

# More than a contract

*The importance of alliances in the transition towards a circular economy*

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## **The importance of alliances in the transition towards a circular economy**

*"Great discoveries and improvements invariably involve the cooperation of many minds"*

A. G. Bell

# EXECUTIVE SUMMARY

## Abstract

*We face enormous difficulties towards liveable urban areas. Urban areas consist of real estate, infrastructure, and a providing energy network. The transition towards a circular economy should be an answer to these difficulties. Public authorities could have a big influence in executing public projects in a sustainable way. Current forms of executing public projects are often focusing on shifting risks and responsibilities, and a predefined solution. Transition processes are characterised as unexpected and uncertain where a predefined solution is often not possible. Currently, most common used forms and transition processes are not matching. Building effective partnerships between public and private organisations is necessary to stimulate transitions. The public-private alliance is a form which is considered as suitable in transition projects. It should deal with increased uncertainty by a more flexible collaboration. Two empirical cases are examined in order to gain insight in how public-private alliances can stimulate the transition towards a circular economy. Several pre-conditions are derived from the public-private alliance in transition processes. When the transition towards a circular economy meet these pre-conditions, the public-private alliances stimulates by 1) transparency in interests, 2) transparency in the business case, 3) equal role in decision-making, 4) ongoing process of problem solving, 5) flexibility in the scope, 6) shared knowledge development, 7) supply chain involvement in the alliance, and 8) trust among involved stakeholders. The use of public-private alliances can be optimised to stimulate the transition towards a circular economy by 1) planning enough time but execute efficient, 2) discussing how you want to collaborate, 3) collaboration between involved organisations, 4) considering the alliance as separate organisation, 5) aligning specifications with impact for others in the supply chain, 6) involving an independent authority or employees.*

*This research contributes to the link between transition management and the public-private alliance. The public-private alliance is a collaboration form on operational level for transition management, and is valuable to stimulate the transition towards a circular economy.*

## Motivation

Urban areas are essential to our society, the economy and the environment. More than half of the population on earth live in urban areas and projections show that in 2050 almost 90% will live in urban areas (United Nations, 2014). The difficulties we face towards liveable urban areas are enormous. John Wilmoth (2014), director of United Nations, argues that a sustainable urban area is the greatest challenge we face in the 21<sup>st</sup> century. A successful urban planning agenda is crucial to succeeding in the challenge towards a sustainable urban area (United Nations, 2014). Different aspects like infrastructure, real estate, and energy contribute to these sustainable urban areas. Therefore, a high level of urgency for successful urban planning is required. The transition towards a circular economy is mentioned as one of the solutions. Public parties have a relative big market share and can accelerate a transition by purchasing innovative products (OECD, 2011). Therefore, in a transition to green growth, the success depends on the ability of policymakers to build effective partnerships with private partnerships (Andrew and de Boer, 2012). A need for research on operational and tactical level is required (Loorbach & Rotmans, 2010). For this reason, this research assesses the following research question: “How public-private partnerships can stimulate the transition towards a circular economy?”

### Theoretical framework

A change in the current economic model, which follows a 'make-take-dispose' pattern, is necessary. Andrews (2015) mentions that designers nowadays should follow and lead the principles of [circular economy](#). A circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles (Ellen MacArthur Foundation 2013). In the Netherlands, this awareness is present. The Rijksoverheid (2016) stated that the Netherlands has to become a fully circular economy in 2050.

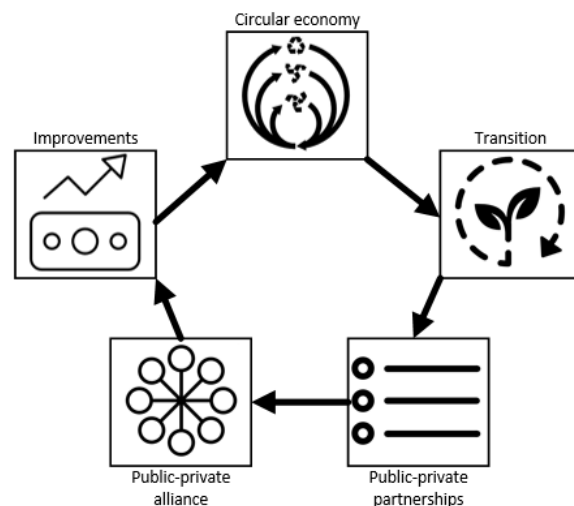


Figure Theoretical Framework (Own illustration, 2018)

An arising importance for circular economy is upcoming. Circular economy lead to the consideration that this transition is a change in routines and a change of the system. The concept consists of challenges and barriers in the area of technological, economic, operational, governmental and behavioural. The built environment is considered as a sector which is conservative and non-innovative (Bygballe & Ingemansson, 2014). Therefore, accelerating the transition towards a circular economy in this sector is necessary. [Transition](#) literature shows relevance to consider circular economy in the perspective of transition. It describes the road to sustainable growth. Transition management can be achieved by system innovation, process innovation and product innovation. Transition processes, which characterises the process of these several steps of innovation, are described by an unexpected process, a shared perspective between participants and learning and reflexivity. Also one of the characteristics of transition processes is public-private collaboration (Loorbach, 2007; Rotmans, 2005; Frantzeskaki et al., 2012). The combination of a certain influence of public-goods, build effective partnerships, and the characteristics of transition processes, lead to an overview of current forms of [public-private partnerships](#). Three different forms of executing public goods can be distinguished. The traditional direction is characterised by shifting risks and responsibilities to the public authority. The concession is characterised by shifting risks and responsibilities to private organisations. The third direction is the alliance direction where forms are characterised by sharing risks and responsibilities between public and private organisations. Considering these three directions, the alliance direction should be the most suitable in transition processes. The concession direction and traditional direction often need a predefined solution and do not have much flexibility after the contract is signed. Inflexibility cannot deal with an uncertain process of transition. The alliance direction should facilitate this uncertain process better since it is suitable for changes and flexibility in the scope. In the [public-private alliance](#), the risks and responsibilities are shared. The alliance form is used in projects with an unexpected or uncertain process with complexity in scope, budget, technique or environment. Several characteristics like aligned interests, greater transparency, cooperation process and an integrated decision-making distinguish the public-private alliance from other forms.

### Case study

Two cases are examined in order to gain insight in how the public-private alliance can stimulate the transition towards a circular economy. The first case aims to stimulate the hydrogen economy in Groningen. Public and private organisations develop two hydrogen buses for public-transport, an innovative plastic pipeline, a tank station and the production of green hydrogen. The second case aims to stimulate circular economy in energy and material use. The municipality and several private organisations agreed to renovate and maintain seven municipality buildings with high sustainability ambitions. The cases have the public-private alliance and a contribution in the transition towards a circular economy in common. Respondents of involved organisations in the two projects are interviewed. Respondents are asked why the public-private alliance is used as form in transition processes, what the characteristics of the project are and what lessons learned are from the public-private alliance in transition processes.

### Results

The two cases lead to pre-conditions of the public-private alliance in transition processes. These pre-conditions have to be met when the results of this research are relevant regarding the research question: how can public-private partnerships stimulate the transition? The following pre-conditions have to be met: 1) an unexpected process, 2) long-term vision beyond the project and 3) a changing market or 4) no full developed market. When these pre-conditions meet the transition towards a circular economy, the public-private alliance stimulates by 1) transparency in interests, 2) transparency in the business case, 3) equal role in decision-making, 4) ongoing process of problem solving, 5) flexibility in the scope, 6) shared knowledge development, 7) supply chain involvement in the alliance, and 8) trust among involved stakeholders. The use of the public-private alliance can be optimised to stimulate the transition towards a circular economy by 1) planning enough time but execute efficient, 2) discussing how you want to collaborate, 3) collaboration between involved organisations, 4) considering the alliance as separate organisation, 5) aligning specifications with impact for others in the supply chain and 6) involving an independent authority or employees.

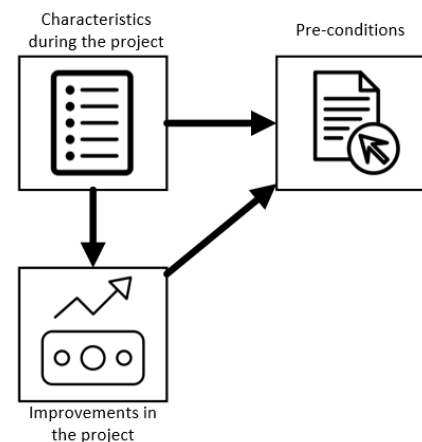


Figure Relation between pre-conditions and stimulating factors (Own illustration, 2018)

### Conclusion

The scientific relevance of this research is the link between transition management towards circular economy and the public-private alliance. The public-private alliance is a form of collaboration on operational level for transition management to stimulate the transition towards a circular economy. This research contributes to the gap in literature of operational experiences in transition management towards circular economy. It shows how two projects contribute to the transition task of a circular economy. Several factors are derived which are important to stimulate and facilitate transition processes to a circular economy. These factors and experiences can be used in other transition projects as well. The public-private alliance is not often used in practice. The derived lessons learned from the two cases are complementary to existing literature of experiences of the public-private alliance. Most of the derived lessons learned are in the same direction of collaboration between organisations and people as in literature. This research offers practical guidelines in how to optimise the public-private alliance.

# MANAGEMENT SAMENVATTING

## Abstract

*We naderen enorme uitdagingen om in de toekomst leefbare stedelijke gebieden te garanderen. transitie naar een circulaire economie moet het antwoord geven op deze uitdagingen. Publieke partijen kunnen een grote invloed hebben in het uitvoeren van haar projecten op een duurzame en innovatieve manier. Bestaande contractvormen voor projecten van publieke partijen, zijn vaak gericht op het wegzetten van risico's en verantwoordelijkheden, met een vooraf gedefinieerde oplossing of uitkomst. Transitieprocessen worden gekenmerkt als onverwacht en onzeker, waarbij een vooraf gedefinieerde oplossing vaak niet mogelijk is. Bestaande vormen voor publieke projecten matchen niet met de eigenschappen van transitieprocessen. Het opbouwen van effectieve partnerschappen tussen publieke en private organisaties is noodzakelijk om transities te stimuleren. Het publiek-private alliantiemodel is een vorm die voor transitieprojecten als geschikt wordt beschouwd. Het zou beter moeten omgaan met de verhoogde onzekerheden tijdens een project door een flexibele samenwerking. Twee empirische cases zijn onderzocht om inzicht te verkrijgen in hoe publiek-private allianties de transitie naar een circulaire economie kunnen stimuleren. Een aantal randvoorwaarden zijn afgeleid van het publiek-private alliantiemodel in transitieprocessen. Wanneer de transitie naar een circulaire economie aan deze randvoorwaarden voldoet, dan stimuleert het publiek-private alliantie model door 1) transparantie in belangen, 2) transparantie in de business case, 3) gelijke rol in besluitvorming, 4) continue proces in het oplossen van problemen, 5) flexibiliteit in de scope, 6) gedeelde kennisontwikkeling, 7) betrokkenheid van de keten in de alliantie, 8) vertrouwen tussen de betrokken organisaties. Het gebruik van het publiek-private alliantie model kan worden geoptimaliseerd om de transitie naar een circulaire economie te stimuleren door 1) voldoende tijd plannen maar efficiënt uitvoeren, 2) bespreek hoe je wilt samenwerken, 3) samenwerking tussen betrokken organisaties, 4) de alliantie als afzonderlijke organisatie, 5) afstemming van specificaties voor anderen in de keten, 6) betrek een onafhankelijke autoriteit of onafhankelijke werknemers.*

*Dit onderzoek draagt bij aan de koppeling tussen transitie management en het publiek-private alliantie model. Het publiek-private alliantie model is een samenwerkingsvorm op operationeel niveau van transitie management. Dit model is van waarde om de transitie naar een circulaire economie te stimuleren.*

## Aanleiding

Stedelijke gebieden zijn essentieel voor onze samenleving, de economie en het milieu. Meer dan de helft van de bevolking op aarde woont in stedelijke gebieden. Uit voorspellingen blijkt dat in 2050 bijna 90% in stedelijke gebieden zal wonen (Verenigde Naties, 2014). We worden met enorme problemen geconfronteerd om stedelijke gebieden leefbaar te houden. Jon Wilmoth (2014), directeur van de Verenigde Naties, stelt dat een duurzaam stedelijk gebied de grootste uitdaging is waar we in de 21<sup>ste</sup> eeuw mee worden geconfronteerd. Een succesvolle stedenbouwkundige agenda is cruciaal om te slagen in de uitdaging van een duurzaam stedelijk gebied (Verenigde Naties, 2014). Verschillende aspecten als vastgoed, infrastructuur en energie dragen bij aan deze duurzame stedelijke gebieden. Een hoge mate van urgentie is vereist. De transitie naar een circulaire economie wordt genoemd als één van de oplossingen. Publieke partijen hebben een relatief groot marktaandeel en kunnen een transitie versnellen door innovatieve producten in te kopen (OECD, 2011). Daarom is het succes van een transitie naar duurzame groei afhankelijk van beleidsmakers die effectieve partnerschappen aangaan met private organisaties (Andrew en de Boer, 2012). Er is behoefte aan onderzoek op operationeel en tactisch niveau. (Loorbach & Rotmans, 2010). Daarom is de volgende hoofdvraag opgesteld: "Hoe kunnen publiek-private samenwerkingen de transitie naar een circulaire economie stimuleren?"



### Theoretisch kader

Een verandering is noodzakelijk in het huidige economische model dat een 'make-take-dispose' patroon volgt. Andrews (2015) geeft aan dat ontwerpers tegenwoordig de principes van een circulaire economie moeten volgen. Een circulaire economie is verstekend en regeneratief in ontwerp en is erop gericht om producten, componenten en materialen op het hoogste kwaliteits- en waarde niveau te behouden. Hierbij wordt onderscheid gemaakt tussen technische en biologische cycli (Ellen MacArthur Foundation, 2013). De Rijksoverheid (2016)

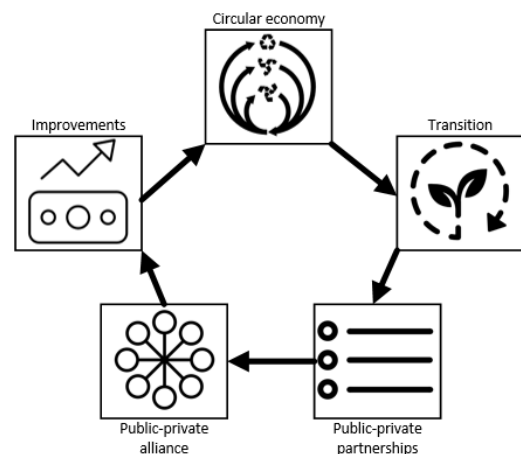


Figure Theoretical Framework (Own illustration, 2018)

stelt dat Nederland in 2050 een volledige circulaire economie moet zijn. De urgentie in Nederland is aanwezig. Circulaire economie kan tot stand komen door een verandering in routines en een verandering in het systeem. De transitie bevat uitdagingen en barrières in de gebieden van technologie, economie, operationeel, wet- en regelgeving en gedrag. De gebouwde omgeving wordt beschouwd als een conservatieve en niet-innovatieve sector (Bygalle & Ingemansson, 2014). Daarom is het noodzakelijk de transitie naar een circulaire economie te versnellen. Transitieliteratuur laat zien dat het relevant is om circulaire economie in het perspectief van een transitie te plaatsen. Het beschrijft de weg naar duurzame groei. Transities worden bereikt door systeeminnovatie, procesinnovatie en productinnovatie. Transitieprocessen worden beschreven door een onverwachts proces, een gedeeld perspectief tussen betrokken organisaties en een reflectief lerend proces. Daarnaast is samenwerking tussen publiek en privaat één van de eigenschappen (Loorbach, 2007; Rotmans, 2005; Frantzeskaki et al., 2012). De combinatie van de invloed van overheidsinstellingen, de urgentie van effectieve partnerschappen en de eigenschappen van transitie processen, leiden tot een uiteenzetting van bestaande samenwerkingsvormen tussen publieke en private organisaties. Drie verschillende vormen kunnen onderscheiden worden. De traditionele richting wordt gekenmerkt door het verdelen van risico's en verantwoordelijkheden. De concessie richting wordt gekenmerkt door het verschuiven van risico's en verantwoordelijkheden naar private organisaties. In de derde richting, de alliantie richting, worden verantwoordelijkheden en risico's gedeeld. Van deze drie vormen zou de alliantievorm het meest bruikbaar moeten zijn in transitieprocessen. De traditionele- en concessie richting hebben vaak een vooraf geformuleerde oplossing nodig and hebben niet veel flexibiliteit nadat een contract is getekend. Deze inflexibiliteit is niet bevorderend voor een onzekere processen van een transitie. De alliantievorm zou dit onzekere proces beter moeten faciliteren omdat het om kan gaan met veranderingen in het project met een flexibelere scope. In de publiek-private alliantie worden risico's en verantwoordelijkheden gedeeld. Deze vorm wordt vaak gebruikt in project met een onverwachts- of onzeker proces met complexiteit in omvang, budget, techniek of omgeving. Verschillende kenmerken onderscheid het alliantiemodel van andere modellen. Kenmerken zoals het verbinden van belangen, grotere transparantie, proces gericht op samenwerking en geïntegreerde besluitvormingen tussen partijen.

### Case studie

Twee cases zijn onderzocht om inzicht te verkrijgen in hoe publiek private alliantie de transitie naar een circulaire economie kunnen stimuleren. De eerste case beoogt de waterstofeconomie te stimuleren in Groningen. Publiek en private organisaties ontwikkelen twee bussen voor het openbaar vervoer, een

innovatieve pijpleiding, een tankstation en de productie voor groene waterstof. De tweede case beoogt een circulaire economie te stimuleren in energie en materiaalgebruik in de gemeente Eindhoven. De gemeente en een aantal private organisaties hebben een overeenkomst gesloten om zeven gemeentelijke gebouwen te renoveren en onderhouden met hoge duurzaamheidsambities. The cases gebruiken beide het publiek-private alliantiemodel en hebben beide een bijdrage aan de transitie naar een circulaire economie. Respondenten is gevraagd waarom het alliantie model is gebruikt, hoe de samenwerkingsvorm wordt gekarakteriseerd en wat geleerde lessen zijn van het publiek-private alliantiemodel in transitie processen.

## Resultaten

De twee cases hebben geleid tot randvoorwaarden van het publiek-private alliantie in transitieprocessen. Als aan deze randvoorwaarden wordt voldaan, dan zijn de resultaten van dit onderzoek relevant met betrekking tot de onderzoeksvraag: hoe kunnen publiek-private samenwerkingen de transitie naar een circulaire economie stimuleren? Aan de volgende randvoorwaarden moet worden voldaan in een transitieproject: 1) een onverwacht proces, 2) lange termijn visie voorbij het project, 3) een veranderende markt of 4) geen volledig ontwikkelde markt. Wanneer er aan deze randvoorwaarden wordt voldaan voor de transitie naar een circulaire economie,

simuleert de publiek-private alliantie door 1) transparantie in belangen, 2) transparantie in de business case, 3) gelijke rol in besluitvorming, 4) continue proces van problemen oplossen, 5) flexibiliteit in de scope, 6) gedeelde kennisontwikkeling, 7) betrokkenheid van de keten in de alliantie en 8) vertrouwen tussen de betrokken organisaties. Het gebruik van de publiek-private alliantie kan worden geoptimaliseerd om de transitie naar een circulaire economie te stimuleren door 1) voldoende tijd plannen maar efficiënt uitvoeren, 2) bespreek hoe je wilt samenwerken, 3) samenwerking tussen betrokken organisaties, 4) de alliantie als afzonderlijke organisatie, 5) afstemming van specificaties voor anderen in de keten, 6) betrek een onafhankelijke autoriteit of onafhankelijke werknemers.

## Conclusie

De wetenschappelijke relevantie van dit onderzoek is het verband tussen transitie management naar een circulaire economie en het publiek-private alliantiemodel. Het alliantiemodel is een vorm van samenwerking op operationeel niveau in transitie management om de transitie naar een circulaire economie te stimuleren. Dit onderzoek draagt bij aan het nieuwe onderzoeksgebied van operationele ervaring in transitie management naar een circulaire economie. Het geeft inzicht in hoe twee projecten bijdragen aan een transitieopgave naar een circulaire economie. Er kunnen factoren worden afgeleid die van belang zijn voor het stimuleren en faciliteren van transitieprocessen. Deze factoren en ervaringen kunnen in andere transitieprojecten worden gebruikt. Het publiek-private alliantiemodel wordt in de praktijk niet vaak gebruikt. De afgeleide lessen uit de twee cases zijn complementair aan de bestaande literatuur over ervaringen de publiek-private alliantie. De meeste geleerde lessen zijn in dezelfde richting als in de literatuur, namelijk de samenwerking tussen mensen en organisaties. Dit onderzoek biedt praktische richtlijnen voor het optimaliseren van het publiek-private alliantiemodel.

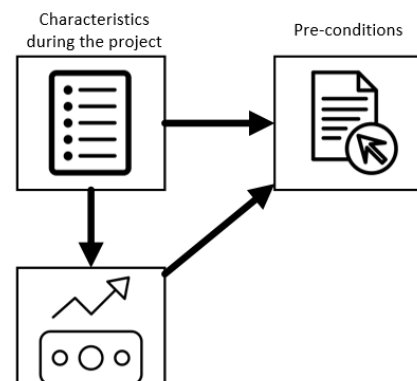


Figure Relation between pre-conditions and stimulating factors (Own illustration, 2018)

# PREFACE

Collaboration is key in reaching goals which are considered as challenging. This research confirms that barriers like legislation and technique are not leading in a transition. It creates awareness of the fact that we have to take big steps towards a more sustainable society. The concept of circular economy is the last years an arising trend and a lot of people have feeling with it. However, current steps are often small, acceleration and up-scaling projects which strive for sustainable transition are necessary. This research gives insight in how we can accelerate and give guidance in transition projects in practice. It provides detailed insight in how collaboration between diverse organisations and people can lead to steps in the transition towards a circular economy.

This report is my final assignment of the master track Construction Management & Engineering at the TU Eindhoven. Therefore, the six months were very instructive and a good preparation for my further career. The aim of the research was to gain insight in another way of working that is required in the beginning stage of a transition. Collaboration in transition processes should facilitate an unexpected process, in a no-predefined solution and knowledge development. I often made the metaphor of writing a thesis with the characteristics of transition processes. I guided myself through that unexpected process without a pre-defined solution. This was of course not always as easy as I expected. I learned more about myself, it opened a lot of new possibilities, and developed a lot of knowledge in field in which I will be working in.

During the process of my research, I had the opportunity to get inspired and guided by multiple persons. First, I would like to thank my first supervisor, Qi Han, for her patience and constructive feedback regarding the structure of my research. I would like to thank my second supervisor, Fred Hobma from the TU Delft, for asking the right questions and his supportive attitude. I would like to thank my company supervisors, Hanneke van Schijndel and Jan Willem de Kleuver from Twynstra Gudde. Their enthusiasm, critical view, and engagement to the process of my research have brought me a lot. Not only regarding the research but in my further practical behaviour in business as well. In addition, I would like to thank the respondents of the two examined cases, who have been willing to support me in the research. Thereby, several employees of Twynstra Gudde who provide moments of distraction, support, and a lot of valuable information.

I want to thank my family and friends. First, I am very thankful to Jesse Rudolphi regarding multiple consultations. In parts of this journey, the conversations with Jesse helped me a lot, when I did not see immediately how I should approach a next step. I would like to thank my friends and girlfriend for their support, love and moments of distraction. I could not do it without them. Last but not least, my parents and brother for their unconditional support and enthusiasm in everything I do.

*Jochem de Vos*

*Utrecht, March 2018*

# READING GUIDE

This research consists of several parts, please find below the structure applied.

## I. Introduction

The introduction is used to show the motivation for this research. The relevance of the two themes is outlined, public-private partnerships and circular economy. As outcome of the motivation, the problem definition is stated. Next, the research questions are formulated. The introduction is finalised with the research design.

## II. Theoretical framework

In part II, the theoretical framework is developed. It explores the literature of the subject and the relations. It starts with the concept of circular economy and with challenges and barriers in different fields for this concept (chapter 2). These challenges and barriers are linked to the concept of transition (chapter 3). Transition processes have characteristics which can be translated into requirements. These requirements are analysed in relation to different directions of public-private partnerships (chapter 4). Three directions are distinguished in this chapter. The public-private alliance model should be a sufficient PPP form in order to stimulate and facilitate transition processes. Therefore, in chapter 5 the public-private alliance is described in more detail. The theoretical framework is finalised by a conclusion (chapter 6).

## III. Methodology

The methodology (chapter 7) describes the way the theoretical framework is empirically explored. The case study method is described and how the results are derived. First, the motivation is described of the method, why the two cases are selected and how the data is collected.

## IV. Empirical research

In two empirical cases the pre-conditions, characteristics, and the lessons learned of the public-private alliances in transition processes are explored (chapter 8 & 9). Next, a cross-case analysis (chapter 10) is conducted to process the most important factors of the two cases. The cross-case analysis is tested by a practical validation. The empirical research is finalised by a conclusion (chapter 11).

## V. Conclusions

This part is started with the main conclusions of the research (chapter 12). The theoretical framework and the empirical results are compared to conclude the research. Next, a discussion is conducted (chapter 13). Last, recommendations are described towards the public-private alliance model of Twynstra Gudde and recommendations for further research.

# TERMINOLOGY

## # Circular Economy

CE – Circular economy is considered as a concept which strives for a regenerative and restorative design and aims to keep product and materials in the cycle. The transition towards circular economy is a change of routines, change of the system and consists of challenges and barriers such as technological, economic, operational, governmental, and behavioural.

## # Public Private Partnerships

PPP – Public-private partnerships are considered in two ways in this research. The integrated contracts and life-cycle contracts (concession direction), and the alliance direction is considered as public-private partnership. Public-private partnerships are a way of executing public goods.

## # Public Private Alliance

PPA – The public-private alliance is a type of PPP in which public and private organisations collaborate in an equal relation, where the interests of involved organisations are aligned with the actual project outcome.

## # Urban Areas

UA – Urban areas are considered as all the physical buildings, with their connecting infrastructure and underlying energy network which supply these buildings and infrastructure to function.

## # Traditional Direction

The traditional direction is used as definition for executing public goods by traditional contracts. Tendency is that responsibilities and risks are shifted to the public authority as client. A clear client and supplier relation is present.

## # Concession Direction

The concession direction is used as definition for executing public goods by concession contracts. The concession direction consists of life-cycle contracts and integrated contracts. Tendency is that responsibilities and risks are shifted to private organisations as supplier. These forms are often related to the introduction of PPP in the Netherlands.

## # Alliance Direction

The alliance direction is used as definition for executing public goods by collaboration forms in which responsibilities and risks are shared between public and private organisations. The alliance direction focuses on a jointly process of problem solving and aims to prevent blaming each other for problems.

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### III. Methodology

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# I. INTRODUCTION

# 1. RESEARCH PROPOSAL

## 1.1 MOTIVATION

The built environment is essential to our society, the economy and the environment. More than half of the population on earth live in urban areas and projections show that in 2050 almost 90% will live in urban areas (United Nations, 2014). The difficulties we face towards liveable urban areas are enormous. John Wilmoth (2014), director of United Nations, argues that a sustainable urban area is the greatest challenge we face in the 21<sup>st</sup> century. A successful urban planning agenda is crucial to succeed in the challenges towards a sustainable urban area (United Nations, 2014). Different aspects like infrastructure, real estate, and energy contribute to sustainable urban areas.

A high level of urgency for successful urban planning in urban areas is required. According to a Dutch governmental report: the built environment is responsible for 50% of the usage of materials, 40% of the energy use and 30% of the water usage (Rijksoverheid, 2016). A change in the built environment is fundamental towards a more sustainable urban area. The current economic model follows the 'make-take-dispose' pattern which arose during the industrial revolution (Andrews, 2015; Ellen MacArthur Foundation, 2013). Andrews (2015) mentions that designers nowadays should follow and lead the principles of circular economy. The Ellen MacArthur Foundation has been established in 2010 to create awareness of the challenges towards a circular economy. Circular economy is a restorative process where the addition of new raw materials has to be reduced as much as possible (Ellen MacArthur Foundation 2013). In the Netherlands, this awareness is increasing. The Rijksoverheid (2016) state that the Netherlands has to become totally circular in 2050.

The built environment is considered as a sector which is conservative and non-innovative (Bygballe & Ingemansson, 2014). Accelerating the transition towards a circular economy in this sector is necessary. Otherwise, it will take too much time to change the current economic system. Technological innovations are not always sufficient to change the economic system. The transition towards a circular economy requires a systematic multi-level change (Witjes & Lozano, 2016; Loorbach, 2007). This multi-level change is required to consist of several aspects like technological innovation, new business models, and stakeholder collaboration. The road from a linear economy to a circular economy is considered as a transition (Rifkin, 2011; Loorbach, 2007). Transitions are characterised by concerning changes in technological, economic, ecological, socio-cultural and institutional developments which are interrelated to each other (Loorbach, 2007). A transition towards a circular economy is a change in the system and has different challenges and barriers considering these developments (Pomponi & Moncaster, 2017).

The transition towards a circular economy is a difficult task since public parties are risk avoiding and the built environment is considered as conservative and non-innovative (Eversdijk & Korsten, 2015; Bygballe & Ingemansson, 2014). Andrew and de Boer (2012) state that in transition to a new economy or green growth, the success depends on the ability of policymakers to build effective partnerships with private parties. They should take an active role in regulating the project and contribute to the costs of a project in the first stages. The contract itself between public and private parties is therefore not a goal anymore (Eversdijk & Korsten, 2015). The relationship between public and private parties needs to shift

in transition (Loorbach, 2007). Transition should break with the traditional way of planning and break with implementing a predefined solution. It seems that a critical view is required regarding current ways of executing public goods in order to stimulate this transition of circular economy. Public parties have a relative big market share and can accelerate the transition by purchasing innovative products and services (OECD, 2011).

Circular economy can be placed in the perspective of a transition. Public parties can influence the market by purchasing innovative products and a need to build effective partnerships between public and private parties is addressed. The question that arises is how public-private partnerships can stimulate the transition of circular economy in urban areas.

## 1.2 PROBLEM DEFINITION

The introduction illustrates the importance of accelerating the transition to a circular economy. Public parties have a relative big market share and can accelerate the transition by purchasing goods which contribute to the transition. Traditional forms and concession forms where risks and responsibilities are divided, are nowadays most commonly used. These forms seem not always suitable in order to stimulate a transition. Transitions processes are characterised as unexpected, require a shared perspective between participants, and should facilitate public-private collaboration. The public-private alliance is a form where responsibilities and risks are shared. The basis of the public-private alliance focuses on collaboration between public and private organisations. This form should be suitable to stimulate the transition towards a circular economy. There is little experience on operational level of transition management. Thereby, there is little experience with the public-private alliance as used form. More insight in how public-private alliances can stimulate the transition towards a circular economy is relevant.

## 1.3 RESEARCH QUESTIONS

The problem definition shows a relevance to gain insight in how public-private partnerships can stimulate the transition to a circular economy. Therefore, the following main question is answered in this research:

*How can public-private partnerships stimulate the transition towards a circular economy?*

To gain an overview of the context in which this research is conducted, a theoretical framework is developed. The concept of circular economy has been clarified. In addition, how circular economy can be considered in a broader context of transition. Thereby, what is the role of public-private partnerships in transition processes. The public-private alliance should be the most suitable form to stimulate the transition towards a circular economy. The following sub-questions are answered to structure the theoretical framework:

1. What is circular economy?
2. What is circular economy in the perspective of transition?
3. What is the role of public-private partnerships in transition processes?
4. What characteristics do public-private alliances have as form of public-private partnerships?

By means of empirical cases, the public-private alliance in transition processes to circular economy is evaluated by the case study method. This method has been used to show how the public-private alliance model is used in two specific environments in the transition towards a circular economy. The following sub-question will be answered:

5. How can, based on findings of empirical cases, the use of public-private alliances stimulate the transition towards a circular economy?
6. How can, based on findings of empirical cases, the use of public-private alliances be optimised in transition processes?

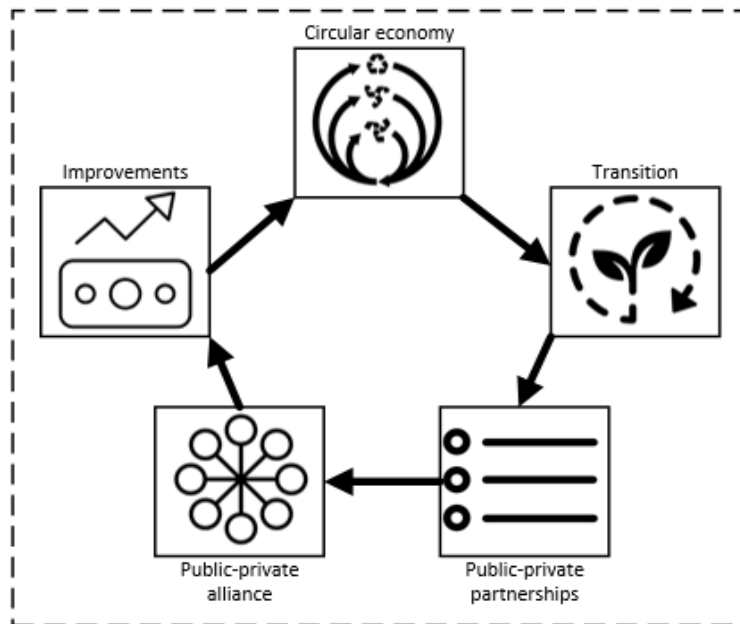
#### 1.4 RESEARCH DESIGN

The research design is shown in figure 1.1. This research starts with a theoretical framework. This framework is developed by answering the first four research questions. It shows relevance between concepts used in this research. First, the concept of circular economy is discussed. The origin, definition and its applicability is discussed. The concept of circular economy is concluded by a an outline of the challenges and barriers in different areas. Next in the theoretical framework, the concept of circular economy is placed in the perspective of a transition. Transition describes the development of sustainable growth of our society. More project specific, the characteristics of transition processes are described. The third part of the framework explores public-private partnerships in transition processes. Three different directions are derived from this section: 1) traditional, 2) alliance, and 3) concession direction. The public-private alliance should be the most suitable direction considering transition processes. In the last chapter of the theoretical framework, the public-private alliance is outlined. What is the consideration of this form, advantages and disadvantages, and what are experiences from earlier used the public-private alliances?

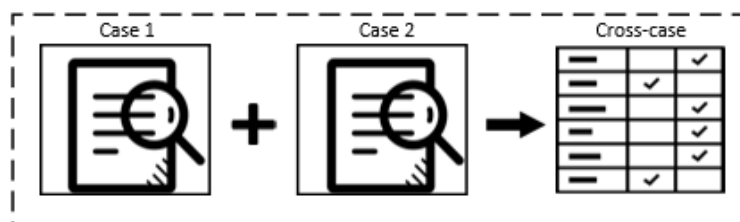
The theoretical framework lead to a causal relationship where improvements of the public-private alliance should stimulate the transition processes towards circular economy. Since there is little experience in the area of public-private alliances towards the transition towards a circular economy, the case study method is used to gain insight in empirical cases. Two cases are explored in which the public-private alliance is used to stimulate the transition towards a circular economy. In these cases pre-conditions, characteristics and lessons learned are derived. These derived factors from the empirical cases are processed by a cross-case analysis. The cross-case analysis lead to relevant and generalised factors.

The last part of the conclusion, discussion, and recommendations merge the theoretical framework and the results from the empirical cases. Conclusions are drawn in order to answer the research questions. The discussion place the research in perspective. The recommendations lead to an improved of alliance model for Twynstra Gudde, and recommendations regarding follow-up research.

## Theoretical framework



## Empirical results &amp; cross-case analysis



## Conclusion &amp; Discussion &amp; Reflection

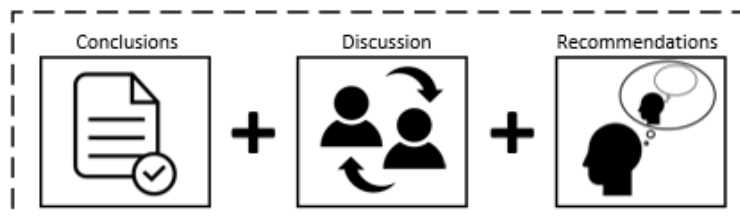


Figure 1.1 Research Design (Own illustration, 2018)

## II. THEORETICAL FRAMEWORK



## 2. CIRCULAR ECONOMY

This chapter will answer the sub-question: “*What is circular economy?*”. First the origin and concept of circular economy (CE) is described. Next, how the concept is applicable in urban areas. The way it can be applied in urban areas lead to challenges and barriers in several domains. These challenges and barriers are important for this research regarding stimulating the transition from a linear economy to a circular economy.

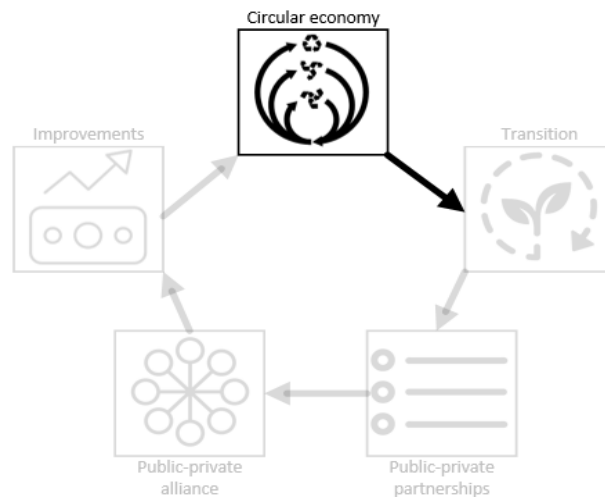


Figure 2.1 Theoretical framework - Circular economy (own illustration, 2018)

### 2.1 HISTORY OF THE CONCEPT CIRCULAR ECONOMY

The concept of ‘circular economy’ is not a new concept. There is not a single point in history where the concept finds its origin (Winans, Kendall & Deng, 2017). Since 1950 many authors, scientists, and pioneers, invented ideas and concepts towards the disconnection between the way humanity live and the environment. In this section an overview is displayed of contributors to the concept of CE.

One of them is Boulding (1966). He describes the concept of a circular economy by focusing on material flows. The open system has to be changed to a closed system, where there is no need for additional materials. However, he concluded that a closed system is very rare in human experience. Another contributor to the concept, is the Club of Rome with their publication of ‘The limits to growth’ (Meadows et al., 1972). It was one of the first books which criticised the continuous growth of the human ecological footprint. It has still value in today’s discussions about the transition to green growth. The greatest challenges they addressed, is the scarcity of resources and increasing waste which affect eco-systems.

A more recent contribution to the concept of CE is biomimicry, which is about imitating models and systems out of nature to solve problems. Copy models and systems out of nature can lead to sustainable and energy-efficient solutions in our society (Benyus, 1997). McDonough and Braungart (2002) came up with the concept of cradle to cradle. It replaces the cradle to grave principle what can be compared to the open system as described by the Ellen MacArthur Foundation (2015). Cradle to cradle is about the nature cycle in which the waste of a circle is the food for another circle. These processes are categorised in two parts: technical and biological. Cradle-to-cradle is based on the principle cradle-to-

grave, where products and materials are produced to be considered as waste at the end of the life-cycle. The performance economy of Walter Stahel (2010) is focusing on the economic benefits that are created by closing loops. A new economy of closing loops instead of an open loop can create jobs, new economic business models and leads to waste prevention. It is closely related to CE and Stahel is nowadays still working together with the Ellen MacArthur Foundation. One of the latest related concepts is the blue-economy invented by Gunter Pauli (2010), who is a member of the Club of Rome. The basic idea of blue economy consists of two principles: the use of techniques and sources which are available in close proximity, and closing the loop to prevent material and energy waste. Pauli (2010) assumes that green solutions are not always striving for full sustainability. One of the principles of blue economy is that striving for a more sustainable planet does have a lot of economic opportunities. Out of these different concepts, ideas and visions emerged the concept of CE. Nowadays, CE gained a lot of attention by the Ellen MacArthur Foundation which is founded in 2010 as independent charity to outline the economic opportunities of this concept (Ellen MacArthur Foundation, 2015).

## 2.2 DEFINITION OF CIRCULAR ECONOMY

The transition to a new economy or green growth is a complex road. CE has to contribute to this new economy and offers a solution towards efficiency in usage of materials (Rijksoverheid, 2016). As mentioned in the previous section, the concept gained a lot of attention since the establishment of the Ellen MacArthur Foundation in 2010. The definition of CE is described by several authors.

Ellen MacArthur Foundation (2015)	European Commission (2014)	Aldersgate group (2012)
<i>"A circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles."</i>	<i>"A circular economy preserves the value added in products for as long as possible and virtually eliminates waste. It retains the resources within the economy when a product has reached the end of its life, so that they remain in productive use and create further value."</i>	<i>"A circular economy is a generic term for an industrial economy that, by design or intention, is restorative and eliminates waste. Material flows are of two types; biological nutrients, designed to re-enter the biosphere safely, and technical nutrients (non-biological materials), which are designed to circulate at high quality, with their economic value preserved or enhanced."</i>

Figure 2.2 Definitions of circular economy (Own illustration, based on Ellen MacArthur Foundation (2015), European Commission (2014) and Aldersgate group (2012))

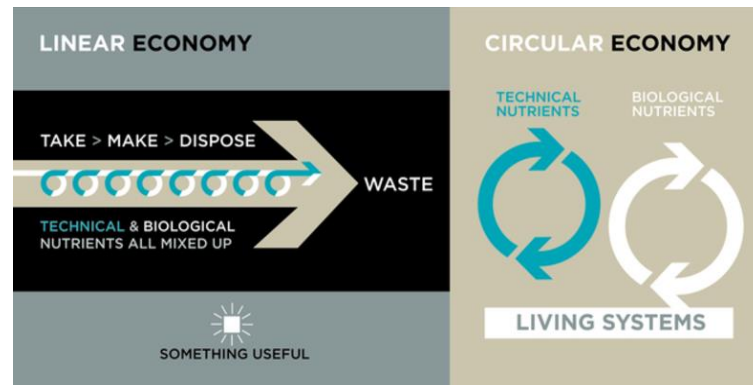


Figure 2.3 Conceptual model of linear economy and circular economy  
(Webster, 2015)

A circular economy strives for a restorative and regenerative system. Since the industrial revolution, the economy is dominated by a take-waste-dispose model or the linear model (Ellen MacArthur Foundation, 2015). McDonough and Braungart (2002) mention the cradle-to-grave economy as linear economy. During the last century, technological development has led to enormous economic growth. Countries like China, Brazil and India are rapidly growing and will be sooner or later equal in welfare as western countries. From then, the decoupling of natural resource and environmental impacts are growing from economic growth (UNEP, 2011). When there is economic growth and the human well-being is increasing, the resource usage increases and the environmental impact is higher. Therefore, a transition from a linear economy towards a circular economy seems necessary. In figure 2.3, a simplified image is shown of the linear economy and a circular economy. The linear economy has waste as outcome. A circular economy aims to close the loop of technical nutrients and biological nutrients. A CE strives for closing the loop instead of the linear system. The definitions shown in table 1, focus on how to keep products, elements and materials within the cycle. The concept of CE has a clear focus on the value of materials over the life-cycle time. A business case behind sustainability is important as well.

## 2.3 PRINCIPLES OF CIRCULAR ECONOMY

The principles of CE are displayed in figure 2.4 following the Ellen MacArthur Foundation (2013). There is a distinction in biological (green) and the technical (blue) cycles. Biological nutrients are made for safe disposal in the environment. Technical nutrients need to be recycled or are part of one of the cycles as shown in figure 2.4 (McDonough & Braungart, 2002). In the biological cycle resources are regenerated while resources in the technical cycle are recovered. For instance, considering the technical cycles, it is preferred to use the smallest cycle. In figure 2.4, the smallest cycle is maintenance. If a product, component or material is not fit for maintenance, the next cycle is considered. In this case the product, component or material, is considered for reuse or redistribute. In the end it can be possible that recycling is the only option. CE is based on five key principles following Ellen MacArthur Foundation (2013) and figure 2.4:

1. **Design out waste:** waste does not exist when the biological and technical components (or 'nutrients') of a product are designed by intention to fit within a biological or technical materials cycle, designed for disassembly and refurbishment.

2. **Build resilience through diversity**; modularity, versatility, and adaptivity are prized features that need to be prioritised in an uncertain and fast-evolving world.
3. **Rely on energy from renewable sources**; systems should ultimately aim to run on renewable sources.
4. **Think in 'systems'**; the ability to understand how parts influence one another within a whole, and the relationship of the whole to the parts, is crucial.
5. **Waste is food**; On the biological nutrient side, the ability to reintroduce products and materials back into the biosphere through non-toxic, restorative loops is at the heart of the idea.

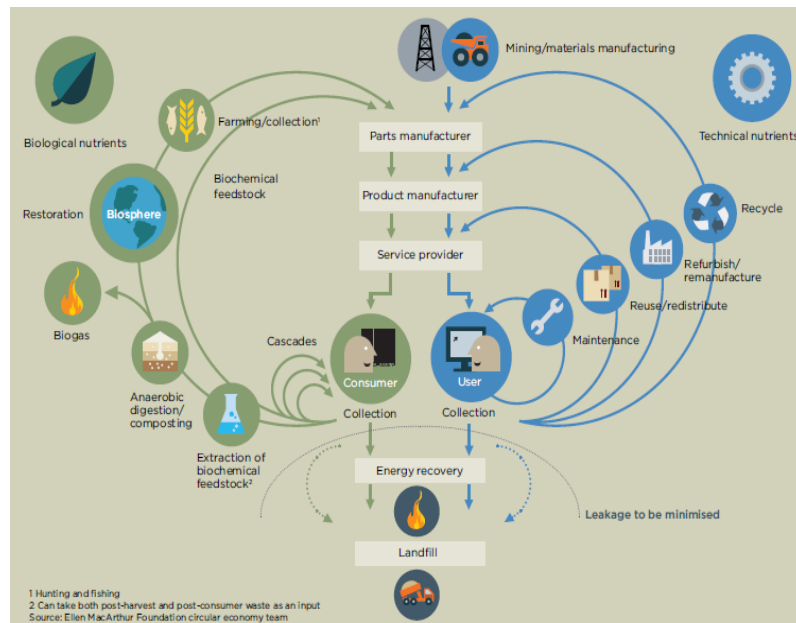


Figure 2.4 Model for circular economy with closing cycles following Ellen MacArthur Foundation (2013)

## 2.4 CIRCULAR ECONOMY IN URBAN AREAS

To explain circularity in urban areas, the Ellen MacArthur Foundation (2016) uses the ReSOLVE framework. Also Prendeville et al. (2017) use this framework towards the transition of CE of cities. The framework consists of six different concepts about applying circularity (Ellen MacArthur Foundation, 2016; Prendeville, 2017). These six different concepts of the ReSOLVE framework are useful for businesses. The framework can be applied on urban areas since it has a broad scope. Urban areas are considered as real estate, infrastructure and its providing energy network.

Concept	Application urban areas
Regenerate	Regenerate in urban areas is about the use of renewable energy like solar energy, hydrogen energy and wind energy. The concept of regenerate includes land restoration by using brownfield sites. Regenerate can be seen as safeguarding, restoring and increasing resilience of ecosystems.
Share	The concept of sharing is more practical. Think of parking sharing and shared infrastructure areas but also office-sharing and co-housing. Projects in urban areas have to maximise the use of shared assets and minimise the use of assets only used for that specific project.

Optimise	Optimise is about optimising the whole logistic process, extending the use period of products and materials and decreasing resource usage. Specific for urban areas, it includes a decrease of transport of materials, smart urban planning and the use of prefabrication to optimise the building process.
Loop	The loop is about closing the loop for materials. In the ideal world, there is no need for adding raw materials or external energy during the lifetime of a building. Also the concept of loop is about the multi functionalities of a building and the flexibility of the buildings.
Virtualise	Virtualising leads to a reduced need for physical products. Virtualising processes in a BIM environment and smart appliances in building are covered by virtualising in urban areas. Also using possibilities of virtualising the design of buildings to show this to end-users is a way of virtualising in urban areas.
Exchange	The exchange is described by selecting wisely better-performing materials, selecting new technologies like 3-d printing and choosing new products and services by using for instance combined transport.

Figure 2.5 Concepts of circular economy relevant for urban areas (*Own illustration based on (Ellen MacArthur Foundation, 2016; Prendeville, 2017))*)

## 2.5 BARRIERS AND CHALLENGES CIRCULAR ECONOMY

The transition from a linear economy to a circular economy in urban areas is described in the previous section. This transition to CE has many challenges and domains. Pomponi & Moncaster (2017) identify six research dimensions of CE in urban areas which are important in the transition to CE: environmental, technological, economic, operational, governmental and behavioural.

### Technological

The technological dimension of CE stresses mostly the transition from a take-waste-dispose to a closed-loop of materials (Pomponi & Moncaster, 2017). In the technological domain, innovation is necessary on the following aspects: in the design of materials and their processes, the design of products and resource management (European Commission, 2014; Ritzén & Sandström, 2017). In a circular design, the focus is needed towards the materials and product but also on the processes and resource management to create the product. Obstacles in these challenges are the linear technologies that are part of the current system. There is little attention for the end-of-life phase of products and a low availability and quality of recycling materials (Kok et al., 2013).

- Closing material loops
- Design of materials and their processes
- Resource management
- Little attention of end-of-life phase

### Economic

The economic dimension of CE is about financial consequences and new business models (Pomponi & Moncaster, 2017; Kok et al., 2013). To stimulate the transition to a new economy, a change is needed in current business models considering the ownership models (Pomponi & Moncaster, 2017; European Commission 2014). The ownership of a product or materials shifts to the supplier and has financial effects. In line, the European Commission (2014) states that the innovation to a new economy contains new production models, product service models and design services. For these new business models,

new financial instruments are required (European Commission, 2014). These financial instruments are useful to measure benefits of CE and processed in new business models (Ritzén & Sandström, 2017). CE leads to reduced life-cycle costs which can be taken into account. Another aspect is that up-front costs are high in the beginning (Kok et al, 2013). The profitability can be a barrier at this moment for circular projects (Ritzén & Sandström, 2017). Additionally, stakeholders which are considered as important for the transition, act with a short-term agenda (Kok et al., 2013).

- Change ownership models
- New production models
- New financial instruments
- High up-front costs

### Operational

The operational dimension stresses the involvement of partnerships and the need for collaboration to stimulate CE (Pomponi & Moncaster, 2017). These challenges involve wider stakeholder management and network management towards the reuse of materials and sharing resources (European Commission, 2014; Pomponi & Moncaster, 2017). Towards this need for partnerships and collaboration, Andrew & de Boer (2012) stress the ability of policy makers to build effective partnerships with private parties for the transition to a new economy. A circular economy has an effect on the current supply chain. Therefore, governance issues regarding responsibilities, liabilities and ownership are nowadays experienced as barriers (Kok et al., 2013; Ritzén & Sandström, 2017). Another challenge is developing a long-term company vision to identify circular opportunities (Kok et al., 2013). An important aspect in collaboration is the exchange of information (Ritzén & Sandström, 2017; Kok et al., 2013). Sometimes information exchange is not sufficient or there are trust issues regarding the exchange of information.

- Need for partnerships and collaboration
- Trust issues regarding exchange of information
- Policy makers should build effective partnerships with private parties
- Governance issues regarding responsibilities and liabilities
- Long-term orientation organisations necessary

### Governmental

The governmental dimension is about the influence that public parties can have towards the transition on different scale levels (Pomponi & Moncaster, 2017). As mentioned earlier, the success of a transition depends on the ability of policymakers to build effective partnerships with private parties. A clear role for governmental parties is assigned (Rijksoverheid, 2016; Witjes & Lozano, 2016). Bastein et al. (2013) state that governmental parties have to act active and like an expert with the role of launching customer to take away some of the barriers. Their interest includes social issues like the environmental challenges. In that way public parties take care of private parties who take a leading role in the market towards a circular economy (Bastein et al., 2013). The European Commission (2014) underlines this by mentioning that public parties have to focus on policy instruments that support the transition. This is of importance because current legislation according competition does not stimulate collaboration between public and private (Kok et al., 2013). Current ways of executing public goods are often stimulating the linear economy. Legislation blocks in many ways new business models as well (Kok et al., 2013). However, Darko et al. (2016) mention that current green buildings legislation drive the transition in several ways.

These legislations are often linked to energy-efficiency and not to other concepts of CE. A driver can be corporate image, culture, and vision which cannot be only a driver for governmental parties, but also for private parties (Darko et al., 2017).

- Policymakers should build effective partnerships with private parties
- Governmental parties act as launching customer
- New supporting policy instruments
- Current legislation stimulates competition which is not sufficient for CE
- Current legislation often blocks new business models

### Behavioural

The behavioural dimension is considered as key to succeed in the transition. For instance, people are choosing for the reuse of wood because of the aesthetics instead of the environmental benefits. (Pomponi & Moncaster, 2017). A driver which can be assigned to the behavioural domain are peoples' knowledge, awareness, and information about the challenge of the transition (Darko et al., 2016). The European Commission (2014) mentions awareness as well in relation to dissemination, but more on company and nation level. Building on this awareness, citizens' involvement is a significant driver for the transition (European Commission, 2014). Education and training can also be a driver (Darko et al., 2017).

- Peoples knowledge, awareness and information can be a driver
- Citizen involvement is a significant driver
- Education and training can be a driver

## 2.6 CONCLUSION

The sub-question that is answered in this chapter is: *"What is circular economy?"*. A circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times. The concept distinguish technical and biological cycles. This definition of CE leads to the consideration that the transition is a change in routines and a change of the system. The transition stresses several challenges and barriers in domains such as technological, financial, operational, governmental and societal. It outlines the complexity of accelerating and stimulating the road from a linear economy to a CE. This road should be approached in a way that several domains of challenges and barriers are changed. The complexity of this transition can be placed in a broader perspective. Therefore in the next chapter, transition literature is outlined.



### 3. PERSPECTIVE OF TRANSITION

This chapter will answer the sub-question: *“What is circular economy in the perspective of transition?”* In the previous chapter, CE is framed as a change of routines and change of the current system. The transition to a circular economy stresses challenges and barriers in several domains. Therefore in this chapter, CE is considered in the perspective of a transition.

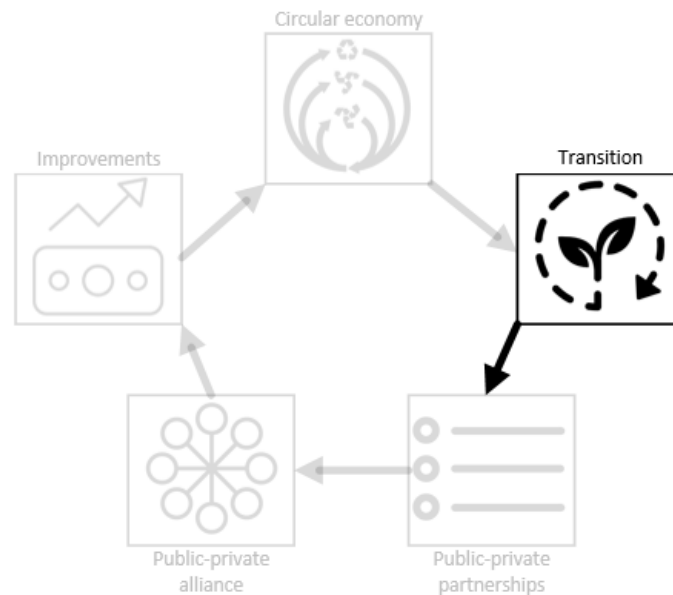


Figure 3.1 Theoretical framework – Transition (Own illustration, 2018)

There are some reasons why the current time period can be considered as a transition. Some authors draw this bigger picture of transition (Loorbach & Rotmans, 2010; Porter & Kramer, 2011; Rifkin, 2011; Frantzeskaki et al., 2012). To have a clear understanding of the field in which this research takes place, a broader scope is necessary. The concept of transition can probably contribute to CE in urban areas. To illustrate this, the arguments of transition management in the Netherlands are highlighted. The Ministry of Economic Affairs was the most enthusiastic about transition management. The fact that especially the Ministry of Economic Affairs was enthusiastic, was considered as remarkable because their main goal is to represent businesses (Kemp & Loorbach, 2005). So this Ministry linked the opportunities of sustainability to the interests of businesses. They stated three reasons why transition management is necessary (Ministerie van Economische Zaken, 2004):

- Create sustainable businesses, so the Netherlands can positioning themselves as attractive for innovative and sustainable oriented companies;
- Sustainable energy systems require system innovations and therefore cooperative long-term approaches such as transition management;
- The transition would help changing the relationship with business. It makes it more interactive and participatory, and strives to align societal goals and business goals.



### 3.1 WHY TRANSITION?

Loorbach & Rotmans (2010) describe an arising awareness for transition in several fields. One of them is in urban areas. Where urban areas sometimes only focus on the technical aspects of sustainability, transition is considered as much broader. Transition research consists of sociology, political, governance and psychology studies (Loorbach & Rotmans, 2010). Porter and Kramer (2011) describe the importance of a shared perspective in order to transition. When public parties think more in terms of value, the awareness of collaboration with private parties increase. Shared value not only focuses on sustainability, but on a new view of economic success. The results of the current economic system are price competition, little innovation and slow growth (Porter & Kramer, 2011). In the theory of shared value, several business cases are linked to social issues like environmental impact, employee health, and supplier access. Another visionary Jeremy Rifkin (2011) is describing a third industrial revolution in which current activities of CE can be placed.

### 3.2 WHAT IS TRANSITION MANAGEMENT?

Loorbach & Rotmans (2010) describe that a transition towards sustainability has to deal with uncertainties, involve different stakeholders, stimulate incremental improvements, have a long-term vision and a multi-domain view. Thereby, Ernst et al. (2016) stress that a transition in the built environment involves changes in culture, structure and practices. Transition management is a governance mode that is approached by different levels of activities (Loorbach, 2007):

- Strategic
- Tactical
- Operational

The strategic level focuses on culture in a certain societal system (Loorbach, 2007). The culture in a certain societal system can be related to the description of transition, described in the previous section (Rifkin, 2011; Porter & Kramer, 2011; Loorbach & Rotmans, 2010). Focusing on strategic level is related to a long-term time scale of 30 years (Loorbach, 2007). Geels and Kemp (2000) describe the strategic level as the landscape in which a certain transition take place. For instance, it refers to social values and political cultures. On tactical level the focus is a the so-called 'sub-system' like a sector which is in transition. It refers to regulations, routines and power-relations (Geels & Kemp, 2000). The tactical level focuses on a time-span of 5 to 15 years (Loorbach, 2007). Last, the level of operational, where certain niches contribute to the transition. The time-span is shorter, 5 years. This level refers to new technologies, new rules and legislations, new projects and new concepts or ideas.

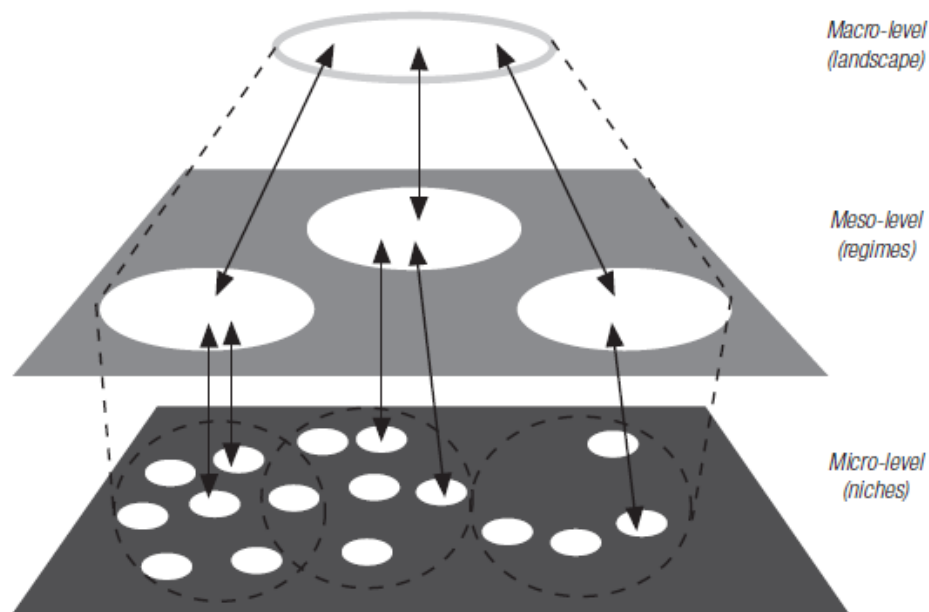


Figure 3.2 Interaction of different levels in transition (Geels & Kemp, 2000)

However, Loorbach (2007) stresses in practice no clear distinction between these levels. They overlap in activities and stakeholders. At this level, actors decide to restructure the way a system works. Concluding the three levels of transition, a need for research towards transition management on operational and tactical level is suggested by Loorbach & Rotmans (2010).

### 3.3 HOW TO MANAGE TRANSITION?

Frantzeskaki et al. (2012) mention that a change in governance is necessary which can deal with a long-term ambition, uncertainty and change. Thereby, a practical focus on the short-term is required. This is in line with Loorbach & Rotmans (2010) who clarify the need for research towards the operational and tactical approach of transition management. A transition approach does not offer a step-wise plan but offers a conceptual framework for a better understanding (Frantzeskaki et al., 2012). Governance in transition needs to deal with an unexpected process. A transition arena is framed as an area where frontrunners collaborate towards committed sustainable values. Frantzeski et al. (2012) and Loorbach (2007) describe the transition arena as a governance innovation.

Following Rotmans (2005), the goal of transition management is to induce societal innovation. Societal innovation is defined by Ernst et al. (2016) as change in culture, structure and practices. But it also includes factors, stressed by Pomponi and Moncaster (2016) like environmental, technological, economic, societal, governmental and behavioural. Through a combination of innovations in these domains, transition management experiments in projects. These ongoing experiments of innovation lead to a system innovation, and finally to transition. In figure 3.3 this process is displayed.

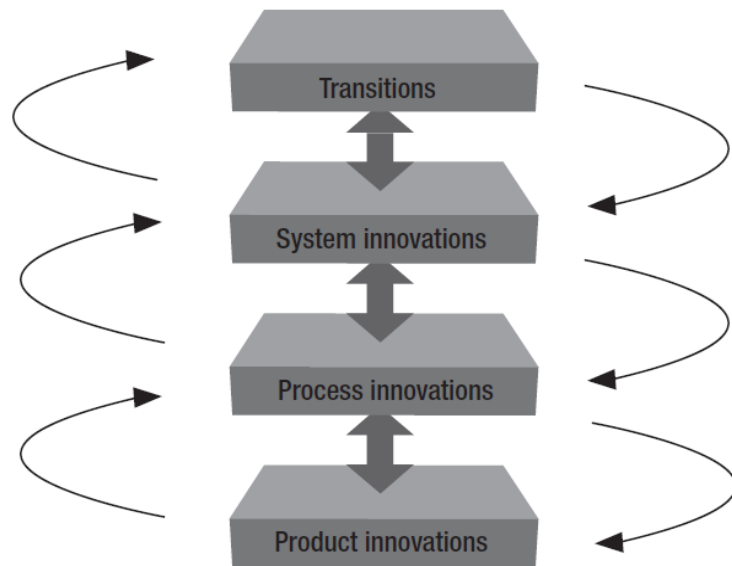


Figure 3.3 Cascades of transition management (Rotmans, 2005)

### Transition arena

Scholars stress the transition arena as tool to 'manage' transitions or as tool to outline the area in which a project, striving for transition, is acting (Loorbach, 2007; Rotmans, 2005; Frantzeskaki et al., 2012). The transition arena strives to stimulate and coordinate innovation by creating a shared problem definition and shared long-term goals. A certain transition goal is stated by several stakeholders in order to create sustainable development through new coalitions, partnerships and networks. It aims to pressure political and market movement towards long-term orientation and goals to sustainable transition (Loorbach & Rotmans, 2010). The ultimate goal is to disturb existing structures and create new business models and a redefined system (Loorbach, 2007). The transition arena focuses on all the three levels of transition.

Loorbach (2007) describes governance principles and starting points as input for new coalitions, partnerships and networks. The principles are based on strategic level, tactical level and operational level as well. These governance principles and starting points are valuable for the design of effective partnerships. Transition breaks with the traditional way of planning and implementing a predefined solution. The governance in a transition arena deals with uncertainties, a reflexive process between short-term activities and long-term goals and keeps options open. In figure 3.4 an overview is given of all the governance principles and starting points. These factors should be considered in building new coalitions, partnerships and networks.

## Transition arena

Governance principles	Starting points
Multi-actor policy making	Equal representation of all actors
Innovation nucleus	Integrated system approach and analysis
Multi-perspectivity	Small group of innovative actors
Transition and long-term (structural change)	Long-term vision as frame for short-term
Keeping options open	Multiple target images and transition paths
Experimenting and innovation	Experiment portfolio
Dealing with uncertainties	Scenarios and cyclical adaptive process design
Learning and reflexivity	Monitoring and evaluation

Figure 3.4 Characteristics transition arena  
(Own illustration based on Loorbach, 2007)

### 3.4 WHAT IS IMPORTANT IN STIMULATING TRANSITION?

In literature, transition management is described as governance mode to manage the complex road to sustainable growth (Loorbach, 2007; Ernst et al., 2016; Frantzeskaki et al., 2012; Rotmans, 2005). In this research, the focus is on operational level and partly on tactical. Since the transition arena consists of all three levels, several aspects of the governance principles and starting points are less relevant at operational level. However, the transition arena describes the environment in which new coalitions, partnerships and networks act. On operational level, these forms of collaboration act in certain 'niches' (Loorbach, 2007; Markard et al., 2012). These niches are described as a protected space in which a new concept, idea or technology is developed. It is not being subject to the pressure of the current regime (Markard et al., 2012). New partnerships towards more sustainable urban areas, can be of value to stimulate transition processes. Several requirements towards these partnerships can be derived from sustainable transition management literature:

- Transition processes break with traditional planning aimed at achieving particular outcomes in a set period of time (Loorbach, 2007);

- Transition processes should deal with a uncertain process (Loorbach, 2007; Loorbach & Rotmans, 2010; Ernst et al., 2016);
- Transition processes break with the current system and aim for a change in routines (Loorbach, 2007; Rotmans, 2005);
- Transition processes require a shared perspective between participants because of different backgrounds (Frantzeskaki et al., 2012; Loorbach, 2007);
- A long-term ambition with short-term actions is necessary in transition processes (Loorbach, 2007);
- Transition should help government to change the relationship with business. Co-aligning objectives and co-determining in projects between public and private parties should be the standard in transition (Ministerie van Economische Zaken, 2004; Loorbach, 2007)
- Transition processes should facilitate public-private cooperation (Ministerie van Economische Zaken, 2004; Loorbach, 2007).

### 3.5 CONCLUSION

The perspective of transition is outlined and the second sub-question is answered: *“What is circular economy in the perspective of transition”*. Transition literature shows relevance to consider CE in the perspective of transition. The transition to CE requires change of routines and a change of the current system. This leads to challenges and barriers in several domains for CE. Transition literature describes how to deal with this complex task. Several aspects of transition literature are important towards a circular economy. Transition processes are described by an unexpected process, a shared perspective between participants and learning and reflexivity. Also one of the characteristics of transition processes is public-private collaboration. Since a need for research towards transition management on operational and tactical level is recommended, build effective partnerships on project level seems relevant. A relevance arises for public-private partnerships towards the transition of CE. Therefore, the next chapter describes public-private partnerships.

## 4. PUBLIC-PRIVATE PARTNERSHIPS

This chapter will answer the sub-question: *“What is the role of public-private partnerships in transition processes?”* In the previous chapter CE is placed in the perspective of transition. Transition processes describe several requirements which have to be met. In the problem definition of this research is suggested that executing public goods can have a contribution towards the transition of CE. Thereby, transition literature suggest a need for research on tactical and operational level of transition. Therefore, the context of public-private partnerships (PPP) is outlined. What directions can be distinguished and which direction is the most suitable in transition processes.

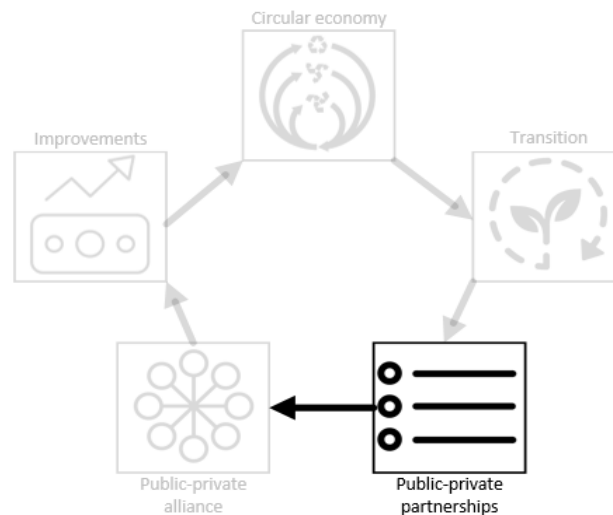


Figure 4.1 Theoretical framework - public-private partnerships

### 4.1 WHAT IS A PUBLIC-PRIVATE PARTNERSHIP?

Public-private partnerships are a phenomenon which arise out of a traditional way of working. Projects may be assumed as successful as the triangle of planning, costs and quality leads to client satisfaction (Naoum & Egbu, 2015). A traditional tender is therefore mainly based on an evaluation of costs. The client wants projects to be built as costs efficient as possible (Zhang, Luo, & He, 2015). There is a strict separation of design and construction (Pianoo, 2017). The public authority defines precisely desired outcomes and tender these specifications in the market. Several disadvantages like lack of integration, ineffective communication, increasing project complexity and changing clients' priorities and expectations led to alternative methods to execute public projects (Naoum & Egbu, 2015).

The introduction of PPP was upcoming in the second cabinet-Lubbers (1986-1989) (Eversdijk & Korsten, 2015). The drivers towards PPP in the Netherlands was a need for executing more by private parties and a decrease of employees at public authorities. The arising interest in PPP was a result of experiences in the United Kingdom. Private parties were financially included in different maintenance projects. It saved a lot of money for the government of the United Kingdom (Eversdijk & Korsten, 2015). This was the start of working on public goods, products and projects with private parties, without exactly knowing the consequences of these kind of collaborations. Since the start of the discussion of PPP, the focus was more towards infrastructural projects. Therefore the following definition focuses on infrastructural PPP's:

*"Public-private partnerships are arrangements whereby private parties participate in, or provide support for, the provision of infrastructure, and a PPP project results in a contract for a private entity to deliver public infrastructure-based services." (Grimsey & Lewis, 2004, p. 2)*

The focus of this definition is on the concept of 'arrangement'. Grimsey & Lewis (2004) define PPP as a contract with agreements focusing on the characteristics of a long-term contract, a certain risk transfer to private parties and an integration of different stages in a single contract. Stages like design, construction, financing, maintenance and operate. It seems that the definition of Edelenbos and Teisman (2008) has another focus:

*"More or less a sustainable collaboration between public and private stakeholders where public products or services are developed and risks, costs and revenues are divided."*

Notable is the concept 'collaboration' which implies another focus of the definition of public-private partnerships. Klijn and Twist (2007) describe that collaboration, lead to an added value. This added value is created by a synergy. It leads to more benefits and is not created by focusing only on costs and risks.

These two definitions stress some implications in the interpretation of public-private partnerships. Klijn and Twist (2007) refer to two principles in governance science, namely: new public management and, governance and networking. In the philosophy of new public management the government is responsible for defining policies to regulate and let the market execute policies. In this model, the government has a smaller role in public-private partnerships and therefore, the focus is on transferring risks, finance and different stages of projects to private organisations (Marques, 2017; Pianoo, 2017). The assumption is that private parties have more knowledge and can execute more efficient. The reason to choose for a PPP is more based on finance and risks related assumptions, following the principle of new public management. Another principle is the trend of governance and networking (Klijn & Twist, 2007; Marques, 2017). This principle assumes collaboration leads to more successful projects and products. Most definitely when the environment for a specific public task is complex (Naoum & Egbu, 2015). The relation between public and private parties changes from a vertical relation towards a more horizontal relation (Klijn & Twist, 2007). Therefore, the governance and networking approach is more based on innovation, complexity and coordination assumptions. These principles can be distinguished in two ways to execute public goods (Hodge & Greve, 2005): the concession model and the partnership model.

Concluding, three directions are derived of how public projects can be executed. The traditional direction is considered as third direction. Important note is that the traditional directions cannot be considered as public-private partnership, but as just a way to execute public goods. The traditional direction is included in further analysis. The following three directions are further outlined in the next section:

- Traditional
- Concession
- Partnership

## 4.2 PUBLIC-PRIVATE FORMS

In the previous section, three directions of executing public goods are outlined. In figure 4.2 the different directions of how public goods can be executed are displayed. The distinction is based on the distribution of responsibilities and risks between public and private organisations. These directions can be linked to current forms in the built environment. These three directions are outlined in more detail in this section.



Figure 4.2 Directions executing public-goods (*Own illustration based on PIANOo, 2017*)

### Traditional direction

Before PPP was introduced, projects with a public party as client, were executed in a traditional way (Klijn & van Twist, 2007). The focus in these kind of contracts are time, not exceeding budget and quality (Naoum & Egbu, 2015). The client defines exactly what the specifications are in the form of drawings and technical specifications. This is a form which integrates the design and construction phase. In this form, there is a clear client-supplier relation and the transaction costs are lower than in other forms. Often the supplier is chosen by the lowest price. It is difficult to select a supplier on other aspects than costs. The design and construction phase are often separated phases and therefore, total life cycle costs are not always considered (PIANOo, 2017). Thereby, this traditional approach cannot deal properly with increased complexity (Lenferink, Tillema, & Arts, 2013).

### Concession direction

Two directions of PPP-concessions can be distinguished: the integrated contract forms and life-cycle (Koning, et al., 2012). The difference lies in the responsibility of maintenance and operation of a public good. Shifting the responsibility of the maintenance and operation to the private party, lead to a focus of the contractor to the whole life-cycle of the public good. Major improvement in contrast to traditional forms, is the life cycle consideration which is involved in these kind of contracts (Koning, et al., 2012).

In the field of concession forms, different stages of a project are integrated. The responsibilities are shifted to the contractor. Some examples of the concession direction are:



Integrated contracts:

- Engineering & Construct (E&C)
- Design & Construct (D&C)
- Turn-key

Life-cycle contracts:

- Design, Build, Finance, Maintain (DBFM)
- Design, Build, Finance, Maintain, Operate (DBFMO)

In these kind of contracts there is still a clear client and supplier relation. As mentioned earlier, a need is aware for clear formulated project goals. There is no coproduction and only before the tender there is room for changes and consultation (Klijn & van Twist, 2007).

### Alliance direction

Alliances are linked to the partnership direction where organisational factors are the most important. Following Klijn & van Twist (2007), this is the way how public-private partnerships are intended. The decision-making is a common process between public and private parties. The contract is less relevant in this direction. The public-private alliance can often be identified by a separated entity. These forms are not commonly used and nowadays often related to area development (Deloitte, 2017). A focus of this direction is a common process of problem solving, linking different elements, connecting interests of different parties, and a certain flexibility in the scope of a project (Deloitte, 2017; Klijn & van Twist, 2007). This direction offers room for collaboration in order to strive for synergy effects.

## 4.3 PUBLIC-PRIVATE PARTNERSHIPS IN TRANSITION PROCESSES

The question that arises is what direction of executing public goods, is the most suitable in the transition processes towards a circular economy. No specific forms are considered for now, only the three directions. In case of the concession direction of PPP, it is important to consider the integrated form and the life-cycle form. Out of transition literature, section 3.4, the requirements and characteristics are summed. These requirements and characteristics are compared to the three different directions of PPP in appendix II 'Comparison of PPP directions to transition process'.

Considering the three directions, the alliance direction or partnership direction should be the most suitable in transition processes. Several reasons out of the matrix in appendix II, can be used to consider the alliance direction as most suitable. The concession direction and traditional direction need a predefined solution and do not have much flexibility after the contract is signed. An uncertain process of transition cannot deal with inflexibility. The alliance direction should facilitate this uncertain process better since it is suitable for changes and flexibility in the scope. Thereby, transition should help public parties to change the relationship with private parties and facilitate public-private cooperation. The traditional direction most definitely, but also the concession direction, do not change a relation since these directions have a clear client-supplier relation. Cooperation is not optimal in these directions. The alliance direction is based on an equal relationship and should stimulate cooperation between public and private parties.

#### 4.4 CONCLUSION

The third sub-question is answered: *“What is the role of public-private partnerships in transition processes?”* The origin of public-private partnerships lead to two different interpretations. These interpretations lead to the most common used PPP concession direction and PPP alliance direction. The traditional direction is considered as third direction. These three directions has all specific forms. In the analysis of these directions towards transition processes, the alliance model or alliance principles should be the most suitable to facilitate and stimulate a transition processes. Therefore, in the next chapter the public-private alliance is described in more detail.

## 5. PUBLIC-PRIVATE ALLIANCE

The public-private alliance (PPA) form or principles of the PPA are suitable to stimulate the transition to a circular economy. The alliance model is not often used as form of PPP (Deloitte, 2017). Public authorities tend to avoid risks and focus on the specific goals of the project. (Eversdijk & Korsten, 2015). Public authorities do have a public responsibility and therefore civil servants prefer to predefine the possible risks. In a PPA the risks can often not be predefined. The discussions of avoiding risks and focusing on goals lead to the choice for a certain form of PPP. There is not one way to characterise the alliance model, since it is different in every project (Davies, 2008). The focus of this research is on the principles of the alliance model and what the PPA distinguish from other forms. The following sub-question will be answered: *“What characteristics do public-private alliances have as form of public-private partnership?”*

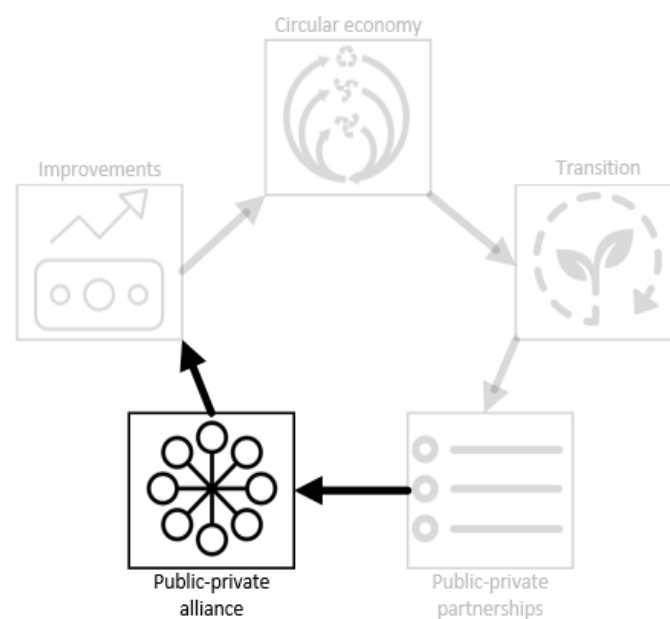


Figure 5.1 Theoretical framework - Public private alliance  
(Own illustration, 2018)

### 5.1 GENERAL DESCRIPTION

Following Ross (2003) the definition of a project alliance is: *“A project alliance is where an owner (or owners) and one or more service providers (designer, constructor, supplier, etc.) work as an integrated team to deliver a specific project under a contractual framework where their commercial interests are aligned with actual project outcome.”* One of the characteristics of the concession form is shifting as much responsibilities to private organisations. The alliance form is focusing on connection (Eversdijk & Korsten, 2008). The alliance form is in line with the previously described PPP-partnership by Klijn & van Twist (2007). The alliance form has added value when there is considered exchange of knowledge and information. It lead to common decision-making and interaction is central in collaboration (Eversdijk & Korsten, 2008). The collaboration is based on trust and equality (SBRCURnet, 2006). Generally, public and private stakeholders are involved from the definition until the realisation phase (van Woerkum, 2001). The initiative phase is characterised by initiating the problem, feasibility and create a start document. Tendency is that earlier involvement of stakeholders creates a better relationship between stakeholders and an increased local ownership among stakeholders (Campos et al., 2011). In environments with an

increased complexity and increased uncertainty, it is of interest to involve stakeholders as early as possible. Next in the definition phase, the project definition and the budget is estimated (van Woerkum, 2001). In the design phase the realisation of the project is planned. The preparation and realisation refer to the execution of the project. In the exploitation phase the product is in use and is maintained (van Woerkum, 2001). Important note is that these phases are generalised and differ in every project where the alliance model is used. In figure 5.2 is shown this generalised overview.

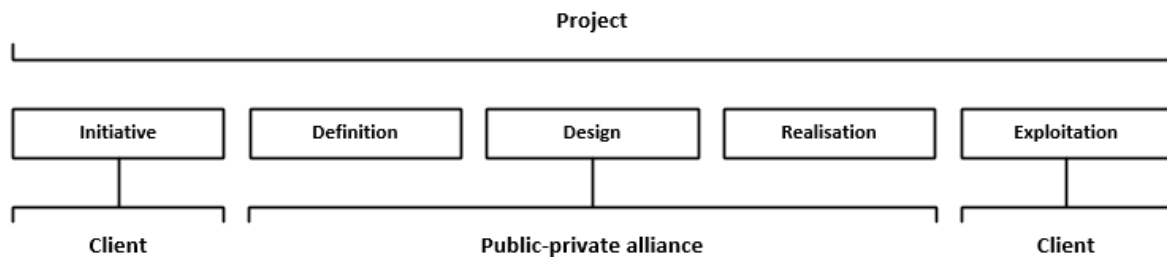


Figure 5.2 Project stages public-private alliance  
(Own illustration based on (van Woerkum, 2001))

## 5.2 CONSIDERATION ALLIANCE MODEL

The main considerations to choose for the alliance model are discussed. Thereby, why this consideration is relevant for transition processes towards a circular economy. The considerations of the PPA focus within a several conditions. Two main conditions are highlighted by means of figure 5.3 and 5.4. First, the way circumstances of the project can be predicted is a condition. A project with an unexpected process is suitable for a collaborative strategy. When the project has a fixed scope and can be fully pre-defined, a more traditional strategy is preferred. Second condition is the size of the project. A minimum investments is required since private parties should be able to pay for organisational costs. Thereby, above a certain price, it will not lead to a higher profit or higher value for public organisations. Besides these two discussed reasons, there are other reasons to choose for a PPA. These can be find in complexity in the areas of scope, time, technique or environment (Evaluation report OV-SAAL, 2015). Another condition can be the necessity of expertise of client and supplier. Lastly, when the client cannot define the project for 100% after selecting the supplier(s) (Evaluation report OV-SAAL, 2015).

One of the main characteristics of transition processes towards a circular economy is an unexpected process (Rotmans, 2005). Transition is characterised by processes which need to be defined during the project. Therefore, the consideration of the way it is an unexpected process, is in line with a collaborative approach, and thus for the PPA. The created value and required profits are important to consider in the PPA. Since CE strives for a sustainable urban areas, the created value can probably be found somewhere between the required and desired value for public organisations. The required and desired profit for private organisation(s) is of importance considering the size of the project. In the transition towards a circular economy, it should be feasible to define projects which are extensive enough to be feasible for private organisations. Other reasons mentioned by earlier project are scope, time, technique and environment. These aspects are complex in transition processes. Transition processes focus on particular outcomes instead of a predefined solution (Loorbach, 2007). That makes scope, time, technique and environment much more complex. Therefore, the consideration of the PPA is relevant in transition projects.

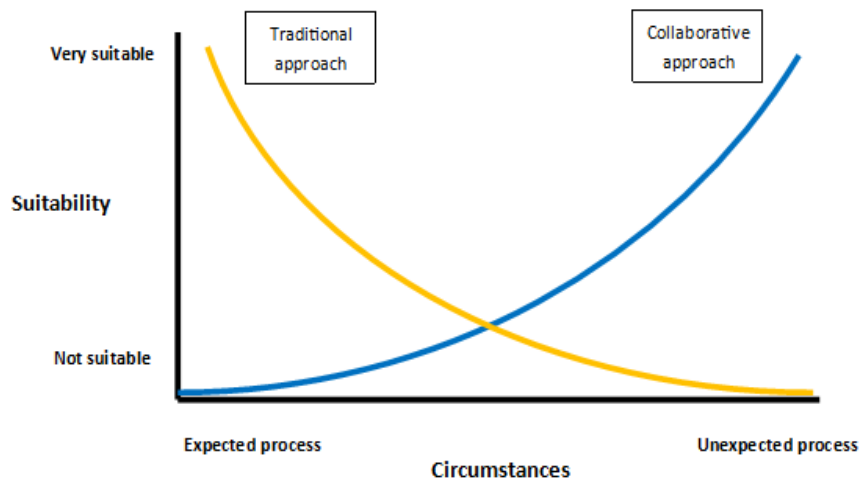


Figure 5.3 Suitability alliance form based on circumstances  
(Own illustration based on Ross (2003))

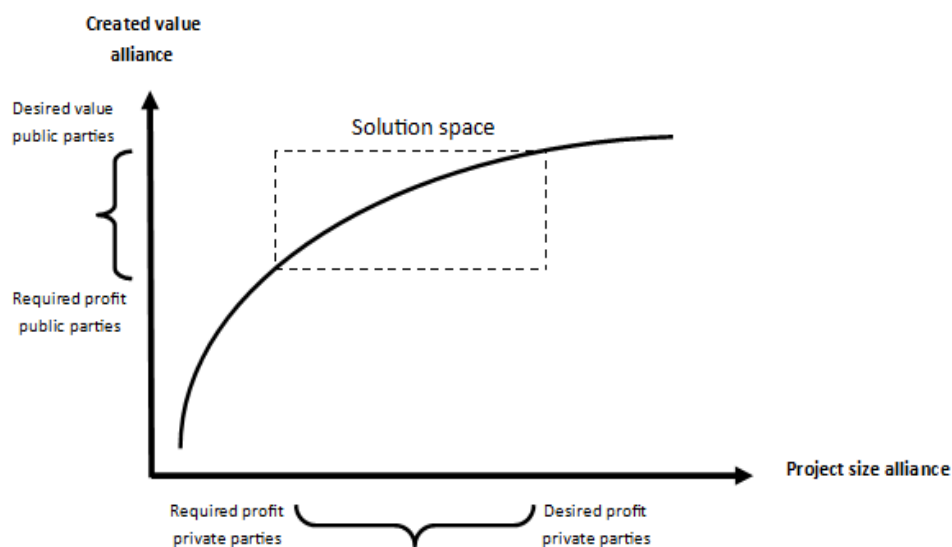


Figure 5.4 Suitability alliance form based on size of project  
(Own illustration based on (Koolwijk & Geraedts, 2006))

### 5.3 ORGANISATIONAL STRUCTURE

All key stakeholders are included in the alliance organisation (Lahdenperä & Karjalainen, 2009). At least the owner (public party), contractor and designer (private parties). Dependent on how big the project is, more stakeholders are involved in the organisation. A general overview of the organisation of a PPA is displayed in figure 5.5. Only a general view is possible since the alliance organisation is project-specific and is modified considering the demand of a project. The alliance organisation can be distinguished in three different levels namely: the alliance management group (AMG), the project management group (PMG) and the project organisation (PO) (Lahdenperä & Karjalainen, 2009). The

alliance organisation can differ per project. However, the levels of strategic, tactical and operational can often be distinguished in the alliance. The *alliance management group (AMG)* includes at least one participant of each key partner. In this layer the decisions are made preferable unanimously. It happens that decisions have to be made by majority decision. Within the AMG the need for a common long-term vision is necessary on which decisions can be based. The *project management group (PMG)* is presented by managers of diverse stakeholders of the alliance. Again, at least one represent of each key partner. The PMG is responsible for managing the practical implementation and on average they discuss the project once a week. This group is chaired by a project alliance manager. This project alliance manager is also present at meeting from the AMG. The *project organisation (PO)* executes the project and each member has a clear responsibility. It is not allowed that team members have double roles on this level (Lahdenperä & Karjalainen, 2009). Otherwise responsibilities can become 'blurred'. The roles and tasks will be filled in which suit the best for the project (Ross, 2003).

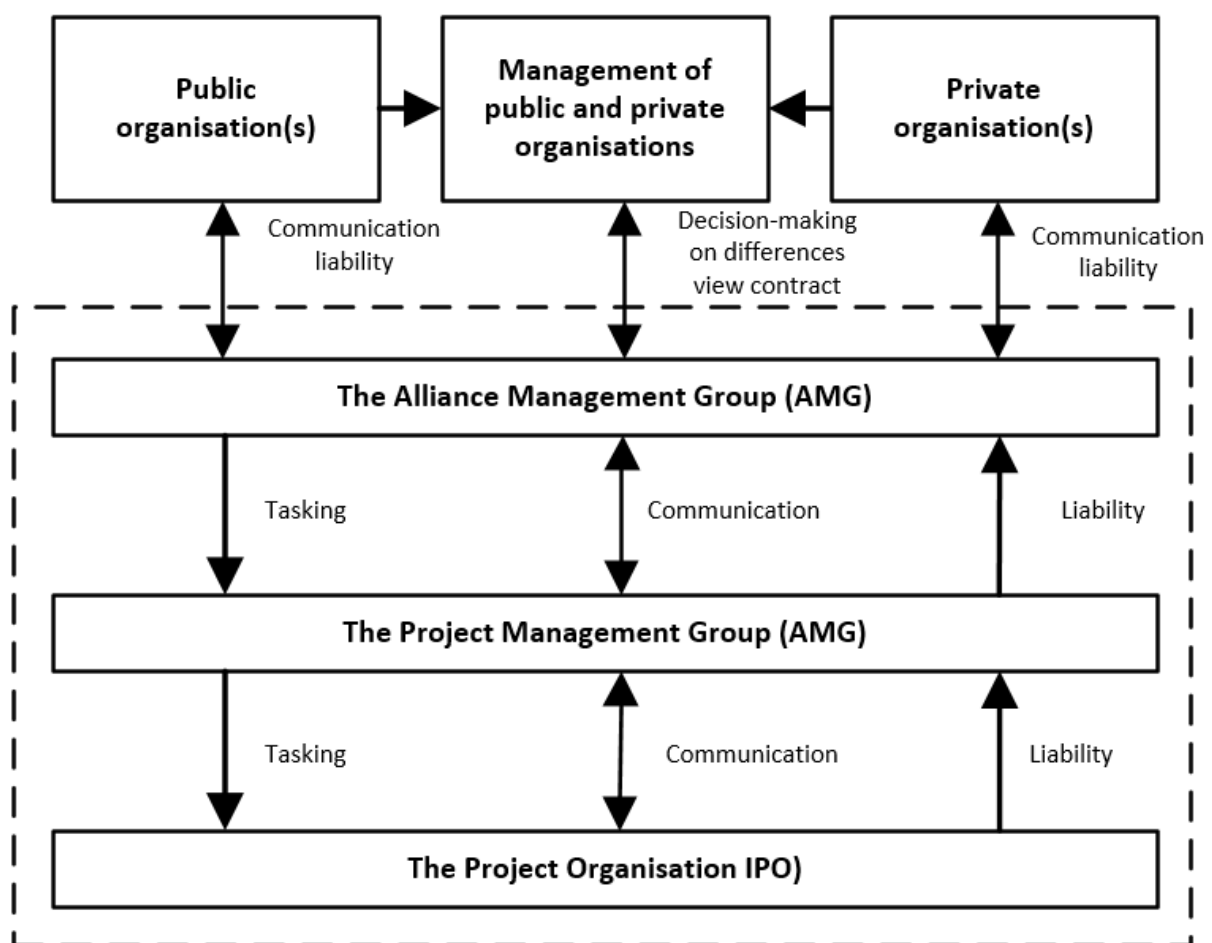


Figure 5.5 Organisation of an alliance  
(Own illustration based on Lahdenperä & Karjalainen (2009))

## 5.4 ADVANTAGES AND DISADVANTAGES

To define why a PPA model is desirable as form, the advantages and disadvantages are discussed. This is based on several sources, Ross (2003), Klijn & van Twist (2008), Department of Treasury and Finance Victoria (2010), Eversdijk & Korsten (2015), Elemans (2016) and Davies (2008). Elemans (2016) categorises the advantages and disadvantages of the PPA by organisation, collaboration and project. In figure 5.6 the different advantages and disadvantages are illustrated. Several advantages or disadvantages cover more than one category. Important note is still that the PPA is project specific. The three categories can differ in every project environment.

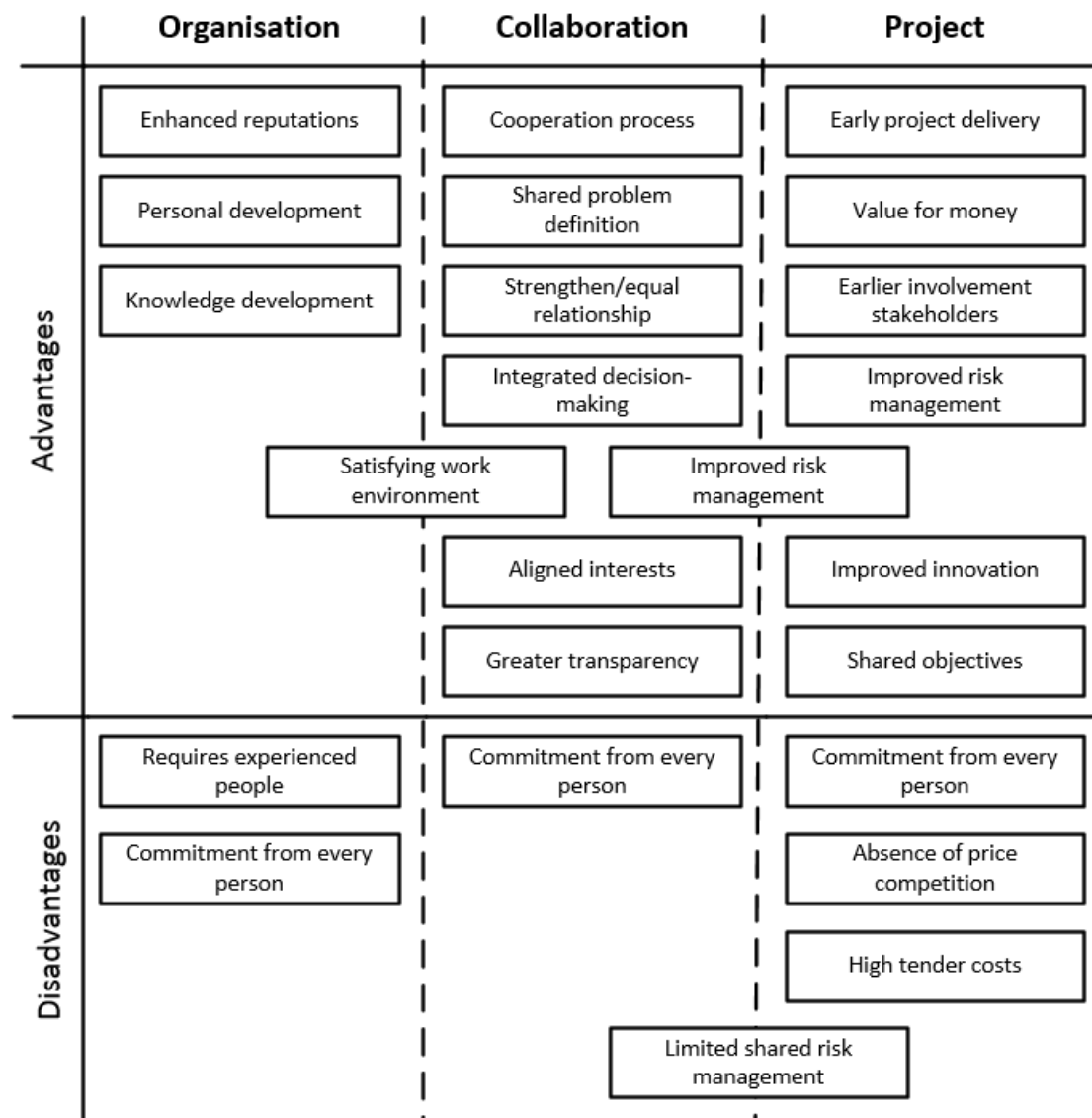


Figure 5.6 Advantages and disadvantages public-private alliance  
(own illustration based on (Ross, 2003; Klijn & van Twist, 2008; Department of Treasury and Finance Victoria, 2010; Eversdijk & Korsten, 2015; Elemans, 2016; Davies, 2008))

## 5.5 PRINCIPLES PUBLIC-PRIVATE ALLIANCE

Edelenbos and Teisman (2008) indicate five characteristics in which the PPA model can be distinguished from other PPP forms:

1. An equal and horizontal relationship between public and private organisations;
2. Low degree of emphasis on the contract and more on mutual trust;
3. Public and private parties are involved in a joint process of defining problems and solutions;
4. The scope is considered as flexible and not restricted;
5. Focus on process management instead of project management

An **equal relationship** is the outcome of the way responsibilities are shared, interests are aligned and decision-making is a jointly process. Compared to traditional forms, the relationship between public and private parties is horizontal instead of more hierarchical (Klijn & van Twist, 2007). The relationship is described by many scholars. Zou et al. (2014) describes the importance of relationship management in PPP projects. Since the involvement of different stakeholders can be complex, a certain awareness for the relationship is needed. The most critical success factors in order to aim for an sustainable relation are commitment and participation of senior executives, defining the objectives of the strategy towards an equal relation and the integration of different divisions within the project (Zou et al., 2014).

A **low degree of emphasis on the contract but mutual trust** is an outcome of sharing risk and responsibilities. In traditional contracts shift responsibilities and risks to organisations is important. Therefore, a well-defined contract is necessary (Edelenbos & Teisman, 2008). However, in the alliance model these responsibilities and risks are shared and therefore the contract is less relevant. The trust between stakeholders is more relevant. Trust can be operationalised in vulnerability, risk and expectations (Edelenbos & Klijn, 2007). Mutual trust facilitate, solidifying and enhancing cooperation within PPP forms. Uncertainty and complexity is existing in decision-making because of different perceptions and diverse interest of stakeholders. Most definitely therefore is trust a driver for cooperation instead of going only for own success (Edelenbos & Klijn, 2007).

The **process of defining problems and solutions is a jointly process**. In the traditional approach the problem definition is defined by the public authorities. In the PPA usually the public organisation(s) initiate the project and next define the problem definition with private parties. During the process sudden changes or problems arise and solutions are defined commonly (Edelenbos & Teisman, 2008). Unanimously decisions are made towards solutions for problems in the project (Davies, 2008).

The **scope is considered as flexible and not restricted**. Edelenbos & Teisman (2008) describe a process where the scope is flexible and aim to search for connections. There is a need for reflection of the scope, the scope can be redefined and need be powerful enough to expand the scope and lay connections between substantive elements within the project.

The focus is on **process management instead of project management**. Project management is based on specifying clear objectives, plan the road of these objectives and manage this planning (Edelenbos &



Teisman, 2008). The alliance form is more founded on a goal-oriented operation, development of a solid cooperation and effort to interconnect goals (Edelenbos & Teisman, 2008).

An example of the PPA is from Twynstra Gudde and shown in figure 5.7. It is based on independent process management. The process is guided in a way it does not represent a certain interest of a stakeholder. Thereby, three pillars in collaboration are important in aiming for a sufficient alliance between public and private organisations: transparency interests, transparency in social and financial business case and public-private decision-making structure.

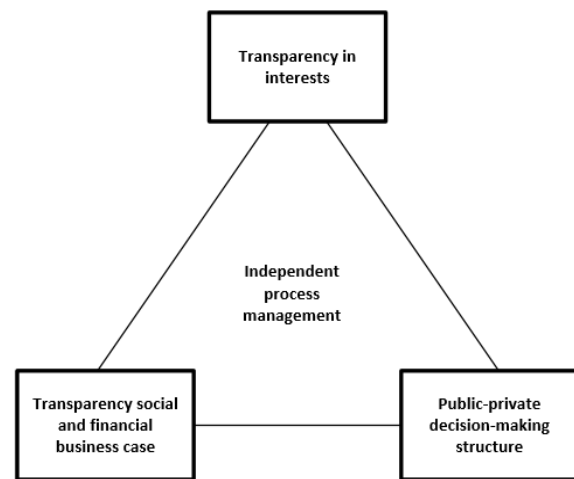


Figure 5.7 Example of public-private alliance strategy (Lastdrager, 2015)

## 5.6 ASSESSMENTS OF THE PUBLIC-PRIVATE ALLIANCE

Since this research focuses on the PPA, it is of importance to consider earlier evaluations of the PPA. There are several assessment studies towards the PPA. In this section an overview is given of the lessons learned of the PPA from two projects. A brief introduction is given of the project and the most important experiences are mentioned for the projects. The information of project A2 Holendrecht-Ouderijn (2010) and OV-SAAL (2015) is derived from evaluation reports.

### A2 Holendrecht-Oudenrijn

The goal of this project was to expand the number of highway lanes for A2 Holendrecht-Oudenrijn. The project was initiated because this part was one of the most expensive traffic jams in the Netherlands. This project was the introduction of another way of approaching collaboration. The main motive was to learn to collaborate again. The project was initiated with a covenant in 2005 and in 2010 the project was finished. After the project there is conducted an extensive evaluation which is based on interviews with all the participants of the project. The following lessons are learned from this project considering the collaboration in a PPA (Evaluation report A2 Holendrecht-Oudenrijn, 2010):

- Attitude and behaviour are essential to create an open culture where can be collaborated and experimented
- Collaboration is about developing reciprocal relations and steer on these relations. Crucial skills are focusing, communicate and connect.
- Important is to create shared view on a common goal and common interest of the project.
- Participants prefer more knowledge about the process of collaboration rather than the content of procedures.
- Understandings like trust, dare to speak, respect and transparency are important.
- There was too much focus on the contract which led to pressure on the collaboration. Contracts are focusing on procedures, collaboration is about the process between people. It is about accountability and responsibility.

- The contract may never use as excuse for no collaboration. Therefore it is necessary to form a working system, besides the responsibility structure of the contract.
- In a several used contract forms, within the alliance organisation, responsibilities be not at the right organisation. In this project specific the responsibility for managing the environment was not lying at the right organisation.
- When insights differ, milestones cannot be achieved or problems are not openly discussed, functional escalating these problems can help. Shift a problem to a higher level can solve a problem. Important is that all organisations are represented at this higher level.
- Positional behaviour (think in functions from a hierarchical basic attitude) need to transformed towards transactional behaviour (think in roles and responsibilities from an equal basis).

### OV SAAL

The goal of OV SAAL is to increase the capacity and speed of the train connection between Schiphol – Amsterdam – Almere – Lelystad (OV SAAL). The main focus of this project is to double the number of train tracks on this trajectory. The project is executed by two alliances. Several motivations were present to consider the alliance model for this task: high level of complexity, a predefined solution was not possible, a high level of time pressure, and expertise from public and private was necessary as well. The following lessons are learned from this project considering the collaboration in a PPA (Evaluation report OV SAAL, 2015):

- Plan enough time to build and give direction to the public-private alliance. Strategy, processes and take time for commonly designing this.
- Get to know each other, it's the beginning of trust. Create mutual understanding, a bigger network and a better collaboration. Celebrate and spread jointly successes.
- Consider equality as basis of the collaboration.
- An ongoing process of investing time in: interests, goals, expectations and norms and values. Organise interest sessions.
- Organise at administrative level meetings to make process agreements. Focus on the content (hard) as on process (soft) as well.
- Take care of a good balance between a careful collaboration and retain enough speed in the ongoing process of searching.
- Difficult is to assess the best distance from the mother organisations to the alliance. Be careful for too much distance: alignment and attention towards the mother organisation is an important condition for success.
- Transparency in the exchange of information and communication among involved organisations.
- Conduct directed evaluations of alliances of alliance forming.

## 5.7 CONCLUSION

Several factors are identified in order to characterise a public-private alliance model or alliance principles. Thereby, the advantages and disadvantages are summed. Lastly, the lessons learned are outlined of two projects which used the PPA as form. The PPA focuses on collaboration between public and private organisation. The improvements and experiences of the PPA, focus in both projects on the collaboration between organisations and people.

# CONCLUSION THEORETICAL FRAMEWORK

This research finds its origin in the enormous difficulties we face towards sustainable urban areas. Different aspects like infrastructure, real estate, and energy contribute to sustainable areas. The current economic model follows a 'make-take-dispose' pattern since the industrial evolution. Executing public goods or public projects in urban areas can have an impact on sustainable growth in the Netherlands since public parties have a relative big market share. They can accelerate the transition to sustainable growth.

The concept of circular economy is framed and is one of the roads to the enormous difficulties we face. It is an upcoming concept which strives for the transition from a linear economy towards a circular economy. CE in urban areas is framed as a change of routines and change of the current system. It contains of several domains in which challenges and barriers are identified. The concept of CE is placed in the perspective of transition. Transition describes the complex road towards sustainable growth. Transition literature acknowledge a need for change of the current system and change of routines in order to strive for a CE. Transition processes deal with an uncertain process, a need for a shared perspective among stakeholders and a need for public and private cooperation. Since public organisations can contribute by executing public goods, the three directions of public-private forms are discussed; traditional direction, concession direction and alliance direction. Which direction of PPP can stimulate the transition towards a circular economy and meet the requirements of transition processes? The traditional direction and concession direction are assumed as less suitable than the PPA direction. The concession direction and traditional direction need a predefined solution and does not offer much flexibility after the contract is signed. The alliance direction should facilitate this uncertain process better since it is suitable for changes and flexibility in the scope. The PPA is not identified as a single used form, but as a direction with several principles. It is based on an equal relationship where responsibilities and risks are shared, and interests are aligned. The process of defining problems and solutions is a common process. The scope of the project is considered as flexible and not restricted. The focus of the PPA is on process management instead of project management. These characteristics of the PPA can stimulate and facilitate transition processes.

The theoretical framework shows theoretically how the PPA can stimulate the transition towards a circular economy. The principles of the PPA should stimulate the transition towards a circular economy. Later in this report, case studies will elaborate how the PPA can practically stimulate the transition towards a circular economy.

## III. METHODOLOGY

## 6. METHODOLOGY

In the previous chapters, the theoretical framework is outlined. As mentioned in the previous chapter, the theoretical framework is empirically tested by two cases. Two cases which strive for the transition towards a circular economy in urban areas are explored. In this chapter the methodology of the empirical research is described. The motivation, rationale, design and selection of cases regarding the methodology are described.

### 6.1 MOTIVATION METHODOLOGY

Several methods can be used to explore a theoretical framework with an explorative purpose. This chapter starts with outlining the most suitable method to answer the research questions. This research is considered as an explorative research. Baarda and Goede (2005) describe several tools to conduct an explorative research: analysis of existing material by desk research, a survey, an experiment, observation and a case study. Desk research is not sufficient because of absence of research towards the use of the public-private alliance in transition processes. Desk research will gain not deeply enough insight to answer the research questions. A survey requires a relative high number of respondents. A survey requires specific knowledge from respondents about the PPA and the transition to CE as well. Acquire enough samples for a survey is considered as not feasible for this research. An experiment in this research is not possible as well. A public-private alliance in transition processes is not an event that can be started as experiment. Therefore, the case study method is considered as method for this research.

Before outlining the reason for the methodology and the design of the case study in this research, the approach of the case study is discussed to gain a better understanding of the research design. Following Bromley (1990) it is a systematic approach in which a certain event or set of related events are described or explained towards the phenomenon of interest. It enables to study a complex phenomenon within a certain context (Baxter & Jack, 2008). The case study should be considered when the following aspects apply (Yin, 2009): (1) the research aim to answer 'how' or 'why' questions, (2) the behaviour of involved respondents in the case study cannot be influenced, (c) the context of the research is important to cover because you want observe whether the phenomenon is relevant under study and (4) the boundaries are not clear between the phenomenon and context (Baxter & Jack, 2008). There can be distinguished several types of case studies (Yin, 2009; Swiercz, 2004):

- Explanatory cases: type of case study is used when you seek an answer to explain a theoretical causal link that are too complex to explain by survey of experimental strategies.
- Exploratory cases: this type of case study describes a phenomenon that has no clear outcome.
- Descriptive cases: this type of case study describes a phenomenon and the context in which it occurred.

Therefore, the case study method is an alternative to more traditional approaches like surveys and other quantitative approaches. There are a several types in which the case study can be distinguished and also why a case study can be relevant.

## 6.2 RATIONALE OF CASE STUDY

Several reasons can be given to choose the case study method for this research. Firstly, the case study method allows to integrate theory and practice (Zucker, 2009; Swiercz, 2004). This is an advantage for an emergent subject as the transition to CE and the use of the public-private alliance. While observing cases, it is possible to refine the theoretical framework. In line with this, the case study method gives new insights and creates new thoughts (Swiercz, 2004).

Thus, this method is useful in order to gain new knowledge about the phenomenon. The case study method does not tend to find a solution which is applicable universally (Swiercz, 2004). It is about interpreting data in an unstructured way from an ambiguous and dynamic organisational process. This research includes cases in which a transition is stimulated by using the alliance form. There can be assumed that there is not one way to organise projects towards transition. However, the case study method can conclude the description and observation of a phenomenon, to a certain intervention (Zucker, 2009). In this case what aspects in a public-private alliance model contribute in the transition to CE in urban areas.

Considering the different types of case studies, it can be concluded that this research is of exploratory purpose, since it focuses on an emergent field of not-common used public-private forms in transition projects towards a circular economy.

## 6.3 CASE STUDY DESIGN

Before describing the steps taken in the process of case studies, the **unit of analysis** is defined. In this research the unit of analysis is a project which strives for CE. In the cases the alliance model or principles of the alliance model are used in order to stimulate the transition to CE. Subunits can be identified during the study of the case by involved organisations or other individuals which represent these organisations. Next, the consideration of a **single case study versus a multiple case study** (Yin, 2003; Swiercz, 2004). The alliance model is not a common used public-private form to execute public goods (Deliotte, 2017). Most definitely towards the transition of CE it is not often used as form. Therefore, it is not sure whether a single case serves a justifiable approach towards showing empirical relevance for the theoretical framework of this research. The evidence from multiple cases is often considered as more compelling (Yin, 2009). Thereby, Zucker (2009) mentions that the multiple case study can compare cases on similar and contrasting outcomes. Considering the robustness and the validity of the research, the multiple case study approach is used in this research. Several stages can be defined in this case study design (Yin, 2009). Since this research conducts two cases, the robustness and the validity is still questionable. Therefore, in this research there is conducted a practical validation. An interview is conducted with a respondent who is involved in a similar project as the two cases. Because this project is still in the beginning phase, it cannot be used as a third case in this research. It can be used to validate several factors of the PPA in the transition to CE.

Stage 1: define and design. This stage starts with development of a theory. In the previous chapters the theoretical framework is developed and is used to examine the two cases. The two cases are chosen on the basis of the theoretical framework. Yin (2009) mentions that the initial step must consist of theory development. In this way the case study selection and how the cases can be measured are supported.

After the cases are selected, the protocol of collecting the data is defined. In the next paragraphs of this section, the cases are selected and the data collection protocol is described. The cases are selected by means of four criteria and the data collection protocol involves interview questions and desk research towards project information and characteristics of the project.

Stage 2: Prepare, collect, and analyse. In this stage the interviews will be executed for the two cases.. Zucker (2009) describes strategies to generate meaning. First to indicate noting patterns. Next, see things and their relationships more abstractly. Lastly, assemble a coherent understanding of the data. There will be build a logical chain of evidence making theoretical coherence (Zucker, 2009).

Stage 3: analyse and conclude. This stage deals with the findings of the cases overall. It aims to link to the theoretical framework to these findings and generalise conclusions. Generalising conclusions need to be done carefully since this is limited in the case study method (Zucker, 2009). However, theoretical generalisation can be considered to the domain of case study what statistical generalisation is to the traditional experiment (Yin, 1984). There are two main types of cross-case analysis: case-survey approach and case-comparison approach (Yin, 1981). The case-survey require a high number of cases and must be large enough to warrant cross-case tabulations. Therefore in this research, the case-comparison approach is more suitable. This approach is more likely to draw useful conclusions for cross-case analysis (Yin, 1981). It searches for a common explanation based on several cases. The main goal to preserve in this phase is the chain of evidence. It links relationships of the theoretical framework explicitly towards the cases and shifting between within-case analysis to cross-case analysis. It ends with overall conclusions and theoretical refinement (Yin, 1981).

## 6.4 SELECTION OF CASES

The selection criteria of the cases are important in order to conduct a valid comparison of the cases. Two case studies are selected to explore empirically the theoretical framework. The selection criteria are directly related to the theoretical framework. The first case is about a project of hydrogen in Groningen and the second case is about municipality buildings in Eindhoven. In next chapters, the two cases are outlined in detail. In short, the two cases are selected by means of four criteria. The following criteria are taken from the theoretical framework:

- The case contributes to circular economy in urban areas;
- The case is considered as a transition task;
- The case uses the public-private alliance form or principles of the public-private alliance form;
- The case is a project initiated or funded by a public authority.

The public-private alliance is rarely used. Most definitely in combination with the transition towards a circular economy. Therefore, it was not possible to select two cases in the same sector. However, both cases contribute to more sustainable urban areas. Urban areas are characterised by their real estate, infrastructure, and providing energy network. The case of Groningen contributes to an increased circular energy network and thus, the providing network of real estate and hydrogen. The case of Eindhoven contributes to an increased circular real estate and thus the real estate in urban areas. A third case is used to validate the results regarding the derived factors from two cases of the PPA in transition processes. One interview is conducted to explore this third case. The case meets the same

four criteria as the two selected cases. It is about developing a circular viaduct. It contributes to an increased circular infrastructure and thus infrastructure in urban areas.

## 6.5 DATA COLLECTION

The data is collected by several sources. The most important source is the use of interviews. The interview format is shown in appendix III (English) and appendix IV (Dutch). In appendix V is a list of interviewees displayed. The aim is to discover how the principles of the PPA facilitate and stimulate the transition task to a circular economy. The structure of the interviews is based on the theoretical framework as described in part II of this research. The interview is structured in three sections. In the first section of the interview the questions are focused to the pre-conditions of the PPA. Next, the interviewer suggest several characteristics of the PPA in transition processes derived from literature. The interviewees answer in what way they experienced these characteristics. In the last part of the interview, the interviewees are asked for lessons learned of the PPA in transition processes to CE.

Project documentation and articles derived from the internet, are used to outline the context of the project. The theoretical framework is used to compare the outcomes of the cases to the literature.

- Interviews
- Project documentation
- Articles, news and other information from internet

The sources are used to derive information about the cases that are structured in the next chapters. The documentation of the cases is structured in the following way. First, the cases are introduced. Why the project is initiated, the contribution it has in the transition towards a circular economy, and background information. The alliance organisation is described and project specifications. Next, the results of the interviews are processed and described by the three mentioned parts of PPA in transition processes: pre-conditions, characteristics and lessons learned.



## IV. EMPIRICAL RESEARCH

## 7. HYDROGEN IN GRONINGEN – CIRCULAR ENERGY NETWORK

In this chapter, the case of hydrogen in Groningen is explored. The background of the case is outlined. This consists of an introduction of the project, the stakeholders, the alliance organisation, project specifications and the project planning. Next, the empirical results are discussed which were derived from interviews with respondents who were involved in the project. The interviews are transcribed and coded. In this way factors are derived of the public-private alliance in transition processes. First in the empirical results is outlined what the pre-conditions (a) are in the choice of the public-private alliance in transition processes as used form. Next, what characteristics (b) of the PPA in transition processes were experienced by the respondents. Last, results are outlined of lessons learned (c) which were mentioned by respondents.

### 7.1 INTRODUCTION



Figure 8.1 Involved stakeholders of the project  
Hydrogen in Groningen (Ovpro, 2017)



Figure 8.2 The first car on hydrogen in Groningen as  
effect of the project (GIC, 2017)

### Background

Stimulating hydrogen as energy source is one of the roads towards a circular economy in urban areas. The project aims to stimulate the economy for hydrogen in the province of Groningen. In this project, stakeholders address the important role of launching customer of public parties in the transition towards a circular economy. Scaling-up the production of hydrogen and increased use of hydrogen leads in the end to a price decreasing effect. An introduction of hydrogen should be stimulated to reach for price decreasing effects. The current system of energy is often based on fossil fuels and effects climate in a negative way. The current system of energy use is considered as linear economy and hydrogen is one of the roads towards a circular economy.

To stimulate the economy for hydrogen in Groningen, the province of Groningen developed in collaboration with private parties and knowledge institutions a roadmap. Groningen is positioned favourable to have a contribution to deliver green energy and green hydrogen. However, to realise this, there is a need for a radical change in the current system (van Wijk, 2017). It requires another way of thinking and approach.

### The project

One of the steps in the roadmap of Groningen towards a circular energy network, is zero emission in public transport. This project aims to introduce two buses on hydrogen in public transport. The involved stakeholders approach this project as stimulant regarding other activities that are in line towards a circular energy network. The province of Groningen, Qbuzz, AkzoNobel, Groningen Seaports, PitPoint and OV-bureau Groningen Drenthe work together. They use room of an existing contract between OV-bureau Groningen Assen and Qbuzz of buses in public transport in the region of Groningen and Drenthe. Qbuzz won the contract by a tender in 2009 of public transport for regional public transport in the region Groningen and Drenthe plus city transport in the city Groningen. The project of two hydrogen buses started in 2014. The goal of the project is therefore formulated as follow: Test two market scalable hydrogen buses in the regular public transport services, with the use of sustainable produced hydrogen, to stimulate and accelerate the regional economy of Groningen.

## 7.2 STAKEHOLDERS

### Ministry of Infrastructure and Environment (public)

The ministry of Infrastructure and Environment aims for liveability and accessibility, with a smooth flow in a well-designed, clean and safe environment in the Netherlands. For this project they granted subsidy for €1.650.000. They do not participate in the project but are considered as an important stakeholder since they granted subsidy for the project.

### OV-bureau Groningen Drenthe (semi-public)

The OV-bureau organises the public transport of buses, on the behalf of the province of Groningen, province of Drenthe and the municipality of Groningen. They take care of the implementation of the two buses in the current contract with Qbuzz. The OV bureau takes care of guiding, monitoring and evaluating the project and reporting to the province of Groningen and the government about the project. They take care of the choice of the hydrogen buses in consultation with Qbuzz. They want to reduce the emission of public transport.

### Qbuzz (private)

Qbuzz is a transport company owns the concession with OV bureau Groningen Drenthe in which this project takes place. They position themselves as an innovative transport company and are flexible towards the needs of their clients. In this project Qbuzz is responsible for the availability of employees and materials. They take care of the choice of the hydrogen buses in consultation with OV bureau Groningen Assen. Their contract with OV-bureau in Groningen and Drenthe expires in 2019.

### Province of Groningen (public)

The task of the province of Groningen is to develop policies, provide subsidies and grant permits. They are the switch between government and municipalities. They work together with the province of Drenthe and the municipality Groningen, participant in the common service of public transport of OV bureau Groningen Drenthe. Therefore, they are involved in this project to guide, monitor and evaluate.

### AkzoNobel (private)

AkzoNobel is one of the biggest industrial concerns in the world. They produce paint, coatings and specialist chemicals. They try to position themselves as pioneers in innovative and sustainable products in their work field. In this project, AkzoNobel take care of the production of hydrogen. AkzoNobel is also responsible for acquiring a project partner(s) which process the hydrogen to suitable pressure and take care of continuous availability of hydrogen for the buses.

### Groningen Seaports (private)

Groningen Seaports is the maintainer and commercial operator of the port of Delfzijl and Eemshaven and adjacent industrial sites. They take care of the development of the plastic pipeline from the industrial site of AkzoNobel to the hydrogen tank station of PitPoint. Groningen Seaport owns the area where the pipeline and the tank station are located.

### PitPoint (private)

PitPoint is developer of green fuel tank points. They facilitate electric charging points and start with the construction of hydrogen fuel stations. In this project, PitPoint is responsible for realising the hydrogen fuel station at Chemiepark Delfzijl. After finishing the project, PitPoint will become the owner of the tank station.

### Twynstra Gudde (private)

Twynstra Gudde is a Dutch organisation consultancy firm with a specialty in public-private partnerships. They aim to connect public and private organisations at administrative level and operational level where projects strive for transition tasks. In this project they are responsible for the independent process management in the project.

## 7.3 ALLIANCE ORGANISATION

The alliance organisation in this project is structured by a steering group, project organisation and operational execution (shown in figure 7.3). The project is initiated by the ministry of Infrastructure and Environment and the province of Groningen. These two public authorities have a public responsibility and were centrally involved in the beginning of the project. During the project they are only involved when decisions cannot be made or other conflicts arise which cannot be solved by the alliance organisations. Important aspect is the representation of all the alliance organisations in the steering group and project organisation.

### The Steering Group

The steering group is allowed to make joint decisions which affect the project budget. When decisions need to be made which contain budget extensions, stakeholders will first consult their own board to make this decision. In the steering group the directors of the organisations are represented. The steering group has four times a year, a meeting to discuss decisions to be made. The steering group consist of the following parties:

- Province of Groningen
- OV bureau Groningen Drenthe
- AkzoNobel

- Qbuzz
- PitPoint
- Groningen Seaports

### The Project Organisation

The operational tasks are prepared in the project organisation. They also prepare decision-making meetings for the steering group. In practice, the decisions are unofficially made in the project organisation since they are most up-to-date of the project. The project organisation has weekly contact about the project. The following organisations participate in the project organisation:

- Province of Groningen
- OV bureau Groningen Drenthe
- AkzoNobel
- Qbuzz
- PitPoint
- Groningen Seaports

### Operational execution

The operational execution shows the level of operational. Employees of the alliance organisations execute the operational tasks which are prepared in the project organisation.

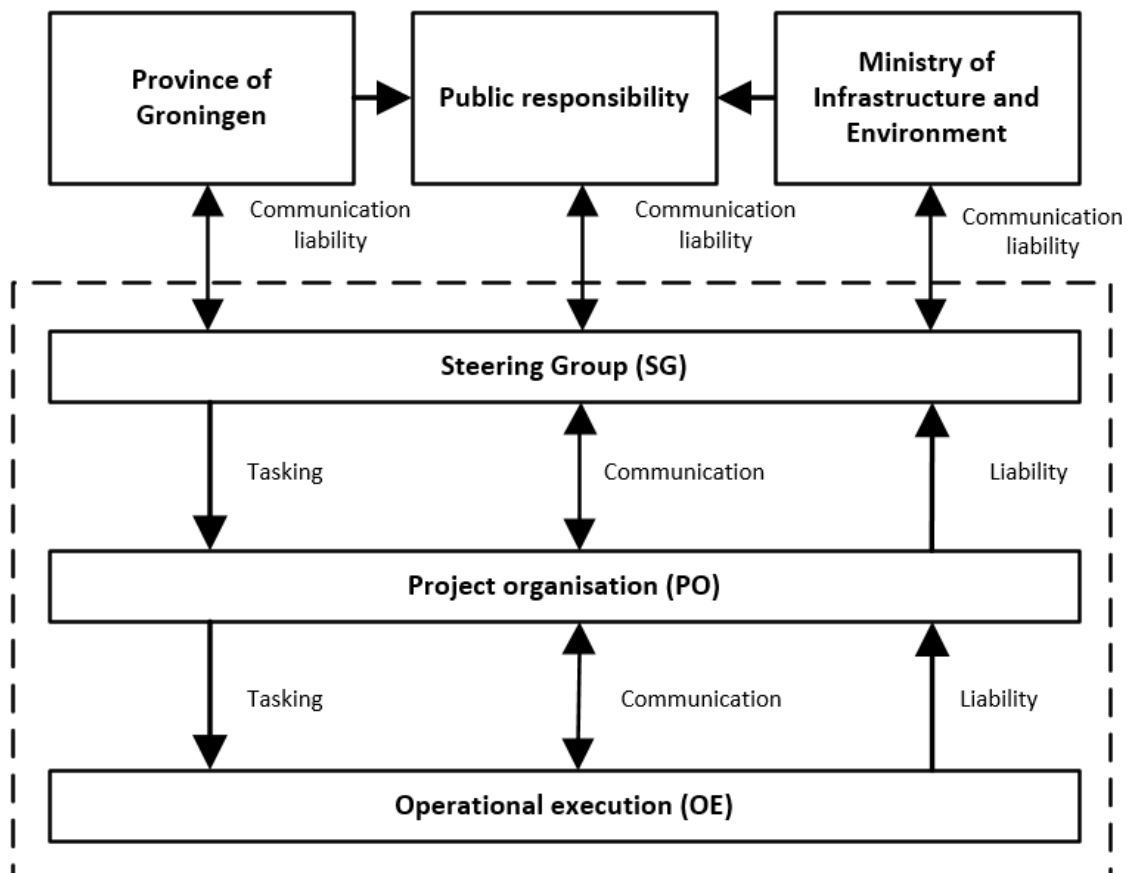


Figure 7.3 Alliance organisation - Hydrogen Groningen  
(Own illustration, 2018)

## 7.4 PROJECT SPECIFICATIONS

Project factor	Project data
Program	<ul style="list-style-type: none"> <li>• Two hydrogen buses</li> <li>• Hydrogen fuel station</li> <li>• Plastic pipeline</li> <li>• Production of hydrogen</li> </ul>
Investment value	4 million – 6 million euros

## 7.5 PROJECT PLANNING

Time period	Activities
Mid of 2014	First project proposal with four alliance organisations
2015	Two new partners + detailed project proposal
Start of 2016	Investment decision buses, fuel station, and pipeline
End of 2016	Cooperation agreement signed
End of 2017	Start exploitation of buses in public-transport
Start of 2018	Delivery of project

## 7.6 EMPIRICAL RESULTS

In this section the empirical results are discussed. As mentioned in the introduction of this chapter, the interviews are transcribed and coded. As shown in appendix III, the interview format is structured in three groups. Firstly, the respondents are asked why the public-private alliance is used. Secondly, what characteristics are experienced during the project. Lastly, what the lessons learned of the project are. The results of why the PPA in transition processes is used and the lessons learned of the PPA in transition processes, were derived by open questions. The results of characteristics were derived by partly semi-structured questions. Six characteristics were suggested by the interviewer. In the interview format is shown which six characteristics are suggested. The question is asked whether the respondent experienced the suggested characteristic during the project and how the respondent experienced it.

The interviews are transcribed in order to code the results. Coding helps by bundling the results of all the interviews of one case. When a respondent mentioned a certain factor of the PPA in transition processes, it is labelled by a code and assigned to a group of factors. The coded factors are assigned to the group of pre-conditions, characteristics or lessons learned. The interviewees do not always answer the questions strictly by the structure of the interview. For instance, a question regarding the lessons learned of the project, led sometimes to a pre-condition of the project. In this section, these answers are restructured in a way that it is assigned to the right group. The different factors with codes are shown in appendix VI.

### a) Pre-conditions

In figure 7.4 is shown which three factors interviewees mentioned, considering the motivation of the PPA in transition processes. The pre-conditions are factors which were present before the project started. The interviewees are asked why the PPA in transition processes in this project is selected as form. The different pre-conditions are displayed and which interviewees mention these pre-conditions. The factors are discussed in this section and why the factors are important to consider as motivation for this project.

Pre-conditions	OV-bureau	Twynstra Gudde	Qbuzz	PitPoint	AkzoNobel	Groningen Seaports
Unexpected process	x	x	x	x	x	x
Long-term vision beyond the project	x	x	x	x	x	x
There is no full market		x				

Figure 7.4 Pre-conditions – Hydrogen Groningen  
(Own illustration, 2018)

### Unexpected process

All the interviewees gave as a pre-condition for the PPA in transition processes, an unexpected process. The development of this project is unsecure. Upfront, aspects like planning, budget, involved organisations and risks are all unclear. There are assumptions but these can change during the process. Thereby, the innovativeness of hydrogen lead to questions. The project need to solve these questions during the project. In other public-private forms, these questions are solved upfront. In this project, several options are explored during the process of how the technique can be used. To illustrate the innovativeness of hydrogen, during, there were new discoveries in the technique of hydrogen. Some of these new discoveries were during the process implemented. In most other public-private forms these specifications are fixed from the start.

*“My assumption is that only the public-private alliance can work in this project. Upfront we did not know what to execute. We only knew the higher goals. It was unclear which other parties need to be involved, what the precise scope was, what the precise budget was and what the precise costs will be” (de Kleuver, 2018)*

### Long-term vision beyond project

All the interviewees gave as pre-condition for the PPA in transition processes, a long-term vision beyond the project. Organise a new supply chain for circular energy network of hydrogen is one of the higher goals in this project. The project of two buses on hydrogen stimulate to transition to a circular energy network in Groningen. The involved organisations need this long-term vision to participate in the project. For some organisations only participating in this project is not financially suitable. They participate because of the long-term interest of this development. The project aims to stimulate in the end the transition to CE, sustainability and employment opportunities. This project triggers other activities in the Province towards circular hydrogen.

*“This project has a positive effect on the circular hydrogen economy. Local entrepreneurs, policy makers, and others spread activities of hydrogen because of this project. The return as partner in this project is bigger than only the project itself. You are now part of the hydrogen economy” (van der Mark, 2018)*

### There is no full developed market

One interviewee gave as pre-condition for the PPA in transition processes, there is no full developed market. In a lot of projects you do not know exactly what the end result will be. Therefore, you can consider the PPA. However, in this project an additional aspect is that there is no full developed market for this development. This is the third hydrogen station in the Netherlands, and bus number 5 and 6. So you are not able to ask the market to execute this project in a traditional way, you have to work in an alliance in order to deliver a project like this. You have to discover this market with all relevant stakeholders of the future supply chain to strive for the transition towards hydrogen.

### b) Characteristics during the project

The characteristics during the project show what the respondents experienced and observed in this project. In the interview format in appendix III you can see which characteristics are suggested during the interviews. Some of the characteristics are derived by suggested characteristics in the interview. In figure 7.5 is shown which ten factors are experienced as characteristics of the PPA. The different characteristics are displayed in the table and which interviewees mention these reasons. All the factors are discussed in this section and why the factors are important to consider for this project.

Characteristics during the project	OV-bureau	Twynstra Gudde	Qbuzz	PitPoint	AkzoNobel	Groningen Seaports
Organisations with different backgrounds	x	x	x	x	x	x
Flexibility in the scope	x	x	x	x	x	
Aligned different interests in project	x	x		x	x	x
Shared knowledge development	x	x	x	x	x	
Equal role in decision-making		x	x	x	x	x
Transparency in business case	x	x	x			x
Ongoing process of problem solving	x		x	x		
Supply chain involved in the alliance				x	x	x
Risk management				x	x	

Figure 7.5 Characteristics – Hydrogen Groningen  
(Own illustration, 2018)

### Organisations with different backgrounds

All the interviewees gave as a characteristic for the PPA in transition processes: organisations with different backgrounds. In a more traditional approach only OV-bureau and Qbuzz were involved in this project since the project results in two hydrogen buses. The buses have been implemented in the



current contract between OV-bureau as client, and Qbuzz as supplier for this contract. However, the project uses a new energy as fuel. The production, infrastructure and use of hydrogen requires different knowledge. AkzoNobel has knowledge of the production of hydrogen. PitPoint and Groningen Seaports have knowledge about the infrastructure. Qbuzz has knowledge about the use of the buses and has the network of bus suppliers. In this way, the whole supply chain is represented in the organisation of the PPA in order to align the process of using hydrogen in the buses effectively. For instance, the quality of hydrogen was unclear by the bus supplier. At the start, the specifications of the hydrogen that were necessary for the buses were too high, therefore Akzonobel was unable to measure the level of hydrogen and produce the hydrogen. Since all organisations were involved in the alliance, every change in how to measure quality of hydrogen, can directly be discussed between the different organisations.

### Flexibility in the scope

Five of the interviewees gave as a characteristic of the PPA in transition processes, the flexibility in the scope. The flexibility in the scope lead to room for changes that are necessary in this project. You cannot define the specifications of the project upfront. In comparison with other contract forms, the scope is more flexible. In this project it gives room for the involved stakeholders during the process, and to make changes in the specifications.

### Aligned different interests in the project

Five of the interviewees gave as a characteristic of PPA in transition processes, aligned interests in the project. In other contract forms, the discussions are often guided by specifications which are defined at beforehand. In the alliance the interests are leading in the discussions towards specifications. The direct interests of Qbuzz and OV-bureau were clear. They want to contribute towards a more sustainable public transport system. The interests of AkzoNobel, Groningen Seaports, PitPoint, Ministerie, and the Province of Groningen are indirect. They find their interest in the further development of hydrogen. During the process, organisations search for these interests in order to translate them into project specifications.

### Shared knowledge development

Five interviewees mentioned the joint knowledge development as characteristic of the PPA in transition processes. Because the supply chain and the public authorities work closely together, they gain a lot of insights in the processes of each other. For instance, AkzoNobel spread a lot of knowledge about the quality of hydrogen. The interviewee of Qbuzz mentioned that they learn a lot about hydrogen. They did not know about different qualities in hydrogen. Thereby, the knowledge gained in the project will be used outside the project as illustrated in the quote below.

*“We did not only gain knowledge between the involved organisations in the project, but it led to sharing knowledge outside the project as well. This project is the start of next steps. Out of this project ideas arise how to develop hydrogen as circular energy further. For instance, what does it mean for upscaling? What are other applications of hydrogen than (Stoker, 2017)”*

### Equal role in decision-making

Five of the interviewees mentioned an equal role in decision-making as a characteristic of the PPA in transition processes. The steering group in the alliance is qualified to make decisions for the project. Every organisation is represented in the steering group. Some organisations do have enough mandate in the steering group to make decisions, others do not. This was difficult sometimes. Organisations should confirm decisions internally. For bigger organisations like AkzoNobel this was a process that took time. Because the decision-making was equally organised, every decision was made with the support of all organisations. Thereby, joint decision making was the most difficult when the discussion was about money.

### Transparency in the business case

Four of the interviewees gave as a characteristic of the PPA in transition processes, transparency in the business case. The involved organisations show all their financial numbers and implement these numbers in the business case. As mentioned earlier, a confidentiality statement is signed. Also in this project there was some controversy in developing a suitable business case. First, to share all your company confidential numbers. However, the transparency in the business case lead to an open business case and this way of working was feasible because of trust among involved organisations.

### Ongoing process of problem solving

Three of the interviewees gave as characteristic of the PPA in transition processes, ongoing process of problem solving. The process of problem solving was different than in other projects. During the process problems are continuously arising. The two independent process managers guide this process. These process managers have a network on administrative level and are able to link problems directly to the responsible ones. Every arising problem is approached jointly. During meetings the question is asked: who could solve this one or how else can we solve this problem? The problems are solved in favour of the project. For instance, the quality of hydrogen is already mentioned as problem. But PitPoint mentioned this problem first in the project. Then the conversations start how to solve this. In the end the supplier of Qbuzz which delivers the buses, change their requirements towards this quality.

### Supply chain involvement

Three interviewees gave as characteristic of the PPA in transition processes, supply chain involvement. The whole supply chain is involved in the project. Traditionally, there is one main contractor with several sub-contractors. The advantage of the PPA is that organisations which form the supply chain, are all involved on an equal basis. In this way the producer of hydrogen, the developer of the infrastructure, developer of the tank station and supplier of the hydrogen could align their requirements.

### Risk management

Two of the interviewees mentioned the joint knowledge development as a characteristic of the PPA in transition processes. The risks are shared amongst the involved organisations. This is an advantage because risks have less effect on your own organisation during this project. However, this also have some disadvantages. All organisations want to have insight in each other's processes. Nobody want to be surprised. This lead to a focus on the process of the tank station since this is the most tangible. At the same time, the development of the tank station is an unsecure process. At the end of the project

there was some delay in the development of the tank station. This was a surprise for the other organisations. Internally there was some controversy about this delay.

### c) Lessons learned

In figure 7.6 is shown which nine factors interviewees mentioned certain lessons learned of the PPA in transition processes. This part is derived by open questions without any suggestions by the interviewer. The different lessons learned are displayed in the figure. All the factors are discussed in this section and why the factors are important considering this project.

Lessons learned	OV-bureau	Twynstra Gudde	Qbuzz	PitPoint	AkzoNobel	Groningen Seaports
Sign a confidentially statement	x	x	x	x	x	
Be careful in selecting partners	x	x	x	x	x	
Involve independent process management	x	x	x	x	x	
Need for certain framework of project	x			x	x	
Be more transparant in the beginning				x	x	
Align specifications with impact for others				x	x	
It cost a lot of time			x			x
Consider the alliance as separate organisation			x			
A back-up plan by not available product				x		
Be aware of the focus aspects of the alliance model		x				
Give incentives instead of pricing risks						x

Figure 7.6 Lessons learned – Hydrogen Groningen  
(Own illustration, 2018)

### Sign a confidentially statement

Five of the interviewees gave as lesson learned of the PPA in transition processes, need for trust amongst involved stakeholders. Respondents state that trust lead to an improved collaboration in during the project. Participants are more open about confidential information. A confidentially statement is signed to ensure organisations do not share information of others. For instance, Qbuzz shared all their financial numbers of the exploitation of the buses. PitPoint for the infrastructure, AkzoNobel for the production, and Groningen Seaports for the pipeline. Therefore, other participants could easily search for room in the business case of the project. Trust amongst stakeholders is needed to take steps by participants, before the financial business case is closed and they have certainty about their payment.

*“Organisations are open in their information which is necessary for the success of the project. How do you notice that? In other forms there are barriers between client and supplier to be more open. In this project we work from the following basic principle. How do we work together instead of the questions like: what are the requirements?”*  
(Sandberg, 2018).

### Be careful in selecting partners

Five of the interviewees gave as lesson learned of the PPA in transition processes, be careful in selecting partners. None of the respondents mentioned that one of the organisations should not have participated in this project or another organisation should have been included which was not. There was discussion about risk sharing. Some organisations are smaller and could not take the same risks as other organisations. For instance, the developer of the tank station could not take the same risks as the producer of hydrogen. Thereby, more organisations lead to more interfaces, thus more time needed to settle. The developer of infrastructure is involved later. They are necessary for the long-term infrastructure of hydrogen but this new interface costs a lot of time. Another lessons learned about this new interface is to evaluate more often whether the current organisations are sufficient for the project and for the long-term. This is not done during this project. Besides, this project tried to open a new market and therefore, they are bounded to several organisations. Sometimes you have no choice in partner. This is difficult because trust is one of the most crucial factors, following several respondents.

### Involve independent process management

Four of the interviewees gave as lesson learned of the PPA in transition processes, an independent process management during the project. In defining interests and structure in the organisation, decision-making as an independent process is crucial. Organisations are not familiar with their new role in a transition project. They do monitor the role of organisations and whether their interest is still clear. This is mainly important upfront. Organisations are searching for their role and interest in the project. After a while, the steering group makes jointly decisions and the process managers are not necessary anymore. Only when the project escalates, the process managers are involved. Important is that the person who guides as an independent process manager, has a network on administrative level. Otherwise, the costs of this consultant or process manager are of enough value.

*"It is important to be open as organisation within the alliance organisation. Sometimes this is difficult because organisations are not familiar with this new role. Therefore, the role of independent process manager is important. He can speak on behalf of the alliance organisation and speak out when there is a problem. He can mention that we have to talk about a specific problem independently (van Berkum, 2018)."*

### Need for certain framework

Three of the interviewees mentioned as lesson learned of the PPA in transition processes, a need for a certain framework during the project. The quote above, relates to the unexpected process of the project, shows that the project is difficult to guide. However, the goal of the project stands during the whole process. The goal can be formulated as testing two hydrogen buses in public-transport and start a basis for the supply chain of hydrogen in the mobility sector. This goal stands during the project. Besides, there are some project specifications secured during the process. There is made an agreement for the term of five years to purchase hydrogen for these two buses. Another agreement was the location of the tank station in Delfzijl. These specifications are necessary to develop a framework in which organisations do develop their own part of the supply chain.

### Be more transparent in the beginning

Two of the interviewees gave as lesson learned of the PPA in transition processes that organisations should be more transparent in the beginning of the project. The developer of the tank station suggest to be more open as an organisation next time. However, this seems easier than it probably is. The delivery of the tank station was delayed and this was their responsibility. When they want to be more transparent, it feels they have to be more business-like which is not always preferable. In the perspective of other involved organisations, the developer of the tank station could have been more transparent about their planning and risks.

*“When you have to finish the tank station within 8 month it seems easy. They ask you: why do you not meet the planning? You are tempted to say: we are going to do our best instead of being reassuring. Next, when you do not deliver the tank station on time, there arises discussion. You have to make very explicit what the risks are in your planning and why they can arise (van Berkum, 2018).”*

### Align specifications with impact for other

Two of the interviewees gave as lesson learned of the PPA in transition processes, to align specifications with the impact for others. This is about aligning the activities of the different organisations in the supply chain. Organisations are dependent of each other. As mentioned earlier, the tank station had delay in delivering. This kind of critical factors should be discussed in the overall planning. It becomes clear for everybody what the critical moments were in the planning. Activities from other organisations can be aligned with these critical moments. For instance, the supplier of the buses in public-transport can announce the opening a several weeks later as buffer.

### It costs a lot of time

Two interviewees gave as lessons learned of the PPA in transition processes, it costs a lot of time. Most definitely upfront in the project. The structure and role of the alliance need to be defined. Thereby, not all the organisations are open about their interests. It costs time to process these aspects. The organisational factors in the PPA costs more time than in other forms. In a project like this, it was important to plan enough time to execute the project.

### Consider the alliance as separate organisation

One interviewee mentioned the lesson learned of the alliance in transition processes as separate organisation. It happened one time that the public authority of public-transport gave a presentation of all their activities in the field of sustainability. This was in name of the alliance organisation. However, in this presentation the development of electric buses was presented as well. The partners in the alliance did not feel they were represented in the presentation.

### A back-up plan by not available buses

One interviewee gave as lesson learned of the PPA in transition processes, to have a back-up plan. In the alliance organisation you can consider where risks can be detected the best. It is important that buses are driving in the current concession between Qbuzz and OV-bureau. When the hydrogen buses cannot drive, it is necessary to have a back-up plan.

### Be aware of the focus aspects of the alliance model

One interviewee gave as lesson learned of the PPA in transition processes, be more aware of the focus aspects in the PPA. Most of involved parties were not aware of the alliance model and their principles like transparency of interest, transparency in business case and joint decision-making. Twynstra Gudde is responsible for the process management and they mention that next time they should create more awareness of the focus aspects of the alliance model.

### Give incentives instead of pricing risks

One interviewee gave as lesson learned of the PPA in transition processes, another financial structure. In this project the risks and uncertainties are priced by several organisations. Sometimes this lead to increased costs. These increased costs lead to difficult discussions. Next time, the PPA should work with incentives instead of pricing risks. By means of a bonus/risk budget you can use extra money when a risk come out. However, this decreases your incentive in the end of the project. With this structure, you trigger and stimulate organisations to decrease their costs. This will lead to less discussions about budget.

## 8. SLIM VERDUURZAMEN GEMEENTELIJKE GEBOUWEN

In this chapter the case ‘slim verduurzamen gemeentelijke gebouwen’ in Eindhoven is explored. The title of the project can be translated to ‘make municipality buildings in a smart way sustainable’. First, the background of the case is outlined. This consists of an introduction of the project, the stakeholders, the alliance organisation, project specifications and the project planning. Next, the empirical results are discussed which are derived from interviews with involved respondents in the project. The interviews are transcribed and coded. In this way there is derived, which factors are present in this public-private alliance in transition processes. First, there is outlined what the pre-conditions (a) are in the choice of the public-private alliance in transition processes as used form. Next, what characteristics (b) of the PPA in transition processes are experienced by the interviewees. Last, results are outlined of lessons learned (c) which are mentioned by interviewees.

### 8.1 INTRODUCTION



Figure 8.1 Town hall as one of the buildings in the project (Reef, 2017)

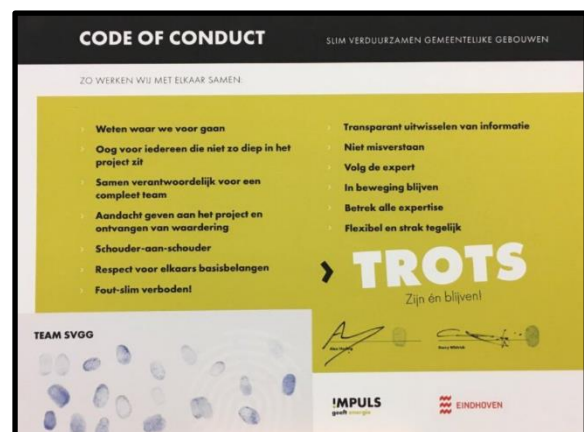


Figure 8.2 Code of conduct signed by the involved organisations (Impuls geeft energie, 2017)

#### Background

Stimulating sustainability is one of the main pillars of the municipality of Eindhoven. This consists of reducing the demand of energy and use materials regarding a circular economy. This is all part of the natural step approach to which the municipality of Eindhoven link their goals. The natural step approach strives for a sustainable society where nature is not subject to systematically increasing (1) concentrations of substances from the earth's crust such as fossil CO<sub>2</sub> and heavy metals, (2) concentrations of substances produced by society such as antibiotics and endocrine disruptors, (3) degradation by physical means such as deforestation and draining of groundwater tables and (4) a society there are no structural obstacles to people's health, influence, competence, impartiality, and meaning (The natural step, 2018). These four pillars of the natural step are closely related to the principles of circular economy (The natural step, 2018). To apply the natural step approach the municipality of Eindhoven set goals to make this specific. An example of the goals they set is energy neutrality in 2035 in the city of Eindhoven and for their own building in 2025 (The natural step, 2018).



They aimed to give a good example at renovating their own buildings in a way, other activities arise to work together towards the natural step approach.

### Project

One of the steps that Eindhoven took is the project of 'slim verduurzamen gemeentelijke gebouwen'. The municipality tendered seven buildings in an innovative way on the market. They used as tender methods the 'Best Value Procurement' (BVP) and the 'Competitive Dialogue'. The BVP was used as tender method that focused on the highest value for the lowest price in an award phase of a tender. In this case the highest value was strongly related to sustainability. The 'Competitive Dialogue' was used to enter conversation about a solution for the question they asked. Part of the solution was to develop a collaboration structure in which the project can be executed for 10 years, with optional 5 extra years. Because of their innovative way of tendering, they received a subsidy of more than €600.000. The outcome of the tender procedure was the proposal of consortium Impuls that suggested to work in an alliance between the municipality and the consortium. In general, municipalities do have separate budgets for renovations and maintenance. In this project these budgets were put together. A sustainable improvement upfront lead to lower costs for maintenance. In that way higher sustainable ambitions were set towards these seven buildings. The aim is to reach for 95% circularity. This percentage was focused on the materials that were derived from the existing buildings.

## 8.2 STAKEHOLDERS

### Municipality of Eindhoven (public)

The municipality is responsible for the general policies in Eindhoven. For instance, they develop policies for civil affairs, education, economic affairs, social affairs, and health. In this project the municipality initiated the project and is one of the alliance organisations. They are considered as the client in this project and are represented as the public authority in the PPA.

### BRINK Groep (private)

The BRINK Groep is a consultancy firm in management, advisory and automation. They support their clients in construction, housing, and real estate tasks. In the project they are one of the alliance partners in the steering group, and shareholder of the consortium. The focus of BRINK lies in the project management and in the beginning, the organisational questions of this project.

### DOOR architecten (private)

DOOR architecten is one of the two architects in the project. They strive for a joint design and aim for a sustainable result by collaborating. This expresses itself by clear architecture, beautiful space and a fine urban design. They were not represented in the alliance steering group but as a shareholder of the consortium. Thereby, they were involved in the design of the renovations of the municipality buildings.

### Rudy Uitenhaak + partners architecten (private)

Rudy Uitenhaak + partners architecten is a research based and creative firm, and design with attention for experiential value, manufacturability, and sustainability. Typical is their use of space and the way to use materials and technique, to reach for the use of space. They are not represented in the alliance



steering group but as a shareholder of the consortium. Thereby, they design the renovations of the municipality buildings.

#### DWA (private)

DWA is a consultancy firm focusing on installations and energy. Often they are involved in projects from initiative until exploitation. Since one of the employees of DWA started an own company, Buro Loo, DWA is still shareholder but hire this employee of Buro Loo to represent DWA in the alliance steering group.

#### Kuijpers (private)

Kuijpers is a nationally operating technical service provider. They design, build and maintain technical installations in buildings and industry. In that way Kuijpers try to contribute towards a healthy work and living environment. They are the holder of the contract of the consortium with the municipality. Thereby, Kuijpers is shareholder of the consortium and represented in the alliance steering group.

#### LAUDY Bouw & Ontwikkeling b.v. (private)

LAUDY is a contractor as subsidiary company of Ballast Nedam. They are specialised in the construction of renovations, restoration of utility, industrial, and residential buildings. LAUDY is one of the shareholders of the consortium but is not involved in the alliance steering group.

### 8.3 ALLIANCE ORGANISATION

The alliance organisation in this project is structured by a steering group (respondents call it 'the alliance'), project organisation and an operational execution (shown in figure 8.3). The project is initiated by the municipality of Eindhoven.

#### The Steering Group

The steering group is allowed to make joint decisions what affect the project budget. When decisions need to be made which asked for a budget extension, stakeholders first consulted their own board to make this decision. The steering group consist of the following parties:

- Municipality of Eindhoven
- BRINK Groep
- DWA (Buro Loo)
- Kuijpers

#### The Project Organisation

In the project organisation the operational tasks are prepared. They also prepared decision-making meetings of the steering group. On this level several employees from the consortium and municipality formed a partner following a shoulder-to shoulder principle. In this layer project managers are assigned for the different subproject of the total project. The project organisation consists of the following organisations:

- Municipality of Eindhoven
- BRINK Groep
- DWA (Buro Loo)
- Kuijpers
- LAUDY Bouw & Ontwikkeling b.v.
- DOOR architecten
- Rudy Uitenhaak + partners architecten

### Operational execution

The operational execution shows the operational level. Employees of the involved organisations execute the operational tasks which are prepared in the project organisation.

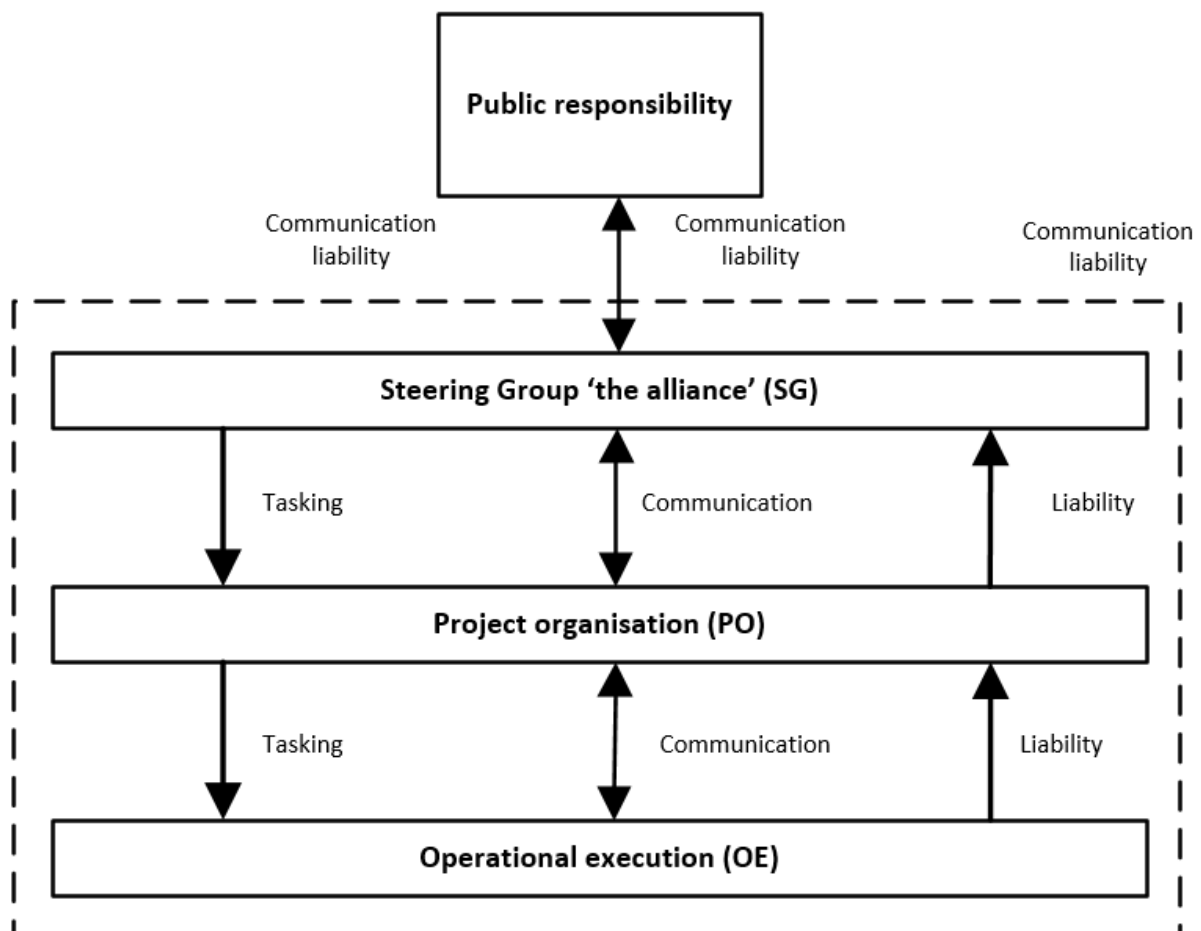


Figure 8.3 Alliance organisation – Slim Verduurzamen  
(own illustration, 2018)

## 8.4 PROJECT SPECIFICATIONS

Project factor	Project data
Program	<ul style="list-style-type: none"> <li>- Town hall and town hall tower</li> <li>- Mercado</li> <li>- Van Abbemuseum</li> <li>- NRE</li> <li>- Designhuis</li> </ul>
Investment value	75 million – 100 million euros

## 8.5 PROJECT PLANNING

Time period	Event
2013	Initiative project by the municipality
October 2016	Contract signed between consortium and municipality
May 2017	Start renovation of town hall and town hall tower
...	The renovation of remaining buildings

## 8.6 EMPIRICAL RESULTS

In this section the empirical results are discussed. As mentioned in the introduction of this chapter, the interviews are transcribed and coded. As shown in appendix III, the interview format is structured in three groups. Firstly, the respondents was asked why the PPA is used. Secondly, what characteristics were experienced during the project. Lastly, what the lessons learned of the project are. The results of why the PPA in transition processes was used and the lessons learned of the PPA in transition processes, are derived by open questions. The results of characteristics were derived by partly semi-structured questions. Six characteristics are suggested by the interviewer. In the interview format is shown which six characteristics are suggested. The question was asked whether the respondent experienced the suggested characteristic during the project and how the respondent experienced it.

The interviews are transcribed in order to code the results. Coding helped by bundling the results of all the interviews of one case. When a respondent mentioned a certain factor of the PPA in transition processes, it was labelled by a code and assigned to a group of factors. The coded factors were assigned to the group of pre-conditions, characteristics or lessons learned. The interviewees did not always answer the questions strictly by the structure of the interviewer. For instance, a question regarding the lessons learned of the project, led sometimes to a pre-condition of the project. In this section, these answers are restructured in a way that it is assigned to the right group. The different factors with codes are shown in appendix VI.

### a) Pre-conditions

In figure 8.4 is shown which three factors interviewees mentioned several pre-conditions. The pre-conditions are factors which were present before the project started. The interviewees is asked why the PPA in transition processes in this project is selected as form. The different pre-conditions are displayed

and which interviewees mentioned these pre-conditions. The factors are discussed in this section and why the factors are important to consider as motivation for this project.

Pre-conditions	Kuipers	Gemeente Eindhoven (1)	Buraloo	Gemeente Eindhoven (2)	Brink
Unexpected process	x	x		x	x
Long-term vision beyond the project	x	x		x	x
Changing market		x	x		

Figure 8.4 Pre-conditions – Slim verduurzamen  
(Own illustration, 2018)

### Unexpected process

Four of the interviewees gave as pre-condition of the PPA in transition processes, an unexpected process. The term of the project is 10 year plus a possible additional 5 years. An important aspect of this project is innovation. However, innovations that can be used, change over time. A certain flexibility is therefore necessary. It could be that about a few years, other solutions are much more efficient towards sustainability. Thereby, the project is about the housing of employees of the municipality of Eindhoven. They do not know whether the organisation will increase or decrease in number of employees. There are a lot of uncertainties in the process why the PPA is considered as sufficient for this project.

*“Actually, the choice for the public-private alliance was very simple because we did not know what to develop. We had money and an idea. This is what we want to achieve. We had a sample of examples, but we did not know exactly what the end results will be (Hesling, 2018).”*

### Long-term vision beyond project

Four of the interviewees gave as pre-condition of the PPA in transition processes, a long-term vision beyond the project. The long-term vision is mainly included in the project itself because of the agreement for ten years plus additionally five years. Therefore, it is possible to include a sustainable innovation upfront which effect in a positive way the maintenance costs. Thereby, this project is used as stimulator and motivator to reach energy neutrality of the municipality in Eindhoven in 2035. It should activate local entrepreneurs, knowledge institutions like TU Eindhoven, to contribute towards sustainable goals of the municipality of Eindhoven. However, the organisations in the consortium impulses do not have a direct benefit from these long-term vision. The PPA makes it possible to include organisations for the long-term but at the same time there is flexibility in type of organisations that are involved.

### Changing market

Two of the interviewees gave as pre-condition of the PPA in transition processes, a changing market. The market is currently changing faster than ever. Therefore, the PPA offers the flexibility to involved new innovations or can adapt a changing market in the collaboration form. The municipality asks private parties to develop a plan of action towards how to deal with that changing market. Mainly, the conversations in the alliance are about changes in the project. This can be related to new innovations, a changing demand of workplaces from the municipality or opportunities towards reuse of materials.

### b) Characteristics during the project

In the interview format in appendix III you can see which characteristics are suggested during the interviews. In figure 8.5 is shown which fourteen factors are experienced as characteristic of the PPA in transition processes. The different characteristics are displayed in the table and which interviewees mentioned these reasons. All the factors are discussed in this section and why the factors are important to consider for this project.

Characteristics during the project	Kuipers	Gemeente Eindhoven (1)	Buraloo	Gemeente Eindhoven (2)	Brink
Ongoing process of problem solving	x	x	x	x	x
Organisations with different backgrounds	x	x	x	x	x
Flexibility in scope	x	x	x	x	x
Equal role in decision-making	x	x	x	x	x
Transparency in interests	x	x		x	x
Transparency in the business case	x	x		x	x
The alliance as separate organisation	x	x			x
Shared knowledge development			x	x	x
Trust among involved stakeholders		x	x		x
Supply chain involved in the alliance					x

Figure 8.5 Characteristics – Slim verduurzamen  
(Own illustration, 2018)

### Ongoing process of problem solving

All the interviewees gave as characteristic of the PPA in transition processes, an ongoing process of problem solving. The code of conduct describes how to act in the process of problem solving. When there is an upcoming problem, it will be faced as a problem of all the alliance partners. Sometimes this is difficult. For instance, when one of the Key Performance Indicators is not met. The tendency is that the municipality act in their traditional role of client. However, the shoulder to shoulder principle should take care of these contradictory roles. The shoulder to shoulder principle ensures that there are couples with one employee of the municipality and one employee of the consortium. They collaborate

and take care of their area of problems. When they solve a problem with consensus, they present it to the steering group.

### Organisations with different backgrounds

All the interviewees gave as characteristic of the PPA in transition processes, organisations with different backgrounds. This need is related to innovations to be implemented in the project during the project. There is a lot of expertise in the alliance to renovate and maintain the seven municipality buildings. They can link their activities to each other. For instance, the architect communicates directly with the municipality. However, it is not clear what organisations are needed to implement new innovations in the future. Therefore, there is a 'flower' construction and the alliance symbolises the flower. It is possible to add leaves at the flower. New organisations which have expertise in a new innovation could be involved.

### Flexibility in scope

All of the interviewees gave as characteristic of the PPA in transition processes, flexibility in the scope. In the alliance organisation, they think about new opportunities. For instance, when there is a new way of energy supply, which is much more efficient. Then it is possible to schedule an investment earlier for this new possibility for energy supply in order to lower the exploitation costs. Another possibility is the way the number of employees develop over time. This number can increase or decrease over time. Therefore, the number of buildings could change during the next ten years and thus the project scope. There is already mentioned that it is possible to involve new partners in the alliance. If a certain innovative technique, product or service is of such importance for the project, but offered by an organisation outside the alliance organisation, it is possible to introduce a new partner.

### Equal role in decision-making

All the interviewees gave as characteristic of the PPA in transition processes, an equal role in decision-making. Inside the framework of the scope, the alliance makes decisions. When a certain change in the project has an effect on the contract, all involved organisations in the alliance should agree on that change. Otherwise, the contract remains the same. A change for a specific building, is prepared on operational level. At operational level, the teams consist of at least one person of the municipality and at least one person of the consortium. They try to agree on a change in a subproject in that project team. If they agree, they propose the change to the steering group and the steering group makes that decision.

### Transparency of interests

Four of the interviewees gave as characteristic of the PPA in transition processes, transparency in interests. The municipality of Eindhoven gives insights in their decision-making internally. In that way it is possible for private organisations to take into account what a certain choice in the project contains. The other way around it works the same. Sometimes the contractor has some troubles with liquidity. The municipality helps the consortium in that way. Another example is about higher costs for maintenance in one case. The costs for maintenance were ten percent higher than expected. The contractor gives openness in prices of maintenance to have an open discussion within the alliance. This transparency in information but also in interest is considered as an advantage by involved organisations.

*“Choices for the project have to result in a win-win. Therefore there is a need for understanding each other point of view. Private organisations have a business interest and the municipality need to explain every decision. If you understand how every organisation works, you can fill in together the project. (Niese, 2018)”*

### **Transparency in the business case**

Four interviewees gave as characteristic of the PPA in transition processes, transparency in the business case. In regular projects of the municipality, there is a strict separation between budgets for different buildings and between budgets for investments and maintenance. In this project, all the budgets of the municipality which are related to the seven buildings are put together. The municipality of Eindhoven gives full transparency in their business case and the consortium knows exactly what they can spend to reach for the KPI's.

### **The alliance considered as separate organisation**

Three of the interviewees gave as characteristic of the PPA in transition processes, the alliance considered as separate organisation. The alliance steering group experience the team as a separate organisation. They identify themselves with the alliance organisation. It is like a concentric circle. Inside the circle this feeling is the biggest. However, in teams with more distance from the project, the feeling is less.

### **Shared knowledge development**

Three of the interviewees gave as characteristic of the PPA in transition processes, shared knowledge development. For instance, the municipality considers this way of collaborating with the market, in other projects in Eindhoven. The municipality gains a lot of experiences in this project, and therefore see opportunities to use these experiences in other projects. Shared knowledge development is in this case also related to find out which party has the most knowledge to solve a specific problem. For example, the subsidy needed to be requested in the beginning of the project. The municipality has the most experiences with this request and therefore takes responsibility for this activity. Of course, risks and responsibilities are shared in the alliance, however since many organisations are involved, it is important to search for the right one to execute an activity.

### **Trust among involved stakeholders**

Three of the interviewees gave as characteristic of the PPA in transition processes, need for trust amongst involved stakeholders. It is not efficient to check as public organisation the activities of private organisation. The PPA should create an environment where organisations trust each other. You cannot expect this from the first day, but the alliance gives space to get to know each other and understand the organisations involved.

### **Supply chain involved in the alliance**

One interviewee gave as characteristic of the PPA in transition processes, supply chain involved in the alliance. Although, in the consortium is not the whole supply chain represented. During the project, sessions with market parties are organised, outside the alliance organisations. For instance, to stimulate reuse of materials from the municipality buildings. For this session a demolition company is invited. So the PPA facilitates collaboration within the supply chain.

### c) Lessons learned

In figure 8.6 is shown which nine factors interviewees mentioned, considering the lessons learned of the PPA in transition processes. This part is derived by open questions without any suggestions by the interviewer. The different lessons learned are displayed in the figure. All the factors are discussed in this section and why the factors are important considering for this project.

Lessons learned	Kuijpers	Gemeente Eindhoven (1)	Buraloo	Gemeente Eindhoven (2)	Brink
Code of conduct	x	x	x	x	x
Shoulder-to-shoulder	x	x	x	x	x
Open request to the market		x	x	x	x
Skilled people necessary	x			x	x
Need for certain framework	x			x	x
Communication lines between operational and steering group	x		x		
It cost a lot of time	x				
Celebrate milestones and achievements		x			
Independent advisory group				x	
Involvement of decision-makers		x			
Take more time for innovation					x
Give incentives instead of pricing risks					x

Figure 8.6 Lessons learned – Slim verduurzamen  
(Own illustration, 2018)

### Code of conduct

All the interviewees gave as lesson learned of the PPA in transition processes, the code of conduct. The code of conduct describes what factors in the collaboration are important. Aspects like involve all expertise, transparent in sharing information, shoulder to shoulder and respect each other's interests. It focuses on craftsmanship, connection and trust. It is signed by each team member. The code of conduct is used to introduce new people in the alliance organisation. Thereby, it describes the new role of people involved in the project. Sometimes people tend to their 'old' and 'traditional' role. This role is characterised by a controlling client and asking supplier. Then an intervention is necessary with the code of conduct leading by one of the members of the steering group.

Another lesson learned, in line with the code of conduct, is the focus in the tender on collaboration aspects. Discuss how you want to collaborate, what the organisation will look like and how the processes will be. The code of conduct should be introduced from the beginning of the project. In this project the code of conduct was initiated three months after the contract was signed. The other way of working in a PPA, led to controversy in the beginning since not every organisation was fully



transparent in their interests and information. Initiating the code of conduct offers a solution and made for everybody clear what should be the focus.

*“By letting go the traditional client-supplier model, the project will be smarter and will be better. The municipality do not deliver a predefined solution but collaborate with the market to find the optimal solution (Niese, 2018).”*

### Shoulder-to-shoulder

All the interviewees gave as lesson learned of the PPA in transition processes, the shoulder-to-shoulder principle. Every employee of the municipality forms a couple with an employee of the consortium. They discuss arising problems and try to solve this or develop solutions in order to discuss these in the alliance. The communication lines are therefore short.

### Open request to the market

Four of the interviewees gave as lesson learned of the PPA in transition processes, an open request to the market. Thereby, let the market think about the question to ask. This led to KPI's that were defined by the alliance organisation. The consortium and the municipality rank the KPI's. The KPI's have to be reached in the project. However, the road with specific solutions is open upfront in the project. This way of flexibility leads to better results. Sometimes it was difficult to collaborate in this new way. During the project, people involved need to be continuously aware of their new role, because it is easy to shift to your more familiar 'old' and 'traditional' role.

*“The flexibility in the scope was in this project very broad, that was not always easy for everybody. Do we dare? In the end we had the guts to do it in this way. Both municipality and the private parties as well (Vercoelen, 2018).”*

### Skilled people necessary

Three of the interviewees gave as lesson learned of the PPA in transition processes, skilled people are necessary. Of course, in every project you need skilled people. In this project respondents mentioned that the PPA is not a form where everyone can work in. You should be able to function in a new role in projects like these. Roles in other contract forms are more familiar.

*“It is relative new. This new way of working is not suitable for everybody. The collaboration in a public-private alliance will not flow on its own. The traditional way of working is easy. But this is different. This new way sounds nice, but you have to work hard together (Niese, 2018)”*

### Need for certain framework

Three of the interviewees gave as lesson learned of the PPA in transition processes, a need for certain framework. In the previous discussed characteristics of the PPA, the room for changes and flexibility in the scope are important for the project. However, in the alliance there is also need for a certain framework. Key Performance Indicators (KPI) are formulated to achieve several goals. When one of the KPI's is not achieved, the consortium gets a fine. The project consists of seven buildings. For every municipality building, there is a definition plan in which in general a direction is given for the renovation plan and interventions.

### Communication lines between operational and steering group

Two of the interviewees gave as lesson learned of the PPA in transition processes, communication lines between operational and steering group. In the beginning of the project, the aim was to intertwine as much employees of the municipality with employees of the consortium. The outcome of an intertwined organisation was chaotic. It was not clear what decisions were made or what informal agreements were. Mainly when this was about decisions or agreement made outside the steering group. It feels sometimes as directional. Otherwise, it is very difficult to manage the project as steering group.

### It costs a lot of time

One interviewee gave as lesson learned of the PPA in transition processes, it costs a lot of time. It costs a lot of time in the beginning to get to know each other and structure the organisation in an effective way. Thereby, problems that arise need to be solved in consensus with all the alliance partners. This lead to more necessary time. The way problems are solved is considered as an advantage and disadvantage as well.

### Celebrate milestones and achievements

One interviewee gave as lesson learned of the PPA in transition processes, celebrate milestones and achievements. The milestones and achievements are less celebrated. Considering the involvement to the project of employees of the municipality and the consortium as well, celebrating milestones and achievements should be promoted more.

### Independent advisory group

One interviewee gave as lesson learned of the PPA in transition processes, an independent advisory group. The alliance organisation has an independent advisory group. When the alliance cannot find a solution for a certain problem, this advisory group will advise about possible solutions. It consists of three professors from the university.

### Improved involvement decision-makers

One interviewee gave as lesson learned of the PPA in transition processes, improved involvement decision-makers. Within the municipality there are controllers who can influence decision-makers. In this project, their role is changing. Upfront they could involve these controllers better in the process in order to figure out what their role will be. Involvement of controllers create awareness towards their new role.

### Take more time for innovation

One interviewee gave as lesson learned of the PPA in transition processes, take more time for innovation. The project is guided by the seven buildings which need to be renovated and maintained. Therefore, the focus of innovation in the project is less important.

### Give incentives instead of pricing risks

One interviewee gave as lesson learned of the PPA in transition processes, give incentives instead of pricing risks. In this project the PPA model is used. The plans for the municipality buildings are flexible and only guided by a reference plan and KPI's. However, when a plan for a building is made in the alliance, it is finalised by a UAV-GC agreement. The execution of a certain renovation is in the end traditional. Sometimes this lead to more 'traditional' relation than they strive for in the alliance. An

improvement next time could be an open book, also in the execution of planned building activities. Thus, make upfront agreements about rate of return for instance. However, this is in the building industry even more unfamiliar than using the PPA.

# CONCLUSION EMPIRICAL RESEARCH

The results of two empirical cases are outlined. In these two cases the PPA is used in order to stimulate the transition towards a circular economy. Important note is that these results need to be further analysed in the cross-case analysis. However, the empirical results are the first step to answer the following sub-questions:

- *How can, based on findings of empirical cases, the use of public-private alliance stimulate the transition towards a circular economy?*
- *How can, based on findings of empirical cases, the use of public-private alliances be optimised in transition processes?"*

The pre-conditions of the PPA in transition processes are derived. The pre-conditions are factors which were present before the project started. The pre-conditions of the PPA in transition processes in the two cases is an unexpected process, a long-term vision and market dynamics. The unexpected process can be related to the uncertainty of development towards hydrogen and sustainability. In the two cases it is not clear what the end result exactly will be. Only that the two cases want to stimulate the transition to sustainability (Eindhoven case) and hydrogen (Groningen case). A long-term vision is also derived as pre-condition in both cases. In Groningen there is vision about the hydrogen economy in Groningen. In Eindhoven there is a vision and several goals towards sustainability in the municipality in Eindhoven. Other pre-conditions were related to a changing market or even no full developed market. The transition to hydrogen in Groningen does not have a full developed market in which a certain supply chain can fulfil the desired development. In the case of Eindhoven there is a changing market. The speed of innovation is high, also in the field of the transition towards a circular economy, the collaboration should facilitate this speed of innovation. In transition processes, it seems obvious that the market is changing or that there is even no full developed market available for the development. The characteristics of the PPA should stimulate and facilitate these transition processes in the two cases. For instance, aspects like transparency in the business case, equal role in decision-making, and an involved supply chain are characteristics which should facilitate and stimulate this. The first sub-question that is related to how the PPA stimulate the transition towards a circular economy is related to these characteristics. The 'how' in the sub-question is related to these characteristics of the PPA in the two cases. Thereby, the two cases result in optimisations and lessons learned in the PPA. In several bullets regarding lessons learned, you can feel the novelty of this form in combination with the transition towards a circular economy. The focus of these empirical cases are collaboration aspects between organisations and people. There are barely 'hard' aspects that are suggested as lessons learned. It seems that focusing on collaboration aspects, lead to improved results in the PPA in transition processes. The respondents were focusing on optimisations between people and organisations involved in the two cases. For instance, aspects like need for trust between participants, need for independent authority or employee, and discuss at beforehand how you want to collaborate. These improvements of the PPA in transition processes are related to how the use of the PPA can be optimised in transition processes towards a circular economy.

The empirical results should be further analysed in the cross-case analysis. What similarities and differences are present between the two cases? Are lessons learned contradicted? Does every lesson learned fit the alliance form? These are questions that will be answered in the next chapter. After the

cross-case analysis it should be possible to answer the questions towards 'how to stimulate transition processes' and 'what are optimisations in the PPA'.

## 9. CROSS-CASE ANALYSIS

In the previous chapter, the empirical results of two cases are outlined. The pre-conditions and characteristics during the project are described for the public-private alliance in transition processes towards circular economy. There is concluded that the lessons learned are mainly focusing on collaboration aspects. The lessons learned should optimise collaboration between organisations and people. Next step is to discuss these results by means of a cross-case analysis. Two cases have been explored. It is important to be aware that matching factors between the two cases cannot be simply assumed as present in every PPA in the transition towards a circular economy. The empirical cases are structured in the previous chapter as follows:

- Pre-conditions
- Characteristics during the project
- Lessons learned

The cross-case analysis starts with a comparison towards the background of the cases. It is important to discuss this before diving into the similarities and differences in factors of the PPA in transition processes. The similarities and differences are outlined to keep this in mind during the further cross-case analysis. As mentioned in the previous chapter, the interviews are structured in three parts. This lead to factors of the PPA in three different areas of outcomes. For the cross-case analysis, the pre-conditions and characteristics are compared amongst both cases. The outcomes of the lessons learned are restructured in order to have more generalised lessons learned. After restructuring the factors of lessons learned, the results will be compared as well. The cross-case analysis leads to factors which are considered as relevant for the PPA in transition processes. These analysis will lead to an answer of the following questions: *'How can, based on findings of empirical cases, the use of public-private alliance stimulate the transition towards a circular economy? and 'How can, based on findings of empirical cases, the use of public-private alliances be optimised in transition processes?'*.

### 9.1 BACKGROUND OF THE CASES

#### Industry

The first characteristic is related to the industry on which they focus. The case of hydrogen in Groningen is focusing on the mobility sector. The project initiates an infrastructure for hydrogen as circular energy network. A pipeline is developed for hydrogen and a tank station. Also the production of hydrogen is facilitated in the project. The aim of the project itself, is to develop two hydrogen buses in public transport. When this network will expand, it offers room for increased mobility on hydrogen. The second case of 'slim verduurzamen gemeentelijke gebouwen' is related to the building industry in Eindhoven. It aims partially, to stimulate the transition towards sustainability by setting high ambitions for circularity. The focus is therefore on the circularity of materials, but also to reduce the demand of energy for these buildings. The higher goal of the project is to stimulate sustainable activities in the city of Eindhoven by these seven buildings of the municipality. It is mentioned that hydrogen can be used in the built environment as circular energy. However, currently there are no developments towards hydrogen in the built environment. Therefore, the two projects strive for circularity in another industry. It is not clear what effect this has on differences in factors between the two cases.

### Budget of the project

The two projects differ in size and this affects the factors of the PPA in comparison. The case of hydrogen in Groningen is more a start towards a network of hydrogen and has a smaller budget. The case of 'slim verduurzamen gemeentelijke gebouwen' in Eindhoven is bigger considering the budget. Circular economy is not the main focus, but renovating the seven buildings. This affects the size of the alliance organisations. Some differences in factors of the PPA between the two cases are related to the difference in budget of the project.

### Transition towards a circular economy

The two cases have in common the transition to a circular economy. Both are aiming to stimulate the transition of CE in their region. Not only in the project itself, but also stimulate circular activities outside the project. In the end the reduction of CO<sub>2</sub> emission is relevant, and the projects both reduce this number. Difference is that CE is the main objective of the case in Groningen. In Eindhoven the main objective of the project itself, is to renovate the seven municipality buildings. However, sustainability is one the most important pillars of the project and is even present in the title of the project.

### Organisation

In the characteristics is suggested that the budget leads to differences in size of the organisation of the public-private alliances. However, in both cases there is a clear distinction between the strategic, tactical and operational level of the alliance organisation. They used both an equal represented steering group which is presented by public and private organisations. In the case of Eindhoven the operational level is much more extensive than in the case of Groningen.

## 9.2 PRE-CONDITIONS

In figure 9.1, the cross-case analysis is displayed of the pre-conditions in these projects. There are four pre-conditions derived. The pre-conditions are factors which were present before the project started.

Pre-conditions	Case 1	Case 2	Matching factors
Unexpected process	x	x	x
Long-term vision beyond the project	x	x	x
Changing market		x	
No full market	x		

Figure 9.1 Pre-conditions – Cross-case analysis (Own illustration, 2018)

### Similarities

An **unexpected process** is the most mentioned factor in both cases towards the PPA in transition processes. In both cases an unexpected and uncertain process is experienced. In the case of hydrogen in Groningen, there was in the beginning no precise planning, precise budget, precise scope or other way of predefined solution. Even whether organisations will be additionally included in the project was unclear. This is due to the fact that hydrogen in mobility is new. Thereby, there was no infrastructure for hydrogen. No organisation could know how the process will be. In Eindhoven, the process seems less unexpected because the project consists of seven specific buildings. However, this number can change, and the way the buildings are renovated and maintained was unclear. CE was an important aspect and several key performance indicators were related to sustainability. How these

KPI's will be achieved, was unclear at beforehand. A predefined solution upfront was not possible. A form that facilitates this unexpected process in both cases was required. It can be concluded and unexpected process is a pre-condition for PPA in transition processes.

Next, a **long-term vision beyond the project** was present in both cases. These long-term visions of both cases are related to the specific transition tasks. In Eindhoven the vision beyond the project was to strive for energy neutrality in the city of Eindhoven. Thereby, to stimulate circular and innovation activities in the region. In Groningen the vision beyond the project was related to the hydrogen economy. The province of Groningen wants to stimulate this economy in the Province. The project should be an impulse to strive for this vision. A long-term vision is considered as a valid pre-condition of the PPA in transition processes.

### Differences

The difference in pre-conditions for the PPA in transition processes lie not far from each other. In the case of Groningen, **no full developed market** was present to execute the project. The participating organisations did not collaborate earlier. They develop with each other a new supply chain that never existed before. For instance, the producer of hydrogen did not have ever collaborate with the bus supplier. This differs from the case of Eindhoven. In this case is mentioned a **changing market** towards the transition task. This difference probably lies in the fact that CE is stimulated by collaboration with organisations who already form a supply chain in the building sector. The changing market is related to the fact that their way of working will change over time. Another aspect that can explain this difference, is the focus of the project. In despite of the difference, it seems relevant to consider market dynamics as valid pre-condition of the PPA in transition processes.

There can be concluded that both cases almost have the same pre-conditions. Since the market is mentioned in both cases, but just from their own perspective, the two factors will not be excluded further in this research. It can be related to market dynamics in which a transition towards a circular economy moves.

## 9.3 CHARACTERISTICS DURING THE PROJECT

In figure 9.2, the cross-case analysis is displayed of the characteristics of the PPA in transition processes in these two cases. As mentioned earlier, these characteristics of the PPA should facilitate and stimulate the transition processes towards a circular economy.



Characteristics during the project	Case 1	Case 2	Matching factors
Transparency in interests		x	
Aligned interests in project	x		
Organisations with different backgrounds	x	x	x
Transparency in the business case	x	x	x
Equal role in decision-making	x	x	x
Ongoing process of problem solving	x	x	x
Flexibility in the scope	x	x	x
The alliance as separate organisation		x	
Shared knowledge development	x	x	x
Supply chain involved in the alliance	x	x	x
Trust among involved stakeholders	x	x	x
Risk management	x		

Figure 9.2 Characteristics – Cross-case analysis (Own illustration, 2018)

### Similarities

Most of the characteristics are similar in the two cases. In both cases, **organisations with different backgrounds** are involved in the alliance. Not only the client and supplier, but at the supplier side, different organisations are involved with different backgrounds and specific knowledge. In Groningen this is related to a hydrogen supplier, infrastructure supplier, tank station supplier, and bus supplier. In Eindhoven this related to a main contractor, management advisory organisation, architect, and an installation contractor. However, the question arises whether this is a specific characteristic of the PPA or it can be also a characteristics in other forms. We can assume that the PPA is not only a form which can involve organisations with different backgrounds. However, in the empirical cases this characteristic arise. It could be that the alliance form should facilitate these different backgrounds well.

Secondly, **transparency in the business case** is mentioned in both cases as a characteristic. In Groningen this was important to know what the budget was for every organisation to execute their activities. In the Eindhoven Case because the budget of the municipality for seven buildings can be used efficiently over fifteen years. This characteristic is therefore used further in this research.

Also an **equal role in decision-making** was present in both cases. Every organisation was involved in the steering group and the project team. An arising problem is solved by a solution which is agreed upon by all the involved stakeholders. The solutions were prepared by operational teams and presented to the steering group. The equal role in decision-making is considered as important towards PPA in transition processes.

Next, an **ongoing process of problem solving** is experienced as characteristics of the collaboration. In Eindhoven a code of conduct is developed to behave in an equal way with the process of solving problems. In Groningen, an independent process manager manages these arising problems. The problems often arise from the unexpected process and were solved during the process.

The **flexibility in the scope** is also experienced in both cases. In Groningen the flexibility was necessary. There were certain activities where the specifications cannot be defined. It offered room to define specifications later on in the project. An example was the quality of hydrogen. Beforehand, it was not

possible to define the quality. In Eindhoven, this flexibility was related to opportunities towards energy efficiency. When a circular opportunity was discovered, the alliance offers room to implement this opportunity. The flexibility in the scope is therefore considered as an important characteristic of the PPA in transition processes.

Another similar characteristic is **shared knowledge development**. In Groningen this led not only to knowledge sharing within the project, but also to other initiatives regarding the hydrogen economy in Groningen. In Eindhoven the knowledge sharing was related to other projects of the municipality of Eindhoven. This other way of collaborating with the market will probably be used in other projects of the municipality of Eindhoven. In both cases certain knowledge of the project will be used in other similar activities or projects. Knowledge development is therefore considered as important for the PPA in transition processes.

Another similar characteristic is the **involvement of the supply chain in the alliance**. Often the client agrees with a supplier, and this supplier agrees with their sub-suppliers. In these two cases, all the suppliers were involved in the alliance. This characteristic is strongly related to the factor of organisations with different backgrounds. In both cases this is suggested as a characteristic of the PPA in transition processes. The transition influences the activities of the whole supply chain, and therefore it seems that an involvement of the whole supply chain in the PPA in transition processes is of high relevance.

As characteristic in both cases, a **need for trust amongst stakeholders** is given. In the Eindhoven case, respondents mention that it is not efficient to check each other in their activities. The alliance should give space to get to know each other and understand the involved organisations. In the Groningen case respondents mention that trust lead to better collaboration. Participants were more open about confidential information and that was necessary to take steps in the project. In both cases there was a need for trust. For the Groningen case, this characteristic is related to the lesson learned of sign a confidentially statement. Trust between involved stakeholder within the alliance is an important characteristic for the PPA in transition processes.

## Differences

A few differences arise in the empirical results. The first difference is about **transparency in interests**. This is only mentioned by respondents as characteristic in the case of Eindhoven. In the case of Groningen, the characteristic **aligned interest in project** is derived. Both cases indicate an awareness for interests. This can probably explained by the fact that in the case of Eindhoven, transparency in interest was important since the private parties do need to fulfil a business case in the project. The municipality wants to strive for a transition towards sustainability. It is difficult to align these interests directly with interest of private parties. However, it is important to be transparent because you want to strive for win-win in defining solutions. In the case of Groningen aligned interests were more important. This was probably due to the interest in the hydrogen economy. All the organisations strive for that goal because there is a social or financial business case after this project. In the Eindhoven case, there is no specific social or financial business case for private parties after the project ends. At least transparency in interests is necessary. Dependent on the project, aligned interests between involved

organisations are important. Therefore, the characteristic of transparency in interest is included as important for the PPA in transition processes.

The characteristic of the **alliance as separate organisation** is only mentioned in the Eindhoven case. The alliance participants consider each other as colleagues. They identify themselves with the alliance. In the case of Groningen, this is not mentioned as characteristic. However, it is mentioned as lesson learned. It is as characteristic mentioned in Eindhoven and as lesson learned in Groningen. Therefore, it seems interesting to include it at least in the lessons learned.

**Risk management** is only mentioned in the case of Groningen. It was experienced as an advantage because risks had less effect on one organisation. At the other hand, as disadvantage because organisations want to have full insight in processes of other organisations. When an organisation has higher costs for a certain activity, this led to controversy in the project. Again, this characteristic could be also present in the case of Eindhoven. However, none of the respondents mentioned risk management. Thereby, only two respondents mention this characteristic in the case of Groningen. Therefore, this characteristic is excluded further in this research.

#### 9.4 LESSONS LEARNED

In figure 9.4, the cross-case analysis is displayed of the lessons learned of the PPA. The lessons from both cases were very specific and therefore difficult to compare. Some of the lessons are generalised in order to analyse the results in this section. In figure 9.3 the generalised factors are shown. After the table the cross-case analysis is shown.

Reflection bullet(s) case 1	Reflection bullet(s) case 2	Generalised factor
(1) Be aware of the focus aspects of the alliance model	(1) Code of conduct	Discuss how you want to collaborate
(1) Involve independent process management	(1) Independent advisory group	Involvement independent authority or employee(s)
(1) Consider the alliance as separate organisation	(1) Celebrate milestones and achievements	Consider the alliance as separate organisation
(1) It costs a lot of time	(1) Take more time for innovation	Plan enough time but execute efficient
(1) Be careful in selecting partners	(1) Communication lines between operational and steering group , (2) involvement of decision-makers, and (3) shoulder-to-shoulder	Collaboration between involved organisations

Figure 9.3 Cross-case analysis (Own illustration, 2018)

Lessons learned public-private alliance	Case 1	Case 2	Matching factors
Plan enough time but execute efficient	x	x	x
Discuss how you want to collaborate	x	x	x
Collaboration between involved organisations	x	x	x
Sign a confidentiality statement	x		
Need for a certain framework	x	x	x
Be more transparent in the beginning	x		
Consider the alliance as separate organisation	x	x	x
A back-up plan by not available product	x		
Align specifications with impact for others	x		
Involvement independent authority or employees	x	x	x
Give incentives instead of pricing risks	x	x	x
Open request to the market		x	
Skilled people necessary		x	

Figure 9.4 Lessons learned – Cross-case analysis (Own illustration, 2018)

### Similarities

The first similarity in lessons learned is **plan enough time but execute efficient**. In the Groningen case alignment of interests between organisations took a lot of time. In Eindhoven it is preferred to take more time for innovation. The flexibility in the scope is not used optimal. The focus lies on renovating municipality buildings and too less on finding innovation solutions. However, the project is still in its beginning and there is time to improve this. In general, the PPA requires time. Not only to align the different organisations, but also in defining solutions in the project. Thereby, also to structure the collaboration between people and organisations. This costs more time than in other forms. Therefore, this lesson learned is considered as relevant for the PPA in transition processes.

Next lesson learned, **discuss how you want to collaborate**. Some of the involved organisations in Groningen, were not aware of the fact that the alliance model was used. Some respondents suggest that next time, they want to discuss the most important principles of the PPA. In the Eindhoven case, they developed a code of conduct in which collaboration principles are described. However, the code of conduct was only after three months drafted. Important lesson learned for similar projects is to discuss clearly what collaboration principles are. Where should be the focus on and how do you want to interact with each other? These factors are mentioned only one time in the case of Groningen, but several times in the case of Eindhoven. Therefore, there is assumed this characteristic is relevant for the PPA in transition processes.

Third lesson learned is, **collaboration between involved organisations**. This is a generalised factor. In the Groningen case there was a need for awareness which organisations you need to involve. In Eindhoven they made some specific changes in the collaboration between organisations. First, they implement the shoulder-to-shoulder principle. Every employee of the municipality in the project, has a partner from the consortium. You can discuss arising problems directly with your partner from the other side. Thereby, after a few months the communication lines between the steering group and operational teams changed. These specific lessons are important for next similar collaborations. The collaboration between involved organisation is important in a PPA and therefore these recommendations can help organisation in structure their PPA in an effective way. The characteristic

of collaboration between involved organisations is therefore considered as important for the PPA in transition processes.

A **need for a certain framework** is experienced in both cases as necessary. The alliance model provides room for flexibility. In Eindhoven they use reference frameworks for the buildings and KPI's to develop a framework. In Groningen, the framework was not drafted upfront. After the start of the project, there were some specifications in the project which were necessary to have a framework. This gave organisations some certainty towards the project. For instance, the location of the tank station. The question that arises is whether not every project has a need for a certain framework. Almost every project or collaboration form needs a certain framework. Thus, it is important to have a certain framework in transition processes using the PPA. Because this characteristic is too general, it is considered that a need for a certain framework is not relevant for the PPA in transition processes.

Next lesson learned, **consider the alliance as a separate organisation**. There was some controversy in the case of Groningen considering a presentation in which the own organisation and the PPA, were blurred. In Eindhoven, it was important to have continuity in the people involved, and to celebrate milestones and achievements. The consideration of the alliance as separate organisation is therefore important. Thereby, in the case of Eindhoven the alliance as separate organisation arises as characteristic. Therefore, the lesson learned of consider the alliance as separate organisation is included further in this research.

**Involvement of independent authority or employee(s)** is also in both cases experienced as lesson learned. In Groningen this was considered as most important since there were involved two independent process managers. Important was that they have administrative influence and a network. In Eindhoven there was an independent advisory group of professors from university. When there cannot be find a solution between organisations in the alliance, they can consult this advisory group. An involvement of independent authority or employee(s) is considered as relevant for the PPA in transition processes.

Last similar lesson learned, **give incentives instead of pricing risk**. This lesson learned is mentioned in both cases, but in each case only by one respondent. In both projects there was not fully an open book in the benefits, costs, and risks. Risks were priced in the activities of organisations and there was not a risk budget which was shared by all alliance partners. Since only two respondents suggest this lesson learned, it is not considered as important for the PPA in transition processes in this research. For follow-up research it can be interesting to investigate the impact of other ways of secure financial risks.

### Differences

The first difference is about the lesson learned, **sign a confidentially statement**. In the case of Groningen, this was necessary to share confidentially information between organisations. It lead to better alignment and more trust between the different organisations. Since trust is mentioned as characteristic in the Eindhoven case, and a certain relation indicates with this lesson learned, it will be included as characteristic in the factor 'need for trust among stakeholders'.

**Be more transparent in the beginning** is mentioned in the beginning of the project in the case of Groningen. Sometimes, it feels like that more transparency leads to more business-like attitude. However, it seems like that it is necessary to align planning and risks. Probably in the case of Eindhoven this transparency is necessary as well, however there is not one respondent who mentioned this as lesson learned. Since only two respondents this lesson learned mentioned, it is excluded further in this research.

Next, **a back-up plan by not available product**. This lesson learned is related to the case of Groningen. When the hydrogen buses were not available on time, there were buses on fossil fuel as back-up. Since this lesson learned is very specific for this project and cannot be linked towards a general lesson learned for the PPA in transition processes, it is excluded further in this research.

**Align specifications with impact for others within the alliance**. This was important in the case in Groningen since this was a new supply chain involved. Specifications upfront in the supply chain should be aligned with specifications from other organisations in the supply chain. This is not explicitly mentioned in the case of Eindhoven. However, this lesson learned can be of importance in other projects. Therefore, this lesson learned is included further in this research.

An **open request** is a lesson learned of the case in Eindhoven. The initiator in this case was clearly the municipality of Eindhoven. They did an open request to the market with just some goals for the long-term. The lesson learned is mentioned because this led to innovation and creativity of the market. In the case of Groningen the question was open as well. However, probably because of the way the project in Groningen is initiated, this lesson learned is not mentioned. In Groningen it was an initiative of public and private organisations as well. The project did not really start with a clear question. Thereby, the open request is related to the flexibility in the scope. Since this lesson learned arises in only one case, it is excluded further in this research.

The last difference is **the necessity of skilled people**. This lesson learned is related to the way of working. Working in an environment without a precise scope, unexpected process, and people with other backgrounds requires specific skills. In the case of Eindhoven this lesson learned is mentioned. Since the lesson learned is only mentioned in one case, it is excluded further in this research.

## 9.5 CONCLUSION

In this section a cross-case analysis is conducted. The two empirical cases are compared and the results analysed. Results which arise in both cases, can be considered as more relevant. The cross-case analysis is used to derive factors of the PPA in transition processes that are reasonably assumed as valid. The factors considered as valid regarding the two empirical cases, lead to an answer of the two sub-questions.

Before answering these questions, the pre-conditions are important to consider. The sub-questions state a certain value of the PPA in transition processes. When a project strives for a circular economy, and transition processes are present in a project, then a relevance is aware for the questions 'how the PPA can stimulate' and 'how the PPA can be optimised'. To examine whether the PPA in transition processes

towards a circular economy is relevant, the pre-conditions have to be met, following the two empirical cases. Next, the characteristics are considered as stimulating and facilitating regarding the pre-conditions. For instance, an unexpected processes (pre-condition) is stimulated and facilitated by flexibility in the scope (characteristic). The characteristics during the project of the PPA in transition processes, lead to lessons learned. For instance, flexibility in the scope (characteristic) lead to more interaction between involved organisations, and thus to a lesson learned 'collaboration between involved organisations'. An improvement in the collaboration between involved organisations stimulate and facilitate pre-conditions as well. These relations are displayed in figure 9.5. So the pre-conditions for the transition towards a circular economy are:

- Unexpected process
- Long-term vision beyond project towards transition task
- Changing market
- No full developed market

Sub-question: *"How can, based on findings of empirical cases, the use of public-private alliance stimulate the transition towards a circular economy?"* The following characteristics stimulate the transition towards a circular economy of the public-private alliance:

- Transparency in interests
- Transparency in the business case
- Equal role in decision-making
- Ongoing process of problem solving
- Flexibility of the scope
- Shared knowledge development
- Supply chain involved in the alliance
- Trust among stakeholders

Sub-question: *"How can, based on findings of empirical cases, the use of public-private alliances be optimised in transition processes?"* The following lessons-learned can be used to optimise the public-private alliance to stimulate the transition towards a circular economy:

- Plan enough time but execute efficient
- Discuss how you want to collaborate
  - o Code of conduct
  - o Outline focus aspects of PPA
- Collaboration between involved organisations
  - o Shoulder to shoulder principle
  - o Careful selection of organisations
  - o Communication lines between steering group and operational level
- Consider the alliance as separate organisation
- Align specifications with impact for others in the supply chain

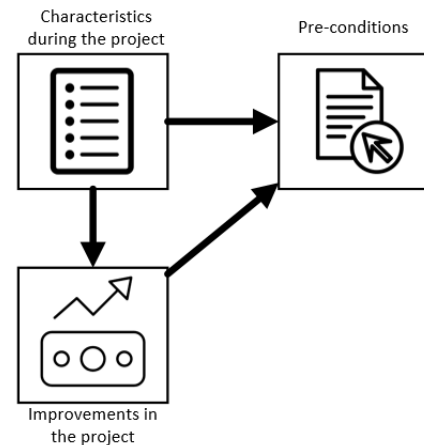


Figure 9.5 Relation between pre-conditions and stimulating factors of PPA in transition processes (own illustration, 2018)



- Involvement independent authority or employees

The two examined projects strive both in another way for the transition towards a circular economy. However, the cross-case analysis does not show big differences between the two cases considering the pre-conditions and characteristics. In the lessons learned a great amount of similar factors is aware as well. Important note is that these were more similar after generalising the factors. Lessons learned in only one project are often related to very specific events. The lessons learned are mostly related to collaborations aspects between organisations and people. It is unlikely that lessons learned are similar in detail since it depends on events between people and organisations in a specific project. Interpretation, personality and reflection of people are leading in these empirical results. However, after generalising factors a lot of similarities are derived. In order to stimulate the transition to CE, improvements in the PPA can be made towards collaboration aspects between people and organisations.

The cross-case analysis is important to discover general experiences in using the PPA in transition processes. Also to exclude not relevant factors and outliers. However, it has taken into account that there are only two cases conducted. Therefore, a practical validation should help to make the results more reliable. Still after this practical validation, it is important to consider the number of cases in the conclusions of this research.



# 10. VALIDATION

In the previous chapter the cross-case analysis is executed. There are factors derived of the public-private alliance in transition processes of two empirical cases. In this chapter, a validation is conducted to compare the derived factors to an initiated project with similar characteristics regarding the PPA in transition processes. It validates the results of the two projects. The case is about realising a circular viaduct. It is in the initial stage and therefore not used as a third empirical case in this research. In an initial stage, the lessons learned are considered as less relevant. However, the pre-conditions and characteristics of the PPA in transition processes in this project are relevant regarding the validation of the two empirical cases. The results of the validation are derived by one interview with a participant in the project of Rijkswaterstaat. The results are derived by three open questions considering the pre-conditions, characteristics and lessons learned of the project. The case of the circular viaduct meets the requirements as mentioned in section 6.4. It has a certain contribution to CE and a transition task. Thereby, the project is executed by a PPA.

## 10.1 BACKGROUND

The project is initiated by the contractor. It focuses on the project of the N18. This road will be widened and aims to reduce traffic accidents and to increase the liveability in the area of Eibergen, Haaksbergen and Enschede. The client in this project is Rijkswaterstaat as public organisation. The project includes the development of several viaducts. The idea for the design of a circular viaduct arises at van Hattem and Blankevoort. They organised a meeting with Rijkswaterstaat and several private parties. After the meeting they started a consortium in which Rijkswaterstaat and several private parties participate. The consortium is a form of the PPA where a public party and several private organisations work on an equal basis. All the organisations are involved in the project equally. The project is now waiting for approval in order to develop the first circular viaduct. The design stage started half 2017, and is in the beginning of 2018 finished. The design of the circular viaduct focus on the modularity. Thereby, the ownership is reconsidered and there discuss how it is financially feasible.

## 10.2 EMPIRICAL RESULTS

### a) Pre-conditions

In figure 10.1 the pre-conditions are shown. It includes the confirmed factors of the cross-case analysis and whether the respondent for the validation mentioned one of the pre-conditions. The pre-conditions are factors which were present before the project started.

Pre-conditions	Case 1	Case 2	Conclusion cross-case	Practical validation
Unexpected process	x	x	x	x
Long-term vision beyond project	x	x	x	x
Changing the market		x	x	x
No market	x		x	

Figure 10.1 Pre-conditions - Validation (Own illustration, 2018)

The motivation for this form was not made conscious, it was an automatic process. There is agreed on developing a circular viaduct between public and private organisations. There was no idea how the viaduct will be developed or where the viaduct will be build. An unexpected process and a changing market or no full developed market was the motivation in the two empirical cases in this research. This is in line with the motivation for the development of the circular viaduct. The process is unexpected at the start of the project. Thereby, there is no full developed market for circular viaducts. However, there is a market for viaducts. The question for a circular viaduct can also be framed as a changing market. The long-term vision beyond project can be related to ambitions of the government to reach for a full circle economy in 2050.

*“There is agreed on an intention agreement in which is stated, we are going to develop a circular viaduct. Whatever that may be (Kerkhofs, 2018).”*

### b) Characteristics

The respondent is asked how the collaboration can be characterised in this project. The following aspects are mentioned by the respondent: openness, transparency, trust, knowledge development, and supply chain involvement. Openness and transparency relate to the collaboration between Rijkswaterstaat and the contractor. They have to be open in their information and internal processes for decision-making. Because of the unexpected process and less contractual agreements, trust in each other is an important factor. Organisations should trust the other side in their willingness to let the project succeed. Knowledge development is mentioned by the respondent regarding knowledge about circular viaducts. The quote in the previous paragraph shows little experience about how to build a viaduct in a circular manner. Last characteristic derived from the validation is about involvement of the supply chain. In this project there are several other private organisations involved. A supplier of concrete prefab products, a research company towards materials and sustainability in the built environment, a knowledge institution which focuses on practical solutions, and a company which focus project management. Not all organisations within the supply chain are involved, but more than only a client and contractor. As shown in this figure, there are several characteristics that correspond with derived characteristics from the two empirical cases.

Characteristics	Case 1	Case 2	Conclusion cross-case	Practical validation
Transparency in interests		x	x	x
Aligned interests in project	x			
Organisations with different backgrounds	x	x		
Transparency in the business case	x	x	x	x
Equal role in decision-making	x	x	x	
Ongoing process of problem solving	x	x	x	
Flexibility in the scope	x	x	x	
The alliance as separate organisation		x		
Shared knowledge development	x	x	x	x
Supply chain involved in the alliance	x	x	x	x
Trust among involved stakeholders	x		x	x
Risk management	x	x		

Figure 10.2 Characteristics - Validation (Own illustration, 2018)

### c) Lessons learned

Lessons learned are less relevant in this stage of the project. Therefore, the lessons learned are omitted in this practical validation. However, what the respondent mentioned is a difficulty in aligning interests of different organisations. Probably further in the project, lessons towards experiences towards the process of aligning interests will be of value. Thereby, the interviewer suggest that role should follow the market and should not have to define a pre-defined solution. Last suggested lesson learned, is a difficulty in tender legislation, and the effect of legislation on how you want to collaborate as public organisation with private organisations.

## 10.3 CONCLUSION

The validation leads to a comparison between the results of the cross-case analysis and the outcomes of a third case. Three pre-conditions and five characteristics from the circular viaduct as third case are similar to the outcomes of the cross-case analysis. It confirms the relevance of characteristics of the PPA as stimulating and facilitating factors in the transition towards a circular economy. Thereby, the cross-case analysis concludes that lessons learned focus on the collaboration between organisations and people within the project. The suggested lessons learned from the interviewee of Rijkswaterstaat leads towards similar lessons. The validation shows that the results of the research are useful for future projects in which the PPA is used in transition processes.

## V. CONCLUSIONS

# 11. CONCLUSIONS

This research gained insights into how public-private partnerships can stimulate the transition towards a circular economy. The theoretical framework in figure 11.1 has been used to define the research area. In this chapter, the theoretical framework is compared to the results of this research. Next, the research questions are answered. Last, the added value of this research is outlined regarding scientific and practical relevance.

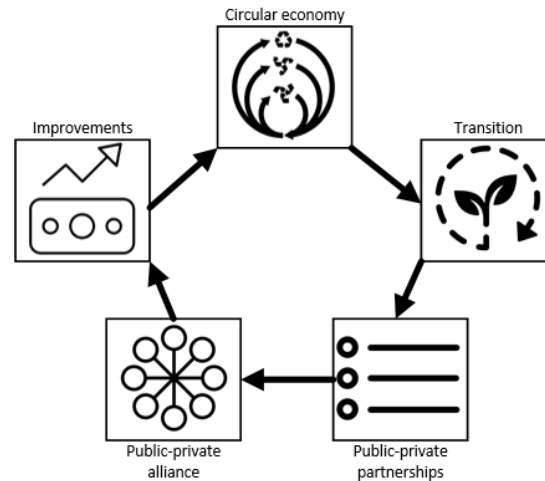


Figure 11.1 Theoretical framework (Own illustration, 2018)

First, the concept of circular economy is outlined. The transition from a linear to a circular economy is considered as change in routines, change of the current system and consists of challenges and barriers in areas such as technological, financial, operational, governmental, and societal. This leads to considerations to place the concept of circular economy in a broader perspective of a transition. Transition literature describes the complex road towards sustainable growth of our society. Transition processes are described as 1) an unexpected process, 2) alignment of societal goals and business goals of public and private organisations and 3) shared perspective between participants. Since public authorities have a relative big market share, they can accelerate the transition. Nowadays, traditional forms and concession forms regarding executing public goods are most common. However, these forms are based on a pre-defined solution. Since transition processes are characterised as unexpected, the public-private alliance should be the most suitable. The public-private alliance should be suitable because it can deal with an unexpected process by a flexible scope. Additionally, there is little experience on operational level of the PPA. Two cases are analysed in order to give insights in how the PPA stimulates the transition towards a circular economy. The case study method is used to gain these insights. In two cases, eleven respondents are interviewed. The first case (six interviews) focuses on circular economy in the building industry in Eindhoven. The second case (five interviews) focuses on a circular energy network in Groningen. The interviews were divided in three parts. First (a), what are the pre-conditions for the public-private alliance in transition processes? Second (b), what characteristics do the public-private alliance have in transition processes? Third (c), what are lessons learned of the PPA in transition processes? The pre-conditions are considered as starting points for the two projects. The characteristics stimulate and facilitate the pre-conditions. The lessons learned are the outcome of collaboration aspects between organisations and people of the PPA in transition processes. The lessons learned should stimulate and facilitate the transition to CE in future similar projects.

### a) Pre-conditions of public-private alliance in transition processes

Pre-conditions	Case 1	Case 2	Cross-case analysis	PPA literature	Transition literature
Unexpected process	x	x	x	x	x
Long-term vision beyond project	x	x	x		x
Changing the market		x	x		
No full market	x		x		

Figure 11.2 Pre-conditions - Conclusion (Own illustration, 2018)

An **unexpected process** is one of the most important pre-conditions. In literature, a higher level of uncertainty is suggested as motivation for a more collaborative approach (Koolwijk & Geraedts, 2006). The public-private alliance is very suitable regarding the unexpected process in these two cases. Loorbach & Rotmans (2010) characterise transition processes as an uncertain process. The pre-conditions of the public-private alliance can be related to complexity in the area of scope, time, technique or environment (OV-SAAL, 2015). In the cases of Eindhoven and Groningen, this complexity is related to transition processes towards circular economy. The processes of the development of hydrogen and circularity in the building sector are considered as complex in the areas of time, scope and technique.

A **long-term vision beyond the project** cannot be directly related to PPA literature. However, in transition literature a long-term ambition or long-term vision is an important pre-condition as frame for short-term actions (Frantzeskaki et al., 2012; Loorbach, 2007). The two examined researches can be considered as a short-term action regarding a long-term vision. In both cases, a long-term vision towards the transition towards a circular economy is aware. In literature of circular economy, Kok et al. (2013) mention that developing a long-term company vision is important as well regarding identifying circular opportunities. The two cases show both a long-term vision regarding the transition task. In Groningen, the hydrogen economy in the Province was the long-term goal. In Eindhoven, the long-term goal is stimulating energy neutrality and reusing materials.

A **changing market and no full developed market** are pre-conditions in the empirical cases that cannot directly be derived from literature. However, transition literature suggests that sustainable transition is a change in the current economic system and includes change in the fields of sociology, political, governance, and psychology (Loorbach & Rotmans, 2010). This perspective of transition can be related to a changing market or no full developed market. Loorbach (2007) describes that transition changes the current economic system. The current economic can be considered as a take-waste-dispose model of a linear economy. The two empirical cases show that circular goals in projects lead to increased market dynamics.

## b) Characteristics of public-private alliance in transition processes

Characteristics	Case 1	Case 2	Cross-case analysis	PPA literature	Transition literature
Transparency in interests		x	x	x	x
Transparency in the business case	x	x	x	x	x
Equal role in decision-making	x	x	x	x	x
Ongoing process of problem solving	x	x	x	x	
Flexibility in the scope	x	x	x	x	x
Shared knowledge development	x	x	x	x	
Supply chain involved in the alliance	x	x	x		
Trust among involved stakeholders	x	x	x	x	

Figure 11.3 Characteristics - Conclusion (Own illustration, 2018)

**Transparency in interests** is one of the characteristics considering the collaboration of the PPA in transition processes. This factor is mentioned in the case of Eindhoven. Organisations give insight in their interest towards decision-making in their own organisations, in order to align activities in the project. Davies (2008) mention that transparency is required regarding confidence in decision-making and manage processes and actions within the project. Therefore, this characteristic should have a positive effect on the process of the project in Eindhoven. Aligned interests was a characteristic in the case in Groningen. In transition literature, it has been described that a transition would help governmental authorities change their relationship with business. It strives for both aligned societal goals and business goals (Ministerie van Economische Zaken, 2004). Notable is that the project of Groningen received subsidy from the Ministry of Infrastructure and Water Management. This characteristic is therefore in line with earlier motivations for transition management of the government. It seems that aligned interest between involved organisations is a step further than transparency in interests. Transparency in interests is important in an unexpected process of transition processes towards decision-making and aligning activities. Aligned interests stimulate organisations to strive jointly for a long-term vision regarding a transition task.

**Transparency in the business case** is another derived characteristic. Ross (2003) mentions that transparency is required and nothing can be hidden in a PPA. According transition literature, Nevens et al. (2013) mention that people involved in urban transition teams, should assure transparency in the collaboration. In the case of Eindhoven, transparency in the business case led to the calculation of innovative solutions through a business case of fifteen years. In Groningen, transparency in the business case led to better management of the unexpected process regarding the budget of the project.

An **equal role in decision-making** is derived from both cases. Loorbach (2007) describes that in transition processes all the actors should be represented equally. In the PPA all the participants should have an equal say (Ross, 2003). From transition and literature of PPA as well, an equal role in decision-making is considered important. In Groningen, no developed market was present at the start. An equal role in decision-making led to commitment from every organisation regarding the new supply chain for a hydrogen economy.

An **ongoing process of problem solving** is another important characteristic. Following Davies (2008), unanimously decisions are made towards solutions for problems in the project. During the process sudden changes or problems arise and solutions are defined commonly (Edelenbos & Klijn, 2007). The process of problem solving is in transition literature more focusing on strategic level (Loorbach, 2007).

Not explicit at operational level as in the two examined projects. The ongoing process of problem solving is related to the unexpected process in the project. An unexpected process towards the transition of circular economy requires an ongoing process of problem solving.

The **flexibility in the scope** is clearly related to the unexpected process of transition. The PPA should facilitate room to adapt changes in the scope, risks and opportunities during the project (Department of Treasury and Finance, 2010). Thereby, Loorbach (2007) describes keeping options open as governance principle during transition processes. A predefined solution is not desirable in projects striving for transition. The flexibility in the scope should facilitate the unexpected process and to keep options to adapt arising risks and opportunities.

**Shared knowledge development** is a characteristic of the PPA in transition processes, as outcome of the two empirical cases. Loorbach (2007) describes a learning and reflexive process during a project. The reflexive process aims for change in social actions out of lessons learned. The collaborative design of the PPA promotes knowledge development and learning as well (Lahdenperä & Karjalainen, 2009). In the two examined cases, knowledge development was important considering activities regarding the transition task to circular economy. This knowledge is of value in further developments regarding the long-term vision on the transition task.

**Supply chain involvement** is an addition to literature of the PPA in transition processes. Transition literature suggest that small groups of innovative stakeholders need to be involved in projects (Loorbach, 2007). In the conducted case studies, several respondents mention increased complexity because of relative high number of involved stakeholders. However, it was necessary to have these stakeholders involved to succeed in the project goals. The involvement of the supply chain in the alliance is important to align interests of different organisations regarding a changing market or the development of a new market. The interests of all organisations should fit in the changed or new market.

**Trust among involved stakeholders** is the last characteristic of the PPA in transition processes. Ross (2003) mentions that trust is often an omitted alliance principle. However, it is a fundamental principle in the alliance form. Trust among stakeholders tends to be an outcome instead of characteristic, which need to be assured at the start of a project (Ross, 2003). Thereby, Edelenbos & Klijn (2007) describe a low degree of emphasis on the contract but mutual trust as outcome of sharing risks and responsibilities. In the empirical cases, trust needed to be assured because of unexpected changes in the project. Organisations could not made agreements on everything. Trust was among involved stakeholders was necessary to collaborate in the environment in which the two projects were executed.

### c) Lessons learned

Lessons learned public-private alliance	Case 1	Case 2	Cross-case analysis	PPA literature
Plan enough time but execute efficient	x	x	x	x
Discuss how you want to collaborate	x	x	x	
Collaboration between involved organisations	x	x	x	
Consider the alliance as separate organisation	x	x	x	x
Align of specifications with impact for others	x		x	
Involvement independent authority or employees	x	x	x	

Figure 11.4 Lessons learned - Conclusion (Own illustration, 2018)



In the theoretical framework, two projects are evaluated to derive lessons learned from earlier executed project with use of the PPA. There are differences in market in which these two earlier public-private alliances are executed. One of the projects is an infrastructural project (A2 Holendrecht-Oudenrijn) and the second project is about the development of train lanes for public-transport (OV-SAAL). These two projects are used to compare with the two empirical cases in this research.

As a result of this research, the first lessons learned is to **plan enough time but execute efficient**. In the project of OV-SAAL (2015), planning enough time to give direction and build the public-private alliance is a lessons learned as well. Jointly designing the process, organisation and strategy requires a flexible planning. In OV-SAAL (2015) another lesson learned was to retain a good balance between collaboration and enough speed in the ongoing process of searching. In the two examined cases, the PPA in transition processes required a lot of time. This was due some specific events like aligning interests between organisations, implement innovative solutions, and participants need to get to know each other. In Eindhoven, this was due the preparation of the design of the alliance organisation. Part of this was due the time-consuming tender.

Next lesson derived from the two cases is, **discuss how you want to collaborate**. In both examined cases, an awareness for the alliance principles among the participants was necessary. In Eindhoven, a *code of conduct* was developed to underline desired collaboration aspects. After three months this code of conduct was developed because of some controversy in the collaboration. In Groningen, the collaboration principles of the alliance were not underlined during the project. Some organisations suggest for future projects, *to discuss among the involved stakeholders the most important collaboration principles*. In the two earlier projects using the PPA, this lesson learned did not arise. A need for discussion about focus aspects in the collaboration between participants is of importance for the PPA in transition processes.

Third lesson learned is the **collaboration between involved organisations**. It is a generalised factor of different specific lessons learned from the two examined cases. First specific factor, is the *shoulder-to-shoulder* principle from the case of Eindhoven. Involved employees of the public organisation forms a partner with an employee of the private organisation and the other way around. Second specific factors is about a change in the *communication lines* made after a few months. Lesson learned considering these communication lines, is to place the steering group central. Communication between the operational level of the municipality and private organisations need to go through the steering group or at least the steering group need an update. Thereby, awareness is necessary that *organisations have to be involved in the alliance*. Sometimes for the process it is more efficient to contract a smaller organisation as supplier instead of alliance partner. One of the lesson learned of OV-SAAL (2015) is transparency in communication among involved organisations. Another lesson learned from this project, is a preference of participants for more knowledge about the process of collaboration rather than the content of procedures. The generalised lesson learned can be derived from literature. However, the two examined cases give insight in how the collaboration between involved organisations can be improved by specific improvements.

Next lesson learned is about the **consideration of the alliance as separate organisation**. In the case of Groningen, one of the organisations, considers the alliance as part of their own organisation. This led

to some controversy by other involved organisations. In the case Eindhoven, the alliance organisation was considered as separate organisation as well without any controversy. In the PPA it is in general difficult to assess the distance from the mother organisations to the alliance (OV-SAAL, 2015). Alignment and attention towards the mother organisation is an important condition for success.

**Align specifications with impact for other** is mentioned as lesson learned. Circular economy influence activities of the whole supply chain. Involvement of the supply chain in the PPA in transition processes lead therefore to easier alignment of activities between the different organisations. A change in specifications upfront in the supply chain, leads to different specifications for the last supplier in the chain. No suggestions are made in the two evaluation studies in the theoretical framework about this lesson learned.

The last lesson learned is the **involvement of an independent authority or employee(s)**. In the case of Groningen, two independent process managers were involved to manage the project. Important note is that these process managers had administrative influence. Otherwise, the value is not high enough, considering the costs. In the case of Eindhoven an independent authority of three professors from university were assigned. These will be involved when a certain problem cannot be solved within the alliance. A certain form of independency involved in the PPA in transition processes is therefore considered as important. In the case of Groningen, a form of independency is desired since discussions of problems can be started from an independent view.

### Research questions

The empirical results are concluded and contribute to answering the research questions. The first four questions are answered by use of the theoretical framework. The last two questions are answered by means of empirical cases.

#### 1. What is circular economy?

Circular economy strives for a restorative and regenerative system. Since the industrial revolution, the economy is dominated by a take-waste-dispose model. This linear economy has waste as outcome. A circular economy aims to close the loop of technical nutrients and biological nutrients. The transition towards a circular economy is considered as a change of routines, change of the current system and has challenges and barriers in the areas such as technological, economic, operational, governmental, and behavioural. Stimulate the transition towards a circular economy is a complex road. The road to a linear economy to a circular economy can be placed in a broader perspective.

#### 2. What is circular economy in the perspective of transition?

Transition should create sustainable business, requires systems innovations, long-term approaches, and help changing the relation between government and business in which the transition towards a circular economy fits. Transition describes the complex road towards sustainable growth. This road is characterised as an unexpected process, involvement of different stakeholders, and a required shared perspective between participants. The transition arena is framed as an area where frontrunners

collaborate towards committed sustainable values. It aims for learning and reflexivity, keeping options open, and dealing with uncertainty. Transition processes should facilitate public-private collaboration.

### 3. What is the role of public-private partnerships in transition processes?

Three different directions of executing public goods are distinguished on how risks and responsibilities can be divided. In the traditional direction the risks and responsibilities are with the public party. In the concession direction these are with private organisations. The alliance direction share responsibilities and risks between public and private organisations. Considering the three directions, the alliance direction should be the most suitable in transition processes. The concession direction and traditional direction often need a predefined solution and do not have much flexibility after the contract is signed. Inflexibility cannot deal with an uncertain process of transition. The alliance direction should facilitate this uncertain process better since it is suitable for changes and flexibility in the scope.

### 4. What characteristics do public-private alliances have as form of public-private partnership?

In the public-private alliance, the risks and responsibilities are shared. The alliance form is used in projects with an unexpected or uncertain process with complexity in scope, budget, technique or environment. Several characteristics like aligned interests, greater transparency, cooperation process and an integrated decision-making distinguish the public-private alliance from other forms. The following sum of principles conclude this research question:

- An equal and horizontal relationship between public and private parties
- Low degree of emphasis on the contract and more on mutual trust
- Public and private parties are involved in a joint process of defining problems and solutions
- The scope is considered as flexible and not restricted
- Focused on process management instead of project management.

The previous four research questions are answered through the theoretical framework. It theoretically highlights the relevance of the public-private alliance in transition processes towards circular economy. The next research questions are focusing on the use of the public-private alliance in transition processes towards circular economy empirically. Before answering these questions, certain pre-conditions are important to consider. The sub-questions state a certain value of the public-private alliance in transition processes. When a project strives for circular economy, and transition processes towards circular economy are present in a project, then there is a relevance for the questions 'how the public-private alliance can stimulate' and 'how the public-private alliance can be optimised'. To examine whether the public-private alliance in transition processes towards circular economy is relevant, the pre-conditions have to be met following the two empirical cases. The pre-conditions derived for the public-private alliance in transition processes are:

- Unexpected process related to the transition task
- Long-term vision beyond project related to the transition task
- Changing market or no full developed market

### 5. How can, based on findings of empirical cases, the use of public-private alliances stimulate the transition towards a circular economy?

In two empirical cases, the transition towards a circular economy is stimulated by use of the public-private alliance. Characteristics of these projects lead to stimulating principles in the use of the public-private alliance. The derived characteristics are considered as recommendation of this research towards future similar projects. Considering the pre-conditions of public-private alliance in transition processes, the following principles in the use of the public-private alliance can stimulate the transition towards a circular economy:

- Transparency in interests
- Transparency in the business case
- Equal role in decision-making
- Ongoing process of problem solving
- Flexibility of the scope
- Shared knowledge development
- Supply chain involved in the alliance
- Trust among involved stakeholders

### 6. How can, based on findings of empirical cases, the use of public-private alliances be optimised in transition processes?

In these two empirical cases, lessons learned are derived in order to search for optimisations in the public-private alliance in transition processes. Notable is the focus of the lessons. The improvements and lessons learned concentrate mainly on collaboration aspects between organisations and people who were involved in the alliance. In future projects of the public-private alliance in transition processes, the focus should be on collaboration factors. The next optimisations can be made in order to optimise the PPA in the transition towards a circular economy:

- Plan enough time but execute efficient
- Discuss how you want to collaborate
  - o Code of conduct
  - o Outline focus aspects of public-private alliance
- Collaboration between involved organisations
  - o Shoulder to shoulder principle
  - o Careful selection of organisations
  - o Communication lines between steering group and operational level
- Consider the alliance as separate organisation
- Align specifications with impact for others in the supply chain
- Involvement independent authority or employees

**Main question: How can public-private partnerships stimulate the transition towards a circular economy?**

The public-private alliance as public-private partnership can stimulate the transition towards a circular economy. The public-private alliance in transition towards a circular economy has a several pre-conditions which have to be met: 1) an unexpected process, 2) long-term vision beyond the project and 3) a changing market or 4) no full developed market. When these pre-conditions meet the transition towards a circular economy, the public-private alliance stimulates by 1) transparency in interests, 2) transparency in the business case, 3) equal role in decision-making, 4) ongoing process of problem solving, 5) flexibility in the scope, 6) shared knowledge development, 7) supply chain involvement in the alliance, and 8) trust among involved stakeholders. The use of the public-private alliance can be optimised to stimulate the transition towards a circular economy by 1) planning enough time but execute efficient, 2) discussing how you want to collaborate, 3) collaboration between involved organisations, 4) considering the alliance as separate organisation, 5) aligning specifications with impact for others in the supply chain, 6) involving an independent authority or employees.

The scientific relevance of this research is the link between transition management towards circular economy and the public-private alliance. The public-private alliance is a form of collaboration on operational level for transition management to stimulate the transition towards a circular economy. Loorbach & Rotmans (2010) mention a need for operational and tactical experiences in transition management. This research contributes to the gap in literature of operational experiences in transition management towards circular economy. It shows how two projects contribute, by use of the public-private alliance, on operational level to the transition task of a circular economy. Several factors are derived which are important to stimulate and facilitate transition processes to a circular economy. These factors and experiences can be used in other transition projects. The public-private alliance is not often used in practice. Therefore, this research contributes to more insight in the use of the public-private alliances as well. The derived lessons learned from the two cases are complementary to existing literature of experiences of the public-private alliance. These lessons learned are a theoretical refinement. Most of the derived lessons learned in this research are in the same direction of collaboration between organisations and people as in literature. This research offers practical guidelines in how to optimise the public-private alliance.

## 12. DISCUSSION

### Perspective of the public-private alliance in transition processes

The main focus of this research is the public-private alliance. It is a suitable model in transition processes towards circular economy. In two cases, the public-private alliance is used to make this transition happen. However, the public-private alliance is not just one type or a form that you can simply apply as format in other environments. The two cases show a lot of differences in activities and environments, while in both, a PPA was used. The public-private alliance consists of several principles which are quite similar in the two examined cases. These principles provide an area in which organisations and people can use space to experiment and learn. For instance, derived characteristics in this research are flexibility in the scope, transparency in interest and ongoing process of problem solving. Therefore, the keynote should not be that PPA is a goal. The keynote should be that no person or organisation exactly knows what the transition enhances and what the road will be. To make a transition happen, frontrunners, inspiratory people and innovators should have an environment in which they experience not too much barriers. Organisations and people need to work together with a long-term ambition and long-term vision which they want to strive for. They cannot do it alone. Often, private parties cannot invest in a development over 10 years when it is unclear whether it is profitable after a few years. Public parties do not have the knowledge, expertise, and employees to develop activities towards a transition on their own. Thereby, you must consider public-public and private-private collaborations as well. The public-private alliance is not just one of the three directions of public-private partnerships. It is about people and organisations who have guts and dare to act as a frontrunner, want to inspire others, and innovate. Give them space to innovate, experiment and learn. The public-private alliance is a model to overcome these challenges.

### The concept of circular economy

Discussions are ongoing about what circularity is and how you can measure it. What impact has a solution in a project for the transition towards a circular economy? Most definitely when the concept is translated to operational activities in projects. In this research, it was not included in the scope to measure the way of circularity. The two cases do have a contribution towards the transition. Full circularity is a future perspective and difficult to measure. What are the effects of activities in projects on the long-term? This is illustrated by the following example. One of the respondents mentioned the current developments towards neighbourhoods without a gas network. This is considered as stimulating towards a circular economy. However, this has an enormous impact for network manager of electricity TenneT. They have to invest billions of euros in the changing demand of electricity. Gasunie, supplier of gas and network manager of pipelines for gas, have to depreciate their pipelines because the developments towards neighbourhoods without gas connections. Also this costs Gasunie billions of euros. Possibly, within several years hydrogen is suitable as energy source for buildings. However, when we build a lot of areas without gas network, we cannot use a gas network for hydrogen. This example shows that activities towards sustainability are difficult to assess. An energy saving activity or a CO<sub>2</sub> reducing activity on the short-term, can have financial contradictions and long-term contradictions in the transition towards a circular economy. This example shows how difficult doing the right thing can be. It is expected, the two examined cases contribute towards the transition towards a circular economy. The final say of the added value can only become clear on the long-term.

### The public-private alliance is rarely used

This research shows the relevance of the public-private alliance as form to stimulate the transition towards a circular economy. The characteristics of this form are concluded as stimulating and facilitating. There are no other projects examined using other types which can stimulate and facilitate. Other contract forms, tender forms or collaboration types like the innovation partnership and Design, Build, Maintain and Remove (DBMR) are arising. Also, service contracts or lease contracts regarding the transition towards a circular economy. The public-private alliance or even principles of the public-private alliance are becoming more relevant considering the cases in this research. In the future, it will be more clear what other types contribute in removing barriers and how they offer space towards the transition. In this research, the public-private alliance is considered as suitable form. The type requires different behaviour and attitude from people than we are familiar with. Thereby, it requires a lot of time to structure the collaboration. Different interests need to be aligned and it takes time to upfront define a business case. Public authorities need time to tender collaborations like these. A certain project size is necessary to develop a feasible collaboration. These factors lead to the fact that the form is rarely used.

Another consideration is the moment of transition in which the public-private alliance is used in these examined cases. The transition towards a circular economy is in an initial stage and much more unexpected and uncertain than on the long-term. When the transition towards a circular economy is more developed, the public-private alliance is probably not necessary anymore. For instance, for hydrogen buses, there is no full developed market and the public-private alliance provide in the discovery to develop this market. When the number of hydrogen buses will be over 100, new tenders for hydrogen buses can be executed by more traditional forms.



# 13. RECOMMENDATIONS & RESTRICTIONS

## 13.1 Recommendations Twynstra Gudde

Twynstra Gudde uses the public-private alliance to stimulate the transition to smart and sustainable mobility. Twynstra Gudde was involved in the project of hydrogen buses in order to structure the process, bring organisations together, and manage the process. They developed a model for the PPA which they apply on the project. It is shown in figure 5.7. The focus is on institutional factors like transparency in interests, transparency in social and financial business case, and a public-private decision structure. In the middle is placed an independent process management, which can be considered as more project specific. The three pillars in the outer layer are focusing on involved organisations. The institutional factors are important to shape conditions in which employees of these organisations can work in a public-private alliance. In this research, these institutional factors were also derived from the two cases as characteristics of the PPA in transition processes. However, more project-specific characteristics and lessons learned are also derived as important for the PPA. In figure 13.1 a new PPA model for Twynstra Gudde is proposed. The three mentioned institutional principles are considered as conditions to structure the way organisations need to aligned. These are placed in the outer layer. The project-specific principles, which affect the way employees of involved organisations interact with each other are in the middle layer. In the most inner circle, the improvements towards collaboration are shown. It should be noted that these three layers are somehow blurred and cannot be totally separated. However, it should Twynstra Gudde help to structure, manage, and process projects which aim to stimulate a transition.

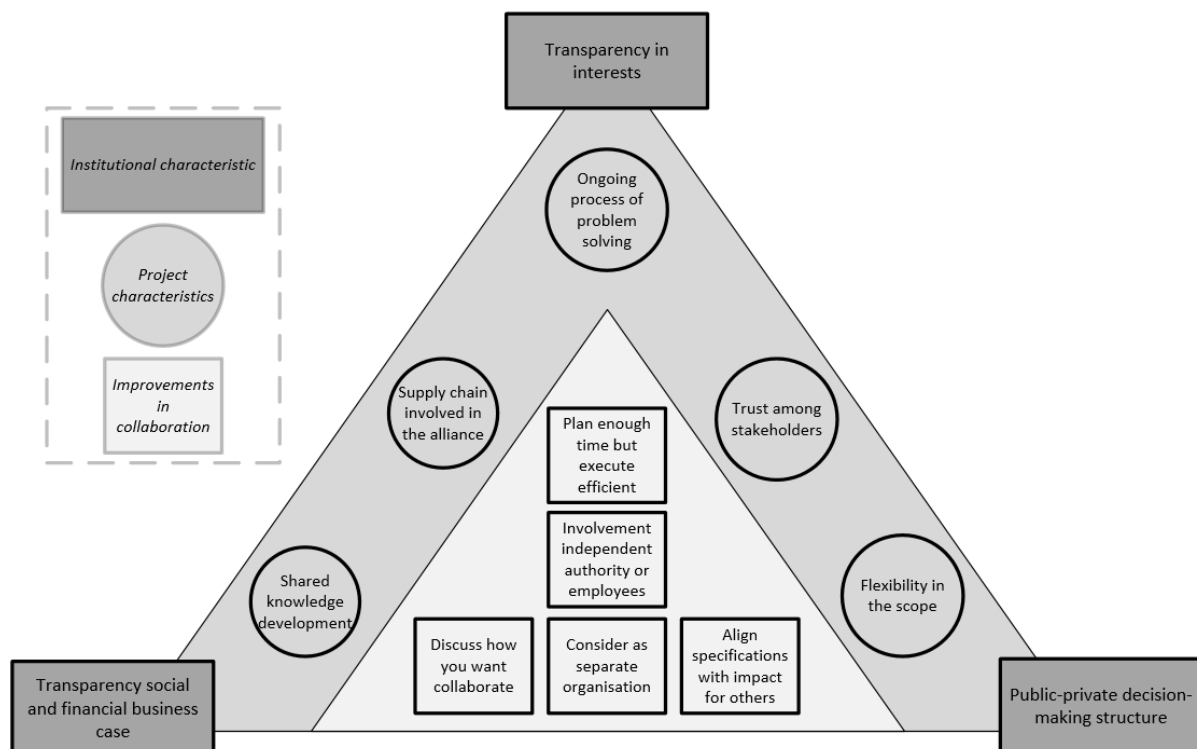


Figure 13.1 Proposed public-private alliance model Twynstra Gudde  
(Own illustration, 2018)



### 13.2 Restrictions research

In this research some restrictions need to be considered:

- First, the number of suitable cases was a restriction. The PPA is not often used and most definitely not in combination with high circular ambitions. Two cases cannot easily be generalised. The external validity is not strong. Thereby, the two cases are focusing on circular economy in a different sector. One of the cases is executed in the mobility sector and the other project is executed in the building sector.
- In what specific way the two cases contribute to the transition towards a circular economy is not measured. The cases strive for a circular economy, however it is not clear in what way.
- An awareness is necessary for biased outcomes from the interviews. The respondents are aware of the focus of the public-private alliance in the projects. Respondents tend to provide social desirable answers.

### 13.3 Recommendations further research

- Further research is recommended towards legal specifications. Current tender legislation which stimulates competition is not sufficient for the transition towards a circular economy. Further research towards barriers in legal specifications in the public-private alliance is recommended for further research.
- Relevant for further research is the relation between projects on operational level, like the two cases in this research, towards vision and goals on strategic and tactical level of transition management. In more general, how do activities in projects (operational level of transition management) contribute to the vision and goals of the transition task (strategic and tactical level of transition management).
- The value of tender procedures like the best value procurement, innovation partnership and competitive dialogue regarding the transition towards a circular economy.
- Further research is recommended towards new financial methods used for projects in a circular economy. What is the value of financial methods like TCO and LCC in a circular economy?

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# APPENDIX

- I. Enablers circular economy
- II. Comparison of PPP directions towards transition process
- III. Interview structure English
- IV. Interview structure Dutch
- V. List of interviewees
- VI. Interview outcomes

## APPENDIX I ENABLERS CIRCULAR ECONOMY

	Enablers towards circular economy
<b>Technological</b>	<ul style="list-style-type: none"> <li>• Innovation necessary in design materials and products (European Commission, 2014; Ritzén &amp; Sandström, 2017)</li> <li>• Innovation necessary in resource management (European Commission, 2014; Ritzén &amp; Sandström, 2017)</li> <li>• Little attention for end-of-life phase of products (Kok et al., 2013)</li> <li>• Linear technologies are rooted in the current system (Pomponi &amp; Moncaster, 2017)</li> <li>• New production models and product services (European Commission, 2014)</li> </ul>
<b>Financial</b>	<ul style="list-style-type: none"> <li>• According current business models: a change in ownership is necessary (Pomponi &amp; Moncaster, 2017; European Commission 2014)</li> <li>• New financial instruments to measure circular economy in new business models (European Commission, 2014)</li> <li>• Up-front costs are high in this transition (Kok et al., 2013)</li> <li>• Stakeholders act with short-term agenda (Kok et al., 2013)</li> <li>• Reduced whole lifecycle costs (Darko et al., 2016)</li> </ul>
<b>Operational</b>	<ul style="list-style-type: none"> <li>• Wider stakeholder management and network management (European Commission, 2014; Pomponi &amp; Moncaster, 2017)</li> <li>• Partnerships and collaboration between public and private parties (Andrew &amp; de Boer, 2012)</li> <li>• Responsibilities, liabilities and ownership are experienced as governance barriers (Kok et al., 2013; Ritzén &amp; Sandström, 2017)</li> <li>• Challenge is to develop a long-term company vision to identify opportunities (Kok et al., 2013)</li> <li>• In collaboration exchange of information is a challenge because of confidentiality and trust issues (Ritzén &amp; Sandström, 2017; Kok et al., 2013)</li> <li>• A driver can be a corporate image, culture, and vision of companies (Darko et al., 2016)</li> </ul>
<b>Governmental</b>	<ul style="list-style-type: none"> <li>• Government has to act like active and expert with the role of launching customer (Bastein et al. 2013)</li> <li>• Government has to focus on policy instruments to support the transition (European Commission, 2014)</li> <li>• Current legislation according competition in tendering projects does not stimulate the transition (Kok et al., 2013)</li> <li>• Current tenders and way of working of public parties often stimulate the linear economy (Kok et al., 2013)</li> <li>• Current legislation which stimulate the transition, is often only linked to energy-efficiency and not to other concepts of circular economy (Darko et al., 2016)</li> <li>• The transition is asking for a different role of public parties (Rijksoverheid 2016)</li> </ul>
<b>Societal</b>	<ul style="list-style-type: none"> <li>• Peoples' knowledge, awareness, and information about circular economy (Darko et al., 2016)</li> <li>• Citizens' involvement is a significant driver for the transition (European Commission, 2014)</li> <li>• Education and training can be a driver towards circular economy (Darko et al., 2016)</li> <li>• Awareness as well in relation to dissemination but more on company and nation level (European Commission, 2014).</li> </ul>

## APPENDIX II COMPARISON OF PPP DIRECTIONS TOWARDS TRANSITION PROCESS

Transition requirements	Traditional	Alliance	Concession
1. Transition breaks with traditional planning aimed at achieving predefined outcomes in a set period of time (Loorbach, 2007)	The client defines in the design exactly what the specifications are in the form of drawings and technical specifications (PIANOo, 2017)	A characteristic in of the alliance model is that the scope is flexible and not restricted (Edelenbos & Teisman, 2008)	There is in this direction of executing public goods still a need for clear formulated project goals at beforehand (Klijn & van Twist, 2008)
2. Transition should deal with a uncertain process (Loorbach, 2007; Loorbach & Rotmans, 2010; Ernst et al., 2016)	The client defines in the design exactly what the specifications are in the form of drawings and technical specifications (PIANOo, 2017)	A characteristic in of the alliance model is that the scope is flexible and not restricted (Edelenbos & Teisman, 2008)	There is in this direction of executing public goods still a need for clear formulated project goals at beforehand (Klijn & van Twist, 2008)
3. Transition requires a shared perspective between participants because of different backgrounds (Frantzeskaki et al., 2012; Loorbach, 2007)	The traditional approach cannot deal properly with increased complexity (Lenferink, Tillema, & Arts, 2013).	A focus in these kind of collaborations is a common process of problem and solving specification (Klijn & van Twist, 2007)	In these kind of contracts there is still a clear client-supplier relation and there is no coproduction (Klijn & van Twist, 2008)
4. Transition helps government change the relationship with business. (Ministerie van Economische Zaken, 2004)	In this form there is a clear client-supplier relation and the transaction costs are lower than in other forms (PIANOo, 2017)	The alliance should stimulate an equal and horizontal relationship between public and private parties (Edelenbos & Teisman, 2008)	In these kind of contracts there is still a clear client-supplier relation and there is no coproduction (Klijn & van Twist, 2008)
6. Transition should facilitate public-private cooperation (Ministerie van Economische Zaken, 2004; Loorbach, 2007)	In this form there is a clear client-supplier relation and the transaction costs are lower than in other forms (PIANOo, 2017)	These kind of collaborations offer room for collaboration in order to strive for synergy effects (Edelenbos & Teisman, 2008)	There is no coproduction and only before the tender there is room for changes and consultation (Klijn & van Twist, 2007)



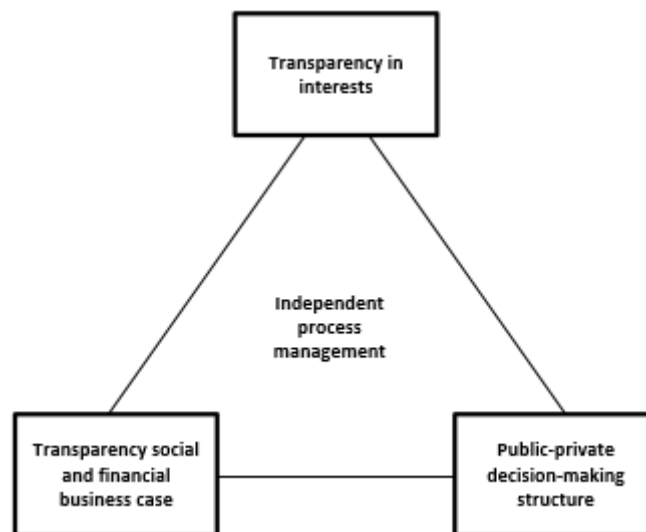
### APPENDIX III INTERVIEW STRUCTURE ENGLISH

This research focus on the public-private alliance and what the contribution is of this model towards the transition towards circular economy. The questions focus on collaboration aspects of the alliance model linked to characteristics of transition. For this research there is made a distinction in public-private forms on the basis of shared responsibilities and risks. Below a figure with three directions of how public-private forms can be divided. In the middle the alliance model is shown. Responsibilities and risks are shared between public and private parties.



*Figure public-private forms*

The alliance model knows different forms and applications. To give an example for this interview, the alliance model is shown in the figure below. It is based on three pillars: transparency in interests, transparency in social and financial business case and public-private decision structure. Finally, in this alliance model, the process management of the project is independent.



*Figure example alliance model*

1. Introduction – research transition task ( 5 min)
  - a. How would you describe the transition task of circular economy?
  - b. How does your organisation contribute to this transition? What are the activities of your organisation towards circular economy?
2. Introduction – case study (5 min)
  - a. How are you (as organisation) involved in this project?
  - b. Why are you (as organisation) involved in this project?
  - c. What is in your opinion, the most innovative aspect of this project?
3. The alliance model general (5 min)
  - a. Why is there chosen, in your opinion, for the alliance model or principles of the alliance model in this project?
  - b. What are in your opinion, the most important used alliance principles in this project?
4. The alliance model in transition (30 min)
 

According to the literature, the alliances are well suited for transition tasks (such as the transition towards circular economy). This is because the alliance form focuses on a jointly process and aims to prevent blaming each other for problems. In light of this consideration, the following questions are asked:

  - a. Alliances should – better than other contract forms – deal with different backgrounds of involved parties in a transition project. How did you experience this?
  - b. Alliances should – better than other contract forms – deal with different interests of parties in a transition project? How did you experience this?
  - c. Alliances should – better than other contract forms – contribute to commonly knowledge development of public and private parties. How did you experience this?
  - d. Alliances should – better than other contract forms – deal with unexpected changes in the process of a transition project. How did you experience this?
  - e. Alliances should – better than other contract forms – deal with flexibility in the scope of a transition project. How did you experience this?
  - f. Alliances should – better than other contract forms – deal with making joint decisions in a process which is difficult to predict. How did you experience this?
  - g. Alliances should – better than other contract forms – deal with a changing relation between public and private parties in transition. How did you experience that?
  - h. Are there other advantages of the alliance model or alliance principles in this transition project?
5. The experiences of the alliance model (10 min)
  - a. What are the definite do's by using the alliance form and by who? What should be secured?

- b. What are the definite don'ts by using the alliance form and by who? What should be avoided?
6. Closing (5 min)
- a. Are there any other aspects for this project important in the collaboration for this transition task?
  - b. Short summary / reflection of this interview
  - c. Do you have other contacts which I could interview for this research?
  - d. Do you have any remarks?

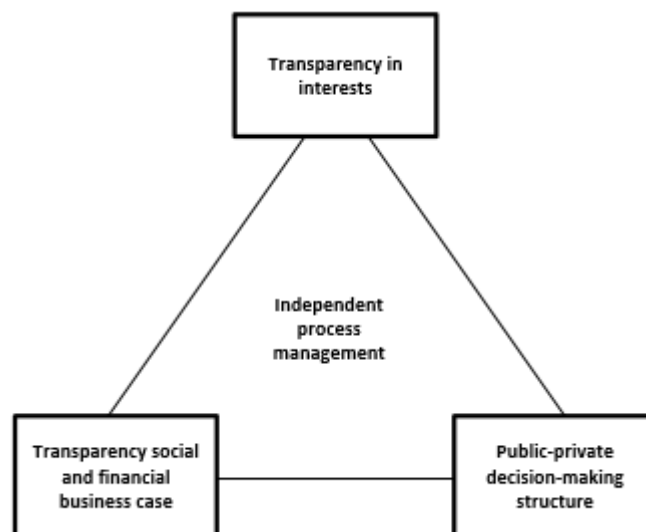
## APPENDIX IV INTERVIEW STRUCTURE DUTCH

Dit onderzoek richt zich op het publiek-private alliantiemodel en de bijdrage die dit model kan hebben richting de transitie naar circulaire economie. De vragen zijn gericht op de samenwerkingsaspecten van het alliantiemodel richting de transitieopgave. Er is in dit onderzoek onderscheid gemaakt in publiek-private vormen op basis van gedeelde risico's en verantwoordelijkheden. Onderstaand een afbeelding waarop een aantal vormen worden weergegeven. In het midden is het alliantie model te vinden waar verantwoordelijkheden en risico's gedeeld worden.



*Figuur Publiek-private samenwerkingsvormen*

Het alliantie model kent vele verschillende vormen en toepassingen. Om een voorbeeld te geven voor het interview, is het onderstaande alliantiemodel weergegeven. Het gestoeld op drie pijlers: transparantie in belangen, transparantie in sociale en financiële business case en publiek-private besluitvormingsstructuur. Als laatste staat centraal in dit alliantiemodel, onafhankelijk procesmanagement.



*Figuur voorbeeld alliantiemodel*

1. Inleiding – Onderzoek transitieopgave (5 min)
  - a. Hoe zou je de transitieopgave naar circulaire economie omschrijven?
  - b. Hoe draagt uw organisatie bij aan deze transitie? Wat zijn activiteiten van je organisatie richting circulaire economie?
2. Inleiding – case study (5 min)
  - a. Hoe bent u (als organisatie) betrokken in dit project?
  - b. Waarom bent u (als organisatie) bij dit project betrokken?
  - c. Wat is volgens u het meest innovatieve aan dit project?
3. Het alliantie model algemeen (5 min)
  - a. Waarom is er volgens u gekozen voor het alliantiemodel of alliantie principes in het project?
  - b. Wat zijn volgens u de meest belangrijke principes in het alliantiemodel die zijn gebruikt in dit project?
4. Het alliantie model in transitie (30 min)
 

Volgens de literatuur zijn allianties bij uitstek geschikt voor transitieopgaven (zoals de verandering naar circulaire economie). Dat ligt vooral aan de contractvorm die gezamenlijk handelen bevordert en afrekengedrag tegengaat. In dit licht zijn de volgende vragen opgesteld:

  - a. Allianties zouden – beter dan andere contractvormen – omgaan met de verschillende achtergronden van betrokken partijen in een transitieproject. Hoe heeft u dat ervaren?
  - b. Allianties zouden – beter dan andere contractvormen – omgaan met verschillende belangen van partijen in een transitieproject. Hoe heeft u dat ervaren?
  - c. Allianties zouden – beter dan andere contractvormen – bijdragen aan gezamenlijke kennisontwikkeling van publieke en private partijen. Hoe heeft u dat ervaren?
  - d. Allianties zouden – beter dan andere contractvormen – omgaan met onverwachte veranderingen in het proces van een transitieproject. Hoe heeft u dat ervaren?
  - e. Allianties zouden – beter dan andere contractvormen – omgaan met flexibiliteit in de scope van een project in transitie. Hoe heeft u dat ervaren?
  - f. Allianties zouden – beter dan andere contractvormen – omgaan met het nemen van gezamenlijke besluiten in een moeilijk te voorspellen proces van transitie. Hoe heeft u dat ervaren?
  - g. Allianties zouden – beter dan andere contractvormen – omgaan met een veranderende relatie tussen publiek en privaat in transitie. Hoe heeft u dat ervaren?
  - h. Zijn er nog andere voordelen die u heeft ervaren van het alliantiemodel in dit transitieproject?

5. Het alliantiemodel ervaringen (10 min)
  - a. Wat zijn de absolute do's bij het werken in de alliantievorm en door wie? Wat moet er worden geborgd?
  - b. Wat zijn de absolute don'ts bij het werken in de alliantievorm en door wie? Wat moet er worden vermeden?
  
6. Afsluiting (5 min)
  - a. Zijn er nog andere aspecten binnen het project, buiten de gestelde vragen die belangrijk zijn in de samenwerking voor de transitieopgave?
  - b. Korte samenvatting / reflectie op gesprek
  - c. Heeft u nog contacten die ik voor mijn onderzoek kan interviewen binnen de cases?
  - d. Heeft u nog opmerkingen?

## APPENDIX V LIST OF INTERVIEWEES

Interviewee	Project	Company	Date
Erwin Stoker	Hydrogen in Groningen	OV-Bureau Groningen Drenthe	18-12-17
Jan Willem de Kleuver	Hydrogen in Groningen	Twynstra Gudde	02-01-18
Michel van der Mark	Hydrogen in Groningen	Qbuzz	11-01-18
Marnix van Berkum	Hydrogen in Groningen	PitPoint	12-01-18
Joost Sandberg	Hydrogen in Groningen	AkzoNobel	18-01-18
Eertwijn van den Dool	Hydrogen in Groningen	Groningen Seaports	02-02-18
Alexander Hesling	Municipality buildings Eindhoven	Kuijpers	19-01-18
Joop Ketelaers	Municipality buildings Eindhoven	Municipality of Eindhoven	23-01-18
Bas Niese	Municipality buildings Eindhoven	BRINK Management / Advies	30-01-18
Joyce Vercoelen	Municipality buildings Eindhoven	Municipality of Eindhoven	05-02-18
Machiel Karels	Municipality buildings Eindhoven	Buro Loo	14-02-18
Stan Kerkhofs	Circular viaduct	Rijkswaterstaat	16-02-18

APPENDIX VI OUTCOMES INTERVIEWS

**- Confidential –**

Interview outcomes on request



