd voordat het R&D traject van de innovatiepartnerschap procedure wordt ingezet.
- De kosten(verdeling) en doorlooptijd van de procedure van het innovatiepartnerschap zijn onzeker en onvoldoende in beeld gebracht.
- Een innovatiepartnerschap zal te hoge administratieve kosten met zich meebrengen.
- De verdeling van intellectueel eigendom zal beperkingen opleveren voor aanbestedende diensten en marktpartijen in een innovatiepartnerschap.
- In de toepassing van de procedure ontstaat het probleem van cherry picking door de aanbestedende dienst.
- Samenwerking tussen markt en overheid stimuleert innovaties meer dan (reguliere) aanbestedingen.
- Een publieke klant met technische competenties is de beste partij om innovatief gedrag van een marktpartij stimuleren.
- Functionele of prestatiegerichte specificaties stimuleren innovatief gedrag bij een marktpartij.
- Kennis van universiteiten moet gebruikt worden in een innovatiepartnerschap.
- Met een innovatiepartnerschap kunnen ongevraagde aanbiedingen (unsolicited proposals) van een marktpartij worden ingekocht.
- Het innovatiepartnerschap zal zorgen voor een nieuwe vorm van innovatieve consortia van marktpartijen.

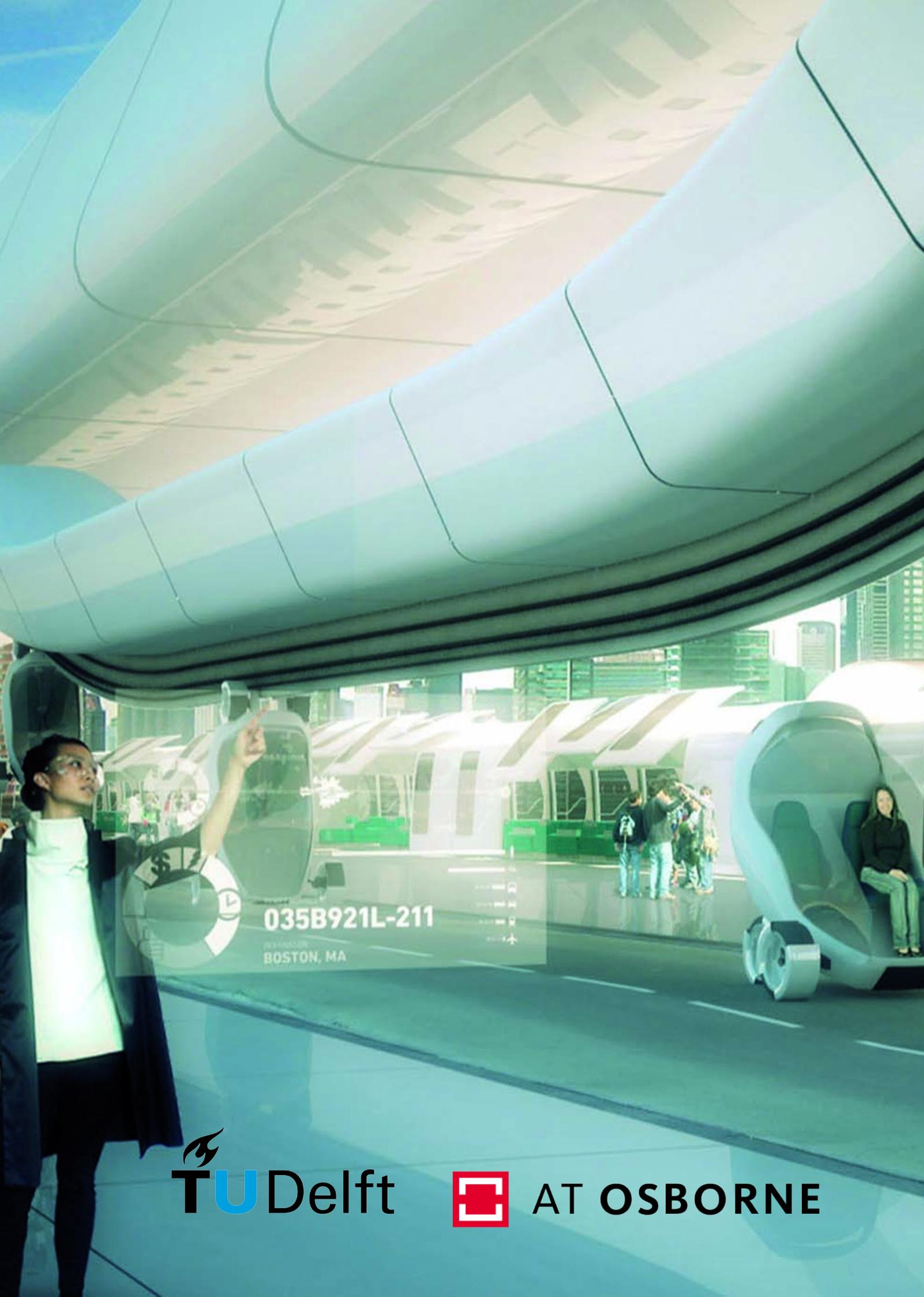
- Gezamenlijke inkoop door aanbestedende diensten zal de resultaten van de aanbesteding verbeteren.
 - Het imago van een aanbestedende dienst verbetert door het gebruik van het innovatiepartnerschap.
 - Radicale innovaties zijn zo onvoorspelbaar dat ze niet kunnen worden aanbesteed.
 - Aanbestedende diensten zijn risicomijdend en besteden daarom geen innovaties aan.
 - Tijdens een aanbesteding wordt doorgaans slecht gecommuniceerd.
 - Overdreven beperkende wet- en regelgeving staat innovatie in de weg.
 - Het innovatiepartnerschap zal niet gebruikt worden omdat overheden innovatie liever stimuleren met regelgeving en subsidies.
 - Deelname aan innovatiepartnerschappen is niet aantrekkelijk genoeg voor marktpartijen.
 - Als bij de eerste paar innovatiepartnerschappen het doel niet bereikt wordt, past een aanbestedende dienst de procedure niet meer toe.
 - Een innovatiepartnerschap brengt grote financiële en praktische risico's met zich mee waardoor aanbestedende diensten de procedure niet zullen gaan toepassen.
 - Enkel de centrale overheden in Nederland zullen het innovatiepartnerschap in de praktijk gebruiken.
 - Aanbestedende diensten zullen zich niet wagen aan een innovatiepartnerschap en het houden bij vertrouwde aanbestedingsprocedures om innovaties te stimuleren.
-
- Heeft u nog vragen of opmerkingen?

APPENDIX E: OVERVIEW OF DETERMINANTS

Author	#	Factor	Laws and regulations	Project characteristics	Market situation	Iron Triangle	Risk avoidance	Client situation	Others
Twynstra Gudde	1	Efforts asked from applicants			+			++	
	2	Market supply			++				
	3	Possibilities for specifications		++				+	
	4	Complexity procedure		++				+	
	5	Lead time				++			
PIANOo	1	Regulations and directives	++						
	2	Nature of the assignment		++					
	3	Type of assignment		++					
	4	Special circumstances							++
	5	Size of contract	+	++					
	6	Specificity		++					
	7	Type of client						++	
	8	Administrative burden				+		++	
	9	Market situation			++				
	10	Award criterion				+			+
	11	Policies						++	
	12	Competition			++				
	13	Lead time				++			

	14	Importance of the product		++				+	
Alhamzi & McCaffer	1	Project characteristics		++					
	2	Market attributes			++				
	3	Contractor and Architect / Engineer needs			++				
	4	Categories of clients						++	
	5	Client design orientation						++	
	6	D & C regulations	++						
	7	Client's needs		+				++	
Gordon	1	Construction sophistication		++					
	2	Capabilities of the owner						++	
	3	Risk aversion					++		
	4	Restrictions on methods	++						
	5	Other external factors			+				+
Mohsini	1	Project characteristics		++					
	2	Project complexity / uniqueness		++					
	3	Legal constraints and regulations	++						
	4	Degree of control client					+	++	
	5	Risk aversion					++		
Okulola & Olugbenga	1	Speed				++			
	2	Cost certainty				++	+		
	3	Time certainty				++	+		

	4	Price competition			++	+			
	5	Quality		+		++			
	6	Risk avoidance (time)				+	++		
	7	Risk avoidance (cost)				+	++		
			9	24	14	17	11	21	4



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