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A co-creational approach in the Dutch infrastructure sector

Exploring the added value of implementing a co-creational approach in the pre-contractual phase.

R.S. van Staveren

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Colophon

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PREFACE

This graduation process has resulted in much more than only a research into co-creation in the infrastructure sector. It has also provided me with a great learning experience in which I had the opportunity to meet wonderful people, got insight into an inspiring Advisory and Consultant company and learned new things about myself. Writing this thesis was not an easy or straightforward process for me, but via this way I want to thank all people who contributed and helped me to finish it.

First of all, I owe my gratitude to my commission who supported me during the research. Even though I was lost a few times, they always could set me back on track. First of all, I would like to thank my first supervisor, Leonie Koops, whose feedback is sharp and constructive and was also good at structuring my chaotic thinking by carefully listening to me. After those meetings Leonie could with ease summarise it in a way that was super clear. You also made sure that I took decisions to move forward, thank you for that. Next, I want to thank my second supervisor, Leentje Volker, whom I saw less but by no means did this impacted the quality of the feedback and input. I wish you very well in your next adventure as you will become a professor yourself. Third, I want to thank my professor, Marcel Hertogh, who was good at zooming out of the research and place it back in its context. Your questions are always straight to the point. Last but not least, I want to thank my company supervisor, Marten Lagemaat who made sure that I felt welcome at the company and took always the time to sit for a discussion. Thank you so much for guiding me through the process and from time to time made sure that fun things still were organized, as you took for instance the initiative to organize climbing sessions with some colleagues.

Besides my supervisors I would like to give a special thanks to the interviewees and members of the expert meeting, who helped me gather the information throughout the research and had no problem to reserve some time of their day for me. After each interview I got excited thanks to you.

With finalizing this report not only this project has come to an end, but it is also the closure of my time of being a student. I could not have done this alone and many people have helped me to achieve my goals throughout the studies. I would especially thank my parents for supporting me throughout the many years and supported me in my decision to continue my studies after completing my bachelors at The Hague University.

R.S. van Staveren
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SUMMARY

Introduction

Recently a new phenomenon introduced itself in the Dutch infrastructure sector called co-creation. It is described in literature as 'the joint creation of value between a company and its consumers'. The concept originates from the service- and product industry and places the consumer in a central position during the design phase. It marks a shift in thinking and became a popular concept to increase the participation of consumers around the year 2000. Since then it has spread to other industries. In the service-and product design it already proved to be a good method as benefits such as increased satisfaction among consumers, cost reduction for the firm and innovative ideas has been mentioned in literature.

Experience with the concept is not widely present in the infrastructure as this is only a recent development. Nowadays it is a buzzword and hard to explain what the concept is about. In this research, seven elements are identified that are found as necessary conditions for the co-creation concept. With decomposing it into elements it was found that the concept became less abstract, making it more practical for project leaders to implement the concept in their projects. Co-creation in the infrastructure sector is about placing the stakeholder in a central position and together identify their needs and investigate how value can be created jointly. Thereby aiming to achieve similar benefits as the service-and product industry.

As co-creation is a recent development in the Dutch infrastructure sector, this research has been set up with the aim to contribute to our knowledge about co-creation and investigating what is necessary for the Dutch infrastructure sector to exploit the benefits that it claims to have.
To reach this objective the following research question is formulated:

What is the added value of a co-creational approach in the pre-contractual phase of infrastructure projects?

Research Approach

A qualitative research was performed to find an answer to the main research question, information derrived by conduction four case studies was used to gather information from the practice. The research started with a literature study in which is elaborated upon the co-creation concept. As during the literature study seven elements were identified the question raised how they were represented in practice. For this an assesment tool was constructed and information was gathered in the case study to answer this question.

To apply the assessment tool and measure the extent of co-creation, information was gathered via interviews with the project leaders and derived by conducting a document review. Additionally, a database which contains all requirements set by the stakeholders is analysed. The results were analysed per case-study after which a cross-case comparison was performed. Last, the identified elements and assessment table was discussed among professionals to validate its applicability and identify further improvements. The four researched cases were different in size and design freedom, but all were infrastructure projects. However, none of the cases explicitly adopted a co-creational approach in advance.

Results & Conclusion

Firstly, literature was reviewed to provide a baseline for the research which resulted in the identification of elements that acts as conditions which need to be present in order for co-creation to exist. In total, seven elements were identified. The decomposition of co-creation makes the concept less abstract as validated in the expert consultation meeting. The seven elements were added to the existing DART-model which the scholars Prahalad and Ramaswamy (2004) constructed to elaborate on the co-creation concept. The framework as created throughout this research is illustrated in Figure 1.

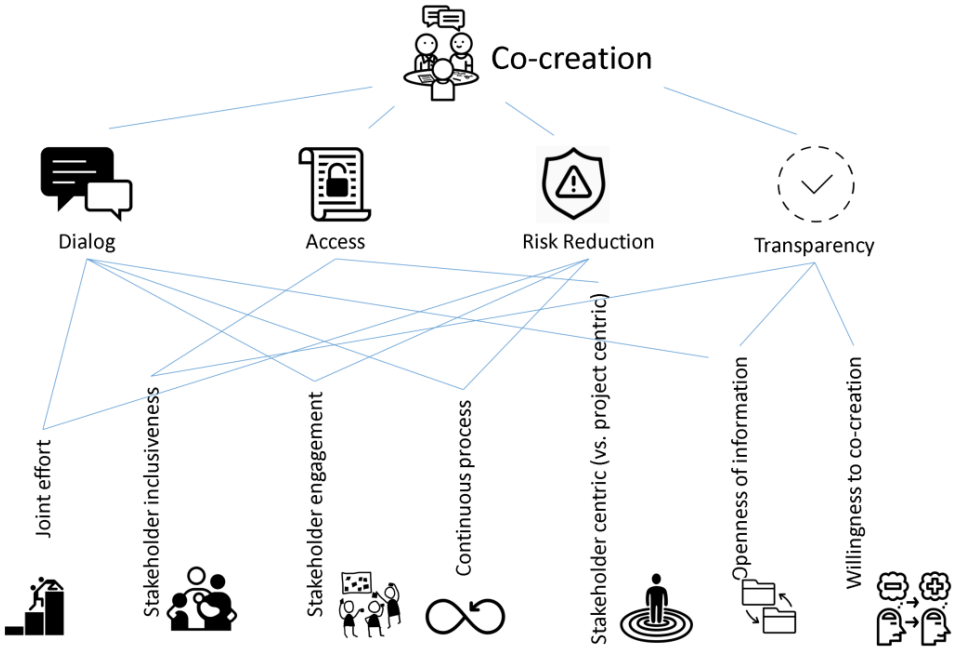

Figure 1 Co-creation decomposition model (own. Ill)

The co-creation concept was researched in the context of Dutch infrastructure projects, since none of the case studies explicitly adopted a co-creational approach, a co-creation assessment tool was constructed to overcome this obstacle. By operationalizing the elements with indicators that are recognized in the stakeholder approach strategy for infrastructure projects, it became able to rate how the elements are represented in their project. The outcome of the assessment table is an illustrative scorecard. The scorecard represents the scores of the analysed case studies and is shown in Table 1.

Table 1 Scorecard overview all cases

Score overview	Case 1: The island road	Case 2: The crossing	Case 3: The bypass	Case 4: The harbour
Joint effort	Medium	Low	Medium	Low
Stakeholder inclusiveness	High	Medium	High	Medium
Stakeholder engagement	Medium	Medium	Low	Medium
Openness of information	Low	Low	Low	Low
Stakeholder centric view	Medium	Medium	Medium	Medium
Continuous process	Medium	Low	Low	Low
Willingness to co-create	Low	Low	Medium	Medium

Even though the case studies were different in size and design freedom, as two cases were concerned with developing new areas and two cases were concerned with reconstruction work, none of the projects stood out when compared with each other. The scorecard does reveal on a much smaller level that all projects scored low on the element 'Openness of information', based on the fact that information regarding the stakeholders' requirements was not shared among each other. With the lack of insight in the needs of other stakeholders, processes and ideas cannot be shared and optimised and co-creation opportunities are less likely to succeed. It is advice to invest on the transparency of each other's requirements to be able to increase the chances of a successful co-creation attempt.

The stakeholder inclusiveness element was already better represented as the projects made efforts to identify the stakeholders with a stakeholder analysis. Overall the scores might seem low, but it should be taken into account that none of the projects aimed for a co-creational setting. If adjustments to the stakeholder approach will be made with this aim, they will probably already score better.

Together with rating the individual elements, the requirements set by public and professional stakeholders were identified as one of the four following types; Requirements that specify a need, Product specification, Process or Boundary condition and a Combination of needs and a product requirement. Of each category the acceptance rate was measured and resulted that one of the cases scored significantly higher regarding the specification of needs. This project was concerned with the new development of an area, and the land-use plan was not finalised yet. Given the design freedom together with fewer restrictions due to a land-use plan, made it more suitable to identify their needs.

The results of the case studies did not reveal much regarding the added value of a co-creational approach, which can be explained by the fact that none of the projects explicitly paid attention to implementing such an approach upfront. In order to co-create, project teams are advised to think how they can increase the transparency of their projects in this phase, as insight into each other's needs is crucial to be able to co-create but not yet given. The advisory company can act as a mediator to facilitate this as they manage all the information. Besides this, the decomposition framework and the assessment table does provide the project leaders with additional practical insight into this approach and how it can be implemented in the future.

Discussion

The research has an explorative character and the findings are on most part based on qualitative data. This comes with a margin of error as the date can be interpreted differently by other people. The same goes for the identified elements and indicators which can be interpreted differently. To overcome this the elements and used indicators are provided with an elaboration. Nevertheless, the scorecard which is a result of the analysis, should therefore be considered as illustrative. The tools were discussed with some experts and considered useful since it enables project leaders to discuss the abstract concept of co-creation on a more practical and understandable level.

The research is conducted with Witteveen+Bos and projects in the case study were all executed according to their work procedures. As such, in other companies the methods to set up a project may differ and the indicators in the assessment table are not recognized. To increase the applicability, two external experts from different companies were asked to join the expert panel to ensure the broader applicability. Nevertheless, this should be taken into account when applying this tool.

Recommendations

With this research the path is shaped for the future to assess the fitness of Dutch infrastructure projects to implement a co-creational approach. Only if project teams gain experience with this approach, the benefits or limitations will become clearer and a more complete answer can be formulated to the research question. For Witteveen+Bos it is recommended to gain experience with the framework and assessment tool and use this as a tool to create awareness on this subject in the organisation. Clients that are open for the approach can be advised in a more detailed way and the stakeholder approach can be shaped accordingly. It is recommended to update the indicators in the assessment table to improve its accuracy. This can either be done by applying it in practice or by a future study, where in-depth information is gathered to make improvements.

For future researches it is as well recommended to consider the tools while taking into account all stakeholders and not only the public and professional stakeholders, since efforts taken to co-create with all stakeholders are not taken into account yet.

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1 INTRODUCTION

This first chapter introduces the topic of the research and elaborates on the relevance of the research. The relevance is expressed by the problem statement in which this research is set up to contribute in the solution of the problem. The practical and academic relevance are briefly discussed, followed with the reading guide in which the outline of the thesis is presented.

This research is entitled 'A co-creational approach in the Dutch infrastructure sector' and focusses on co-creation within the infrastructure sector. Co-creation is a stakeholder management approach which recently introduced itself in the Dutch infrastructure sector, and originates from the service- and product design. It is an intensive form of collaboration in which stakeholders actively participate and have influence in the design phase of an infrastructure project.

Infrastructure projects are projects concerned with the (re)construction of physical objects such as roads, tunnels, bridges, waterways, dykes and other physical objects that facilitate a country, city, region or other area in order for it to function (Koops, 2017). During the different stages of an infrastructure project, numerous different and sometimes conflicting interests will, both positively and negatively, be affected. The representatives of these interests are referred to as the project stakeholders (Olander, 2007). Every project has its own set of stakeholders from which it needs contributions, since every project is unique and has a specific purpose (Eskerod & Jepsen, 2013).

The profession to deal with all these interests and thus all the stakeholders is what is called stakeholder management. Stakeholder management is not new in the field of project management (e.g., Cleland, 1985) but the discussion of stakeholder theory intensified in the last several years and constantly adapts due to new insights (Huemann, Eskerod, & Ringhofer, 2016). Project managers are frequently challenged by the complexity of managing stakeholders and scholars continue reporting a number of cases of project failure and unsatisfied stakeholders (Dalcher, 2009) since the stakeholder's expectations and interest were not sufficiently considered or expectations were mismanaged (Shenhar & Dvir, 2007). To overcome this Preble (2005) recommends a more participatory approach to improve the relationships with diverse stakeholders.

Co-creation is such a participatory approach and experience is already present in other sectors. Benefits that are harvested by this approach and which are of interest for the infrastructure sector are less rework and more satisfied stakeholders since project teams can fit the project better to the needs of the stakeholders.

1.1 Relevance of the research

The co-creation concept originates from the service- and design industry with the focus on creating value with end-users and consumers and is considered as a shift in thinking from a company-centric view towards a consumer-centric view (Ind & Coates, 2013; Sanders & Stappers, 2008, Prahalad & Ramaswamy, 2000). Originally end-users were left out of the design phase, but by inviting them value was created together and products served their needs in a better way as they could express their needs earlier. As a result, the end-users were more satisfied. Beneficial to the firm it came with a more efficient design process as well. In the infrastructure sector, stakeholders are becoming more important and recommended is a more participatory approach with stakeholders (Bouwagenda, 2016, Preble, 2005). Recent developments in the infrastructure sector creates an opportunity to co-create with stakeholders. Co-creation is therefore a concept which gained the attention of the Dutch infrastructure sector in the last several years. Extensive literature about co-creation in the context of the infrastructure sector is however not widely present and much experience with the approach is also lacking.

A preliminary literature study into co-creation, which has been performed at the start of this research, indicates that the concept of co-creation could be an interesting stakeholder management method. What actually is meant with co-creation in the infrastructure context is however not clearly defined (Dronkers, 2013). How the concept translates to the public sector with regard to public and professional stakeholders is as well not widely discussed. In addition scholars are highlighting the importance of integrating multiple actors to extend the range of co-creation opportunities (Gummesson & Mele, 2010; Driessen & Hillebrand, 2013; Wind & Mahajan, 1997).

The items as discussed above reveal a yet unexplored area in literature. The aim of this research is to contribute to our knowledge about co-creation and investigating what is necessary for the Dutch Infrastructure sector to exploit the benefits that it claims to come along. For the research these findings are presented in a problem statement.

The co-creation concept is derived from other industries and while the Dutch infrastructure sector is interested in adopting this method, co-creation in the public domain with stakeholder groups different than consumers and end-users are not widely discussed in literature. Causing the sector to wonder how they can implement and benefit from this approach.

The aim of this research is contribute in solving this problem. The practical relevance of this research lays in the insight it provides for stakeholder managers, project leaders, clients, stakeholders and other people that work in the infrastructure sector and want to work closely with the stakeholders and want to benefit from each other's strengths. Co-creation as a stakeholder method can be added to the toolkit of the stakeholder managers, expanding the range of choice and expanding the opportunities on how to interact with stakeholders.

At the same time, this research is contributing to the academic field of expertise in stakeholder management as part of project management. By conducting the research with other groups of stakeholders than end-users, extra insight is gained on how the co-creation possibilities can be extended. As throughout this research also a framework is constructed to decompose the co-creation concept, this provides the academic world with extra insight on the conditions that are necessary for co-creation to exist. As will become clear during this research.

1.2 Outline of the report

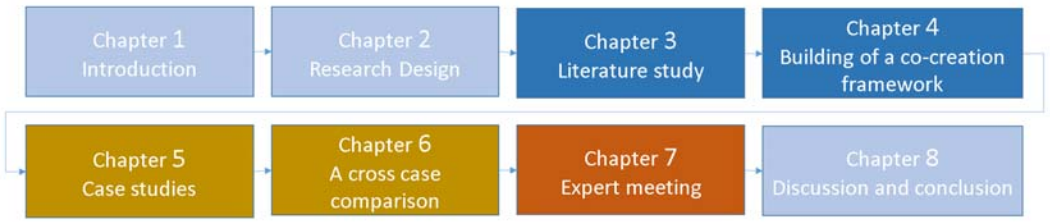


Figure 2 Overview of the chapters in the report

The outline of the report is illustrated in Figure 2. In Chapter 2, the design of the research is elaborated; starting with the research objective and presenting the research questions. After this, the context in which this research is discussed in the scope. Chapter 2 also contains an elaboration on the methodologies that has been used throughout the several parts of the research. In Chapter 3 the literature study is presented, consisting out of the theoretical review of the co-creation concept. In this chapter several elements are identified which are used in the research to examine co-creation in the infrastructure sector. To be able to do this, a framework and assessment table are constructed and presented in Chapter 4. Chapter 3 and Chapter 4 together form the basis of the research. In total four cases are studied to derive information from practice. The individual case study analysis are presented in Chapter 5 after which a cross case comparison is made and presented in Chapter 6. Additionally, a panel of five experts is consulted to discuss the research. The result of this discussion is presented in Chapter 7. Chapter 8 marks the end of the research by providing an answer on the research question together with a discussion, the limitations and recommendation for the future.

2 RESEARCH DESIGN

This chapter elaborates on the research design for which at first the research questions are presented. Subsequently, the scope of the research is presented followed with the different research methods that are applied.

The research consist out of two main parts in which the first part is the review of the theory. In this part co-creation as a concept is explained by reviewing its history and elements are identified that together set the conditions necessary in a co-creation setting. The identified elements act as a backbone in the research as the second step was to analyse how co-creation comes back in a public sector such as the infrastructure sector. The elements are operationalized for the infrastructure sector by identifying indicators in a project environment that corresponds with these elements.

In the second part of the research, in total four cases from practice are analysed. The projects were analysed on the extent to which these identified elements are present. For this, both the table with the indicators as a method to measure the extent in which they were present are constructed. In the case studies the requirements set by the different stakeholders has been analysed as well. Before discussing the several methods to answer the research question are elaborated upon, the research objective and questions are presented.

2.1 Research objective and research questions

Based on the preliminary literature study and the problem statement as introduced in Chapter 1, the objective of this research is described.

The research objective is to contribute knowledge about the co-creation process in an infrastructural related context and investigate the added value this approach may bring along.

This is done by identifying elements that are needed to create a successful co-creational setting. By comparing how these elements come back in practice and how this differs with the theory, recommendations are constructed to increase the likelihood for successful future attempts.

In order to reach the objective, a main research question is formulated followed by three sub-questions. These questions serve as a guideline during the execution of the research.

RQ: What is the added value of a co-creational approach in the pre-contractual phase of infrastructure projects?

SQ1: What is co-creation and what are the important and relevant elements for co-creation in the infrastructure?

SQ2: To what extent are the derived elements represented in Dutch infrastructure projects in practice?

SQ3: By comparing the theory with the practice, what differences can be identified and which improvements can be suggested?

2.2 Scope

The research is constricted by the context in which it is executed. The co-creation concept itself is not restricted by borders and each firm - when taken the conditions into consideration - can co-create no matter where the firm is located. Similar, infrastructure projects are executed worldwide. The research is concerned with co-creation in the infrastructure sector, however, as culture, organisations and the way in which infrastructure projects are executed does vary over the world, this research will restricts itself to the Dutch infrastructure sector.

The research is executed within the Dutch company Witteveen+Bos. Infrastructure projects that has been selected are cases Witteveen+Bos worked with. Interviews to gather information for the case analysis have been conducted with the project leaders of those projects.

According to Sanders and Stappers (2012) co-creation can take place in any phase of a project and state that the earlier in the design development process co-creation occurs, the greater and broader the likely impact. This research restricts itself to co-creation in the pre-contractual phase of Infrastructure projects. Witteveen+Bos advices public clients such as the government, provinces or municipalities in the process of translating their project idea into a contract. For this, projects are increasingly managed while adopting a Systems Engineering approach. The Systems Engineering approach considers four steps in the pre-contractual phase as shown in Figure 3. These four steps together are considered as the pre-contractual phase. Of those four steps, the research focuses on the second step of the Systems Engineering approach; the Client Requirement Specification (CRS). In this step the input of all stakeholders which is gathered via stakeholder meetings is stored and processed. This input consist of the needs, desires, demands or wishes which will be considered in this research as requirements.

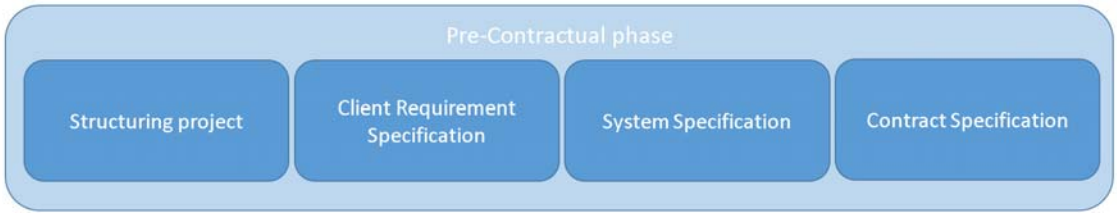


Figure 3 Systems Engineering steps (adapted from Leidraad Systems Engineer version 3, RWS, 2017).

Last, in order to co-create, you need to have someone to co-create with as it is a joint process. It is described as 'the joint creation of value between a firm and its consumers'. In this research the focus lays on co-creation with public and professional stakeholders. Public and professional stakeholders are considered stakeholders who are affected by or can affect the project, is a public organization such as the municipality, water board or province, or are stakeholders that are considered as professional organisations that are more often involved in project situations. Such as organisations concerned with the public transport, cable and pipeline owners or nature preservations. This stakeholder group is considered as currently co-creation efforts are mainly aimed to engage citizens and other organisations that are involved mostly once, but the group who will be stakeholders in multiple projects can benefit from previous experiences. As well, they are considered as granted and requirements that they set are often standardised. By investigating the co-creation potential with this group it is aimed to expand the possibilities of new ideas.

2.3 Research methodology

Within the context, a research design is set up to adequately answer the research questions and reach the objective of this research. In total four main methods are used in the research consisting of: a literature study, a case study, cross case analysis and an expert meeting. In the case study the case study selection, interview preparation, document review and requirement analysis are elaborated upon extra.

2.3.1 Literature study

At first a literature study is conducted to review the existing theoretical work on co-creation while the focus is given on the first sub-question: What is co-creation and what are the important and relevant elements for co-creation in the infrastructure? The co-creation concept is considered in and outside the context of the infrastructure sector and resulted in a list of elements that were identified and considered as necessary conditions for the co-creation approach.

Before the second sub-question can be answered, the elements that were identified are operationalized for the infrastructure sector to be able to recognize them in a practical setting. For this a framework is constructed. For each element indicators are defined that describe a setting in a project that have a positive or negative influence on these elements. After the elements are operationalized, the case study is conducted to collect the information needed to assess the elements.

2.3.2 Case study

Case studies form the second part of this research and are helpful to understand a contemporary phenomenon within its real-life context (Yin, 1994). In this research the phenomenon is co-creation. Focussing on how the co-creation aspects are represented in projects with the purpose to investigate if co-creation has a positive effect on the projects. The case study as is set up should provide the answer on the second sub-question: To what extent are the derived elements represented in Dutch infrastructure projects in practice?

During the case studies information is gathered to apply the framework constructed in Chapter 4. The information needed to be able to assess the extent of the elements was gathered via three different methods. First interviews were held with the project leaders, second a document review is conducted and additionally a database of each project that contains all the requirements set by stakeholders has been evaluated. With applying the framework, it is able to answer the second sub-question: How are these elements represented in infrastructure projects in practice? Each method to gather the information in the case studies are separately elaborated.

Co-creation slowly introduced itself in the Dutch infrastructure sector but remains a fuzzy concept. Besides this, it is a form of collaboration between two people or organisations. The outcome of a collaboration among people is hard to quantify since there are many different variables which cannot be held constant. This makes it hard to use quantitative research methods to derive causalities between co-creation and project outcomes. At the same time, the co-creation concept is a recent development in the Dutch infrastructure sector which makes the research more of an explorative nature.

In total four projects are selected for the case studies, for each project the client requirement system is examined and the project leaders of Witteveen+Bos are interviewed. The several sub-methods of the case study are elaborated, starting with the selection of the cases.

Case study selection

Four case studies are selected to examine the role of co-creation in infrastructure projects. The availability of suitable projects was limited as the co-creation concept is a recent development and projects are not classified with a label that explicitly state if a project is executed via a co-creational approach. Therefore the assessment tool was constructed to be able to overcome this obstacle and compare the projects without this explicit co-creation label.

The selected projects are all Dutch infrastructure related projects that were executed with a Systems Engineering approach. This criterion was added to ensure that the stakeholder requirements among the projects are stored and processed in a similar way. As there are several templates to store the data, only projects were considered within the Witteveen+Bos online Relatics environment. Another criterion was that the CRS-phase was already completed to be able to analyse how the requirements were processed.

Although the selected projects are all infrastructure projects, the four selected cases vary per definition as every project is unique. With the diverse set of cases, a first step towards a holistic view concerning this subject is made. In Chapter 5 each case will be handled separately, after analysing the individual cases a cross-case analysis is held to be able to compare the findings of each case and to discuss the similarities and differences in order to be able to draw general conclusions. The names of the cases has been adjusted to fictive ones for confidential reasons but all known within the committee.

The four selected cases are:

> Case 1: 'The Island road' a large sized roadway reconstruction project. A project concerned with the renewal of two movable bridges and performing big maintenance on the national roadway system including the reconstruction of some crossings.
>
> Case2: 'The Crossing' a small sized roadway reconstruction project. A project concerned with performing big maintenance on the national roadway system.
>
> Case 3:'The Bypass' a small sized roadway development project. A new road designed to bypass a small village in a yet undeveloped area.
>
> Case 4: 'The Harbour' a large sized project concerned with the construction of a berth location for commercial vessels on a new to develop area.

The first two cases are two reconstruction projects, whereas the last two cases are concerned with new construction projects. Difference between last two cases which is in the interest of this research is the phase in which Witteveen+Bos was involved. Witteveen+Bos was involved at 'The harbour' case with the assignment to develop a new land-use plan while for 'The Bypass' project the land-use plan was already adjusted and fixated by the municipality before Witteveen+Bos was involved.

Interview set up

In order to assess the extent to which the co-creation elements were present in the four cases information was gathered by conducting interviews. This section elaborates on the way how the interview is prepared.

For each project the project leader was interviewed. The project leader is selected since the project leader is responsible for the end product and the project team within Witteveen+Bos. Moreover, as Bason (2010) stated, only where a responsible manager embraces the co-creation concept it is likely that the benefits are harvested.

To make sure the gathered information from the projects would be similar, the conducted interview was constructed as a semi-structured interview. The topic was fixed and main questions were fixed, but the sequence in which the questions were asked was free. This was constructed in this way in case that an interviewee touched upon a later question. The interview consisted of two parts. The second part consisted out of questions concerning the co-creation concept, the important aspects, benefits and risks according to the project leaders. The outcomes of this part is included in the cross-case comparison. The first part of the interview was designed to gather information about the stakeholder approach and process used to assess the extent of the co-creation elements in each project. The set of standardized questions which was prepared are included in Appendix A (Dutch).

Each interview is transcribed and summarized afterwards. The comments made by the project leader were categorized and linked to an element. The comments were used as the observations which are compared with the indicators formulized in the operationalization table. The comments can be found in Appendix B (Dutch).

Before each interview, the interviewees were briefly informed about the research, the procedure during the interview and how the interview records are processed, transcribed and used for this research. Before the interview started the interviewees signed an informed consent form.

Document review

In each project the CRS-database is reviewed and information regarding the stakeholder process is extracted from this database. The CRS-database is a digital environment in which all stakeholder requirements, collected via stakeholder meetings, workshops or other methods, are collected. A unique number is assigned to each requirement to keep track on it throughout the process. Each requirement is assessed against the criteria set up by the client, which most often results in assessing a requirement on their effects on Scope, Time, Budget, Technical implications, Conflicts with other requirements, if it is realistic to ask in a tender and if it complies with the laws. Based on this assessment an advice is given whether to accept the requirement or decline it.

The databases of each project contains more or less the same information. Most important in the database is that it contains all the requirements of the stakeholders. Each requirement is linked to a unique ID number. The stakeholder who 'owns' the requirement and the source and date are presented which gives the possibility to investigate the contributions and influence of one stakeholder and whether there are meetings organized with multiple stakeholders at the same time. Finally the honorarium decision is included. A requirement can be accepted, accepted under terms or rejected, in the last column an elaboration or explanation on the status is provided.

The information in this database is used in the process of scoring the elements. The sources and date of the requirements hold information on the type of meetings that were organised and the involvement of the stakeholders. If requirements enter the process often per e-mail, this is an indicator of low engagement of the stakeholder. If there were a lot of different reports of single meetings with one or several stakeholders this provides information on a high engagement. The number of requirements reveals information about the stakeholders with a lot of influence.

Requirement analysis

The assessment results in a score per element and provides an overview on how fit a project is to implement a co-creational approach. In the case study this is set against the project characteristics to identify relations between them. Additionally, the requirements of the stakeholders are analysed.
Throughout the research, the image is created that the co-creation process helps clients to better understand the needs of the stakeholders. Knowledge of needs is fundamental to innovation processes because this knowledge combined with knowledge of solutions is used to meet the identified customer needs (Bogers & West, 2012; Kohler, Matzler, & Füller, 2009; von Hippel, 2005). This is why the requirements are divided into categories.

The aim to divide the requirements into categories is to create extra insight in the type of requirements which public and professional stakeholders set. To analyse how this differs per project and with the extra information of the interviews to analyse if the stakeholder process has an influence on this. By considering the acceptance rate, it can be identified what type of requirement is accepted the most.

In each project, the requirements are divided into four types. A requirement that specifies a need of a stakeholder. A requirement that relates to the specification of a product. A requirement that specifies a process or something that is not related directly to the design. And fourth, a requirement that is a combination of a need and a product specification. This distinction is made since co-creation is a method to gather the needs of stakeholders. It is interesting to check whether this type of requirement is also more often accepted than the other types. The four categories are based on how they influence the design freedom. Requirements that specify a product are much more specific and harms the solution space limiting the possibilities to co-create.

The four types are illustrated with examples. Requirements derived from the projects are used to illustrate these examples.

Specification of a need

This type of requirement is the specification of a need by a stakeholder, without having a big impact on the solution space. The specified requirements are open to several solutions and can be defined later. Thereby leaving room for discussion on how to fulfil this requirement and leaving room for co-creation possibilities.

The province required: 'The dimensions of the basement [of the new bridge] should be such that in the future parts of the installation can easily be replaced.' Followed by: 'Noise nuisance at the [bridge] should be minimized'. A requirement by the municipality requested: 'The municipality would like it very much to receive large cruise ships'. These requirements are classified as a need since they do not prescribe how the solution to meet the requirement should look like. They also do not harm the solution space and co-creation possibilities are not harmed as well.

Specification of a product

This type of requirement is the specification of a product which thereby defines already a preferred solution. The proposed product fulfils a certain need, however this need is replaced by a solution. By defining a product in advance, it can have a big impact on the solution space without knowing it.

The province required for instance: 'The gap behind the sheet pile should be filled with clay due to erosion resistance.' And: 'The shore protection at the location of the waiting places for the commercial vessels must consist of loose quarry stone.' And a municipality formulated: 'Apply red asphalt for bicycle lanes and black asphalt for the road at the road, with the exception of the parking lanes, which must maintain an open pavement for the future replacement of cables and pipes.' These requirements are much more detailed and specify the use of a certain soil or material. Thereby specifying already what the solution must look like and leaving no opportunities for other stakeholders to come up with other ideas or optimizations. These type of requirements are more detailed than the ones which specify a need.

Specification of a process

This category contains the requirements which are not related to the physical design solution. These can be requirements that are process related or are boundary conditions for the project which cannot be influenced.

In the 'Island road' requirements labelled with this type are for instance: 'The [construction] work on two other bridges must be aligned with the work on our bridge to keep track on the overall shipping nuisance.' Or 'The land-use plan needs to be formulated according to the standard template of municipality.' And 'Prior to the tender, the water board must be given the opportunity to test the draft contract'.

These requirements are all process related requirements, which do not affect the solution space of the actual project but do represents the needs of stakeholders or provides information which has to be taken into account while executing the project.

Combination of specifying a need and a product

These are the requirements that are both describing a need while proposing a certain solution or product to cover the need.

For instance: 'The horizontal surfaces of the bridge must be finished with a maintenance-free anti-slip layer or protective layer or wear layer with sufficient skid resistance and a lifespan of at least 15 years'. Or 'In order to prevent damage to the polder dykes, protective measures must be taken. Such as pouring stone and/ or sheet piles'. In both cases the need is stated along with several proposals for solutions, without demanding a certain solution. This way the solution direction is given, but the solution space is not harmed.

An overview with the distinction made per type of requirement, the stakeholder owner and the acceptance rate is added for each case and used in the analysis in the case studies.

2.3.3 Cross case comparison

The findings from the theory and practice will be used to make an integral analysis in light of the research questions. By comparing the theoretical framework and the results derived from the case studies the differences and similarities are identified. This is done by combining the scorecard that were constructed in the case study. A closer look is also taken in the differences between the acceptance rates of stakeholders in the CRS-database to investigate how co-creation can contribute to this. This together with the expert meeting as discussed in the next subparagraph should provide an answer on the third and last sub-question: By comparing the theory with the practice, what differences can be identified and which improvements can be suggested?

2.3.4 Expert meeting

The co-creation framework and the table with indicators to operationalize the elements, which has been constructed in Chapter 4 are validated with an Expert meeting. Here it was tested if the framework did provide the project leaders with a practical tool to recognize co-creation better, and if the project leaders could recognize this. The outcomes are the last results of this research and results in recommendations for future research. The selection of the panel members and the setup of the meeting is elaborated

The selected panel members

A panel with five members was selected based on their background and availability. The panel members have different backgrounds and together they form a group both experienced in the Dutch infrastructure sector as in co-creation. Since this research took place at the Advisory and Consultant firm Witteveen+Bos, it was made sure that members of external firms were present as well to ensure its applicability in the wider context. An elaboration on the background per panel member is provided in Table 2.

Table 2 Overview panel members

Members	**Backgrounds**
Member 1	Diverse roles in large infrastructure projects as project leader and technical manager. In total over 20 years' experience in the infrastructure within Witteveen+Bos. Experience with Systems Engineering and the stakeholder process and design.
Member 2	Over 20 years' experience in water management projects. Innovation manager at Witteveen+Bos and experience with Systems Engineering.
Member 3	Young professional with more than 3 years' experience in SE based infrastructure projects, contract manager at Witteveen+Bos.
Member 4	Educated young professional in facilitating co-creation workshop, organizing co-creation workshops on strategic level on a monthly basis. (external firm)
Member 5	Experienced project leader of infrastructure projects and experience in applying co-creation to gain extra insight into the design phase of the projects.

Set up of the consultation meeting

The meeting was set up as an interactive workshop and lasted for two hours. The workshop consisted of four parts. Starting with the introduction of the research and a view on the co-creation decomposition framework. During the introduction no further elaboration was provided on the elements themselves since the second part contained a discussion about the elements, the completeness of the framework and the mutual exclusivity of the elements. Thirdly, the assessment table was discussed with its indicators followed by four statements to trigger a discussion on the applicability of the tools and to identify improvements needed in the future. The four parts are presented in Table 3.

Table 3 Setup consultation meeting

Part one	**Part two**
- Introduction and background of the research. - Presenting the decomposition framework, without elaboration.	- Discussion about the elements in teams. Completeness and relations between them. - Consensus about the elements.
Part three	**Part four**
- Connecting the indicators with the elements. - Discussion of the indicators	- Discussion statements. - Summarizing conclusions. - Further recommendations.

The statements to trigger the discussion were as following:

1) *The co-creation elements together provide me with a complete picture of co-creation.*

This statement was constructed to discuss the completeness of the elements if other things have to be taken into account and whether the elements are recognized in relation to co-creation.

2) *The indicators in the Assessment table provides me with a practical interpretation of the co-creation concept and helps me recognize the elements in a project environment.*

This statement was constructed to discuss the applicability of the Assessment table and whether the indicators were recognized in a project environment.

3) *With the scorecard I have a first tool to have a conversation about the co-creation concept.*

This statement was constructed to discuss the value of the scorecard and if this helps project leaders to focus on improvements they need to make to create a good setting

4) *The co-creation elements are equally important, I cannot co-create if they are not all present to a high extent.*

This statement was constructed to discuss the potential to co-create and the necessary elements.

The insight of the experts including the recommendations for further improvements of the assessment table. The table as used in this research was not updated after this meeting as this research is considered as a first step in the development of a practical tool to implement co-creation in the infrastructure context. It does however identified recommendations for future research and input for the discussion of this research. As well as input to answer the third sub-question.

3 LITERATURY STUDY

Co-creation made its introduction in the Dutch infrastructure sector as a promising method to intensify the relation between the client and stakeholders of a project. Co-creation is however defined by many authors in different ways. The first sub-question is concerned with the question: What is co-creation and what are the important and relevant elements of co-creation in the infrastructure sector. For this reason, the recent history of co-creation and the different definitions are reviewed.

3.1 The recent history of co-creation

According to Sanders and Stappers (2008) and recognised by many other scholars, Prahalad and Ramaswamy are credited for bringing co-creation to the minds of those in the business community after publishing the article 'Co-opting Customer Competence' in the year 2000. They are considered as the leading scholars in this field. Their interpretation of co-creation has influenced many other academia. These scholars researched the co-creation concept for many years and came to the conclusion that companies in the 20th century were mostly busy managing efficiency while producing products. Mass production meant a decrease in material costs and thereby the products increased in value for the firm. Now, in the 21st century the authors claim that companies have to manage experiences. Today's information and communication technology, with especially the internet, are forcing companies to think in a different way about value creation. Now customers are seen as valuable resources to make the product better and thereby increasing its value (Prahalad and Ramaswamy, 2002; Sanders and Stappers, 2008). This shift is what is called co-creation and the roots of co-creation stretch back to the twentieth century when the management writer Mary Parker Follett was already arguing for the principles of co-creation (Graham, 1995).

In the design industry, this practice of collective creativity has been around for nearly 50 years (Ind and Coates, 2013). It dates back to the 1970's, when research projects focused on user participation in system developments (Sanders and Stappers, 2008). In Norway, Sweden and Denmark the Collective Resource Approach was established in the 1970's with the task to increase the value of industrial production by engaging their workers and use their experiences in the development of new systems for the workplace. This approach put together the expertise of the systems designers, researchers and the expertise of the people whose work was to be impacted by the change (Bødker, 1996). Athough the practice of co-creation was practised earlier, academia seems to have gained the interest in co-creation in the last 20 years thanks to Prahalad and Ramaswamy.

In 2013 Nicolas Ind and Nick Coates published 'The meanings of co-creation'. The authors point out that co-creation has become a widely used term to describe 'a shift in thinking from the organization as the definer of value to a more participative process where people and organizations work together to generate and develop meaning' (Ind & Coates, 2013).

This shift in thinking is described by Prahalad and Ramaswamy as a shift from a traditional company-centric view towards a customer-centric view (Prahalad & Ramaswamy, 2002). According to them, 'the changing nature of the consumer-company interaction as the locus of co-creation (and co-extraction) of value redefines the meaning of value and the process of value creation' (Prahalad & Ramaswamy, 2002).

Durugbo and Pawar (2014) describe this shift as the traditional 'received view' – employing scientists and engineers as proxies for end-users - as the main means for capturing customer needs (Kotonya & Sommerville, 2002) In this traditional view, the main role of the end-user of a product was to offer feedback and were not involved in the value creation during the design process.

Contrary to this 'received view' is the 'co-creation view'. This is about actively involving stakeholders in the customisation, personalisation and invention of solutions (e.g. Bogers, afuah, & Bastian, 2010; Foxall, 1986; Sunikka & Bragge, 2012; Von Hippel, 2005). The co-creation view involves the joint development by companies and their customers of products, services and experiences (Ramaswamy, 2009; Visser & Visser, 2006) via a collaboration that goes beyond organisational boundaries and integrates entities external to the firm (Sawhney, Verona, & Prandelli, 2005).

3.2 Definitions in literature

The authors Prahalad and Ramaswamy published in the year 2000 the article 'Co-opting Customer Competence', in 2002 'The Connection' and in 2004 they published the book 'The future of competition: Co-Creating Unique Value with Customers'.

These publications elaborate on the empowerment of customers and how companies have to work together with their customers in order to be competitive. In their work they express co-creation shift as: "*The meaning of value and the process of value creation are rapidly shifting from a product- and firm-centric view to personalized consumer experiences. Informed, networked, empowered and active consumers are increasingly co-creating value with the firm* (Prahalad and Ramaswamy, 2004). "

Defining co-creating value as; 'The joint creation of value by the company and the customer; allowing the consumer to co-construct the service experience to suit their context.'

Prahalad and Ramaswamy are credited by many researchers for their contribution in this subject and are considered the leading scholars in this field. Their interpretation of co-creation has influenced many other academia.

Wierdsma, professor of "Organizing and Co-creating" at the Business University of Nyenrode, introduced the concept of co-creation to the Netherlands. In the 'Co-creation of Change' (1999) a conceptual framework is provided relating to knowledge development, organizing and learning. What is not provided in the study entitled The Co-creation of Change is an explicit definition of co-creation. Wierdsma prefers to use the term in several contexts and illustrations which leaves it to the reader to derive an implied definition. Wierdsma argues that the concept of co-creation cannot be captured in a single definition. However, in an interview with Centric Magazine in 2011 a definition is provided by Wierdsma. Since this is Wierdsma's only explicit definition of co-creation and it was given during an interview and has not been published in the scientific literature, the scientific value of this definition is questionable. Nevertheless, it does provide additional insight into the concept. Wierdsma describes co-creation as 'The way of working together, in which one accepts interdependence, the need of each party for the other, and the importance of mutual respect of differences.'

Perks, Gruber and Edvardsson (2012) define co-creation as 'Co-creation involves the joint creation of value by the firm and its network of various entities (such as customers, suppliers and distributors) termed here actors. Innovations are thus the outcomes of behaviours and interactions between individuals and organizations' (p.935). 'A form of innovation where markets are seen as forums for businesses and customers to share, combine and innovate their ideas' is a definition provided by Volberda, Bosch, & Heij (2013).

By now four definitions are provided and we can already observe both similarities as differences. The authors Prahalad and Ramaswamy together with Perks, Gruber and Edvardsson include the term 'Joint creation of value' whereas Wierdsma describes this as 'The way of working together'. Wierdsma (1999) adds terms as 'interdependence' and 'mutual respect for differences' which are not present in the other definitions. Voldebra et al, describes co-creation as 'a form of innovation' and 'sharing, combining and innovate ideas' as the focus of their definition.

According to Ind and Coates (2013) co-creation has diverse roots and a narrow view on co-creation should be avoided. This may explain why there is not a single definition. Throughout the literature study many other definitions were presented by authors. However, some elements were repeated an others provided a more elaborated definition of co-creation. As well, most authors provided examples out of practice in order to illustrate what co-creation is.

In order to provide an overview on how co-creation is defined and in what context it is discussed, a list is composed of definitions used by authors who previously conducted research on this subject. The aim of this list is to compare the definitions in their similarities and differences as is previously done with the four definitions above. By comparing the definitions provided by the authors we can establish an overview of what is most presented and what are items that are discussed less, thereby creating an understanding of what it is and what the main elements are that are described. The underlined sections are and colours help to identify the similarities between the authors, as each colour marks parts that other authors described as well. The overview of the different co-creation definitions is presented in Table 4.

Table 4 Overview of different co-creation definitions in literature

Co-creation definitions – elaborations	Co-creation in the context of:	Authors publishments
The joint creation of value by the company and the customer; allowing the customer to co-construct the service experience to suit their context.	Co-creating unique value with customers	(Prahald, Ramaswamy, 2004)
The joint process whereby firms and customers together (or customers with other actors), in interactions, create value.	Value creation and co-creation in the service logic.	(Gronroos, Voima, 2013)
The co-creation process . . . is modelled as a set of activities for fulfilling customer needs based on agreements and constraints that are defined by customer, supplier and encounter domains.	A unified model of the co-creation proces for strategising suplier-costumer invovlement.	(Durugbo, Pawar, 2014)
Co-creation has become a widely used term to describe a shift in thinking from the organization as a definer of value to a more participative process where people and organizations together generate and develop meaning. . . . The implication for organizations is that co-creation ought to be viewed as a process that provides an opportunity for on-going interaction, where the organization is willing to share its world with external stakeholders and can generate in return the insight that can be derived from their engagement.	Co-creation from the perspective of consumers and other stakeholders.	(Ind, Coates, 2013)
The benefits co-creation process is as an iterative process, shaping benefits throughout the project lifecycle involving stakeholder engagement, adaptive process and emergence of benefits in context with a broad group of stakeholders. This is integrating adaptive learning with planning, which is representative of adaptive flexibility and planned emergence. This is a continuous process of alignment and realignment, where benefits are shaped in interaction with the multiple stakeholders who bring their own benefits, value creation and risk concerns. The project manager is at the center of this process.	Benefits co-creation as a strategy for creating benefits for a broad group of stakeholders reflecting holistic sustainable development.	(Keeys, Huemann, 2017)
Co-creation refers to the active involvement of end-users in various stages of the production process (Prahalad and Ramaswamy 2000; Vargo and Lusch 2004).	Literature review of co-creation with citizens.	(Voorberg, Bekkers, & Tummers, 2015)
Co-creation is the explicit involvement over time of people to identify, define and describe a new solution (Scharmer, 2007; Sanders and Stappers, 2008).	Co-creation as part of Design Thinking.	(Bason, 2010)
The co-creation of value is a new approach to value, meaning the 'joint creation of value by the company and the customer' (Prahalad & Ramaswamy, 2004a, p. 8), and differs from traditional conceptions perceiving the construction of value by companies, within their corporate structure and for the consumer (Vargo & Lusch, 2004; Vargo & Morgan, 2005).	Co-creation and innovation in public services.	(Alves, 2013)
The joint creation of value by the company and the customer; allowing the customer to co-construct the service experience to suit their context (Prahald and Ramaswamy, 2004).	Explain how value can be co-create or co-destroyed in the front end of a megaproject.	(Smyth, Lecoeuvr, & Vaesken, 2018)
'Co-creation involves the joint creation of value by the firm and its network of various entities (such as customers, suppliers and distributors) termed here actors. Innovations are thus the outcomes of behaviors and interactions between individuals and organizations' (p. 935) (Perks, Gruber and Edvardsson (2012).	A strategic approach to innovation from a desing perspective.	(Frow, Nenonen, & Payne, 2015)
The value co-creation is achievable if there is a two-way and direct interactions between customers and providers (Ballantyne, Varey, 2006). During the dialogical processes, customers and providers actively coordinate their actions by learning from others, and influencing each other. The quality of interactions is fundamental for value co-creation. . . . The collaboration begins with a market-based transaction in which the firm is supposed to work closely with its suppliers and key customers in a network. Next, the collaboration would require further information sharing. In this step, a greater level of trust or incentives is needed.	Value co-creation within an agricultural chains network.	(Handayati, Simatupang, & Perdana, 2015)
Active involvement of two or more actors with different roles, the integration of unlimited resources that bring beneficial value to the whole network, a willingness to interact and co-create the service, co-production and co-delivery of the service and co-construction of experiences within the user network independent of the firm (Frow, Payne, & Storbacka, 2011).	Co-creation in service systems.	(Bidar, Watson, & Barros, 2017)
A form of innovation where markets are seen as forums for businesses and customers to share, combine and innovate their ideas.	Re-inventing business	Volberda, Bosch, & Heij (2013)

As can be observed in the table, various authors base their interpretation of co-creation on other academia and the definition of Prahalad and Ramaswamy is adopted several times. Almost all definitions describe a joint process between the company and customer indicated with blue, where Keeys and Huemann (2017) broadens the concept by replacing 'customer' with 'stakeholders'. Voorberg, Bekkers and Tummers (2015) who reviewed 122 articles and books published between 1987 and 2013 replaced 'customers' by 'end-users' as they researched co-creation with citizens in public innovation.

Almost all authors include terms as 'creation of value', 'shaping benefits', 'generating meaning' or 'define new solutions' (indicated with orange) and co-creation is defined by several as an 'active' process where the actors are 'willing to share' information as indicated in yellow.

Key words that were included less often are all marked in red. Among them are 'dialogical processes', 'stakeholder engagement', 'interaction', 'learning from others' and 'suit their context'. Although these terms are stated less often or only once, they do tell something about the concept. By other scholars these terms are often mentioned but not included in the definition itself (e.g. Prahalad & Ramaswamy, 2004; Vargo & Lusch 2004; Perks, Gruber, & Edvardsson, 2012).

Although various definition can be found in literature, disagreement on the terms or conflicting definitions were not observed. The differences are in the degree of specification of the process where some authors prefer to describe less and others include more terms.

This research is concerned with the aim to investigate how co-creation can be of added value to the infrastructure sector. Therefore the broad concept of co-creation is decomposed and interest is shown into the underlying elements. As such, a definition is proposed which is more elaborated. This definition will be used throughout the research.

The definition used throughout this research is: *'The joint creation of value by the client's organisation and its network of actors via a continuous collaboration process in which openness of information and equality among the actors are present and a forum is provided in which the actors can exchange ideas and interact with each other'*

3.3 Decomposing the co-creation concept

As part of this research and to be able to operationalize the broad concept in a way that it can be applied and understand on a project level in the infrastructure sector, this research decomposed co-creation into seven smaller elements derived from the illustrations used to describe co-creation in literature. The decomposition takes place in two steps. At first the four main themes are considered based on the DART-model adopted from Prahalad and Ramaswamy (2004). Second, the smaller elements which are described by various authors are considered. Prahalad and Ramaswamy argue that the DART-model consist of four building blocks on which co-creation is based. Without it, the benefits of co-creation are less likely to be harvested as it cannot reach its full potential. The elements referred to as the second layer are considered as necessary conditions for the building blocks.

Building blocks of co-creation

Prahalad and Ramaswamy discussed the principles according to what they called the building blocks of co-creation value and named it DART. Each separate letter is a building block, and in total they suggest four building blocks named Dialogue, Access, Risk reduction and Transparency. Together, they form the basis to co-create value, in which a consumer-centric view is adopted by the company instead of the traditional company-centric view.

According to Prahalad and Ramaswamy (2004) the traditional company-centric view holds: (1) 'the consumer is outside the domain of the value chain; (2) the company has control on where, when, and how value is added in the value chain; (3) before the point of purchase, value is created in a series of activities controlled by the company; (4) there is a single point of exchange where value is extracted from the customer for the enterprise'. The last one is often the point of purchase of the product by the consumer.

The consumer-centric view as described by Prahalad and Ramaswamy entails: (1) 'the consumer is an integral part of the system for value creation; (2) the consumer can influence where, when, and how value is generated; (3) the consumer need not respect industry boundaries in the search for value; (4) the consumer can compete with companies for value extraction; (5) there are multiple points of exchange where the consumer and the company can co-create value'.

The interactions between the firms and the consumers play a central role in the discussion of Prahalad and Ramaswamy, as well as the consumer experiences. With the co-creation of value approach, they aim to achieve better consumer experiences by letting the consumer engage in the process. While opening up the process, the proposed building blocks should be taken into consideration. In Figure 4 the building blocks are presented after which an elaboration is provided for each building block. The building blocks can be seen as a first step in the decomposition of co-creation.

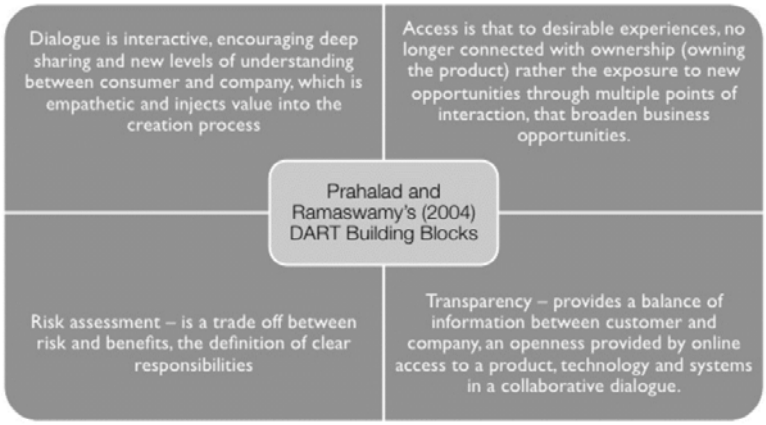


Figure 4 DART model (adopted from Prahalad and Ramaswamy (2004)).

Dialogue

The first building block considered by Prahalad and Ramaswamy (2002) is Dialogue. Without a proper dialogue between the stakeholders, one cannot know what drives the other. The dialogue is encouraged to take place at every stage of the value chain and is not only about sharing knowledge. It is more important to start a dialogue to provide understanding between the companies and consumers. With a dialogue shared meaning is created, people listen and learn from each other and in the most productive ones participants communicate and debate as equals. The dialogue helps companies to understand new levels of the emotional, social and cultural contexts of the consumers that shape the consumer experiences. The dialogue results in knowledge that companies can use to innovate and consumers get more opportunities to interact their view of value into the creation process. (Prahalad & Ramaswamy, 2004).

Access

The second building block is Access. What Prahalad and Ramaswamy mean with access is that consumers do not need to own something (a product) to experience its value. Traditionally ownership is the way to look at the transfer of value from the company to the customer. By thinking in terms of access instead of ownership a company's view of potential markets can be extended which can be very profitable for businesses.

Risk reduction

The risk reduction block is discussed as the third building block. By involving the consumers in the design process more suitable designs which better meet the needs of the consumers can be created. This reduces the implementation risks. Prahalad and Ramaswamy argue that it is safe to assume that as consumers become more involved in co-creating experiences with companies, they may be willing to take on more responsibility for managing risk exposures.

Transparency

Transparency is necessary for consumers of goods and services to become co-creators of value. Transparency as the fourth and last discussed building block inform people about the process, choices and available information. When companies make vital business-process information visible to consumers, companies, in effect relinquish control of the value creation process before the traditional point of exchange (Prahalad & Ramaswamy, 2004).

Elements of co-creation

These four building blocks summarised in the DART-model are further expended by integrating the elements which were observed in the literature. By decompose the co-creation concept further, it becomes clear out of what parts co-creation is based. Making it thereby also less abstract and make it possible to recognize this on a project level. This decomposition step is based on what scholars describe as important features while describing the co-creation process. The literature, which is previously reviewed on the provided definitions, is now assessed on a more elementary level. Although it may be possible that more than the discussed elements affect the co-creation process, the elements elaborated beneath are found most often.

Joint effort

All authors refer to co-creation as the joint creation of value. In the traditional company-centric view the company could dictate the way value was created as they are in control of the whole value creation process. In the co-creation view, value is created by interaction between two or more parties which is only possible in a joint sphere (Grönroos & Voima, 2013). Efforts, in terms of time and knowledge are invested on both sides to create a shared understanding and mutually create value.

Stakeholder inclusiveness

The stakeholder inclusiveness represents the multiplicity of stakeholders. A broad group of stakeholders comes with a multisided view of the problem. Each stakeholder brings their own information with them and can share their view on a solution. Together they can evaluate the problem from different viewpoints which should improve the identification and consideration of options for benefits creation (Keeys and Huemann, 2017). The stakeholders should be considered regardless of their power in relation to the organization (Mitchell, Agle & Wood, 1997). Eskerod, Huemann and Ringhofer, (2015) defines stakeholder inclusiveness as 'the extent to which (in principle) all stakeholders are considered by the focal organization'.

Stakeholder engagement

According to Eskerod and Huemann (2011) stakeholder inclusiveness enables more engaged and satisfied stakeholders. A high level of engagement is needed for co-creation. Engaging stakeholders can be reached by actively involving them, for instance by providing information, setting up focus groups, work councils or other ways. Keeys and Huemann states that for co-creation a broad group of stakeholders, is necessary and they need to be engaged in the process. The quality of the stakeholder engagement will influence the understanding of stakeholder value perceptions, benefits determination, and ultimately the extent and nature of co-creation with stakeholders (Keeys and Huemann, 2017).

Continuous process

Co-creation is an iterative and continuous process where idea's gradually mature over time. Recognizing the interests and concerns of all parties is part of a learning process which requires continual alignment of activities (Keeys & Huemann, 2017). The co-creation process is illustrated in Figure 5.

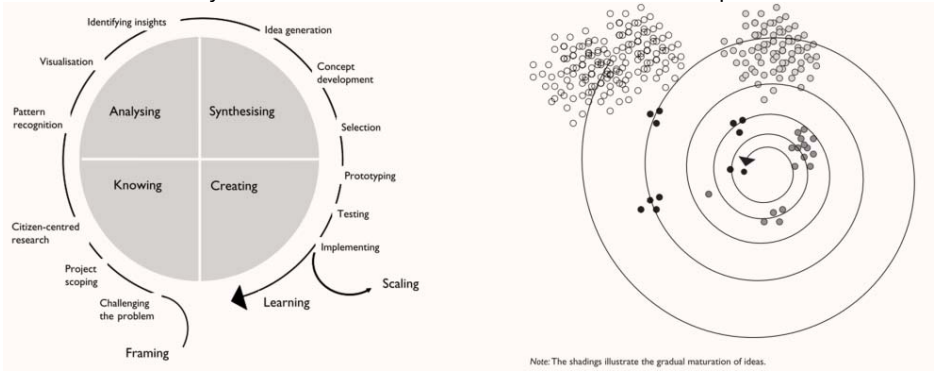


Figure 5 the co-creation process (Bason, 2010)

Stakeholder centric view

Traditional project stakeholder engagement has been project centred as it focuses on 'the people and groups affected by the project or in a position to influence it' (Andersen, 2008) and subject them to project priorities in an effectively one way relationship where the issues originate from project interest (Eskerod & Huemann, 2011). The stakeholder-centric approach considers stakeholder concerns regardless of whether stakeholders have an official role in the project (Loch and Kavadias, 2011). In the co-creation concept, the consumers' needs are at the centre of attention.

Openness of information

Prahalad and Ramaswamy (2004) point out that access and transparency to information must be symmetrical in order to be able to conduct a meaningful dialogue between the firm and customers. Another important aspect of the co-creation process is the expectation management of the stakeholders. The co-creation process aims to stimulate creativity and creating joint solutions, however it is not always possible to execute them. By being transparent on the process and being clear who takes the final decision and how the provided information is handled, expectations that cannot be met can be avoided. Openness of information is the way how information is shared with and can be accessed by stakeholders.

Willingness to co-creation

Co-creation demands an open mind towards other stakeholders. Whether clients will contribute resources like time and effort to co-create depends according to Alford (as cited in Aladalah, Cheung, & Lee, 2016) on two factors; first their willingness to do so, affected by a mix of motivates such as sanctions, material rewards and non-material awards or the unwillingness to do so, due to the risk-averse culture of public-sector organizations (Voorberg, Bekkers, & Tummers, 2015). Previous experiences with co-creation attempts can influence the willingness to be involved in a co-creative process. The second factor is the ability to co-create, which is a function of both the relative complexity of the task and ones' capabilities (Aladalah, Cheung, & Lee, 2016).

3.4 Co-creation in the public sector.

Research conducted in the area of co-creation focused most of the time on the relationship between consumers and marketers rather than other stakeholder groups (Hatch and Schultz, 2010). Several scholars (e.g. Driessen & Hillebrand, 2013; Wind & Mahajan, 1997; Spohrer et al., 2008) have urged to broaden the research towards co-creation with multiple actors. By broadening the group of stakeholders, the range of co-creation opportunities can be extended (Gummesson and Mele, 2010). Accordingly, this research focuses on co-creating with public and professional stakeholders in infrastructure projects where others have researched co-creating with citizens (e.g. Alves, 2013).

Driven by the pressure on budgets and rising citizen's expectations, co-creation occurred recently in the public sector. Previously executed empirical studies in Australia show that innovation driven through co-creation in the public sector, leads up to significant costs savings up to 20 to 60% (Commonwealth of Australia, 2010). It increases citizen satisfaction and creates improved outcomes (Bason, 2010). Also it improves the image, creditability, trust and support regarding the public agencies (Vigoda-Gadot, Shoham, Schwabsky, & Ruvio, 2008; Bloch et al., 2009; Heijne et al., 2017).). The benefits resulting from the co-creation approach only occur however if the right conditions are secured and the principles are taken into account correctly. When the process is not followed correctly it comes with drawbacks as it will create mistrust, waste professional and customer's time and money and can seriously harm and undermine future attempts for let people involve in a co-creation setting (Heijne et al., 2017). In the end, co-creation is not just about finding solutions that deliver better services or generate intended outcomes. 'Co-creation is about enabling public organisations to innovate and generate new value for less (Bason, 2010)'.

In the private sector, co-creation is based on two trends. The challenge for corporations to produce their goods more efficiently is the first one and discussed already often referred to as the firm-centric view. While being open for the input of end-users they can also be defined as possible co-producers who take over specific activities in the production chain (Prahalad & Ramaswamy, 2000; Vargo & Lusch, 2008; Von Hippel, 2007). The other trend in the private sector is a trend in which the end-users are an interesting source of product and service innovation and may become co-creators whose experiences with products or services can be of added value for a company (Prahalad & Ramaswamy, 2000; Vargo & Lusch, 2008; Voorberg et al., 2015).

In the public sector, the public authorities, as initiators for the projects, don't have to gain a competitive advantage over other authorities as there are no alternatives for the citizens to choose other products. There is less need to differentiate themselves while companies in the private sector need to differentiate themselves to exist. However, the combination of pressures on public budgets, increasing citizen expectations, social and environmental challenges that are prevailing leads to innovation in the public sector (Bloch, Jorgensen, Norn, & Vad, 2009; Commonwealth of Australia, 2009, 2010; Kaul, 1997; Mulgan & Albury, 2003; Scott-Kemmis, 2009).

In the Dutch infrastructure sector, the co-creation concept gained the interest of this concept after the plea of Jan Hendrik Dronkers, former general director of one of the leading contractor authorities of the Netherlands, Rijkswaterstaat. In 2013 he commented in the Co-Bouw Magazine that co-creation was the future for the infrastructure sector and his organisation. Without further elaboration on the concept, he left it to the market to find out what co-creation was (Dronkers, 2013).

3.5 Stakeholder management

Since co-creation is a method to engage with stakeholders, stakeholder management literature is also reviewed. There are several ways to involve and engage with stakeholder while considering them in an infrastructure project. The profession of this is what is called stakeholder management. Stakeholder management is not a new topic in literature, a long tradition of project stakeholder management is present and can be found widely in literature (e.g. Freeman, Harrison, & Wicks, 2007; Littau, Jurjagiri, & Adlbrecht, 2010; Cleland, 1985).

According to Huemann, Eskerod and Ringhofer (2016) recent stakeholder theory can be split into two approaches; the classical management of stakeholders versus a management for stakeholders approach (Freeman, et al., 2007; Freeman, Harrison, Wicks, Parmar, & De Colle, 2010). The two approaches build on different values and, thereby support different behaviours (Huemann et al., 2016).

In the management of stakeholders approach, the stakeholders are considered as a means and are used as instruments to meet the purpose of a project. A project needs stakeholder contributions to fulfil its purpose. Existing tools for project stakeholder analysis are often project-centric and thereby neglecting the possibility that the project may not be important for the particular stakeholder (Huemann et al. 2016). This project-centric view can be compared with the company-centric view as discussed in the previous chapter when relating it to the co-creation terms. The project team defines the project, and thus defines the value creation it orchestrates how the stakeholders should be involved to be able to execute the project.

The consumer-centric view which is also discussed in the previous chapter can be compared with the management for stakeholder approach. This approach is based on the understanding that all stakeholders are valuable in their own right regardless of their help or harm potential. It places the stakeholder in a central position and according to Huemann et al. (2016) the values as transparency and fairness constitute a management for stakeholder approach. These values are as well important for co-creation and are similar to the foundations on which co-creation is based. The stakeholder and their needs are at the centre of attention and value is created with the stakeholder for the stakeholder.

Where stakeholders are being involved, expectations are created. Not always can those expectations be met. Therefore stakeholder expectation alignment should be one of the project priorities. Since stakeholders are involved at the start of a project initiation and continue to be involved, the stakeholder expectation alignment is a continuous process as well (Eskrod et al., 2015; Missonier and Loufrani-Fedida, 2014). According to Keeys and Huemann (2017) this means that 'projects and their parent organisations will need to consider project structures and approaches that will accommodate and facilitate co-creation'.

3.6 Benefits of co-creation

The theoretical decomposition presented in the previous paragraph illustrates the variety of aspects which are important to consider while adopting a co-creational approach. As co-creation is a shift in thinking compared with the traditional view and comes along with a different attitude. The attitude in which the firm needs to invest in the relationship with their stakeholders first before they can harvest the benefits. For the client there have to be incentives for co-creation before one is willing to invest in it. Without having clear incentives and thus an overview of possible benefits, administrators do not see its usefulness (e.g. Fuglsang, 2008).

Benefits from a co-creational approach only result if the right conditions are secured and the principles are taken into account properly (Heijne, Klamert, Van der Meer, Stelzle & Pump, 2017). According to Bason (2010) orchestrating co-creation is a leadership task and only where a responsible manager embraces the co-creation it is likely that the benefits will be harvested. Keeys and Huemann (2017) highlights as well that in their study the project manager was at the centre of the benefits co-creation process, thus playing an important role in the project.

In literature several benefits are discussed. For example for projects it improves the quality and fit of the end result while the implementation risks are reduced. The reduction of the implementation risks has a direct positive influence on the duration and cost of the project (Heijne et al., 2017). This is supported by Bason (2010) who states that co-creation generates better outcomes. By co-creating with citizens and if applied well, co-creation activities improves the image, creditability, trust and support of the public agencies (Bloch, Jørgensen, Norn, & Vad 2009; Vigoda-Gadot, Shoham, Schwabsky, & Ruvio, 2008). According to Alves (2013) it increases the satisfaction of those who participate in the process. Co-creation has also monetary benefits as innovation in the public sector can reduce public costs significantly (Commonwealth of Australia, 2009).

Yet, if not the right conditions are secured and the principles are not taken into account properly, the opposite of the benefits occur. Failed attempts can seriously harm and undermine future attempts to let people involved in co-creation settings (Heijne et al., 2017). Mistrust regarding the public agencies can harm the project process as it wastes professional and customer's time and money (Heijne et al., 2017). Striving for a win-win approach may also lead to conflict-free solutions that are very ambitious but not executable (Hahn, Figge, Pinkse, & Preuss, 2010). Investments in stakeholder expectations should be made, as misalignment of expectations can harm future processes in the project and result in disappointments.

3.7 Conclusion of the literature study

From the reviewed literature it is derived that the co-creation concept has diverse roots and is defined in literature in different ways. The differences found in literature are context related and relates to the level of specification which scholars use to define the concept. The context related differences come forward from co-creating in a private sector versus co-creating in a public sector. In the private sector, much attention is given to co-creating with consumers where in the public sector end-users or other stakeholders do occur. Authors like to illustrate co-creation examples while describing it since it can be perceived as an abstract term. In the research the following definition of co-creation is constructed:

The joint creation of value by the client's organisation and its network of actors via a continuous collaboration process in which openness of information and equality among the actors are present and a forum is provided in which the actors can exchange ideas and interact with each other'

The definition includes several elements such as a continuous process, openness of information and equality amongst the actors. In total the co-creation concept is decomposed into seven elements, considered as the conditions needed to co-create and presented in Figure 6. This constructed framework is the basis of this research as these elements are assessed throughout the case studies. In the next Chapter a framework is constructed with these elements, continuing on the DART-model of Prahalad and Ramaswamy (2004).

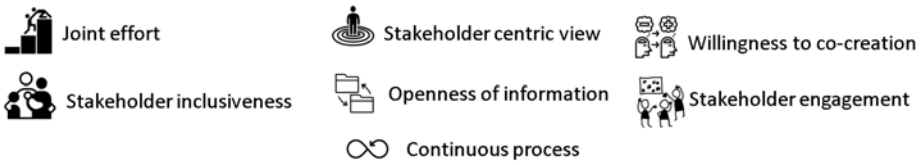


Figure 6 Seven identified co-creation elements (Own Illustration).

The second part of the literature study considers co-creation in the infrastructure sector. The customer-centric view is linked to a management-for-stakeholder style, whereas the company-centric view is linked to a management-of-stakeholder approach as elaborated by Huemann, Eskerod and Ringhofer (2016). Since co-creation is a recent development and while in the next phase the cases were selected of which it was unclear wether they co-created or not in the next Chapter an assessment table is designed to measure the extent in which these elements are represented in practice. For this the elements are operationalized first.

4 BUILDING OF CO-CREATION FRAMEWORK

The literature study in Chapter 3 provides the first part of the answer to the question: What is co-creation and what are the important and relevant elements of co-creation in the infrastructure sector? In this chapter the elements are related to the foundations block described in the DART-model. After that, the elements are operationalized by identifying indicators to recognize the elements in infrastructure projects. Before the extent of the elements can be assessed a tool is constructed. This assessment table is designed to measure the extent in which the elements are represented in practice. For this indicators that have a positive effect on a co-creation setting are identified based on the illustrations provided in literature and similar is done for indicators that harms the co-creation potential. The assessment table is further filled with indicators based on practical settings which are recognized by the project leaders. This way, if project leaders want to design a stakeholder approach which fully supports a co-creational setting, one has to take into account the positive indicators.

The second step is expanding the DART-model by integrating the elements which were observed in the literature. By decomposing the co-creation concept further, it becomes clear out of what parts co-creation is based. Making it thereby less abstract and make it possible to see how the elements come back in projects. This decomposition step is based on what scholars describe as important features while describing the co-creation process. The literature, which is previously reviewed on the provided definitions, is now assessed on a more elementary level.

An overview of the most represented elements related to the co-creation process are depicted in Figure 7. These elements were described by various authors in their examples as elaborated in the previous chapter. Each element is linked to the foundation blocks of which they have an impact on. As described by Prahalad and Ramaswamy (2000) you need all the foundation blocks to be able to create a co-creational setting. It is therefore also argued that all the elements are needed. This question has been raised during the expert meeting who confirmed that all elements are needed, however not every element need to be present to its fullest extent, which will be discussed there.

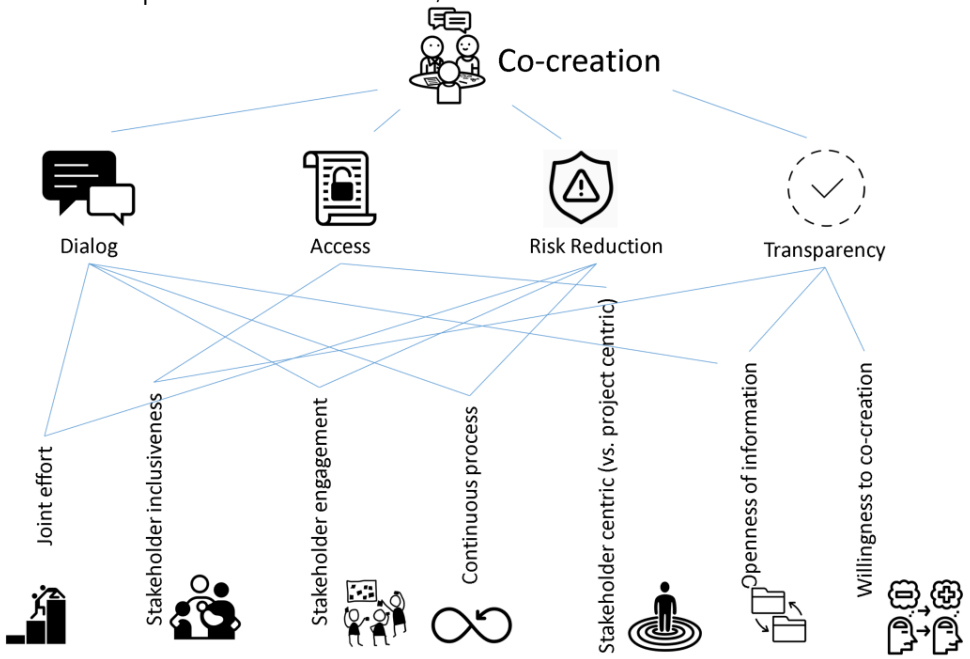


Figure 7 Decomposition of co-creation (Own illustration.)

4.1 Building a tool to recognize co-creation in infrastructure projects.

The seven elements together form the basic ingredients necessary for a co-creational setting. To apply the framework, a table is constructed to link the infrastructure practice with this framework. This is done by operationalizing the elements for the infrastructure sector by defining indicators. Project teams can influence the way in which stakeholders are approached, for instance the management-of-stakeholder versus the management-for-stakeholder approaches. Decisions are taken upfront on how often a stakeholder meeting is scheduled or how certain stakeholders are approached and what information is given to them. During the project this can be adapted, due to new developments in the project. The assessment table is constructed to link activities regarding the stakeholder approach of SE-based projects with the co-creation framework. The assessment table will be applied during the case studies to measure the extent to which each element was present. By analysing the cases on the extent of each element, it can be observed how the co-creation elements are already represented in projects after which recommendations can be given for improvements. The operationalizing table is used to observe which indicators are present in a project environment, with the help of a scorecard, this is translated to a score ranging from a low score to a high score. The table with the indicators per element and the rating of the scorecard are elaborated in the following subparagraphs.

Indicators for a low or high co-creation potential

For each element indicators are formulated and presented in table 3. These indicators are considered as small hints derived from practice that tells something about the co-creation potential. Two categories are defined. One category contains indicators with a low potential for co-creation and the other category contains indicators with a high potential for co-creation. An indicator can have a positive contribution for a co-creation setting or a negative contribution. For example a project in which it is observed that 'The stakeholders did not know other stakeholders' is considered as an observation that contributes negatively to a co-creational setting and therefore considered as an indicator for a low co-creation potential. In order to co-create you must interact with each other which is only possible if the stakeholders know who their fellow stakeholders are. On the other hand if in a project setting it is observed that 'A workshop was organized for all stakeholders' it contributes to a high co-creation potential and thus considered as an indicator which contributes to a high co-creational potential. The indicators are partially based on the literature reviewed in the literature study. Other indicators are derived from practice, based on how stakeholders are approached in infrastructure projects and based on how the project leaders illustrated the setting.

The table with the indicators provides insight in how the elements can be recognized in an infrastructure project environment. To assess to what extent the elements are represented, a score table is constructed, which is discussed in the next paragraph.

In the overview below the elements, the indicators for a low level or high level are presented. After the overview, the way how they are assessed is elaborated upon.

Joint effort

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
If feedback on the requirements was given, it was only shared with the stakeholder who set the requirement.	Feedback on the requirements was shared amongst all stakeholders.
Stakeholders put their own interest upfront and were not willing to think along with others.	Stakeholders were willing to think along with each other.
Stakeholder meetings were organized per individual stakeholder.	Stakeholder meetings were organized with multiple stakeholders at the same time.

Stakeholder inclusiveness

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
A stakeholder analysis was not present, or present but not reviewed and updated.	A stakeholder analysis was present, reviewed and updated
New stakeholders presented themselves, but their requirements could not be included in the project anymore.	New stakeholders did not presented themselves or could easily be included in the organization.

Stakeholder engagement

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Workshops, work councils, focus groups or other active forms of engaging stakeholders were not initiated or only initiated for the client.	Workshops, work councils, focus groups or other active forms of engaging with stakeholders were initiated in which both the client as other stakeholders were invited and participated.
Stakeholders had a passive attitude. They were not triggered to think along and only gave input on demand.	Stakeholders had an active attitude and were stimulated to think along with each other.
Stakeholders received feedback per e-mail or letter.	Stakeholders were invited to discuss the feedback during a meeting.

Openness of information

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not given insight in the requirements of other stakeholders.	Stakeholders were given insight in the requirements of other stakeholders.
Feedback on the decision making process was not accessible for everyone.	Feedback on the decision making process was available for everyone.

Stakeholder centric view

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not informed on how the honorarium decision was made.	Stakeholders were informed on how the honorarium decision were made upfront.
Project priorities were important and leading in the decisions made throughout the project. During the honorarium process requirements were only assessed on the impact on time, scope and budget.	Requirements of the stakeholders were assessed on the added value they bring along, not merely on their costs.
Ideas from stakeholders were not taken into consideration.	An effort was made to investigate the feasibility of ideas of the stakeholders.
Feedback on the requirements was not provided, or after feedback was given stakeholders were not given the chance to change them anymore.	Feedback on the requirements was provided and stakeholders were allowed to change their requirements in needed.

Continuous process

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
One meeting is organized to collect the requirements of the stakeholders. No time was scheduled in the planning to gradually mature and discuss ideas together.	Meetings to discuss the requirements of the stakeholders were organized on a continuous basis and ended when the discussion was completed.

Willingness to co-create	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
The client is not willing to try new things and had a risk-averse attitude.	The client is open to proposed ideas of stakeholders and willing to discuss them.
Stakeholders act on request, do not have the intentions to get involved too much.	Stakeholders are seen as valuable and the project is constructed with them.

The indicators are separated into indicators that are not beneficial for a co-creational setting and to indicators that are contributing to a co-creational setting. In order to assess the extent of co-creation a scorecard is constructed to assign a score to each element for each project. This way, an answer can be formulised on the second sub-question of this research: To what extent are the derived elements represented in Dutch infrastructure projects in practice? The way in which the scorecard is constructed and how it will be applied is elaborated in this subparagraph.

The assigned scores follow from the amount of indicators that are beneficial for a co-creational setting. Information from the projects is collected in the case studies and compared with the indicators of this table. If a lot of observations corresponds with indicators from one category a low or high score is awarded. If observations corresponded with indicators from both categories a medium score is awarded. If observations did not completely fitted within an indicator it was aimed to identify it as best as possible.

For instance, if from the Stakeholder Inclusiveness information is gathered and that a stakeholder analysis is present, reviewed and updated, and no new stakeholders presented themselves. It corresponds with the indicators of the high category and a high score is awarded.

If however, a stakeholder analysis was not updated or reviewed, but new stakeholders did not presented themselves it scores both one indicator of the low category as for a high category. This results in a medium score as from both sides indicators are observed.

Subsequently, if a stakeholder analysis was not updated and new stakeholders presented themselves but their requirements could not be processed anymore, both of the low category are observed and a low score is awarded.

Stakeholder inclusiveness	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
A stakeholder analysis was not present, or present but not reviewed and updated.	A stakeholder analysis was present, reviewed and updated
New stakeholders presented themselves, but their requirements could not be included in the project anymore.	New stakeholders did not presented themselves or could easily be included in the organization.

The different scores are presented in Table 5.

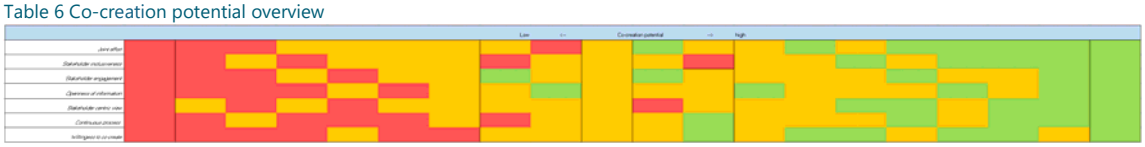
Table 5 Overview scores to rate the co-creation elements

Low	Medium	High
Indicators are observed that harms the co-creation potential and makes it not possible to create a setting in which can be co-created. If indicators are present that contributes to a co-creational setting, they are outweighed by the harming ones.	Indicators are present which harm the co-creation setting and indicators are present that contributes to a co-creation setting. This situation is created for instance by a different relation with two stakeholders. Indicators of one category do not outweigh the others.	Indicators are present which contributes to a positive co-creation setting and increases the co-creation potential. If indicators are present that harms the co-creation setting, they are outweighed by the positive ones.

Since the scores are based on the interpretation and explanation of the observations, this should be considered as an illustrative score. Providing extra insight in how the elements are represented. Awarding a score does however introduce a moment in time in which the project team is thinking about the stakeholder approach they designed, or will be designed in the future. It does also provide the project team with an overall illustration of the extent to which they are able to meet the co-creation conditions and thus if co-creation attempts are likely to fail or not.

The result of these scores are presented in an overview per case. In Table 6 a set of different combinations of scores is presented. Each column could be the outcome of a project. These are by far not all possible combinations but it gives an impression of the spectrum on how a project can score. On the total left side of the spectrum, all the elements are rated with a low score. On the right side of the spectrum all elements have a high score. It illustrates the co-creation potential for the approach that a project use. Attempts to co-create, if all elements for a high score are present to the fullest extent are likely to succeed. Attempts to co-create if all elements are rated with a low score are likely to fail. In practice, a variation of scores is likely to be present. The variation in scores will give insight on what elements should be focussed first and invested in by a project team if it wants to co-create and elements still score low.

Table 6 Co-creation potential overview



5 CASE STUDIES

In this chapter the results of the individual cases are presented and analysed. Each case starts with an elaboration of the project followed with the observations of both the interview as the CRS-database. These observations are directly rated with the operationalizing table and scorecard to rate the extent of the co-creation element. The observations of the requirement analysis are presented thereafter in which these are linked to the scores to present the conclusions. The individual cases are subsequently analysed all together in the cross-case comparison. In the cross-case comparison the comments made by the interviewees about the benefits, risks and purpose of co-creation within a project setting are presented as well.

5.1 CASE STUDY 'The Island road'

5.1.1 Description of the project

The project is a roadway maintenance project initiated by the province, owner of the regional roads and client of the project. In this project the province cooperates with three surrounding municipalities and the water board. The province is the initiator of the project.

For Witteveen+Bos the assignment started with the question to construct a contract for the renewal of a movable bridge in the roadway system. Quickly after the start, the client upgraded the assignment with a second movable bridge followed by the additional assignment to include the upgrade of the road system which connects them.

The layout of the road will remain more or less the same, however some are changed to increase the safety level of the crossing. Due to the added scope of the project the assignment grew in size to 600.000 euro of which 50.000 euro was allocated for the CRS-process. The final project was procured for 50 million euro and will be executed in the upcoming years.

Witteveen+Bos used a Systems Engineering approach to keep control over the project. Special about this project was an agreement between the client and Witteveen+Bos in which the project leader of Witteveen+Bos needed to be present for each stakeholder meeting. In total around 700 requirements were gathered in those meetings of which the majority were set by the stakeholder group we are interested in.

The road crosses an area which can be considered as an inland island as the area is surrounded with a channel. Therefore the two bridges are of large importance to this area as those are two of the three bridges that connect the island with the rest of the region. The third bridge is not part of the regional road system and cannot handle large amounts of vehicles. Constantly discussed in this project was the accessibility during the execution phase. The final design and layout were less interesting according to the project leader.

5.1.2 Observations and score per element

The observations based on the interview and the documentation review are elaborated per element hereafter. The assessment table and scorecard are applied to define a score. This is considered as the extent to which an element was present in a project.

Joint effort

According to the project leader the relation with the municipalities was good. Unusually early the aesthetics comities of the municipalities were taken into account in the process of specifying a new design for the movable bridges. This paid off in the project as according to the project leader the project team created some goodwill by involving them early. With the municipalities meetings were organised up to five times to gather and discuss the requirements. The meetings stopped after the municipalities were happy with the end result. This relation as illustrated by the project leader scores good regarding the element joint effort.

However, besides this positive relationship with the municipalities, the other observations correspond with indicators of a low score. For instance the relationship between the water board and the province hampered the joint effort element. Before the requirements of all stakeholders were gathered and known, the province already made some promises to the water board and thereby created expectations and an unequal setting between the stakeholders. The water board wanted to add scope to the project without providing any support in terms of resources. The lack of support from the water board resulted in a situation in which they did not think along with each other anymore and resulted in 'free-riding' behaviour.

Another observation is that one attempt was made to discuss the project with several stakeholders at the same time in a multidisciplinary meeting. This was organized by the client, however the invited stakeholders, including the water board, putted their own interest upfront and did not dare to think along with each other. This led to a chaotic meeting with no joint result. According to the project leader the other scheduled joint meetings were cancelled for this reason.

The last observation is that the stakeholder's requirements were collected via individual meetings and the stakeholders did not know what the requirements of other stakeholders were. This created a setting in which it is impossible to think along with each other as one does not know the concerns of others.

Based on the observations described above indicators for both a high as a low score are present (indicators observed are assigned with a colour in the table below). For the municipalities a situation was created in which they could think along with each other but for the rest is it was impossible to jointly create value. For this reason the medium score is awarded for this element as there are enough opportunities left to improve on this.

Score	**Case 'the island road'**
Joint Effort	Medium

Joint effort	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
If feedback on the requirements was given, it was only shared with the stakeholder who set the requirement.	Feedback on the requirements was shared amongst all stakeholders.
Stakeholders put their own interest upfront and were not willing to think along with others.	Stakeholders were willing to think along with each other.
Stakeholder meetings were organized per individual stakeholder.	Stakeholder meetings were organized with multiple stakeholders at the same time.

Stakeholder inclusiveness

To rate the extent of the stakeholder inclusiveness element the comments about the stakeholder analysis are considered. The project leader stretched that besides a stakeholder analysis conducted by the client itself, Witteveen+Bos performed a second stakeholder analysis to make sure that all stakeholders were taken into account. According to the project leader no stakeholder groups were forgotten as they did not present themselves during the project. As additional efforts have been taken to make sure all stakeholders were considered, the element is rated as high.

Score	**Case 'the island road'**
Stakeholder inclusiveness	High

Stakeholder inclusiveness	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
A stakeholder analysis was not present, or present but not reviewed and updated.	A stakeholder analysis was present, reviewed and updated
New stakeholders presented themselves, but their requirements could not be included in the project anymore.	New stakeholders did not presented themselves or could easily be included in the organization.
Feedback on the requirements was not provided, or after feedback was given stakeholders were not given the chance to change them anymore.	Feedback on the requirements was provided and stakeholders were allowed to change their requirements in needed.

Stakeholder Engagement

The project leader mentioned the attempt of the province to set up a multidisciplinary meeting in which multiple stakeholders were invited. The meeting was a failure as everyone placed their own interest upfront which led to a chaotic situation. The attempt to set up a multidisciplinary meeting is a positive observation in relation to the engagement element, the outcome was unfortunately not satisfying. The outcome can be related to the behaviour of the stakeholders and is considered under the willingness to co-create element.

The meetings with the municipalities were a lot more constructive, as there were meetings organised until they were fully satisfied. In the meetings the progress of the design was discussed. Taking the effort to engage the municipality in an early stage and until they are satisfied is rated high.

The feedback on the requirements was individually provided to the stakeholders who set them. The stakeholders were sometimes informed only via a letter, which is a sign of a low level of engagement. The stakeholders did not know what the requirements were of other stakeholders. The effort was not made to engage the stakeholders with each other. This is considered as an indication of a low effort to engage stakeholders.

Attempts to engage stakeholders were taken, although not always successful. The majority of the efforts was based on engaging the stakeholders on an individual level instead of trying to get the stakeholders to communicate with each other and providing feedback with a letter is a indicator of a low engagement level. Therefore a high score is not awarded for this element, but based on the observations as described above, the score medium is awarded.

Score	**Case 'the island road'**
Stakeholder Engagement	Medium

Stakeholder engagement

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Workshops, work councils, focus groups or other active forms of engaging stakeholders were not initiated or only initiated for the client.	Workshops, work councils, focus groups or other active forms of engaging with stakeholders were initiated in which both the client as other stakeholders were invited and participated.
Stakeholders had a passive attitude. They were not triggered to think along and only gave input on demand.	Stakeholders had an active attitude and were stimulated to think along with each other.
Stakeholders received feedback per e-mail or letter.	Stakeholders were invited to discuss the feedback during a meeting.

Openness of information

In line with the quality control feedback on the requirements was provided by Witteveen+Bos after the honorarium decision was taken. The stakeholders had the opportunity to change their requirements after the feedback if wanted. The feedback was unfortunately only shared with the stakeholder who set the requirement and the stakeholders did not knew what other stakeholders requested, making it impossible to share and discuss the information with each other. This corresponds with indicators with a low score.

The promises made by the client for the water board do also not contribute to an environment in which openness of information is present. By making exclusive promises to individual stakeholders others feel left out. In addition to the things described above, the project leader mentioned at the end of the interview that it would be nice if there could be a bit more transparency in upcoming projects as he stumbled upon a lack of it throughout this project a few times and also an indicator of corresponding with a low score.

The individual feedback sessions, promises and additional comment by the project leader are all indicators of a low score, and as a result this element is rated accordingly.

Score	**Case 'the island road'**
Openness of information	Low

Openness of information

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not given insight in the requirements of other stakeholders.	Stakeholders were given insight in the requirements of other stakeholders.
Feedback on the decision making process was not accessible for everyone.	Feedback on the decision making process was available for everyone.

Stakeholder centric view

The main objective for the project was to replace the two movable bridges and perform maintenance on the road, with these project objectives in mind the stakeholders were asked for their input. If requirements of the stakeholders were not directly necessary or in the scope of the project, the budget was leading in the decision to accept or reject it. According to the project leader, the client was the definer of the scope and dominant in terms of amount of requirements set by them. The focus on budget, scope and project objectives together with the dominant position of the client in the requirement database are indicators of a low score.

A comment by the project leader which indicates a stakeholder centric view was that the stakeholder manager of the client did thought along with the stakeholders while gathering the requirements. This was done in order to get an idea of what the stakeholder really wanted. The project leader had the feeling that enough effort was put into creating a clear picture of the stakeholder's needs, and that more efforts would not change the project outcomes. The extra effort done by the stakeholder manager to understand the needs of the stakeholders is an observation that corresponds with a high score.

It is positive that the stakeholder manager of the client wanted to understand the stakeholders and their needs. The stakeholder requirements were assessed however mostly on the project goals and influence on the budget and the client was the definer of the scope. As indicators of both sides are present, but improvements are necessary to score a high score. A medium score is assigned for this element.

Score	**Case 'the island road'**
Stakeholder centric view	Medium

Stakeholder centric view

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not informed on how the honorarium decision was made.	Stakeholders were informed on how the honorarium decision were made upfront.
Project priorities were important and leading in the decisions made throughout the project. During the honorarium process requirements were only assessed on the impact on time, scope and budget.	Requirements of the stakeholders were assessed on the added value they bring along, not merely on their costs.
Ideas from stakeholders were not taken into consideration.	An effort was made to investigate the feasibility of ideas of the stakeholders.
Feedback on the requirements was not provided, or after feedback was given stakeholders were not given the chance to change them anymore.	Feedback on the requirements was provided and stakeholders were allowed to change their requirements in needed.

Continuous process

According to the project leader the process went step-by-step and was not as ideal as he wanted it to be. With the client an agreement was made upfront that the project leader would attend every single stakeholder meeting, which gave him not the freedom to design his own stakeholder approach. While looking back on the process, the project leader argues that this process could be designed better. The step-by-step approach in which the stakeholders were individually be approached introduced a lot of hassle in the project. Most stakeholders were only asked once for their input, not providing them with the opportunity to update their requirements throughout time. These are indicators corresponding with a low score.

The project manager was more satisfied with the relation between Witteveen+Bos and the municipalities in which multiple meetings were scheduled to gradually discuss the design of the bridges as this worked out well. The early involvement of the aesthetics committee, which according to the project leader is unusual, worked out beneficial for the project. In the end, the aesthetics committee needs to agree with the design, which was the reason why to give them extra attention. As multiple meetings took place, the design gradually matures and requirements changed over time. With regards to the relation to this specific stakeholder, this corresponds with indicators with a high score.

The project leader illustrated two settings, one which corresponds with a low score and one that corresponds with a high score which depended on the stakeholder. As the stakeholder approach was for the majority of the stakeholders not designed as a continuous process, no high score is assigned but a medium score is assigned, since indicators of both sides are present.

Score	**Case 'the island road'**
Continuous process	Medium

Continuous process	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
One meeting is organized to collect the requirements of the stakeholders. No time was scheduled in the planning to gradually mature and discuss ideas together.	Meetings to discuss the requirements of the stakeholders were organized on a continuous basis and ended when the discussion was completed.

Willingness to co-create

According to the project leader the client was in charge of defining the scope. If a stakeholder requested an out-of-scope requirement, the requirement would be discussed with the client. Speaking in terms of co-creation, they were not creating something together but reacting on each other. Another comment which corresponds with a low level of willingness to co-create was the unsuccessful multidisciplinary meeting organised by the client. According to the project leader the self-interest of the stakeholders, and the lack of people with authority to make agreements resulted in this failed meeting. These are all indicators corresponding with a low score and is thus rated accordingly.

Score	**Case 'the island road'**
Willingness to co-create	Low

Willingness to co-create	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
The client is not willing to try new things and had a risk-averse attitude.	The client is open to proposed ideas of stakeholders and willing to discuss them.
Stakeholders act on request, do not have the intentions to get involved too much.	Stakeholders are seen as valuable and the project is constructed with them.

5.1.3 Extent of co-creation

The outcomes of the individual elements are combined and presented in Table 7. As we can observe this project is rated with a low score for the elements Openness of information and the Willingness to co-create. The other four elements, Joint effort, Stakeholder Engagement, Stakeholder centric view and Continuous process were present to a medium extent. Overall this project scores in the mid-range of the extent of co-creation possibilities. By investing on the openness and willingness, this project can be made more suitable to adopt a co-creational approach. The project leader already stated that he was interested in a tool to share information better with the stakeholders.

Table 7 Score overview 'the island road'

Score overview	Case 1: The island road
Joint effort	Medium
Stakeholder inclusiveness	High
Stakeholder engagement	Medium
Openness of information	Low
Stakeholder centric view	Medium
Continuous process	Medium
Willingness to co-create	Low

5.1.4 Overview of the requirements

The database holds in total 697 requirements set by all stakeholders together. In total 50 stakeholders contributed to this, of which 11 of them were identified as public or professional stakeholders. Together, this small group of stakeholders set 76% of all requirements having much influence on the design.
Of all the requirements set by the public-professional stakeholder group, 57% originated from the client, 22% were set by the water board and other stakeholders had a far less share in setting requirements.

On average, 64% of all requirements were accepted. For the public-professional stakeholder group this was 69%. The requirements were divided into the four categories as explained in Chapter 5. In Table 8 the requirements are presented. Below the table the observations which are derived from this table are elaborated.

Table 8 Requirement overview 'the island road'

Overview honorarium decision per type of requirement

	Province		Water board		Municipalities		Others		Totaal	
Total	**301**	*57%*	**119**	*22%*	**66**	*12%*	45	*8%*	**531**	*100%*
Needs	**117**	*39*	**17**	*14*	**16**	*24*	22	*49*	**172**	*32*
Accepted	92	*79*	13	*76*	9	*56*	17	*77*	131	*76*
Rejected	5	*4*	1	*6*	1	*6*	2	*9*	9	*5*
Under discussion	20	*17*	3	*18*	6	*38*	3	*14*	32	*19*
Products	**55**	*18*	**43**	*36*	**14**	*21*	9	*20*	**121**	*23*
Accepted	43	*78*	28	*65*	5	*36*	8	*89*	84	*69*
Rejected	3	*5*	5	*12*	0	*0*	1	*11*	9	*7*
Under discussion	9	*21*	10	*23*	9	*64*	0	*0*	28	*23*
Process or Boundary condition	**114**	*38*	**54**	*45*	**36**	*55*	8	*18*	**212**	*40*
Accepted	86	*75*	30	*56*	18	*33*	3	*38*	137	*65*
Rejected	9	*8*	1	*2*	2	*4*	1	*13*	13	*6*
Under discussion	19	*17*	23	*43*	16	*29*	4	*50*	62	*29*
Combination of needs and product	**15**	*5*	**5**	*4*	**0**	*0*	6	*13*	**26**	*5*
Accepted	13	*87*	2	*40*	0	*0*	1	*17*	16	*62*
Rejected	0	*0*	2	*40*	0	*0*	1	*17*	3	*12*
Under discussion	2	*13*	1	*20*	0	*0*	4	*67*	7	*27*

What can be observed from this analysis is that the client (province) was dominant in the project as the client contributed 57% of the requirements.

The largest category of requirements are the ones which specify a process or boundary condition. As a possible explanation for this the project leader commented that most stakeholders were concerned about the temporary execution phase, as this was a reconstruction project and in the final design not much deviated from the current design.

In all cases we observe that the requirements set by the client are accepted above average. Another observation is that in the requirements that are classified as a need are accepted more than the other categories.

At last, the honorarium type 'under discussion' was not mentioned in the first place as a possible outcome of the honorarium status. The requirements that have this status were meant to discuss with the client, as those were requirements which were out-of-scope, could not be processed yet as there was no decision made about a variant (and the requirement only had an impact on one of the variants) or could not be processed for another reason. As we can observe, almost 25% of all requirements was given this status. One might expect this in a project which is not finished yet, however this project is already procured. Of the 129 requirements with this status, 89 were processed in the follow-up phase. Although the System specification phase was out of the scope of this research it is likely that those who have been processed were accepted in the end.

5.1.5 Case conclusions 'The island road'

The stakeholder process which was followed in this project was not designed to facilitate co-creation on purpose, while assessing the separate elements it can be observed that most elements are rated with a medium score, meaning that to some extent the elements to co-create are already present.

As can be observed from the scorecard, two scores were rated low. The willingness to co-create and the openness of information. By not sharing the requirements with other stakeholders, it is hard for them to put them in a position that they can think along with each other.

For a reconstruction project, the design freedom is much less than a new to design project. However, by not providing the stakeholders with the opportunity to think along with each other, optimizations of for instance the temporary phase do also not occur. In the design process of the two movable bridges, much more was collaborated by the client and the municipalities. This might be explained since the project team needed the municipality to agree with the final design.

Other stakeholders were less involved in the design or only met once to discuss their requirements, this harms the co-creation process, so in order to adopt a co-creational approach, changes need to implemented that facilitate a more continuous process.

While observing the requirements in the database, we observe that the majority of all requirements were set by the client. The influence on the design by the client was large. Needs were honoured more often than other requirements, but we do also observe that in the reconstruction project a lot of boundary conditions were putted forward.

Overall this project scores in the mid-range with co-creation possibilities, to benefit from a co-creational approach certain adjustments needs to be taken into account but on a smaller scale it is possible to start experimenting with it. For this project this would be recommended to set up a co-creation workshop with the municipality in the construction of the bridges.

5.2 CASE STUDY 'The Crossing'

5.2.1 Description of the project

The project with the name 'The Crossing' is a roadway reconstruction project initiated by the province, owner of the regional roads in this province and the client of the project. The project contains the reconstruction of a crossing in which more than 30.000 vehicles pass by every 24 hours. Due to the current configuration of the road – two lanes in each direction – congestion is often present. The road has a regional function and is connected with the national road system via a highway. With this function it fulfils an important link in the regional roadway system and is in need of an upgrade.

According to the province, the reconstruction is necessary to increase the capacity of the road and to increase the overall safety level. For this, the province allocated a budget and provided Witteveen+Bos the assignment to set-up a contract. The contract is meant as a mean to procure the project on the Dutch infrastructure market. The project goals were predefined and included the reconstruction and big maintenance of the road which has the length of approximately three kilometres and includes a big crossing.

While setting up the contract, Witteveen+Bos constructed a reference design. For this design the wishes and requirements of the several stakeholders were taken into account. A reference design is usually made to verify that the requirements in the contract are reasonable and to create a reference which can be used to make an educated guess about the cost of the project.

Witteveen+Bos used a System Engineering approach in its effort to construct the design and the final contract. While the reference design evolved, the total budget which needed to be reserved for the actual design and reconstruction became clear as well. Before Witteveen+Bos was involved by the client, the client hired a stakeholder manager of another engineering firm to gather the needs of the stakeholders. Most of the wishes and requirements were therefore already present at the start for Witteveen+Bos, however Witteveen+Bos gathered an additional 100 wishes and requirements which all were set by the professional and public stakeholders.

In total Witteveen+Bos received a budget of 235.000 euros of which 3.000 euros was reserved for the CRS part of the assignment. The final project was procured for 4 million euros. The project is procured under the UAV-GC 2005 administration as an E&C contract. Several parts of the reference design were given to the contractor with the assignment to include those parts in the design.

Within Witteveen+Bos a project leader was assigned to control the project, safeguarding the quality of the documents and was in the lead of the project organisation within Witteveen+Bos. The client itself initiated an Integral Project Management (IPM) team for the project. With this team they wanted to keep in control over the project and was something that the project leader had to deal with.
The main goal of the client was to upgrade the road and thereby increasing the safety standard of the road and perform maintenance in a way that big maintenance is not necessary in the upcoming 12 years.

5.2.2 Observations and score of the elements

Joint effort

In the interview the project leader commented that there was a periodical meeting with the IPM-team of the client to discuss the development of the reference design. Other stakeholders were not involved in this meeting. Questions which could not be answered during those meetings, since it was information possessed by stakeholders, were asked via the stakeholder manager to the stakeholders who send their answer towards the project leader of Witteveen+Bos. In that way Witteveen+Bos could indirectly adapt the reference design to the needs of the stakeholders. However, this was a responsive approach as the design was not discussed together with the stakeholders in total. These are indicators of a low joint effort.

The requirements gathered in the stakeholder process were gathered with one stakeholder at the time during individual meetings. There was no meeting organized in which the stakeholders jointly took place. The project leader commented as well that he did not expected that stakeholders had insight in the requirements set by others.

The comments derived from the interview are marked as indicators for a low level of co-creation. The periodical meetings were held between the client and Witteveen+Bos and not with other stakeholders. This made it impossible to jointly create the project as it was a reactive process. This leads to the overall low score of this element.

Score	**Case 'the crossing'**
Joint Effort	Low

Joint effort	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders put their own interest upfront and were not willing to think along with others.	Stakeholders were willing to think along with each other.
Stakeholder meetings were organized per individual stakeholder.	Stakeholder meetings were organized with multiple stakeholders at the same time.

Stakeholder inclusiveness

According to the project leader a stakeholder analysis was done by the IPM-team of the client. Witteveen+Bos did not conducted an additional stakeholder analysis nor updated it. According to the project leader no new stakeholders presented themselves throughout the project, which implies that the stakeholder analysis was executed well.

Although not many observations are linked to this element, the fact that the stakeholder analysis was done by the client and not by the advisory company is an indicator for a low score. As we can observe in the CRS-database only requirements of public and professional stakeholders were included in the database. In the interview however, the project leader mentioned inhabitants as a group which had to be taken into account as well. Although the inhabitants are out of the scope of this research, it is therefore concluded that not all stakeholders were included. For this reason a high score is not awarded, but a medium score is assigned to this element.

Score	**Case 'the crossing'**
Stakeholder Inclusiveness	Medium

Stakeholder inclusiveness

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
A stakeholder analysis was not present, or present but not reviewed and updated.	A stakeholder analysis was present, reviewed and updated
New stakeholders presented themselves, but their requirements could not be included in the project anymore.	New stakeholders did not presented themselves or could easily be included in the organization.

Stakeholder Engagement

Considering this element, we are interested in the way how stakeholders were involved and in what way the requirements were collected. In this project one workshop was initiated by Witteveen+Bos. In the CRS-database we can observe that all requirements which followed from this workshop are however set by one stakeholder which was the client. This is supported by the comment made by the project leader who explained that besides the client only the municipalities were invited, who did not had time to join the workshop. Besides this one time workshop, no other collective meetings were proposed to engage with the stakeholders.

The project leader commented that to his knowledge the stakeholders did not had an idea about the requirements set by others. In the CRS-database we can further see that requirements were received via e-mail communication via the stakeholder manager. The stakeholder manager set the meetings with the stakeholders, which was limited to one time and only scheduled extra if needed for the design. Input for the design was not asked until the design was finished.

The effort taken to organize a workshop is positive and it is also positive that more than one stakeholder was invited. It is however a negative observation that the invited stakeholders did not took the effort to show up during the workshop. Also only a small group of stakeholders was invited. The input by stakeholders was also limited as there was not asked for. As the workshop is a positive indicator but the rest corresponds with low indicators, the medium score is assigned to this element.

Score	**Case 'the crossing'**
Stakeholder Engagement	Medium

Stakeholder engagement

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Workshops, work councils, focus groups or other active forms of engaging stakeholders were not initiated or only initiated for the client.	Workshops, work councils, focus groups or other active forms of engaging with stakeholders were initiated in which both the client as other stakeholders were invited and participated.
Stakeholders had a passive attitude. They were not triggered to think along and only gave input on demand.	Stakeholders had an active attitude and were stimulated to think along with each other.
Stakeholders received feedback per e-mail or letter.	Stakeholders were invited to discuss the feedback during a meeting.

Openness of information

Feedback provided from the honorarium decision was only shared with the stakeholders who set the requirement. Stakeholders were also not given insight in what other stakeholders requested. This information was not shared among each other which is an indicator of the low category, therefore the element is assigned a low score as well.

Score	**Case 'the crossing'**
Openness of information	Low

Openness of information	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not given insight in the requirements of other stakeholders.	Stakeholders were given insight in the requirements of other stakeholders.
Feedback on the decision making process was not accessible for everyone.	Feedback on the decision making process was available for everyone.

Stakeholder Centric view

Before Witteveen+Bos was involved, the client had already collected most of the stakeholder requirements. This was done via a stakeholder manager which they hired and who was involved throughout the whole project duration as part of the client's management team. Having one person as a spoke person for the project is good for the stakeholders, and an indicator for a high score.

Feedback on the requirements was provided by Witteveen+Bos after the honorarium decision was taken. The steps of this process was discussed in the first meeting. If a requirement of a stakeholder was rejected, the stakeholders were given the opportunity to make changes after the feedback

The assignment for Witteveen+Bos was to construct a reference design based on the collected requirements. However, only a small part of all the requirements originated from the stakeholders as 80% of those requirements were set by the client itself. The dominant role of the client is an indicator of a low stakeholder centric view.

While assessing the requirements, main discussion point was how it would be paid for. A stakeholder can require things, however if a stakeholder do not provides any budget for it, it is not automatically accepted by the client. The budget had a large influence on the assessment, and also an indicator of a low score.

If a requirement of a stakeholder was rejected however, the stakeholder was given the possibility to adjust or elaborate on the requirement. The project leader stated as well: 'In the end, the stakeholders have to understand and agree with the decision which is made.' Especially the requirements of the daily management and maintenance department of the province were taken into account. If they were not satisfied about the project it was possible that they did not want to maintain it in the end. This statement indicates that stakeholder requirements were taken into account. As indicators who both harm and benefits a co-creational setting are present, but neither of them are predominantly present, a medium score is awarded for this element.

Score	**Case 'the crossing'**
Stakeholder centric view	Medium

Stakeholder centric view

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not informed on how the honorarium decision was made.	Stakeholders were informed on how the honorarium decision were made upfront.
Project priorities were important and leading in the decisions made throughout the project. During the honorarium process requirements were only assessed on the impact on time, scope and budget.	Requirements of the stakeholders were assessed on the added value they bring along, not merely on their costs.
Ideas from stakeholders were not taken into consideration.	An effort was made to investigate the feasibility of ideas of the stakeholders.
Feedback on the requirements was not provided, or after feedback was given stakeholders were not given the chance to change them anymore.	Feedback on the requirements was provided and stakeholders were allowed to change their requirements in needed.

Continuous process

Periodical meetings between the client and Witteveen+Bos were held to discuss the development of the reference design however most of those meetings were on an ad-hock interval. Regular meetings with other stakeholders did not take place. Questions which the client could not answer were directed to the specific stakeholder via the stakeholder manager and communicated back to Witteveen+Bos. This way, Witteveen+Bos was able to create a reference design in which all concerns were taken into account. However stakeholders were only involved to a minimum and the process was not designed with the aim to continuously involve the stakeholders in the design process. Therefore the element is rated with a low score regarding this element.

Score	**Case 'the crossing'**
Continuous process	Low

Continuous process

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
One meeting is organized to collect the requirements of the stakeholders. No time was scheduled in the planning to gradually mature and discuss ideas together.	Meetings to discuss the requirements of the stakeholders were organized on a continuous basis and ended when the discussion was completed.

Willingness to co-create

According to the project leader, the client had a clear assignment and knew at the start exactly what he wanted. The client only needed someone with the ability to construct a contract around their proposed solution. Co-creation was therefore not considered as something which could be beneficial for the project and stakeholders were only involved if questions arose during the construction of the reference design. Standardised manuals as a standardised document containing all the requirements and guidelines for Construction and Infrastructure projects for the province were used and are manuals that contains tested and accepted standard solutions and elaborates on what processes have to be followed. The project leader commented that deviating from these standard documents is possible, but the project should then be considered as a pilot project. However this was not the ambition of the client. The project leader itself considered it as well as a project with a clear goal with not too much complexity nor incentives to be creative. This element is therefore rated as low.

Score	**Case 'the crossing'**
Willingness to co-create	Low

Willingness to co-create	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
The client is not willing to try new things and had a risk-averse attitude.	The client is open to proposed ideas of stakeholders and willing to discuss them.
Stakeholders act on request, do not have the intentions to get involved too much.	Stakeholders are seen as valuable and the project is constructed with them.

5.2.3 Extent of co-creation

The outcomes of the individual elements are combined and presented in Table 9. As we can observe this project is mostly rated with a low score. In this project setting, a co-creational approach would not be successful as too many elements harm a co-creational setting. This might be related to the attitude of the client, who was dominant in the process. The client also defined the project almost by themselves given not so much opportunity for stakeholders to have influence on the final design. The size and type of project might have had an impact on this, as according to the project leader it was considered as a not to complex project.

Table 9 Score overview 'the crossing'

Score overview	**Case 1: The crossing**
Joint effort	Low
Stakeholder inclusiveness	Medium
Stakeholder engagement	Medium
Openness of information	Low
Stakeholder centric view	Medium
Continuous process	Low
Willingness to co-create	Low

5.2.4 Overview of the requirements

The database holds in total 106 requirements set by all stakeholders together. In total 10 stakeholders contributed to this, of which all of them were public or professional stakeholders. None of the requirements originated from a local inhabitant.

Of all the requirements 80% originated from the client. The largest stakeholder after the client set only 4 requirements. On average, 83% of all requirements were accepted. This is higher than the other projects, and explained by the large share of requirements by the client. The client is as well the definer of the scope.

In Table 10 the requirements are presented.

Table 10 Requirement overview 'the crossing'

Overview honorarium decision per type of requirement

	Client		Water board		Municipalities		Others		Total	
Total	**85**	*80%*	**4**	*4%*	**9**	*8%*	**8**	*8%*	**106**	*100%*
Needs	**24**	*28*	**3**	*75*	**4**	*44*	**3**	*33*	**34**	*32*
Accepted	19	*79*	3	*100*	2	*50*	3	*100*	27	*79*
Rejected	5	*21*	0	*0*	2	*50*	0	*0*	7	*21*
Products	**27**	*32*	**0**	*0*	**1**	*11*	**1**	*11*	**29**	*27*
Accepted	25	*93*	0	*0*	1	*100*	1	*25*	27	*93*
Rejected	2	*7*	0	*0*	0	*0*	0	*0*	2	*7*
Process or Boundary condition	**20**	*24*	**1**	*25*	**4**	*44*	**3**	*33*	**28**	*26*
Accepted	12	*60*	1	*100*	3	*75*	3	*100*	19	*68*
Rejected	8	*40*	0	*0*	1	*25*	0	*0*	9	*32*
Combination of needs and product	**14**	*16*	**0**	*0*	**0**	*0*	**1**	*13*	**15**	*14*
Accepted	12	*86*	0	*0*	0	*0*	1	*100*	13	*87*
Rejected	2	*14*	0	*0*	0	*0*	0	*0*	2	*13*

There are no large deviations observed between the amount in different types of requirements but the acceptance rate of the product related requirements are accepted in almost 93% of the cases which is more than the other types.

5.2.5 Case conclusions 'The Crossing'

This project team was given with a clear assignment from the client and was considered as a project which was good to manage. The project team did not considered a co-creational approach and which can explain that the project scores overall to a low extent. The client was dominantly present in the requirement database, leaving as well not much room for others to exert influence on the design.

This project was concerned with the reconstruction of an existing road, therefore the possibilities for a complete new design was limited. Yet, compared with the other reconstruction project as discussed previously, this project process was designed in a more strict way, leaving almost no room for co-creation possibilities.

This can mainly be explained since the stakeholders were considered as necessary but not as valuable. Compared with the two stakeholder approaches discussed in Chapter 4, this project can be considered as a project who adopted a 'management-of-stakeholder' approach instead of a 'management-for-stakeholder' approach.

In order to apply a co-creational approach both changes in attitude as the process has to be made.

5.3 CASE STUDY 'The Bypass'

5.3.1 Description of the project

The Bypass project is a project concerned with the new construction of a regional road in the south of the Netherlands. The new road has a regional function in the area and has to take over the function of a road which currently crosses a small village. Due to an increase of vehicles in the future and with this increase also an increase in trucks, the municipality initiated the idea to let the road bypass their village.

This idea was initiated and discussed in the regional politics, and after almost four year they created enough political support to realize this project. In order to achieve this, the land-use plan needed to change in order for it to allow room for the construction of the road. The bypass is a new development project for which Witteveen+Bos was given the assignment to prepare the contract for procuring the construction work of the road. Witteveen+Bos got involved in the project after the land-use plan was changed, however it still needed to gather some needs and wishes of the stakeholders.

Initially the municipality was in the lead for the project of the bypass, but in a later stage the province took over the lead since the bypass is part of the regional road system. In the phases which led to the new land-use plan, stakeholders were already informed via formal procedures which also allowed them to make comments on the plan. Witteveen+Bos assisted the client in a later stage to help design the road and make a contract. In this project a System Engineering approach is used by Witteveen+Bos.

The CRS-database contains 430 requirements, however most of them were directly copied from the previous stage in which the land-use plan was constructed. Therefore those requirements are stated as decisions since the land-use plan was already accepted. Out of the 430 requirements, 75 were collected by Witteveen+Bos and only 14 of them were set by professional or public stakeholders. The total budget for execution of the project is 6 million euros, for Witteveen+Bos 85.000 euros was allocated of which 25.000 euros was reserved for the CRS process.

5.3.2 Observations and score of the elements

Joint effort

The project leader described that the relation with the municipality and province was good and can be marked as a joint effort however with other stakeholders this was not the case.
The project leader described the collaboration between the municipality and the province as satisfying. There were some hiccups throughout the project, however by organizing extra meetings, Witteveen+Bos ensured that the project was a joint effort of both the municipality and the province.

On the other side, the water board and the client did not had the shared a similar experience. The communication with the water board took place via official procedures, making the process slow. The project leader described that there was even a conflict occurred, as the water board felt left out and not involved. Another group of stakeholders, the cable- and pipeline owners, were involved late in the project, causing them to execute their work in a rush. Therefore they were not able to think in advance of better solutions and could not think along with the project goals.

Since indicators of a joint effort were present to a high extent with the municipality, but with the rest of the stakeholders indicators were in the direction of a low score, a medium score is attributed.

Score	**Case 'the bypass'**
Joint effort	Medium

Joint effort

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
If feedback on the requirements was given, it was only shared with the stakeholder who set the requirement.	Feedback on the requirements was shared amongst all stakeholders.
Stakeholders put their own interest upfront and were not willing to think along with others.	Stakeholders were willing to think along with each other.
Stakeholder meetings were organized per individual stakeholder.	Stakeholder meetings were organized with multiple stakeholders at the same time.

Stakeholder inclusiveness

Before Witteveen+Bos joined the project, the land-use plan was already changed and a stakeholder analysis was executed by the client. Most stakeholders knew already of the project as they used the official moments to react on the project initiation. After Witteveen+Bos joined, a second stakeholder analysis was conducted. As the project was more detailed, stakeholders were added to the stakeholder analysis. According to the project leader, no stakeholders presented themselves during the phase in which Witteveen+Bos was involved and thus he concluded that the stakeholder analysis was complete. Due to the additional effort to ensure the completeness of the stakeholder analysis, this element is rated high.

Score	**Case 'the bypass'**
Stakeholder inclusiveness	High

Stakeholder inclusiveness

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
A stakeholder analysis was not present, or present but not reviewed and updated.	A stakeholder analysis was present, reviewed and updated
New stakeholders presented themselves, but their requirements could not be included in the project anymore.	New stakeholders did not presented themselves or could easily be included in the organization.

Stakeholder Engagement

The stakeholder group consisting out of cable- and pipeline owners were informed about the project in two central meetings, after which individual follow up meetings were organized with the attendants. According to the project leader it would have been nice if the owners were informed earlier in the project, as now they needed to do last-minute work since they were not engaged earlier. This caused that they could not optimize nor think along to help the project forward.

Most stakeholders were contacted three times, of which the first time was to gather the requirements, the second time was to inform them about the honorarium decision and the third contact moment was to inform them how the requirement was translated to a contract requirement. In the meantime no extra meetings were informed to engage them more. It also means that the stakeholders only had the moment to deliver input on the first moment and were not able to meet other stakeholders to think along with each other.

The water board was never asked to think along with the project team and were only informed via the official procedures about the impact of the project. According to the project leader this caused a conflict between the project team and the water board as they felt left out.

A workshop was organized in which the topic 'innovation' was discussed, this workshop was only organized for the client and no other stakeholders were invited.

Effort was taken in the project to engage the client with the workshop, however the rest of the stakeholders were in this stage not engaged. The efforts taken to engage them were minimal and therefore this element is rated low.

Score	**Case 'the bypass'**
Stakeholder Engagement	Low

Stakeholder engagement

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Workshops, work councils, focus groups or other active forms of engaging stakeholders were not initiated or only initiated for the client.	Workshops, work councils, focus groups or other active forms of engaging with stakeholders were initiated in which both the client as other stakeholders were invited and participated.
Stakeholders had a passive attitude. They were not triggered to think along and only gave input on demand.	Stakeholders had an active attitude and were stimulated to think along with each other.
Stakeholders received feedback per e-mail or letter.	Stakeholders were invited to discuss the feedback during a meeting.

Openness of Information

The stakeholders did not know what the requirements of the other stakeholders were, and could for that reason also not interact with each other. At the same time, feedback was also only meant for that specific stakeholder and could not be accessed by others. As for this, the element is rated with a low score.

Score	**Case 'the bypass'**
Openness of information	Low

Openness of information

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not given insight in the requirements of other stakeholders.	Stakeholders were given insight in the requirements of other stakeholders.
Feedback on the decision making process was not accessible for everyone.	Feedback on the decision making process was available for everyone.

Stakeholder Centric view

According to the project leader special attention was given to the requirements on how SMART they were defined. If a requirement was already SMART-defined, the project leader could process the requirement more easily. At some predefined locations the municipality was open for input on the design, but only if it fits within the budget and planning. Another important was the maintenance aspect of proposed solutions. If a solution, as a result of a requirement, needed to be maintained the question about the responsibility for the maintenance was ask directly. This due to the impact on future budget reservations.

The stakeholders were during the first meeting informed about the process which would be followed regarding the assessment of the requirements. If a requirement of a stakeholder would be rejected, the stakeholders was given the opportunity to adjust the requirement if they wanted to.

Score	**Case 'the bypass'**
Stakeholder centric view	Medium

Stakeholder centric view

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not informed on how the honorarium decision was made.	Stakeholders were informed on how the honorarium decision were made upfront.
Project priorities were important and leading in the decisions made throughout the project. During the honorarium process requirements were only assessed on the impact on time, scope and budget.	Requirements of the stakeholders were assessed on the added value they bring along, not merely on their costs.
Ideas from stakeholders were not taken into consideration.	An effort was made to investigate the feasibility of ideas of the stakeholders.
If feedback on the requirements was given, it was only shared with the stakeholder who set the requirement.	Feedback on the requirements was shared amongst all stakeholders.

Continuous process

The stakeholders were not continuously involved in the project but were contacted in most cases three times. The first time was to gather the requirements, second time to discuss the honorarium advice and the third time to explain how this is written down in the contract. What can be derived from this statement is that although feedback was given to the stakeholders the process of gathering the requirements was a one-time event. In order to score high for this element, the opportunity must be given to gradually mature the ideas and define the needs accordingly. The one-time meeting in which the requirements were collected and the step-wise process for providing feedback is therefore awarded with a low score.

Score	**Case 'the bypass'**
Continuous process	Low

Continuous process

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
One meeting is organized to collect the requirements of the stakeholders. No time was scheduled in the planning to gradually mature and discuss ideas together.	Meetings to discuss the requirements of the stakeholders were organized on a continuous basis and ended when the discussion was completed.

Willingness to Co-create

According to the project leader this was a perfect project to test new (innovative) ideas. The road in itself is not a crucial link in the road system and the client has a policy in which they stated they wanted to do something with innovation. However, reality was different as the project leader commented that in practice the province was not open to innovative ideas even though ideas were proposed by the Witteveen+Bos.

The municipality did wanted to use local knowledge to improve the project design and was open to suggestions. However, since their involvement was too late and the province wanted the plans to be ready nothing could be done with the suggestions. The municipality however wants to do something with these suggestions, and proposed to implement some of them after finishing the project. The willingness to co-create was thus partially present, however the attitude of the province withhold them from actually executing these ideas. For this reason, both the indicators are observed but the project is awarded with a medium score.

Score	**Case 'the bypass'**
Willingness to co-create	Medium

Willingness to co-create	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
The client is not willing to try new things and had a risk-averse attitude.	The client is open to proposed ideas of stakeholders and willing to discuss them.
Stakeholders act on request, do not have the intentions to get involved too much.	Stakeholders are seen as valuable and the project is constructed with them.

5.3.3 Extent of co-creation

The outcomes of the individual elements are combined and presented in Table 11. As well for this project, three elements are rated with a low score meaning that co-creation is not likely to succeed. The rated elements are however all more or less process related. By adjusting the project setup and for instance initiate events to engage more with the stakeholders, making it possible to share information and by doing it on a regular basis, the process can be arranged in a way that these elements will score better. The more attitude related elements all contain some indicators that contribute to a co-creational setting.

Table 11 Score overview 'the bypass'

Score overview	**Case 1: The bypass**
Joint effort	Medium
Stakeholder inclusiveness	High
Stakeholder engagement	Low
Openness of information	Low
Stakeholder centric view	Medium
Continuous process	Low
Willingness to co-create	Medium

5.3.4 Overview of the requirements

The total set of requirements contained 431 requirements. 358 of them were derived directly from the new land-use plan. The owner of these requirements could not be traced back to a specific stakeholder. Besides that, the requirements were also formulated as a decision. For instance one of those requirements derived from the land-use plan was: 'the main lane of the road is 7,50 meters wide', providing no room for discussion.

In the process to construct the contract, 73 requirements were collected in addition to the decisions derived from the land-use plan. These requirements were gathered by Witteveen+Bos. The 73 requirements were set by 32 stakeholders, consisted mainly of direct inhabitants. This research restricts itself to the group of public and professional stakeholders which leaves only 14 requirements ti consider. An overview is presented in Table 12.

Table 12 Requirement overview 'the bypass'

Overview honorarium decision per type of requirement						
	Water board		Cable owners		Total	
Total	**11**	*79%*	**3**	*21%*	**14**	*100%*
Needs	**2**	*18*	**3**	*100*	**5**	*36*
Accepted	2	*100*	0	*0*	2	*40*
Rejected	0	*0*	0	*0*	0	*0*
Not processed	0	*0*	3	*100*	3	*60*
Products	**3**	*27*	**0**	*0*	**3**	*21*
Accepted	2	*67*	0	*0*	2	*67*
Rejected	0	*0*	0	*0*	0	*0*
Not processed	1	*33*	0	*0*	1	*33*
Process or Boundary conditions	**6**	*55*	**0**	*0*	**6**	*43*
Accepted	2	*33*	0	*0*	2	*33*
Rejected	2	*33*	0	*0*	2	*33*
Not processed	2	*33*	0	*0*	2	*33*
Combination of needs and products	**0**	*0*	**0**	*0*	**0**	*0*
Accepted	0	*0*	0	*0*	0	*0*
Rejected	0	*0*	0	*0*	0	*0*
Not processed	0	*0*	0	*0*	0	*0*

In total 6 of the 14 requirements were accepted, 2 rejected and the remaining 6 were not processed, which corresponds with an acceptance rate of 43%. Since the small amount of numbers, no conclusions are derived to this.

Before analysing the database, it was expected was that this project would have a lot of possibilities for co-creation, as it was a new to developing project with quite some stakeholders. However, it was not expected that the database would for the majority only contain decisions based on the land-use plan.

5.3.5 Case conclusions of 'the bypass'

This project was concerned with a new to developing road and therefore it was expected that this would be a good case to co-create. In practice however, three out of seven elements still scored low. This might be explained as no co-creational approach was considered at the start of the project. Where in the other projects the willingness to co-create was rated low, this project scored better due to the fact that the municipality did wanted to implement ideas from the stakeholders to adapt the design. In practice it did not come this far, as it was hampered by the province.

Not much requirements of the public and professional stakeholders were collected in the project. This might be explained as most of the stakeholders were already involved in the phase in which the land-use plan was defined. The land-use plan in fact was used to design the road. Since the land-use plan was so restrictive, not much possibilities to discuss the design any further was possible.

Even though only a limited amount of stakeholders were mentioned in the CRS-database, the inclusiveness element was still rated as high. This is explained since both the client as the consulted performed and updated the stakeholder analysis to make sure that every stakeholder was included. In the project no new stakeholders presented themselves, which strengthen the assumption that already a lot of stakeholders were informed and engaged in the preparations of the land-use plan.

The three elements which are rated low are all process related elements, meaning that a project team can make adjustments in the way the process is organized to facilitate co-creation to a better extent.

5.4 CASE STUDY 'The Harbour'

5.4.1 Description of the project

In 2009 Rijkswaterstaat (RWS) conducted a research which showed that there were to less berth locations on the main water ways. Rijkswaterstaat is a government agency responsible for the design, construction, management and maintenance of the main infrastructure facilities in the Netherlands. This includes the primary road network, the main waterway network and water systems. The availability of enough berth places is important for Rijkswaterstaat as they have to offer the owners of the commercial vessels a place to take a rest.

In 2010 the first steps were taken to realize extra berth places. This first phase was the planning and discovery phase in which several locations were considered which finally has led to a decision in 2013 to the preferred location of this harbour. With this preferred location, another step in the realization was taken. The lake, which has a size of around 350 hectares is located directly at the water way it is meant for. Subsequently several locations on the lake were considered to find the final location for the berth location including a more detailed design.

Witteveen+Bos was involved in this project after the decision of the preferred location was taken by Rijkswaterstaat who is the client in this project. At this stage, Witteveen+Bos had the assignment to develop several variants. The best variant would be the final location of the Berth location and used in the procedures to change the land-use plan and request the building permits. The actual construction phase is planned in 2020-2021 and the project should be finished in 2022.

Witteveen+Bos is concerned with writing the development of the contract and is involved in an early project stage. Witteveen+Bos collected all requirements of the stakeholders and is – among other things - responsible for the whole stakeholder process. The estimated budget to realize this project is 14 million euros. The budget for Witteveen+Bos to guide the process is grown to 2 million euros, it is not clear how much of this total budget was allocated for the CRS process.

After a period of 18 months the project has recently been restarted for Witteveen+Bos. It is unusual to have a break of such a period while the project is in the definition phase. This was because Rijkswaterstaat already had a preferred location in mind and bought the land in advance. After a stakeholder meeting with local stakeholders, it became clear this was misjudged and there were a lot of people against the development of the berth location on that specific location. It was of such magnitude that RWS realized it could not continue with the development of the harbour on that location. RWS needed time to reconsider the preferred location with all it implication as it realized it could not execute the project as they wanted. Now, after the restart the location of the berth-place changed and has been adapted accordingly to the wishes of the stakeholders, they included the location as proposed by the inhabitants in their discovery phase. This had a huge impact on the planning and budget, which can still be felt in the rest of the project. According to the Technical Manager (who was interviewed instead of the Project Leader) this was the best and only possibility for RWS to develop this project in the future.

5.4.2 Observations and score of the elements

Joint effort

According to the Technical Manager there was not much collaboration between the public and professional stakeholders as they felt they had not much in common. Rijkswaterstaat as the client of the project is the initiator of the project and had to follow formal procedures and apply for licenses in order to make the execution possible. For instance the stakeholder concerned with nature preservation, felt they have their own interest which is different than the municipality and therefore they did not collaborated together. The lack of joint effort was also noticeable within the municipality itself as the interviewee could notice that the organization existed out of multiple departments which did not really collaborated either. The requirements of the stakeholders were collected via individual meetings. All together these are indicators with a low rate and therefore this element is rated accordingly.

Score	**Case 'the harbour'**
Joint Effort	Low

Joint effort

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
If feedback on the requirements was given, it was only shared with the stakeholder who set the requirement.	Feedback on the requirements was shared amongst all stakeholders.
Stakeholders put their own interest upfront and were not willing to think along with others.	Stakeholders were willing to think along with each other.
Stakeholder meetings were organized per individual stakeholder.	Stakeholder meetings were organized with multiple stakeholders at the same time.

Stakeholder inclusiveness

Witteveen+Bos did not conducted a stakeholder analysis nor performed an update as RWS had made a stakeholder analysis in a previous stage. The technical manager did not had the idea that stakeholders were left out, but clarified that certain stakeholders were more important than expected. According to the interviewee the stakeholders which had more influence, also received more management attention. As a result of this, not every stakeholder received equal attention. Not updating the stakeholder analysis is an indicator corresponding to a low score, however as no stakeholders were left out in the end, a medium score is attributed to this element.

Score	**Case 'the harbour'**
Stakeholder inclusiveness	Medium

Stakeholder inclusiveness

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
A stakeholder analysis was not present, or present but not reviewed and updated.	A stakeholder analysis was present, reviewed and updated
New stakeholders presented themselves, but their requirements could not be included in the project anymore.	New stakeholders did not presented themselves or could easily be included in the organization.

Stakeholder engagement

Extra efforts were taken to engage with the local stakeholders after the conflict which caused RWS to reconsider the project location. In order to engage with local stakeholders, they proposed a 'Design workshop'. In the announcement of this event they announced to develop the design while co-creating

with the inhabitants, the municipality, Witteveen+Bos as advisory company and other involved stakeholders. In practice however, the only participants were the inhabitants which developed ideas under the supervision of the advisors. The outcome of this workshop were ten requirements, which were all accepted by the client. The public and professional stakeholders as mentioned in the announcements did not participated however. According to the Technical Manager this was due to the fact that these organizations do not have the flexibility to think as free as the inhabitants can, since the organizations are restricted by legislation, procedures and own departments. As for the public and professional stakeholders, the technical manager clarified that the requirements were collected in individual meetings. As indicators of both categories are present the element is rated with a medium score.

Score	**Case 'the harbour'**
Stakeholder inclusiveness	Medium

Stakeholder engagement	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Workshops, work councils, focus groups or other active forms of engaging stakeholders were not initiated or only initiated for the client.	Workshops, work councils, focus groups or other active forms of engaging with stakeholders were initiated in which both the client as other stakeholders were invited and participated.
Stakeholders had a passive attitude. They were not triggered to think along and only gave input on demand.	Stakeholders had an active attitude and were stimulated to think along with each other.
Stakeholders received feedback per e-mail or letter.	Stakeholders were invited to discuss the feedback during a meeting.

Openness of Information

Stakeholders did not know what the requirements of the other stakeholders were, and according to the Technical Manager were also not interested in it. For that reason also not interact with each other. Feedback which was provided was also not accessible for the stakeholders. As for this, the element is rated with a low score.

Score	**Case 'the harbour'**
Stakeholder inclusiveness	Low

Openness of information	
Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not given insight in the requirements of other stakeholders.	Stakeholders were given insight in the requirements of other stakeholders.
Feedback on the decision making process was not accessible for everyone.	Feedback on the decision making process was available for everyone.

Stakeholder centric view

According to the technical manager, the budget was the main driver while assessing the requirements of the stakeholders. The budget of the client was under pressure after the necessary scope change which forced RWS to reconsider the location for the harbour.
RWS wanted not to waste the second chance it was given, and demanded that every requirement was considered into detail before accepting or rejecting it. The stakeholders were during the first meeting informed about the CRS-process and the steps taken that would lead to the honorarium decision, however if a requirement of a stakeholder would be rejected the decision could not be revised anymore.

In the CRS-documentation we can observe that the total share of public and professional stakeholders was 43% and of these requirements, the client set 52% of the requirements. The total influence of the client was therefore 23%. This is far less than the other projects meaning other stakeholders were given the room to express their requirements. As the stakeholders had the opportunity to express their requirements, but the main driver for accepting or rejecting the requirements was the budget and the stakeholders were not given the chance to adjust their requirements after rejection this element is rated with a medium score.

Score	**Case 'the harbour'**
Stakeholder centric view	Medium

Stakeholder centric view

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
Stakeholders were not informed on how the honorarium decision was made.	Stakeholders were informed on how the honorarium decision were made upfront.
Project priorities were important and leading in the decisions made throughout the project. During the honorarium process requirements were only assessed on the impact on time, scope and budget.	Requirements of the stakeholders were assessed on the added value they bring along, not merely on their costs.
Ideas from stakeholders were not taken into consideration.	An effort was made to investigate the feasibility of ideas of the stakeholders.
Feedback on the requirements was not provided, or after feedback was given stakeholders were not given the chance to change them anymore.	Feedback on the requirements was provided and stakeholders were allowed to change their requirements in needed.

Continuous process

According to the Technical Manager, the meeting in which the requirements were gathered with the stakeholders was limited to one per stakeholder. After this meeting the requirements were assessed and the feedback was provided with regards to the honorarium decision. This single meeting is an indicator for a low score. In practice however, it was able to find requirements of one stakeholder with two different sources. One of them was the written report of the individual meeting, but the other was a follow-up or was the result of an e-mail conversation. This means that at least for some stakeholders it was possible to send some requirements after the meeting. Still, this element is rated low.

Score	**Case 'the harbour'**
Continuous process	Low

Continuous process

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
One meeting is organized to collect the requirements of the stakeholders. No time was scheduled in the planning to gradually mature and discuss ideas together.	Meetings to discuss the requirements of the stakeholders were organized on a continuous basis and ended when the discussion was completed.

Willingness to co-create

According to the technical manager the client was open for new ideas, however the budget was leading in the decision to accept or reject a requirement and while organizing the co-creation event, the client did not invited other stakeholders to join the event or to organize a separate one just for the professional and public stakeholders. Some efforts were made to open up for the stakeholders, therefore this element is rated with a medium score.

Score	**Case 'the harbour'**
Willingness to co-create	Medium

Willingness to co-create

Not beneficial for a co-creation setting:	Contributing to a co-creational setting:
The client is not willing to try new things and had a risk-averse attitude.	The client is open to proposed ideas of stakeholders and willing to discuss them.
Stakeholders act on request, do not have the intentions to get involved too much.	Stakeholders are seen as valuable and the project is constructed with them.

5.4.3 Extent of co-creation

The outcomes of the individual elements are combined and presented in Table 13. Three low scores are assigned and the rest is present to a medium extent. Most striking remark by the project leader was that the stakeholders did not felt they had much in common and therefore they did not felt the urge to talk with each other, even though it is a large project with a large impact on its surroundings. Insight in each other's requirements was not given, which may supported this feeling. Most other elements were present to a medium extent, meaning that indicators that both are beneficial as harming for a co-creation setting are observed.

Table 13 Score overview 'the harbour'

Score overview	Case 1: The harbour
Joint effort	Low
Stakeholder inclusiveness	Medium
Stakeholder engagement	Medium
Openness of information	Low
Stakeholder centric view	Medium
Continuous process	Low
Willingness to co-create	Medium

5.4.4 Overview of the requirements

The database contains in total 504 requirements set by 28 stakeholders. Of these stakeholders seven were identified as public or professional stakeholders. 43% of the total requirements were set by one of these seven stakeholders.

The database contains in total 504 requirements set by all stakeholders together. In total 28 stakeholders contributed to this, of which 7 of them were identified as public or professional stakeholders. Together, this group of stakeholders set 43% of all requirements.

Of all the requirements set by the public-professional stakeholder group, 52% originated from the client, 22% was set by the municipality followed by the safety region department with a share of 13%.

On average, 57% of all requirements were accepted, but for the public and professional stakeholders the acceptance rate was 67%. In Table 14 the requirements are presented. Below the table the observations which are derived from this table are elaborated.

Table 14 Requirement overview 'the harbour'

Overview honorarium decision per type of requirement

	Client		Municipality		Safety region dep.		Others		Total	
Total	**114**	*52%*	**48**	*22%*	**29**	*13%*	**27**	*12%*	218	*100%*
Needs	**73**	*64*	**24**	*50*	**14**	*48*	**20**	*74*	131	*60*
Accepted	53	*73*	13	*54*	12	*86*	12	*60*	90	*69*
Rejected	13	*18*	5	*21*	2	*14*	3	*15*	23	*18*
No status	7	*10*	6	*25*	0	*0*	5	*25*	18	*14*
Products	**16**	*14*	**3**	*6*	**2**	*7*	**1**	*4*	22	*10*
Accepted	10	*63*	2	*67*	1	*50*	0	*0*	13	*59*
Rejected	6	*38*	0	*0*	1	*50*	1	*100*	8	*36*
No status	0	*0*	1	*33*	0	*0*	0	*0*	1	*5*
Process or Boundary condition	**7**	*6*	**12**	*25*	**7**	*24*	**3**	*11*	29	*13*
Accepted	3	*43*	6	*50*	6	*86*	3	*100*	18	*62*
Rejected	0	*0*	1	*8*	1	*14*	0	*0*	2	*7*
No status	4	*57*	5	*42*	0	*0*	0	*0*	9	*31*
Combination of needs and products	**18**	*16*	**9**	*19*	**6**	*21*	**3**	*11*	36	*17*
Accepted	10	*56*	7	*78*	5	*83*	3	*100*	25	*69*
Rejected	5	*28*	1	*11*	1	*17*	0	*0*	7	*19*
No status	3	*17*	1	*11*	0	*0*	0	*0*	4	*11*

What stands out in this overview are the amount of requirements classified as needs, which is 60% of all requirements of the public and professional stakeholders. Besides that, the client was not as dominant in this project compared with the other cases. The requirements of the stakeholder 'safety region department' which is a party concerned with the public safety, availability for the fire brigade and public health got their requirements accepted above average with a rate of 83% of which most of them were considered as needs.

5.4.5 Case conclusions 'The Harbour'

As the document study and project characteristics were studied before the interview was conducted, it was expected that this project was most suitable for the implementation of a co-creational approach. There was no land-use plan yet as it was part of the assignment to change the land-use plan. While reviewing the documents it was also observed that a workshop was initiated. However, with extra information provided by the technical manager, who took over some tasks from the project manager, it soon became clear that the project was not fit to adopt a co-creational approach yet. This is caused by the stakeholders that stayed in their role and only considered the project from their perspective, not seeing the added value to discuss the project with other professional stakeholders.

What stands out in this project is the amount of needs which were classified. 60% of the requirements set by the public and professional stakeholders were needs. This could be explained since the end-result was not yet defined and therefore the requirements were less technical. This goes together with a client that was not dominantly present in the project. When looking at the public and professional stakeholder group, half of the requirements were based on the requirements of the client. In other projects this in the range of 60% - 80%. Even though half of it seems much, the client was much more open to the input of the stakeholders than the other clients. This might be explained since the client made a misjudgement in a previous stage, after which due to pressure of the stakeholders the client needed to adapt his strategy.

6 CROSS CASE COMPARISON

In the previous sections the individual cases were rated on the extent of co-creation per element. This chapter contains a cross-case comparison in which the scores are compared between the cases. The aim of this comparison is to find similarities and differences between them and explain this by the observations which are done in the previous chapter. To compare the cases with each other, both the scorecards as the honorarium overview were combined to observe the similarities and differences between them. The aim with the cross-case comparison is to be able to find general observations and suggest improvements. These improvements can be applied in future projects in order to get closer to a setting in which co-creation can exist.

During the second part of the conducted interview, the interviewees were asked questions about their experience with co-creation, what the benefits and limitations are according to them and whit what purpose it should be applied in projects. The outcomes of this part of the interview are presented after the analysing the elements. This chapter concludes with a review of the general findings and set out possible explanations.

6.1 Findings per element

A total overview of the scores is presented via the scorecard in Table 15, per element the similarities and differences are discussed followed with general observations and recommendations for improvements. Starting with the two stand out: Stakeholder inclusiveness and Openness of information.

Table 15 Scorecard overview all cases

Score overview	Case 1: The island road	Case 2: The crossing	Case 3: The bypass	Case 4: The harbour
Joint effort	Medium	Low	Medium	Low
Stakeholder inclusiveness	High	Medium	High	Medium
Stakeholder engagement	Medium	Medium	Low	Medium
Openness of information	Low	Low	Low	Low
Stakeholder centric view	Medium	Medium	Medium	Medium
Continuous process	Medium	Low	Low	Low
Willingness to co-create	Low	Low	Medium	Medium

Stakeholder inclusiveness

Two out of four cases scored in the high range for this element. The observations on which this is based are the efforts taken by the project team of Witteveen+Bos to update or conduct a stakeholder analysis themselves and the weight the client had in the CRS-database. 'The crossing' case was considered as a small project with a low amount of stakeholders and with a clear project goal. In this case the stakeholders were managed, instead of approaching the stakeholders to look for opportunities to improve the project. Even though 'the bypass' is also considered as a smaller project, the project leader felt to update the stakeholder analysis anyways as here the aim was to improve the design with the stakeholders. None of the interviewees had however the idea that stakeholders were forgotten, which is a positive observation.

Openness of information

All projects scored low regarding this element which is based on the fact that all interviewees commented that the stakeholders had no insight in each other's requirements. All the gathered information is stored in the CRS-database, however not accessible for others. In general, the projects did not facilitated general meetings to share and discuss project information. Without the insight in the requirements of each other, no stakeholder can ever think along with someone else.

Stakeholder centric view

While assessing the requirements of the stakeholders, the impact on budget and the pre-defined scope are leading in the honorarium decision. The added value of requirements for the project is hardly ever a criterion. The impact on stakeholder support was only considered in 'the harbour' project. All interviewees brought along that money was an aspect that was considered as well. If a stakeholder did not contributed resources, accepting not crucial requirements is less likely. Even though these project-centric approach, efforts were taken to satisfy the stakeholders. Mainly since the stakeholders had to understand why a certain decision was taken. All projects scored in the medium range, which might can be explained as in the end, the stakeholders need to agree with the decisions as otherwise they might obstruct the project. However, none of the project had an approach in which they put the stakeholder in a central position. A positive remark is that for all cases information was given during the first stakeholder meeting about the SE process and how the input of the stakeholders were processed. It might be that up until now this was not considered as something necessary, as the consultant firm and client already have all the information themselves.

Joint effort

In all cases the stakeholders were individually approached and the requirements were gathered via individual meetings. All interviewees stated that the stakeholders were not given insight in the requirements of the others. Due to the absence of a place where stakeholders could meet, and the absence of insight in each other's requirements ideas for the project could not be shared nor could stakeholders optimize processes or interact and thus synergy could not be reached.

Observations what harmed the co-creation possibility regarding this element was described by one of the interviewees as a 'free-riding' attitude. The attitude to request things, without providing any resources in terms of monetary value. This behaviour had a negative effect on the attempts to jointly define the project.

Stakeholder inclusiveness

Two out of four cases scored in the high range for this element. The observations on which this is based are the efforts taken by the project team of Witteveen+Bos to update or conduct a stakeholder analysis themselves and the weight the client had in the CRS-database. 'The crossing' case was considered as a small project with a low amount of stakeholders and with a clear project goal. In this case the stakeholders were managed, instead of approaching the stakeholders to look for opportunities to improve the project. Even though 'the bypass' is also considered as a smaller project, the project leader felt to update the stakeholder analysis anyways as here the aim was to improve the design with the stakeholders. None of the interviewees had however the idea that stakeholders were forgotten, which is a positive observation.

Stakeholder engagement

None of the cases received a high score for the efforts taken to engage stakeholders, however three out of four project scored to a medium extent. Workshops, which have a positive effect on the engagement, were organized in both 'The crossing' as 'the harbour' projects. For 'the crossing' project this was however organized for the client itself and without other stakeholders. The workshop for 'the harbour' project was meant to engage and interact with stakeholders. Yet, this was organized for the local inhabitants and professional and public stakeholders were left out.

Contact moments with the professional and public stakeholders were for the majority limited to three times. In which the first time was to gather the requirements, second time was to provide feedback after the honorarium decision was taken and third time to provide feedback on the final contract requirement.

Continuous process

Three out of four cases did not designed the process in a way that stakeholders would regular be involved or possibilities were given to gradually mature their ideas. The low scores were assigned since the majority of the stakeholders were asked for input only once, during the first meeting, after which the requirements were processed. Only in 'the island road' project the municipality was involved multiple times and they had the chance to gradually mature and work out their ideas. It is not attributed a high score, as other stakeholders were treated as in the other projects. The step-by-step process does not goes along with a co-creational approach.

Willingness to co-create

The two projects concerned with the reconstruction scored both low as both clients did not had the intention to involve stakeholders to much. Bottlenecks hampering the potential regarding this element are according to two interviewees was the lack of decision power and therefore to think along with others. As public stakeholders are afraid to commit to ideas without discussing it in their internal organisation first. Therefore the stakeholders were more risk-averse and not willing to commit to ideas that were thought up during meetings.

6.2 Comparison of the requirement analysis

In Table 16 an overview is presented in which the results of the requirement analysis are presented. An overall acceptance rate of the requirements among all projects is 70%. Overall, more needs are identified than the product requirements in each project and – leaving out the 'the bypass' project due to the low amount of requirements- the requirements that specified a need were accepted more often in the two large projects 'the island road' and 'the harbour'. In the small reconstruction project 'the crossing' the requirements that specified products were accepted more. But overall the both type of requirements were accepted equally often in this cases.

Co-creation is a stakeholder approach which helps to identify the needs of stakeholders together. Based on the identified needs, solutions can be co-created. Projects that have a larger share of requirements that specify products, processes or boundary conditions, will have a narrower solution space than projects that identify needs more. Therefore the project 'the harbour' is – only based on the assessment of the requirements – more interesting to co-create solutions. In the other project is more of interest to apply the method to better identify the needs of the stakeholders.

Table 16 Requirement overview all cases

	'The island road'		'The crossing'		'The Bypass'		'The harbour'		All	
Total	**531**	*61*	**106**	*12*	**14**	*2*	**218**	*25*	**869**	*%*
Needs	**172**	*32*	**34**	*32*	**5**	*36*	**131**	*60*	**342**	*39*
Accepted	131	*76*	27	*79*	2	*40*	90	*69*	250	*73*
Rejected	9	*5*	7	*21*	0	*0*	23	*18*	39	*11*
No status	32	*19*	0	*0*	3	*60*	18	*14*	53	*15*
Product	**121**	*23*	**29**	*27*	**3**	*21*	**22**	*10*	**175**	*20*
Accepted	84	*69*	27	*93*	2	*67*	13	*59*	126	*72*
Rejected	9	*7*	2	*7*	0	*0*	8	*36*	19	*11*
No status	28	*23*	0	*0*	1	*33*	1	*5*	30	*17*
Process or Boundary condition	**212**	*40*	**28**	*26*	**6**	*43*	**29**	*13*	**275**	*32*
Accepted	137	*65*	19	*68*	2	*33*	18	*62*	176	*64*
Rejected	13	*6*	9	*32*	2	*33*	2	*7*	26	*9*
No status	62	*29*	0	*0*	2	*33*	9	*31*	73	*27*
Combination of needs and product	**26**	*5*	**15**	*14*	**0**	*0*	**36**	*17*	**77**	*9*
Accepted	16	*62*	13	*87*	0	*0*	25	*69*	54	*70*
Rejected	3	*12*	2	*13*	0	*0*	7	*19*	12	*16*
No status	7	*27*	0	*0*	0	*0*	4	*11*	11	*14*

'The harbour' project stands out in comparison with the other project with regards to the percentage of requirements that specify a need. 60% of the requirements set by public or professional stakeholders are identified as needs. A possible explanation is that the land-use plan was yet undefined as the assignment for Witteveen+Bos was to develop one. The difference in type of requirement did however not affected the total acceptance rate of the project.

'The bypass' stands out due to the low amount of requirements that were found in the database. The majority of the requirements were decisions derived directly from the new land-use plan. The land-use plan in this case did not provides any freedom with regards to the design of the new road. The phase of gathering all the requirements was already performed for the development of the land-use plan. On paper, the project had as many restrictions as a redevelopment project.

'The Island road' and 'The crossing' do not deviate that much regarding the amount of requirements regarding the needs and products. In the 'The crossing' case, the acceptance rate for the more specific product requirements was higher which corresponds with the detail level in which the client wanted to define the project. More process related requirements are observed in 'the island road' project, which is explained due to the many requirements regarding the availability in the temporary execution phase. The client was dominant in 'the crossing' project as 80% of all requirements were set by the client and thereby defining the project almost on its own. In 'the harbour' project only 22% of all the requirements originated from the client. Other stakeholders had therefore a much greater share in defining the project. For 'the island road', 43% of all requirements were defined by the client. Last, for 'The bypass' project, as the client made sure that all of his desires were included in the land-use plan it could not traced back what the share of the client was in this case.

6.3 Insights of the project leaders

In the literature part of this research, co-creation is decomposed and a more elaborated definition is proposed based on the widely spread definitions used in literature. This definition is also provided during the interview to discuss the concept. Before the definition was presented, the interviewees were asked how they would describe co-creation and with what purpose they would apply it. In the literature study it was already observed that many definitions are present. Since these questions were not specifically related with the projects themselves, but were on a broader level, the outcomes are discussed here together. The differences and similarities compared with the definition as presented in literature are discussed.

As formulated during the literature study the definition of co-creation is formulated as:

'The joint creation of value by the client's organisation and its network of actors via a continuous collaboration process in which openness of information and equality among the actors are present and a forum is provided in which the actors can exchange ideas and interact with each other'

The interviewees described the process as a more intense form of collaboration between the stakeholders and the client to formulate a solution together. One interviewee stated that he heard of the term co-creation, but never questioned himself what the concept was or how it should be applied. However in reality, by presenting the elements which were identified he already recognized most parts of it.

One interviewee stated that the joint creation, as part of co-creation, could work instead of the step-by-step approach which all interviewees mentioned: 'gathering the requirements, think of a solution yourself followed by requesting feedback'.

The mentioned purpose of why co-creation should be applied in a project differs per interviewee:

One interviewee considers it as an effective method to consider the project with a wider view at an early stage, and identify quicker in what directions the stakeholder think of regarding possible solutions.

Another interviewee considered it more as an information meeting, in which the consultant agency could provide feedback on why a proposed solution of a stakeholder would work or not.

The aim of co-creation is to get a design which better suits the needs of the participants and is broadly supported. As a result, further phases will go smoother.

An identified risk mentioned by all is that you have to put additional effort in expectation management, as ideas cannot always be executed. Extra attention has to be spent in getting the process clear for the participants and everyone, including the client, has to join the process with an open mind.

The project leaders all were open to the concept and recognized some aspects of co-creation in their work and already had a sense of what could be achieved with co-creation.

6.4 Findings from the cross case comparison

Based on the observations in the individual case studies and the cross-case comparison findings per element are discussed as presented above. On a general level the observations are also analysed:

While reviewing the scores as presented on the scorecard, none of the projects had an overall high score for the co-creation elements. This is attributed to the fact that none of the project teams suggested to do something with co-creation upfront. Nevertheless, on an element level projects did showed indicators of a high level. In both cases this was related to the stakeholder inclusiveness element. Overall stakeholder analysis were present in all projects and although not every project leader updated this analysis, none of them had the feeling that stakeholder groups were missed. That all project leaders have the feeling they have a good overview of the stakeholders may be attributed to the fact that there is a long history of analysing stakeholders in the infrastructure sector. Stakeholders are for instance also analysed if the aim is not to engage with them, but for instance to do a risk analysis on stakeholders that may be against the project.

The project team of 'the harbour' project initiated a co-creation workshop. That this was organized showed that project teams do know about the term co-creation as they also announced it with this term. The co-creation workshop was in this case only focussed on a workshop with citizens and not with other parties. As such it was not taken into account as this research focusses only on the public and professional stakeholders, however it does show that projects are investigating the possibilities. According to the interviewee not including the stakeholder group this research is concerned with could be attributed to the fact that the public authorities feel less able to actually be creative. Ideas which are created together are not likely to actually be realised. The fear for creating false expectations are higher than the idea to actually create something positive. Other workshops organized by 'the crossing' and 'the bypass' project were limited only to the client. Expanding this to other stakeholder groups did not occur.

'The harbour' project stood out in the requirement analysis, as 60% of the requirements were identified as a requirement that specifies a need, which is far more than the other projects. This might be explained since their project was concerned with the development of a new project and the development for the land-use plan. This project had a lot of design freedom due to the early phase the project was in. 'The bypass' project was as well a project concerned with a new to developing area. However, the land-use plan which was defined in an earlier phase was so strict that it already specified the project to a detailed extent. In line with the interviewee, the question is raised whether this is necessary as the detailed specification do not let room for creative ideas.

An element in which all projects scored low was the openness of information. Without sharing information between the stakeholders, the stakeholders are not informed about the needs, wishes and capabilities of other stakeholders and can therefore also not think along with each other. This could maybe be explained since there is not so much experience with sharing requirements with each other and thus stakeholders are not used to it and clients and consultancy firms may be careful with doing so. Sharing this information was mentioned by two interviewees as something that they were interested in however.

The project in which most requirements were not set by the client is the 'the harbour' project, followed by 'the island road' project. Both projects are large of scale. Still, in both cases if we consider the share of requirements of the public parties, 1 out of 2 requirements are set by the client. 'The crossing' stood out in the dominant position of the client, as he set 80% of the requirements. This gives the impression that other stakeholders were not given the possibility to really think along with the client.

7 EXPERT PANEL CONSULTATION

Throughout the study a co-creation framework and assessment tool is constructed in order to answer the main research question. These identified elements help to make the fuzzy and abstract term co-creation more manageable. It makes it also possible to compare on a project level how these elements are represented, and test if co-creation attempts are likely to succeed. Since they were non-existing in the first place, an expert panel consultation is organised to discuss the framework, assessment table and investigate the practical relevance. With the expert panel recommendations for improvements are also identified and discussed. The results of the meeting are presented in this chapter.

A panel with five members was selected based on their background and availability. The panel members have different backgrounds and together they form a group both experienced in the Dutch infrastructure sector as with co-creation. At first the discussion about the decomposition framework and assessment table are presented. After that, a short discussion about the co-creation potential was initiated and discussed as well, followed by the discussion on four statements which were presented to them.

7.1 Results of the consultation meeting

Co-creation decomposition framework

At first the panel members had troubles with the differences between the elements when they were asked out of the blue to state their differences and similarities. As the willingness to co-create and stakeholder engagement are behavioural aspects they were considered equal by some. However, others did found them different enough since the stakeholder engagement is concerned how you engage stakeholders, and the willingness to co-create has more to do with being open-minded.

When presented the definitions of the elements, all members understood the differences between them and it then was clear for them why they were different. Therefore it is derived that when talking about the elements, it is necessary to also provide the definition. Without this, confusion may occur.

The decomposition framework gave the panel members a clearer image of how to explain what co-creation is. One panel member added that creating a safe environment is important as well, since otherwise an environment where you approach each other with an open mind cannot exist.

Co-creation assessment table

The panel members were asked to connect the indicators with the elements themselves. After analysing the results, only a low amount of indicators were placed in the original place. As discussed afterwards the panel members stated that they had sometimes troubles with positioning an indicator right, but gave them food for thought on how you can recognize the elements in practice. A recommendation is given to update the assessment table in the future by project leaders or in future research. In this way the assessment table does provide insight in the operationalization of the elements, does stimulate the conversation about co-creation and will become more accurate in the future. The advantage to letting project leaders do this, is the awareness which is created around this topic.

Co-creation potential

The potential to co-create is now expressed via the scorecard. The more elements reach the ideal status of high, the higher the potential for beneficial co-creation attempts. Discussed briefly is the project context in which a smaller project is less likely to have a high potential than a large project. Regarding this, the panel members equipped with co-creation experience stated that the purpose of applying co-creation could differ as well. For a small project, a single afternoon where stakeholders are invited to define the purpose of the project is more likely to be beneficial and a larger project gives you the opportunity to expand the co-creation possibilities. As well, if a project scores low on one element since a stakeholder does not want to be involved, it still could be interesting if there are other stakeholders that do want to be involved. The panel member stated; 'if it goes well, the stakeholder who did not participate will only regret it afterwards'.

On the other hand, co-creation attempts may feel like a lost cause. Both members experienced in facilitating co-creation sessions, experienced some meetings in which the engagement and willingness for the workshop were low. However by placing the stakeholders in one room, stakeholders found each other and connected outside the workshop and discussed each other's interest in the project together. The workshop itself felt like a failed one, but the outcome later in that project was still a success as illustrated with an example of member 4.

Discussion of the statements

The co-creation elements together provide me with a complete picture of co-creation.

The panel members all reached consensus that the decomposition framework makes them much more aware of what the co-creation is about and how to fill in the steps. The term co-creation is recognized as a buzzword such as circularity and sustainability. By decomposing it, it becomes a less abstract terminology.

For the members experienced with co-creation (members 4 and 5) they argued that this focuses on the boundary conditions in order to be able to co-create, where they apply it on a more practical level aimed for a co-creation session lasting for one afternoon. The goal for which you co-create differs in that sense and it does not provide an explanation of how you should organize such a meeting. Nevertheless, they recognized the elements and stated that they do take them unconsciously into account.

Member 2 stated he had a bad experience with a co-creation attempt of one of his clients. According to them he was on the sideline and could not interfere, but also did not know how to interfere. The framework provided him with a much clearer sense what to look for.

Consensus was reached that decomposing the concept enables project leaders to steer the conversation about co-creation in a much more detailed way. According to member 4, creating a safe environment, in which it is possible to say things without being judged by others is also considered as an important aspect for successful co-creation attempts. This is recognized by member 5.

The indicators in the Assessment table provides me with a practical interpretation of the co-creation concept and helps me recognize the elements in a project environment.

Although it was argued that the co-creation concept was already less abstract, some indicators in the assessment table still described project settings on an abstract level. For of the indicator 'a lot of interaction between the stakeholders' was questioned with how much is a lot. Still, on average, the indicators do provide a practical view. The questions that triggered member 3 were discussed. It was concluded that, since it triggered a discussion it already let you make more aware on a practical level about the elements.

Member 5 argued that the real practical part would derive from learning on the job. It was proposed to continue to gather indicators in the future to add in the assessment table. This way, it becomes a living tool that continuously can be improved to recognize real practice situations and connect them to the elements.

Again member 2 stated that the indicators give him a much clearer idea how he can improve the project setting to make it fit for a co-creational approach.

With the scorecard I have a first tool to have a conversation about the co-creation concept.

The panel members did have some different applications of the scorecard, but overall they all found some application for it. Member 1 and 5 stated it was useful for a new project to state what is needed to reach a certain level. If the client states he wants to do something with co-creation, you can explain to the client what the approach needs and if he really wants to commit to it. Since based on their experience most clients that want to do something with co-creation do now know what for impact it has on the organisational behaviour.

Member 2 looks at it from a project that already runs, and to check if co-creation attempts are likely to succeed or that you should make adjustments in your current approach or if you should not invest in it at all and start looking for another approach.

Member 4 saw co-creation as one of the many tools in the toolbox available to interact with stakeholders. He considered the scorecard as one way to explain to a client why you lay the emphasis on one aspect or another.

The co-creation elements are equally important, I cannot co-create if they are not all present to a high extent.

This statement caused the most discussion. Panel member 2 argued that without the willingness to co-create, co-creation was not possible at all and should therefore be assessed first. If there was no willingness to co-create you could stop assessing the others. While members 4 and 5 argued that not every element had to be present to a high extent, although it would be beneficial if they were. By starting with small events, you can broaden the extent of co-creation throughout the project.
If the elements were all present on a low extent, Panel member 5 illustrated that some indicators labelled with a low score, is not even reached in a project setting. Thereby stating that it is sometimes possible to co-create even if not every element is present to a high extent. Interestingly enough, the same member made a comment earlier that 'a stakeholder who do not want to contribute resources' is an indicator way beyond low and kills the whole idea of co-creation. This comment was not discussed in during the plenary discussion though.

Consensus was reached that if all elements were present to a low extent, co-creation could not be reached. On the other hand, if all elements are present to a high extent, you do not automatically co-create. Co-creation attempts are likely to succeed in that case.

7.2 Conclusions and Recommendations consultation meeting

Taken together, the decomposition framework and the assessment tool were recognized by the panel members fast and stated that the abstract co-creation concept is translated to a practical setting which they can apply.

The scorecard provides them with an extra tool to start the conversation with a client or a stakeholder on what the relevant elements are and how to construct a setting which stimulates the co-creation potential.

Not all elements have to be present to a high extent in order to be able to co-create, however if all elements score to a low extent, the co-creation potential dropped significantly and one might better not start with it. An overall high score however, does not automatically result in co-creation, but leads to a high co-creation potential. Co-creation attempts are likely to succeed in that case, but still the process has to be facilitated.

Although discussion is present about the mutual exclusivity of the elements, they were considered different enough to mention separately. The value of the tools was mostly found in the awareness it creates. By applying the tools, the discussion on co-creation is started on a practical level that project team members recognize in their projects. For the conversation with the client it can be used to explain in a better way what the boundary conditions are needed to come to a high co-creation potential in which it is more likely that co-creation attempts succeed and the benefits, as stated in the literature, can be harvested.

Recommended is to keep updating the assessment table to increase its accuracy in the future, this can both be done via new research or by using the assessment table by the project leaders and let them continuously update and expand the table during the execution of projects. The latter has the advantage that project leaders are gaining experience on the job by already discussing the topic in their teams.

8 CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This research was performed with the aim to provide insight into the co-creation concept in the infrastructure sector. This final chapter concludes the research by answering the sub- and main research questions, followed by a discussion of the research findings and limitations of the research. At last, recommendations are given for the company Witteveen+Bos and for future research.

8.1 Conclusions

The objective of this research was to contribute knowledge about the co-creation process in infrastructure projects by identifying the underlying elements which act as the conditions for a co-creational approach. Next to that the added value of a co-creational approach was questioned via the main research question:

What is the added value of a co-creational approach in the pre-contractual phase of infrastructure projects?

Before providing the answer to the main research question, first the answers to the sub-questions are provided.

Sub-question 1: What is co-creation and what are the important and relevant elements for co-creation in the infrastructure?

To answer the question what co-creation is, literature is reviewed outside the domain of the infrastructure sector as co-creation originates from the service- and product industry. Co-creation can be considered as a mindset which focusses on the needs of the stakeholders and can be compared with a stakeholder-centric approach. By opening up the design process and listening to the input and needs provided by stakeholders, value is created together. In this process, values like transparency, equality and being open minded are key values. The definition of co-creation based on the findings in the literature study is: *'The joint creation of value by the client's organisation and its network of actors via a continuous collaboration process in which openness of information and equality among the actors are present and a forum is provided in which the actors can exchange ideas and interact with each other'*

Co-creation is a stakeholder management approach which goes further than most stakeholder approaches which currently are applied within the infrastructure sector. Co-creation is designing the project with the stakeholders, however to enable this certain conditions has to be present. In total seven elements were identified while reviewing the literature, all considered as necessary conditions to co-create. The seven elements are illustrated in Figure 8.

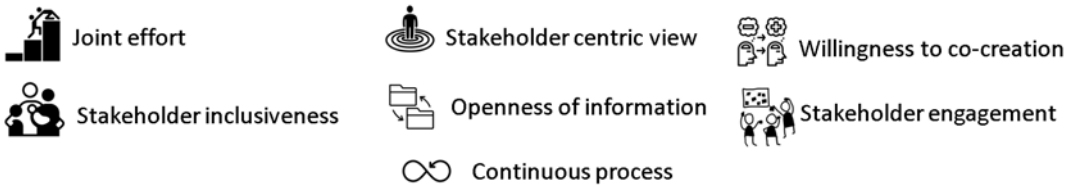


Figure 8 Seven identified elements to facilitate co-creation (Own illustration)

Sub-question 2: To what extent are the derived elements represented in Dutch infrastructure projects in practice?

The extent to which the elements are represented in Dutch infrastructure projects is expressed via the scorecard as presented in Table 17. In this overview three scores can be observed that are derived by analysing the project information and comparing this to a list of indicators in which the distinction was made for indicators that either harm or benefit a co-creational setting.

Table 17 Scorecard overview all cases

Score overview	Case 1: The island road	Case 2: The crossing	Case 3: The bypass	Case 4: The harbour
Joint effort	Medium	Low	Medium	Low
Stakeholder inclusiveness	High	Medium	High	Medium
Stakeholder engagement	Medium	Medium	Low	Medium
Openness of information	Low	Low	Low	Low
Stakeholder centric view	Medium	Medium	Medium	Medium
Continuous process	Medium	Low	Low	Low
Willingness to co-create	Low	Low	Medium	Medium

Overall, the extent to which the elements are represented is low to medium which might be explained by the fact that the investigated projects did not explicitly applied a co-creational approach in the first place.

Based on the scoring card, the openness of information is rated low for every project. This is based on the observations that stakeholders that set requirements do not have insight in the requirements of other stakeholders. For co-creation this is found that it is important to have this insight in order to think along with each other. Sharing the requirements was found as

The stakeholder inclusiveness element scored as only indicator high, based on the fact that in these cases the stakeholder analysis was conducted, reviewed and updated throughout the project to be sure that a complete picture of the stakeholders was present. In the infrastructure sector already a long history in stakeholder analysis exist which can explain why a better score is obtained there.

Sub-question 3: By comparing the theory with the practice, what differences can be identified and which improvements can be suggested?

At first it is concluded that the current cases which have been studied do not contain all the conditions for a successful co-creational approach on a project level. This is based on the scores as represented in the scorecard. In order to facilitate a co-creational approach, project teams need to adapt the setup of the stakeholder approach and make sure that the right attitude is present. Currently, stakeholders are mostly asked for their requirements in only a few meetings or even once, organizational changes can be made to create a more continual discussion in which it is able to gradually discuss and collect their requirements. Openness of information was observed to the lowest extent among all cases. This score is based on the fact that stakeholders were not given insight in each other's requirements. In order to co-create, stakeholders need to have insight in each other's requirements as otherwise they cannot think along with each other. Most information is now collected and processed by the Advisory and Consultant firm and it is their challenge to design a solution that satisfies in both the client as stakeholders. However, by facilitating interaction between stakeholders it is possible that they will be engaged more and help the firm in the design process. Since the firm already is managing all the information, it has the unique ability to facilitate this.

Based on the conducted research the answer to the main research question is formulated:

What is the added value of a co-creational approach in the pre-contractual phase of infrastructure projects?

According to theory applying a co-creational approach results in stakeholders having a higher influence in the design process than they currently have by involving with them more closely in the design process. Co-creation attempts result in a better identification of the needs of the stakeholders and the solutions created together will result in a higher satisfaction. Besides that, the theory state that the joint effort results in monetary benefits as processes can be optimized. These benefits as stated in theory could however not easily be observed in the infrastructure sector with this research. This research aimed to identify to what extent co-creation is already present in the infrastructure sector. What can be derived is that the projects were not completely ready to co-create if taken into account the elements as defined in this research. In order to adopt a co-creational approach, the way in which the stakeholder approach is designed should be adjusted in a way that stakeholders are stimulated to think along with each other and the stakeholders should be invited in a more continuous way. Derived from the case studies is that this for projects in an early phase is the easiest, as than more the needs are better identified and it is expected that here the possiblities to co-create are the largest.

The research provides insight on how future infrastructure projects can make their project fit for a co-creational approach and makes it possible for project leaders to discuss the co-creation concept with their team, the client or the stakeholders. The added value lays in the capability of the project leaders to recognize if the conditions are present.

8.2 Discussion

Some remarks need to be made as throughout the research methods which has been applied had their limitations. At first the elements that were derived and rated in the case studies are discussed, followed by the case studies and requirement analysis. At last, as in the research the extent of co-creation is researched co-creation as a stakeholder management approach is discussed.

Identified co-creation elements

In the literature study it was aimed to find an answer on what co-creation is. By reviewing the available literature, it is noticed that many authors describe co-creation in different ways stretching different elements. During this study, in total seven elements are identified that are considered as necessary conditions to co-create and these elements were used to expand an existing framework. In the rest of the research this framework is used repeaditly and in the case studies it was investigated how these elements came back in practice.

Eventhough in literature a disctinction was found in the elements, in practice it was found to be less clear and an overlap in some elements could be found which makes it the scores awareded in the case studies somewhat related to each other. While validating the framework with the experts, only after a quick elaboration on the definition it was understood where the differences came from. Some elements, mostly the ones that discribe an attitude such as Joint effort, Stakeholder engagement and Willingness to co-create, were the hardest to destinct. With the help of a definition of the elements, the differences were observed and identified different. Still, in practice this has to be taken into account as they might not as strict as applied in this research.

Similary the way the indicators and score are derived should therefore be interpreted as illustrative, as some aspects observed in the projects come back under two elements and therefore overweighted. All indicators were more or less rated with a similar weight and it is adviced to conduct more research if not some indicators have a larger impact on the way the element is represented. It is also possible that a blind spot was present in defining the indicators, as for some elements it was easy to set them and for others harder which may be related that the elemetns which the infrastructure sector has already more expierience with, it was easier to identify indicators. If indicators would have devided differently, this may have resulted in a different score. As for this reason by every element it is explained how the score was derived and on what indicators this was based.

Case studies

The four case-studies which were analysed were all Dutch related projects who adopted a Systems Engineering approach. As such, the findings of this research may not directly be applicable for other projects outside the Netherlands as the indicators based on the assessment table are linked with these projects. The project teams did not adopt a co-creational approach in the first place, which made it hard to derive conclusions regarding the main research question. The tools created however, does provide the information needed to make future project teams more aware of this approach and make them able to be aware of the elements that should be taken into account for a co-creational approach.

The cases which has been selected differed in size, phase and was either a renovation project or a new to developing project. At first this looked like a good set to identify whether they would have different rates for the extent of the scores, however since they differed also quite a lot it was hard to compare them when it was observed that the scores differt in a minimal way.

Analysing the requirements

The CRS-database is analysed with the aim to create insight in the requirements that stakeholders set and to see what elements give stakeholders a greater share in the design process. An analysis has been done to identify if it was possible to say for an individual stakeholder in what project he had was better involved. The requirement analysis did gave insight in the overall acceptance rate of a project, and as well for individual stakeholders. In the analysis a distinqtion is made between four categories of requirements and the acceptance rate is checked. For the rate of acceptence not much disuccsion is needed, as this is directly derived from the database. In the division of the requirements there is room for discussion if a requirement can be clearly devided. In this research this was solved by asking for a second opinion after one case was analysed. Yet a margin of error should be taken into account.

Developed tools

The tools created during the research are nevertheless of value for project teams as it provides a quick glance on a practical level on how the stakeholder process is designed. It enables project teams to discuss the buzzword co-creation to a much more practical level, and provides them in advance with information regarding the likeliness for successful attempts.

The research provides insight on how future infrastructure projects can make their project fit for a co-creational approach and makes it possible for project leaders to discuss the co-creation concept with their team, the client or the stakeholders. The added value lays in the capability of the project leaders to make sure the right conditions are present.

The position of co-creation in stakeholder management

Co-creation is described during the literature study as a shift in thinking in the service- and product design sector, breaking with the old traditional company-centric view and focusing on a consumer-centric view. These approaches were compared with two approaches in the field of stakeholder management. A management-of-stakeholders approach and a management-for-stakeholders approach. The management-for-stakeholders approach showed similarities with the consumer-centric view of co-creation. Both aiming to place the stakeholder in a central position and thinking further than only the project objectives. Co-creation goes even further and I would like to consider co-creation as a third approach: a management-with-stakeholders approach. However, much of the elements that are needed in order to co-create are not new. For instance the element stakeholder inclusiveness is translated to a good stakeholder analysis, in which all the stakeholders are included. For co-creation it is important to have multiple stakeholders and regardless of their view on the project it is good to understand their needs. Preforming stakeholder analysis is however an aspect which in all of the approaches comes forward and which the sector already have a lot of experience with.

The same goes for the continuously element, which is aimed to involve stakeholders over a longer period more often to gradually mature the ideas. In some projects this is already happening, and scheduling a meeting on a more regular interval is not considered as a big change. The big thing that co-creation distinct from others approaches in my view is the holistic approach in which everything centres on the stakeholders and their needs.

8.3 Limitations of the Research

The findings of the research are based on the data that is gathered which was based on both a document review as interviews. Regarding these interviews, for each case-study only the project leader was interviewed resulting in having information of a single source. This makes sense when taking into account that only where a responsible project manager adopts the co-creation approach, it is likely that it can be implemented. Still, this causes that the information provided during the interview has a large impact on the assessment of the co-creation potential. This effect is partially mitigated by reviewing additional sources such as a document review of the cases, but have to be taken into account when considering the findings.

Second, during the validation of the assessment table it became clear that only a small part of the indicators was coupled to its original place, resulting in the recommendation that the assessment table needs to be continuously updated to improve it. Nevertheless, it caused the project leaders to discuss the setup of their stakeholder approach and gave them insight into how it can be made more suitable to implement a co-creational approach.

Thirdly, the research is conducted in a Dutch setting based on projects in which Witteveen+Bos took part. The assessment table to score the projects is partially based on indicators derived from practice. Projects that are executed within a different firm may have a different approach on how they set up projects. Therefore making the assessment less reliable. This effect is partially mitigated since it was made sure that during the discussion about its applicability, an external firm of the sector was present.

8.4 Recommendations

Co-creation is a recent development in the Dutch infrastructure sector, and so for Witteveen+Bos. The framework which is built to decompose the abstract term co-creation to a more practical level helps project leaders to understand the concept. However, it is recommended to repeat the message in the future. Projects do already show some indicators which are beneficial for a co-creation approach but there is still improvements that need to be made in order to make sure that co-creation attempts are also likely to succeed. Something which will be interested for Witteveen+Bos is to see how stakeholders could be given insight in each other's requirement, as some project leaders also were interested in this. However, it is also taken into account that this is not always desired due to other influences.

It is recommended to start informing the project leaders about the concept and introduce them to the framework and let them think how these elements come back in their project and how their projects should be adjusted if we would strive for the ideal situation. By doing so, they can already prepare themselves for the future and recognize the settings faster and thereby adopting it when the opportunity comes forward. Co-creation does not have to replace existing stakeholder management tools, but can be seen as an additional method to improve the relationship with the stakeholders and benefit from each other's strengths.

The assessment table can be used as a starting point for further research and can be improved by identifying clearer indicators as it is reckoned that it can be improved. This can be done both via additional research, as applying it in practice and learning on the job. Besides that, this research focused on co-creation on a project level with the public and professional stakeholders. In the future this can be narrowed down to maybe co-creation between several stakeholders or between the public stakeholders and inhabitants.

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APPENDICES

Appendix A: Interview questions (Dutch)
Appendix B: Interview Results (Dutch)

APPENDIX A: INTERVIEW QUESTIONS (DUTCH)

The interview questions were constructed before the assessment table was finalized. The interview was set up in a way that the questions which are numbered are asked to the interviewee. The grey questions were asked after an answer was constructed and more information was needed about that topic.

Interview vragen (1 uur)

Introductie van de geinterviewde en projectdoelstellingen.

1. Wat was jouw rol en wat waren jouw verantwoordelijkheden in het project?
2. Wat waren de belangrijkste doelstellingen binnen het project en wie was de opdrachtgever of inititiefnemer van het project?
3. Hoe is de rest van de stakeholders in beeld gekomen?
    a. Is er een stakeholder analyse gedaan en zo ja door wie? Is deze nog geupdated door W+B?
4. Zijn er gedurende het project nieuwe stakeholders bij gekomen?
    a. Konden deze makkelijk opgenomen worden in het proces?

Ophalen van de klanteisen: 70% van de eisen zijn gesteld door klant, waterschap en 3 gemeenten, waarvan 40 % het aandeel was van de klant, kijkende naar de groep publieke en professionele stakeholders;

5. Hoe zijn deze eisen opgehaald?
    a. Middels 1 op 1 gesprekken met de stakeholders vs. gezamenlijke meetings?
    b. Op 1 of 2 momenten opgehaald, of gedurende meerdere sessies? (stonden die in het teken van meer eisen ophalen, evalueren van de reeds gestelde eisen of iets anders?)
6. Hoe verliep de samenwerking tussen deze partijen?
    a. Waren er veel gezamenlijke overlegmomenten?
    b. Dachten de partijen met elkaar mee, of was het gericht op eigen belang?
    c. Zijn ze uitgedaagd om met elkaar mee te denken?
    d. Zochten ze contact met elkaar?
    e. Hoe betrokken waren deze partijen?

Kwaliteit van de klanteisen (Uitleg: de input zoals gegeven door de stakeholders)

7. Waar werd er allemaal op gelet bij het ophalen van de klanteneisen?
    a. De vorm/formulering? SMART? binnen scope,
    b. Werdt er ook onderscheid ook aandacht voor behoefte/ oplossing gerichte eisen?
    c. Beoordelingscriteria om te beoordelen of een eis goed is?
8. Wat gebeurt er nadat een klanteis wordt honoreerd of afgewezen?
    a. Is er contact met de stakeholder opgenomen?
    b. Kon deze nog aanpassingen doen?

9. Waar lag, tijdens het opstellen van het honoreringsadvies, de nadruk op bij het beoordelen van de eisen?
    a. Zijn impact op tijd, geld en scope hierin het belangrijkst of wordt er ook vanuit het perspectief van de stakeholder geredeneerd?

10. In hoeverre stond de opdrachtgever open voor nieuwe ideeen van stakeholders en werden die ingebracht? Zijn de projectdoelstellingen of is de scope van het project gewijzigd vanwege de eisen die deze stakeholders hebben gesteld?

Co-creatieve instelling

11. Wat versta jij onder een co-creatieve aanpak in een project?
12. Wat zouden voor- of nadelen van een co-creatieve aanpak kunnen zijn volgens jou?

Volgens de theorie is een van de uitwerkingen van een co-creatieve aanpak het beter in kaart brengen en naar boven halen van de behoeften van de stakeholders. In het project omvat ongeveer 1/3^{e} in meer of mindere mate een omschrijving van een behoefte, ongeveer een kwart bevatte in meer of mindere mate al een oplossing en 40% was geen behoeftevraag of oplossing maar meer informatievoorzienend.

13. Denk je dat er meer aandacht gegeven kan of moet worden aan de behoeftevraag of het doorvragen bij het ophalen van de eisen?
    a. Waarom denk je dat dit niet/wel relevant is?
    b. Wat voor voor- of nadelen brengt dit met zich mee denk je?
    c. Leid het beter in kaart brengen van de behoeftes tot een beter project?

Afronding

14. Zijn er vanuit jou uit nog vragen die je wilt stellen, of delen waarop je wil terugkomen of verder op wil doorgaan?

APPENDIX B: OVERVIEW RESULTS INTERVIEW (DUTCH)

The interviews were all transcribed, after transcribing the interviews the interviews were summarized and key phrases and anecdotes were categorized with in mind the seven identified elements. Subsequently, the key phrases of the interview were divided amongst the elements stating whether it was indicated as something that harmed the co-creation setting or contributed to a co-creational setting. An overview of the key parts are depicted in the tables that will follow after this page. It must however note that these were not the final indicators to which the scores were provided. The scores were based on the indicators that was elaborated during the case studies. However, this overview does provide insight in the information derived from the interviews.

Joint effort	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
Indicatoren veel joint effort.	Gemeentes dachten goed mee, ook goed nagedacht over de eindsituatie. Er is veel meegedacht met de stakeholders, met name door de omgevingsmanager.	Er was periodiek overleg met de OG, waarbij opmerkingen en vragen die W+B tegenkwam in het referentieontwerp bespraken. (Samenwerking tussen WB en OG)	De provincie dacht duidelijk mee, twee overheden maken zelfden ruzie dus ze hadden een gemeenschappelijk belang. Tussen gemeente en provincie was er een extra startoverleg georganiseerd. Daarna in een tweetal overleggen met een beperkte groep mensen de invulling van randzaken besproken. Samenwerken liep vrij soepel.	
Indicatoren weinig joint effort.	Van tevoren zijn toezeggingen gedaan door de OG voor 1 stakeholder. De gesprekken om eisen op te halen vond plaats met 1 stakeholder tegelijkertijd. De publieke partijen hebben niet met elkaar om tafel gezeten met het doel om de eisen gezamenlijk op te halen en te bespreken. Partijen wisten niet van elkaar wat de eisen waren. Hetgeen wat is opgehaald (aan eisen) werdt teruggekoppeld naar die stakeholder. Waterschap dacht niet mee. Die wilde extra's zonder daar voor bij te dragen in de kosten. Iedereen zat vanuit zijn eigen achtergrond en eigen belang in het interdisciplinaire overleg. Stakeholders hadden niet zo veel invloed op het project zelf, eindresultaat was minder interresant (voor omwoneden en bedrijven). Beschikbaarheid tijdens het project des te meer interesse.	De overlegvorm met de OG en de stakeholders was 1 op 1, er waren geen grote sessies waarbij iedereen aanwezig was. Opmerking PL: hij vraagt zich af of een gemeenschappelijke sessie van meerwaarde zou zijn i.v.m. de overzichtelijkheid van het project. Ik denk niet dat alle partijen wisten wat alle eisen waren van de anderen.	De overleggen (om eisen op te halen) vonden voornamelijk met 1 stakeholder tegelijk plaats. Het van elkaar af weten welke eisen er gesteld zijn door de verschillende proffesionele stakeholders was zeer beperkt. Contact met waterschap liep volgens de officiele lijn. Daar waar de provincie niet het gevoel had om de gemeente te hoeven inlichten, had de gemeente het gevoel dat het hun weg was en ze de controle kwijt raakte. Met het waterschap is er gedurende het traject een behoorlijke aanvaring geweest, omdat ze in het ontwerp wel de eisen hebben opgehaald maar nooit gevraagd hebben van als we in dit gebied gaan kijken, kunnen we dingen samen oppakken, optimaliseren of naar extra kansen. Kabels en leidingeigenaren waren voor het eerst geinformeerd door WB, en niet eerder gesproken, dus er kon niks gezamenlijk opgepakt worden omdat het al te laat was. Witteveen+Bos nam het initiatief tot informatie geven, de publieke stakeholders hadden een volgende (passieve) houding daarin. Meestal door werkdruk bij de publieke stakeholders, die blij waren als WB het initiatief neemt. In de uiteindelijke uitwerking zie je dat er lokaal stukken behoefte niet in kaart zijn gebracht, nu worden er wat kansen gemist en wordt geld weggegooid.	Eisen van de publiek/professionele stakeholders zijn middels persoonlijke (1 op 1) gesprekken opgehaald. Er vonden geen gezamenlijke overleggen plaats. Er was eigenlijk niet zo veel samenwerking tussen de partijen. Na het afwijzen van klantwensen was het niet meer mogelijk om nieuwe voorstellen te doen.

Stakeholder inclusiveness	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
Hoge mate van stakeholder inclusiveness	Twee stakeholderanalysis uitgevoerd, door de OG en door W+B. Bij het project was een brede set van stakeholders betrokken. Er zijn gedurende het project geen nieuwe groepen stakeholders bijgekomen.	De OG (provincie) heeft zelf de stakeholders in beeld gebracht en eisen van de stakeholders opgehaald. Het was niet aan de orde dat stakeholders vergeten zijn.	Stakeholders zijn op twee manieren in beeld gekomen, eerste deel via de RO-procedure. Voor de contractvorming heeft W+B een tweede analyse gemaakt.	De OG heeft in een eerdere fase de stakeholders in kaart gebracht. Niet het idee dat er stakeholders vergeten zijn. Sommige stakeholders zijn wel nadrukkelijker in beeld gekomen tijdens het project.
Lage mate van stakeholder inclusiveness		Witteveen+Bos heeft zelf geen stakeholderanalyse gedaan.		Witteveen+Bos heeft zelf geen stakeholderanalyse gedaan.

Stakeholder engagement	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
Hoge mate van stakeholder engagement	Poging tot interdisciplinair overleg vanuit de provincie, waar waterschap kon aansluiten. Leidde tot een chaotische situatie, is mee gestopt. Veel interesse vanuit de omgeving (Bewoners en bedrijven) in tijdelijke bereikbaarheidssituatie. Per gemeente is er tot wel vier of vijf keer overleg geweest, totdat ze niets meer toe te voegen hadden en het er wel mee eens waren.	Er is een eenmalige workshop Duurzaamheid georganiseerd (geinitieerd door WB), waar verschillende afdelingen van de provincie en gemeente waren uitgenodigd. In deze workshop is gezamenlijk gekeken naar hoe Duurzaamheid praktisch in te passen valt.	Het meerendeel van de stakeholders was 3 keer benaderd. Tussen de gemeente en provincie was er een extra startoverleg georganiseerd Met de kabel- en leiding eigenaren is 2 keer een centraal coordinatieoverleg geweest, hieruit volgde individuele gesprekken. Er is een eenmalige workshop georganiseerd om over innovatie te praten.	Er is een ontwerpatelier georganiseerd met de bewoners.
Lage mate van stakeholder engagement	Per stakeholder zijn de eigen eisen teruggekoppeld. De partijen wisten niet van elkaar wat de eisen waren. Weinig interesse vanuit de omgeving (Bewoners en bedrijven) in eindoplossing. Soms zijn stakeholders schriftelijk geinformeerd (over acceptatie/ weigering van eisen).	De partijen wisten niet wat alle eisen (van elkaar) waren.	Het bijelkaar komen van de professionele stakeholders aan het begin had wel handig geweest (maar is niet gebeurd). Georganiseerde workshop is alleen met de OG gedaan. Andere partijen (dan provincie en gemeente) zijn niet uitgenodigd. Gemeente sloot niet aan ivm. geen tijd.	Het is niet zo dat het KES document verspreid wordt, het is vooral ons document. Partijen wisten niet van elkaar wat de eisen/wensen waren. Er was niet zo veel samenwerking (tussen de partijen). Over het algemeen werden de wensen in 1 gesprek opgehaald. De onderlinge partijen hebben niet zo veel met elkaar van doen.

Openess of information	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
Hoge mate openheid van informatie	De gemeenten waren goed vanaf het begin meegenomen in het proces. Ook goed nagedacht over de einsituatie (vormgeving en welstand), waar dit bij andere provinciale projecten niet het geval is. Hiermee is goodwill gekweekt. Verslagen gemaakt over de interpretatie van de eisen en de uiteindelijke acceptatie of weigering van de eisen. Deze zijn ook doorgesproken met veel stakeholders, soms schriftelijk geinformeerd.			Er is nagedacht over de manier waarop terugkoppeling over de klantwensen plaats moest vinden. De OG ging heel zorgvuldig om met het honoreringsproces.
Lage mate openheid van informatie	Op voorhand toezeggingen gedaan aan een stakeholder door de OG. In het overleg zit niet degene die uiteindelijk beslist, waardoor als je al een compromis sluit de kans groter is dat het wordt afgekeurd dan wordt goedgekeurd. De partijen wisten niet van elkaar wat de eisen waren. Het zou wel mooi zijn als er wat meer transpirantie in het proces zat.	Partijen wisten niet van elkaar wat de eisen waren. Partijen hadden geen inzicht in de CRS-database.	Het van elkaar af weten welke eisen er gesteld zijn door de verschillende proffesionele stakeholders was zeer beperkt.	Partijen wisten niet van elkaar wat de eisen waren.

Continuous process	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
Indicatoren voor een continu proces	Er is tot wel vier of vijf keer een overleg geweest per gemeente, waarbij in ieder overleg de eisen en het project is doorgenomen totdat ze niets meer toe te voegen hadden en het er wel mee eens waren.	Er was periodiek overleg met de OG, waarbij opmerkingen en vragen die W+B tegenkwam in het referentieontwerp bespraken. (Samenwerking tussen WB en OG). De omgevingsmanger van de OG nam vervolgens contact op met de stakeholders om de vragen uit te zetten of om een toelichting te geven.		
Indicatoren voor een niet-continue proces	Met het stapsgewijs uit elkaar houden (van het KES proces) introduceer je een hoop gedoe, dus in het vervolg zou de PL dit misschien bespreekbaar maken met de OG. Het liefst zou de PL zijn eigen omgevingsmanager willen leveren en meer aan het stuur willen staan van het proces dan wat nu kon.	De overleggen gepland om de dingen die vanuit W+B zijn aangegeven m.b.t. het referentieproject waren vooral ad-hock.	1 keer overleg voor ophalen eisen, 2e keer n.a.v. honoreringsadvies, 3e keer terugkopelling hoe het in het contract verwerkt is.	Er is 1 gesprek ingeruimd om de wensen op te halen per stakeholder.

Stakeholder centric view	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
Indicatoren voor een project centric view	Projectdoelstelling was het vervangen van twee beweegbare bruggen en een stuk weg. In de basis werdt gekeken of de eis in de scope van het project zat en bij keuze of het in het budget past. Is het een nice-to-have, dan gekeken of er wel budget voor is. Op het moment dat een andere stakeholder (dan de OG) iets vraagt en het is buiten de scope, dan staat het heel vaak ter discussie en worden ze voor een groot deel niet gehonoreerd, ook omdat ze (de stakeholder) geen geld ter beschikking stelde.	De nadruk bij het beoordelen van de eisen lag vooral op of het technisch inpasbaar was. Daarnaast kan een partij wel iets willen, maar als die geen middelen meebrengt (Geld) dan wordt de eis net zomaar ingewilligd.	Bij het beoordelen van de eisen gelet op: aan de ene kant of het binnen het bestemmingsplan (scope) past, anderzijds of het tegen technische conflicten aan loopt. Check of er tegenstrijgdige eisen zijn. Extra kosten, extra tijdsplanning of andere randvoorwaarden zijn die voor problemen zorgen. Geld en beheer&onderhoud zijn belangrijke factoren bij het beslissen of stakeholderwensen vervuld werden.	Bij het beoordelen werdt er onder andere gekeken naar de technische, juridische en financiele consequenties. Budget is leidend. De stakeholder die meer melk te brokkelen heeft, krijgt ook wat meer aandacht.
Indicatoren voor een stakeholder centric view	Er is veel meegedacht de stakeholders, met name door de omgevingsmanager. Tijdens dit project heeft de PL het gevoel dat er voldoende is doorgevraagd naar de behoefte van stakeholders en dat het meer doorvragen niet had geleid tot andere inzichten.	Het is met name zelf doorvragen als er een klanteneis geformuleerd wordt om te vragen wat iemand dan precies wilt. In dit geval waren de eisen meer gericht op behoeften. Als een klanteneis werdt afgewezen werdt dat zeker wel teruggekoppeld en soms kregen we die in een andere vorm terug, uiteindelijk moeten die partijen het er mee eens zijn.	Op een aantal plekken stond de gemeente voor de inrichting open, waarbij wel altijd de vraag was of het binnen budget past (extra kosten), wat de consequenties op de planning zijn (extra tijdsplanning) en onder wiens verantwoordelijkheid het beheer gaat vallen. Bij het ophalen van de eisen doorgevraagd om de behoefte van de stakeholder op te halen, met name de focus of de gestelde eis volledig en SMART was, zodat ook gekeken kon worden hoe we de eis kunnen verifieren.	We proberen wel de vraag achter de vraag te achterhalen. De grootste & moedigste scopewijzing werdt gedreven door de omwonenden.

Willengess to co-create	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
Indicatoren voor openess and willingness to co-create	Gemeentes dachten wel mee, die waren ook goed vanaf het begin meegenomen in het proces. Er is veel meegedacht met de stakeholders, met name door de omgevingsmanager.		De provincie dacht duidelijk mee, maar als het op een beslissing aankwam zag je een duidelijke afscheiding en trokken partijen onderwperen naar hen toe.	Opzich staat de OG wel open voor ideeen, maar het budget is leidend. De OG wilde alle eisen gefilleerd hebben, om te kijken waarom eisen wel of niet gehonoreerd
Indicatoren voor weinig openess and willingness to co-create	Het interdisciplinaire overleg van de OG leidde niet tot een soepeler proces omdat iedereen er vanuit zijn eigen achtergrond en zijn eigen belangen in zat, die niet parallel lopen. In het overleg zit niet degene die uiteindelijk beslist, als je al een compromis naar huis brengt is de kans groter dat het wordt afgekeurd dan goedgekeurd. Als stakeholders in het proces stonden om aan te haken, en daar middelen voor beschikbaar te zetten, zodat het goedkoper kan worden uitgevoerd omdat ze toch bezig zijn, had het wel gekunt. (Maar zo stonden de stakeholders er niet in.) Waterschap dacht niet mee, die wilde graag extra's zonder daar voor bij te dragen in de kosten. Op het moment dat een andere stakeholder iets vraagt en het is buiten de scope, staat een eis heel vaak ter discussie.	Vanuit de provincie zijn er bepaalde eisensets met bepaalde standaarden. Als je daar van af wilt wijken, zou je al moeten spreken over een pilotproject. Bij de N516 wilden ze gewoon het asfalt vervangen hebben en een andere rijstrookindeling, Dat was van te voren bedacht en dat moest gewoon gebeuren en vastgelegd worden in een contract.	De provincie dacht duidelijk mee, maar als het op een beslissing aankwam zag je een duidelijke afscheiding en trokken partijen onderwperen naar hen toe. Waterschap is nooit gevraagd om te kijken om dingen samen op te pakken. Kabels- en leidingeigenaren laat betrokken, geen mogenlijkheid tot optimalisatie. Op innovatie was wat meer weerstand. In het beleid zeggen ze hier open voor te staan, maar in de praktijk zie je dat de rem er op wordt gezet.	

Co-creation	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
	Samen met de stakeholders een oplossing bedenken i.p.v. los de eisen ophalen, een oplossing bedenkt en dan de eisen terugkoppeld.	Het gezamenlijk met allemaal stakeholders bekijken wat de mogenlijkheden en wensen zijn, het uittekenen en ik kaart brengen van de ideeen, brainstormsessies over wat nou eigenlijk de functionaliteit moet zijn.	Niet alleen vanuit de proffesionele OG dingen te bedenken, maar juist in de voorfase andere partijen probeert daarbij te betrekken.	Term wel eens eerder gehoord, maar er nooit over nagedacht hoe dat eruit kan zien.
	Voordelen dat je een bredere blik hebt in de beginfase, dat je weet waar de gevoeligheden liggen en in welke richting de stakeholders op denken of welke voorkeuren ze hebben.	Voordeel zou zijn dat je van de stakeholders meteen ziet wat de belangen zijn en wat de mogelijkheden en onmogelijkheden zijn.	Een ontwerp te maken die beter aansluit bij de direct betrokkenen, die ook een rol geeft binnen het ontwerpproces waardoor je een beter gedragen ontwerp krijgt. Met als gevolg een soepeler process daarna.	Een intensievere samenwerking tussen de stakeholders en de OG, dat je bij elkaar zit en samen naar een oplossing werkt.
	Tijdens de sessie als ingenieursbureau extra informatie geven over waarom bepaalde dingen technisch wel of niet haalbaar zijn.	Nadeel is dat bij projecten die wat controvosieel zijn, waar de belangen echt anders zijn en de partijen de behoefte hebben om andere partijen mee te krijgen in een bepaalde stelling, dat het dan tegen je kan gaan werken.	Extra aandacht geven aan het helder maken van het proces, aangeven dat je er met een open mind in gaat maar dat niet alles gerealiseerd gaat worden. Risico dat de verwachitngen niet aansluiten bij het resultaat, dit kan resulteren tot extra weerstand.	Doel is om draagvlak te genereren. Het is moeilijk om met al die partijen om tafel te gaan zitten. Is co-creatie ook als je een ontwerp maakt, dat presenteert en dat ze daar op reageren?
	Direct kan informeren over de kosten van sommige oplossingen, nadeel is dat een stakeholder geen boodschap heeft aan kosten, is lastig bespreekbaar maar speelt altijd een rol binnen onze ontwerpen.	Bij stuurgroepen of belangengroepen die tegen zijn, moet je het wel heel gestrucutreerd en heel goed aanpakken, of je moet er een ander doel aan koppelen. Niet om tot een oplossing te komen, maar juist om de partijen te betrekken.	PL kan dit faciliteren door iemand die de capaciteiten heeft dit te laten aansturen.	Deelgenoot maken van de problemen in het gebied om uit te legen waarom iets wel of niet kan.
	Van te voren spelregels hebben, hoe dat werkt weet ik niet.	Een open sfeer, waarbij partijen hun belangen op tafel leggen en dat ook echt wordt meegenomen.	Maatschappelijke winst valt er te behalen.	Belangrijk om goed de verwachtingen te managen.
			Eigenlijk zou je het al in de beginfase moeten doen, nog voor het bestemmingsplan.	Er moet begrip zijn over en weer, dat vraagt wel iets van competenties van elkaar.

Opmerkingen algemeen	Key parts interview 'The island road'	Key parts of interview 'The Crossing'	Key parts interview 'The bypass'	Key parts of interview 'The harbour'
	Samen ontwerpen met een team van de provincie (OG) kan eigenlijk niet, omdat die geen ontwerpkennis bezitten maar alleen mensen hebben die kunnen reageren op ontwerpen. Ene projectteam bij de OG is de andere niet, vaak opgebouwd uit ingehuurde mensen van buiten de provincie, dus geen leercurve aanwezig in de organisatie. I.v.m. veel verschillende stakeholders zou het mooi zijn als we met tooltjes (interactieve kaart) of andere dingen het proces anders kunnen instaken, waarbij de stakeholders meer weten van elkaar wat ze gevraagd hebben. Zou fijn zijn om als consultant van de OG zelf het proces in te richten. Nu weinig invloed op de manier waarop klanteneisen werden opgehaald. Eisen voor de OG zijn opgehaald, door ze zelf op te stellen en daarna te laten toetsen. Waterschap is niet in staat om op een hoog abstractieniveau hun systeem te omschrijven. Er zat, zeker aan het begin weinig structuur in de gesprekken, de omgevingsmanager lette op alles of op niks. Later werdt er wel meer gericht op vragen over oplossingsrichtingen en wat het onderdeel was waarvan een bepaalde partij iets moest vinden.	Het ophalen van de eisen door een externe omgevingsmanager werkte in dit geval goed. Er was van te voren geen budget meegegeven, maar bij sommige wensen werdt wel snel een vingeroefening gedaan om de kosten in beeld te brengen, waarbij de conclusie werdt getrokken dat voor sommige dingen geen geld was. Voor dit project zou een co-creatie sessie niet werken omdat het project veel te klein is en de middelen te beperkt.	Volgens de PL was dit juist een project om innovatieve ideeen uit te proberen omdat het afbreukrisico hier laag is ivm de lage verkeersintensiteit en dus lage maatschappelijke kosten in geval van falen. W+B heeft zelf het stakeholderproces geinitieerd en opgezet. Volgens de PL hoeft een bestemmingsplan helemaal niet zo hard te zijn als dat deze nu opgesteld wordt en kunnen juist openingen erin gelaten worden om de invulling later samen met de omgeving te bespreken. De focus bij het ophalen van de eisen op voornamelijk dat het SMART is, omdat er vaak vage dingen terug komen. Om door te vragen om de eis meteen schep te krijgen zodat je het meteen goed kan krijgen voor de vraagspecificatie. Dit hoeft niet per se over een oplossing te gaan, maar wat is de behoefte van de stakeholder en hoe kunnen we die eis verifieren? Een startoverleg met meerdere partijen erbij, niet zozeer alle professionele partijen maar meer de lokale groepen in combinatie met de omgevingsmanager.	Zeer grote scopewijziging laat de welwillendheid van de OG zien om zijn scope aan te passen. Deze kwam voort uit de omgeving, niet van de andere stakeholders. De grote scopewijzing heeft ook tot (financiele) problemen gezorgd, waardoor het project gedownscaled moet worden en budget leidend is.