Graduation project Maaike van Selm

Designing for **climate adaptive behaviour change in IJsselmonde, Rotterdam**

A research through design project to inform design for transitions

Graduation project Maaike van Selm
Supervised by Ingrid Mulder & Roland van der Vorst, TU Delft

In commission of the municipality of Rotterdam
Afdeling Stadsontwikkeling, Project Triple A
Supervised by Ariane Lelieveld, Marianne de Snoo & Oubbol Oung

Acknowledgement

First of all, a huge thanks to everyone who contributed to this project, by means of coffee talks, conversations, brainstorms, interviews, coaching, reading and/ or editing this document, and any other advice - I could not have done it without you!

Personal motivation

Our society has to adapt to climate change. Unfortunately, people often feel *'I'* can't, or have to, do anything about it. I care greatly about the well-being of our society and planet and I am concerned: while we are paying all our attention passing the buck *who has to do something*, rainforests are on fire and sea levels are rising. Within this project, I aim to discover *how can we stop passing the buck and start adapting to climate change.* I have done this by designing for climate adaptive behaviour change in IJsselmonde, Rotterdam. The learnings of this project will be used to inform the practice of transition design, with the aim to develop this emerging discipline - *hoping that results of this project, and the development of this discipline will lead to sustainable transitions*

Abstract

Our society is facing a major challenge: to combat climate change. This requires transformation into a society that does not emit greenhouse gasses. This is known. However, it is not known, how to realise this transformation. This is experienced by Gemeente Rotterdam, as they are responsible for realising the sustainable transformation of the city, and leads to the question: *what can Gemeente Rotterdam do, in addition to their current strategy, to realise the sustainable transformation in IJsselmonde?* This project answers the question as following: Gemeente Rotterdam can further develop and organise the design intervention Schoonschip Week in IJsselmonde. The Schoonschip Week is an organised declutter event, with provided declutter facilities. Decluttering is personal relevant to IJsselmonders, as it increases mental health (tidy house, tidy mind). Decluttering is considered to be a reflective activity, in the climate adaptive behaviour category belongings. Reflection on behaviour in a climate adaptive category, is expected to lead to (receptiveness for) climate adaptive behaviour - which is needed to realise the sustainable transformation.
By organising the Schoonschip Week, it can be evaluated if this is indeed the case. If so, this design intervention can also be used (or adapted) for the sustainable transformation of other districts in Rotterdam.

The question of Gemeente Rotterdam, is a question in a sustainable transition context. Creating an answer for this question through a design project, is designing for transitions. This project is carried out with the help of a map and design approach, which are created based on the indicated limitations and recommendations for research for the transition design practice. Both are experienced as valuable within this project. The creation, use and evaluation of the map and design approach, inform the transition design practice how to design for transitions - and contribute to the development of this emerging discipline, that aims to realise sustainable transitions with a design-led approach.

Contents

Introduction

This project is a graduation project for the master Strategic Product Design of the Delft University of Technology, with a time-frame of 100 working days. Based on the personal interest to design for (sustainable) transitions, *a case-study in a transition context is carried out in commission of gemeente Rotterdam,* and *used to inform the transition design practice.*

Gemeente Rotterdam

Global goal, local challenge

World wide, greenhouse gas emissions have to be reduced to zero by 2050, in order to limit global warming to 1.5*, the indicated maximum rise of temperature before the effects of climate change make our planet unlivable (Intergovernmental Panel on Climate Change, 2018). It is international agreed to reduce world wide greenhouse gas emissions in the Paris Climate Agreement (2015). Based on this international agreement, the national Dutch Climate Agreement is created (presented June 28th 2019).

The first sector mentioned in the Dutch Climate Agreement (2019) is the build environment; this sector is responsible for 40% of the Dutch greenhouse gas emissions:

"We are on the cusp of a sustainable transformation of the built environment and of the adaptation of the 7 million homes and 1 million buildings we have built […] We have chosen a structured approach, tackling one district at a time. ***The municipalities play a crucial role in this regard****"*

"It can be done effectively, provided that we tackle the issue in a structured manner and improve all relevant conditions, as well as ***take a broader view of the sustainability task ahead*** *and include the circular economy as a key component. Perhaps the most important aspect is that we realise that the most significant challenge we face in this endeavour is not a technical, financial or administrative challenge,* ***but a social challenge. It's about people****"*

Accordingly, Gemeente Rotterdam is working on the sustainable transformation of the build environment. Currently, in the district IJsselmonde.

Local challenge, question

There is however, little knowledge on how to realise the sustainable transformation of the built environment. Gemeente Rotterdam is participating in the European initiative Triple A. Triple A is an initiative *"for local authorities who are seeking to support homeowners to reduce emissions in their homes"* (Triple A, 2019). According to triple A, providing Awareness and Access should lead to Adaptation of low-carbon technologies by home-owners, which in turn should lead to reduction of energy consumption of households and the reduction of greenhouse gas emissions.

In line with the Triple A strategy, the Duurzaamheidswinkel (information store on sustainable living) in the local shopping mall Keizerswaard, and the website duurzaamrotterdam.nl are created. Both the Duurzaamheidswinkel and website include other topics on sustainable living - this is in line with the national guidelines to combine this sustainable transformation of the home-environment with a broader view of the sustainability task ahead.

As noticed by the municipality, the Duurzaamheidswinkel and website are not winning over the IJsselmonders, at the pace they would like to see. This leads to the question of the municipality: in addition to the Duurzaamheidswinkel and website, ***what else can we do to realise the sustainable transition of the build-environment, and life-style, in IJsselmonde?***

Transition design

Sustainable transitions

Due to the urgency of climate change, our society has to fundamentally transform the systems it is build on into sustainable systems. Though fundamental system transitions have occurred multiple times in history, they have never been steered, accelerated or facilitated: they happened organically. In current times, it is of great importance to steer, accelerate and facilitate system transitions, in order to reach both the required pace and right direction to combat climate change.
Due to this urgency, transition studies has become an academic field. However, little action on realizing transition is reported. With the aim to act, transition design came to the play: a design-led approach to realise sustainable transitions. The aim of the discipline is clear, the practice of the discipline is not yet developed nor validated, and ends with *the question* ***how to design for transitions?***

Project overview

The question of Gemeente Rotterdam, is a question in a sustainable transition context. Creating an answer for this question through a design project, is designing for a sustainable transition. Thereby, this is project is a great opportunity to answer both the questions of Gemeente Rotterdam and the transition design practice. The question of the municipality is answered with a design proposal which is created through a design process (part 2) and an evaluation of the implications and value of this design proposal (part 3). Then, the question of the transition design practice is answered based on an evaluation of the design process (part 3). **Doing this, is called research through design: the design activities that are carried out to answer the question of the municipality, are evaluated to generate knowledge for the transition design field.**

Before this graduation project, a research into the transition design practice is carried out. The result of this research are indications for limitations, and research directions to develop the transition design practice. In order to effectively develop the practice, this project builds upon this knowledge by taking this information into account, and use it to prepare the design process in part 2. This is done in part 1 of this project. Below, the project overview is visualised (figure 1).

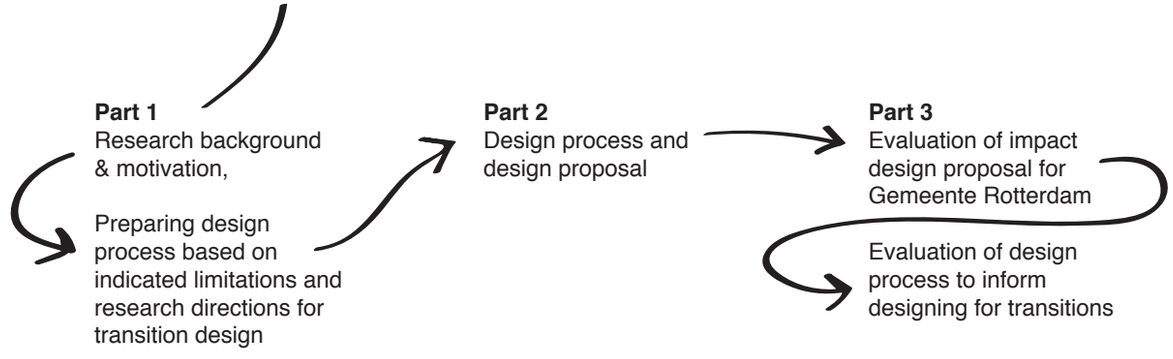
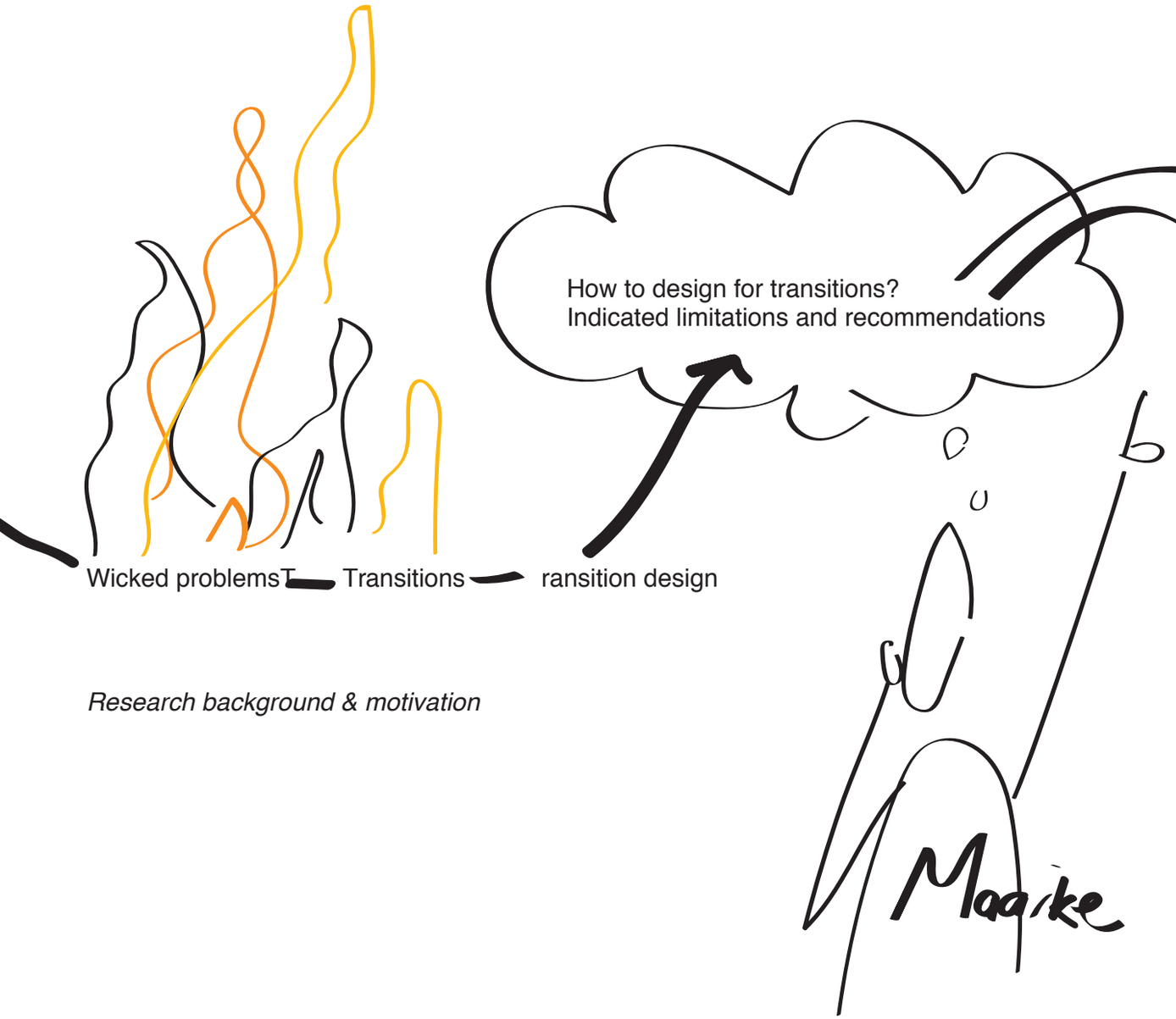


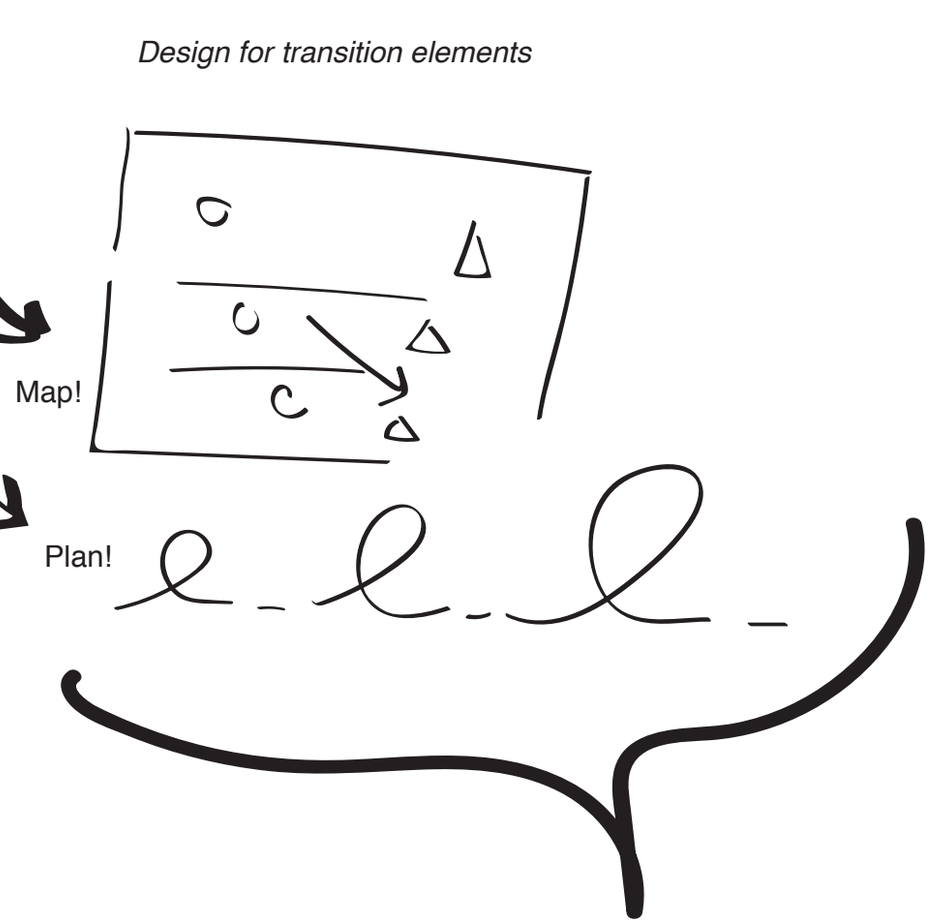
Figure 1: project overview

Part 1

In this part, the research background and motivation to explore the question how to design for transition, are explained. Next, it proposes two elements that will be used in the design phase of this project based on the indicated limitations and research directions for transition design.



Research background & motivation



Let's go design!

Research background & motivation

In order to understand the context and relevance of the research part of this project, the research background and motivation for this project are first introduced.

Research background: the need for system transitions

The growing urgency to address wicked problems
Our society is facing a multitude of wicked problems. To name a few: climate change, loss of biodiversity, depletion of resources, a widening gap between rich and poor (Loorbach, 2014; Irwin, Kossof, Tonkinwise & Scupelli, 2015). The urgency to address those wicked problems is growing, as they increasingly threat our society and the eco-system of the earth. Wicked problems are symptoms of the systems that organise our society (Loorbach, 2014).
A system is defined as *"a set of working together as parts of a mechanism or an interconnecting network; a complex whole"* (Oxford dictionary, 2019). Those systems are, for example, energy, food, mobility, housing, and health care.

Characteristics of systems
More in detail, systems are characterised by the following: *"they exist at (1) multiple levels of scale, are (2) interconnected and interdependent, are (3) self-organizing, (4) display emergent properties, and (5) their dynamics are governed by feedback loops. Therefore changes in one area of a system, ramify throughout in unpredictable ways"* (Irwin, 2019).

Due to those characteristics, systems are nearly impossible to oversee and to fully grasp, and it is difficult to predict the effect of a change within a system.

Addressing wicked problems requires system transitions
As mentioned, wicked problems are symptoms of systems. As is known, the most effective way to address problems is threating the cause problem. Thereby, addressing wicked problems requires fundamental change of those systems, into sustainable systems (Raskin et al., 2002; Irwin et al., 2015). Systems can transition into new systems (Loorbach, 2014; Irwin, 2019).

Characteristics of transitions
"Transitions are understood as long-term, complex and non-linear processes of systemic change" (Mulder & Loorbach, 2018).
More in detail: *"A transition is the result of developments in different domains. In other words, a transition can be described as (1) a set of connected changes, which (2) reinforce each other but take place in several different areas, such as technology, the economy, institutions, behaviour, culture, ecology and belief systems. A transition can be seen as (3) a spiral that reinforces itself; there is multiple causality and co-evolution caused by independent developments"* (Rotmans, Kemp, & van Asselt, 2001, p. 16).

In other words, a transition is (1) a set of changes on multiple levels, (2) that should amplify each other and (3) accumulate change in a direction.

Research motivation: from understanding to action

Transitions studies
As emphasised by many scholars in the fields of transitions and sustainability, it is of great importance to consciously and deliberately steer and accelerate (ongoing) transitions, to ensure a sustainable future (Loorbach, 2014; Irwin et al., 2015; 2019; Grin et al., 2010; Raskin et al., 2002). In line with this, transition studies became an academic field (Escobar, 2015), and much knowledge on how transitions take place is generated. However, little action to realise the sustainable transitions has been reported. "*Much has been under debate on the need to change and to cope with societal transitions, less emphasis, however, is devoted on how to do so"* (Mulder & van Selm, 2019). With the aim to move from understanding to action, the discipline transition design emerged.

Transition design
Transition design aims to address wicked problems through the transition of systems with a design-led approach. As explained by Irwin (2018)*: "A new, design-led approach is needed to address the complex, wicked problems confronting societies in the 21st century (Hughes & Steffen, 2013; Jensen, 2017) and to seed and catalyse societal transitions toward more sustainable and desirable long-term futures (Porritt, 2013, pp 274-276)".*

In the Dutch newspaper NRC, the role and value of design in the creation of sustainable futures is explained: *"Anders dan academisch onderzoek, dat op zoek is naar de waarheid, of toegepast onderzoek, dat op zoek is naar de markt,* ***wil ontwerpend onderzoek een probleem oplossen door de toekomst te verkennen, door mogelijke oplossingsrichtingen te onderzoeken****. Ontwerpend onderzoek stelt ontwerpers en opdrachtgevers in staat om samen met onder meer burgers, overheden, bedrijven en bestuurders op zoek te gaan naar hun toekomst"*

In other words, design (research) is about exploration and creation of solutions for a sustainable future. Thereby it moves from understanding, to action. This is in line with the findings of the previous research into transition design (Mulder & van Selm, 2019). However, this research also resulted in *the notion that the value of transition design is clearly argued - the practice, however, is not yet validated nor developed. Building upon this knowledge, this project aims to explore how to design for transitions, and thereby to inform the transition design practice how to design for transitions.*

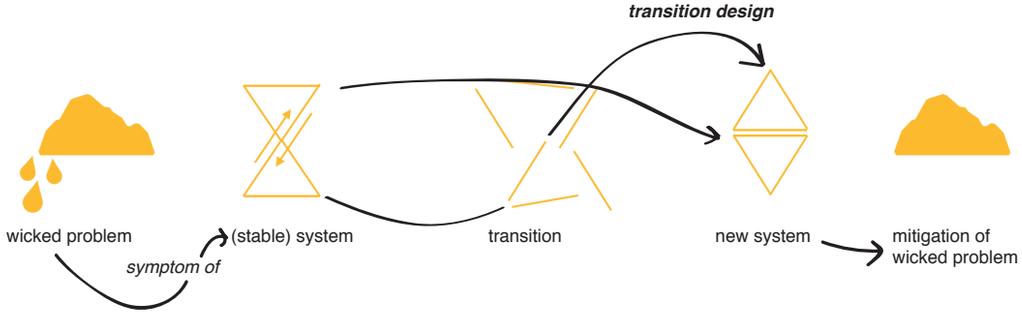


Figure 2: systems, transitions and transition design

Research direction

As explained, there is great relevance to answer the question *how to design for transitions*. As briefly mentioned in the introduction, previous research into the transition design practice resulted in an indication of limitations and research directions for transition design. To prepare the design process of part 2, this section introduces two elements aiming to address the indicated limitations and to explore the indicated research directions.

Previous research results: limitations and research directions

Previous research into the transition design practice (Mulder & van Selm, 2019), resulted in a synthesis of the transition design practice: three phases are proposed. Next, an indication of how well equipped they are, how they relate to the limitations for transition design indicated by Ceschin & Gaziulusoy (2016) and directions for further research are suggested. A summary of the research outcomes is presented below. Based on the indicated limitations and the future research directions, of this research, two elements are introduced: a map which is a schematic representation of the landscape for transition design, and a project approach for the design process based on the 1:10:100 method.

Phase 1 - design research
"This phase is about researching, structuring and understanding the past, present and future context, and the stakeholders, of the problem. This research phase should lead to new insights that are used to create a vision on how to address this problem" (van Selm & Mulder, 2019)

Indication well equipped: there are many design research methods, but they need adaptation to complexity	*Limitation too big picture: it is difficult to move from analysis to action in the complexity of the system*	*Research direction 1: explore a way to structure the system* *Research direction 2: explore an approach to move from analysis to action*

Phase 2 - designing interventions
"[This phase] is about moving from vision towards action by creating the right intervention, at the right place, at the right time" (van Selm & Mulder, 2019)

Indication medium equipped: various methods to create design interventions, lacks methods to strategically plan, situate and link interventions	*Limitation linking (micro and macro) innovations: a transition is a set of connected changes, and the crux of designing a transition is linking multiple innovations (i.e. designs)*	*Research direction 3: explore a way to link and connect innovations (i.e. designs)*

Phase 3 - design practice for transition
"[In this phase, the transition is realised] by accumulation of small happenings and changes, or planned interventions […] [and] measure the effect of design interventions to get insight on their effect, so we steer the non-linear process in the right direction" (van Selm & Mulder, 2019)

Indication not equipped: there are no methods proposed to continuously work on transitions, and to asses the effect and progress of a	*Limitation endorsement: realising transitions requires continuous creation of designs, and assessment of the influence of designs on the system*	*Research direction 4: explore how to continuous create solutions* *Research direction 5: explore how to assess the effect of solutions on the system*

Introducing element: map

Due to the following advantages of using a map (i.e. a schematic representation of the transition landscape), using a map is expected to be useful:

1. A schematical representation allows to structure the complexity of a system transition into a comprehensible overview, which results in insight in the system. *Based on this notion, using a map is expected to address the limitation too big picture, and explores research direction 1: a way to structure the system*
2. Based on the schematic representation of the system, the location of design interventions can be strategically chosen and mapped, and design interventions can be related and to each other. *Based on this notion, using a map is expected to address the limitation linking innovations, and explores research direction 3: find a way to connect innovations*
3. Once the design intervention is carried out and evaluated, the effect on/ in the system can be mapped.
   Based on this notion, using a map is expected to address the limitation endorsement, and builds upon research direction 5: how to asses the effect of solutions on the system

Other disciplines in the transition studies also make use of a schematic representation of the transition landscape. Geels (2002, 2011) created a transition landscape for transition management and Tubergen (2015) created a transition model for sociology.

Geels models the dynamics between the socio-technical regime (meso-level) and niche innovations by ventures (micro-level) in a socio-technical context (macro-level). Design always aims to operate from a user (or, human) perspective. The schematic representation of the transition landscape for design thereby should include humans. This is not included in Geels transition landscape, and thereby it is not suitable for transition design.
Tubergen (2015), created a transition model from a sociological perspective. It models the dynamics between macro conditions and individual behaviour. It leaves out the socio-technical regime and thereby the influence of, and interaction between, individuals and the socio-technical regime. Design aims to operate from a user (or, human) perspective, but takes into consideration the interaction between users and the socio-technical regime. This is not included in Tubergen's transition landscape, and thereby it is not suitable for transition design.

The transition landscapes of Geels and Tubergen both seem not suitable for transition design. Therefor, a map for the transition landscape of design, is designed and proposed. It is based on the transition landscape of Geels (2002, 2011; transition management), and Tubergen (2015; sociology). It models the dynamics between individuals, the socio-technical regime, and the collective paradigm.

Creating: a map for the transition landscape of design

Below, the map for the transition landscape of design is introduced. The structure of the map, and the two ways to use the map are explained. Next, the case study is used to demonstrate the use of the map.

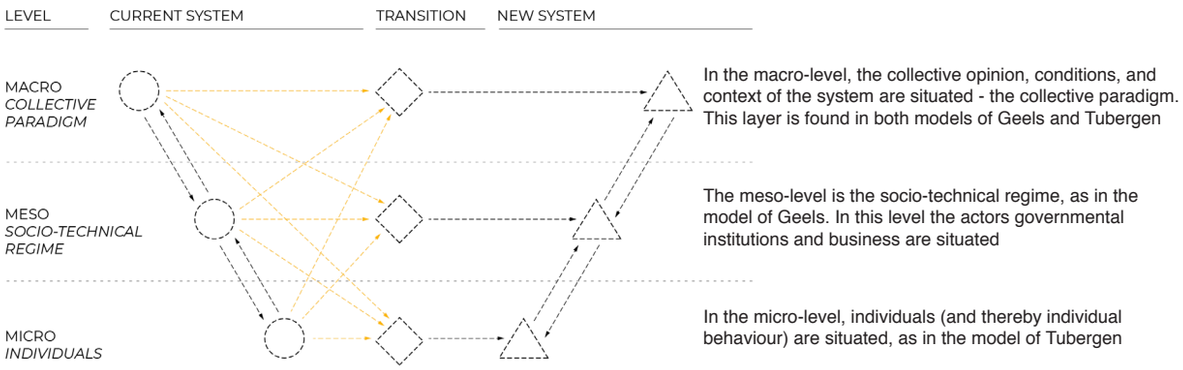


Figure 3: the designed and proposed map: transition landscape for design

The arrows show all levels interact with each other and influence each other, enabling each layer to push (orange arrow) transition or pull (black arrow) in the current system. They also show the many different pathways that can be taken to realise a system transition

Use of map 1: structuring the system and transition context
The first function of this map is to structure system and transition context. The context is layered in three levels: macro, meso and micro, and mapped in the stages: current system, transition and new system.
The relations and interactions in the context can be mapped with the use of arrows.

Use of map 2: creating a transition path
The second function of the map, is the transition path. A transition path is the trajectory that is taken to design for transitions. It maps and represents the relation between
(1) the operating actor,
(2) the bottleneck in the system it aims to remove,
(3) the subject that is concerned with this bottleneck, and
(4) the aimed effect of removing the bottleneck.
Creating a transition path is the first step towards action, as it maps out the relational pattern in the system, and locates the design.
Using a transition path is inspired on the work of Werbeloff, Brown, and Loorbach (2016)

Demonstration of use of the map

Below, the use of the map is demonstrated with case-study of this project. Next to demonstrating the use of the map, it is also mapped to set the starting point of the design process of this project.

Use of map 1: structuring the research context

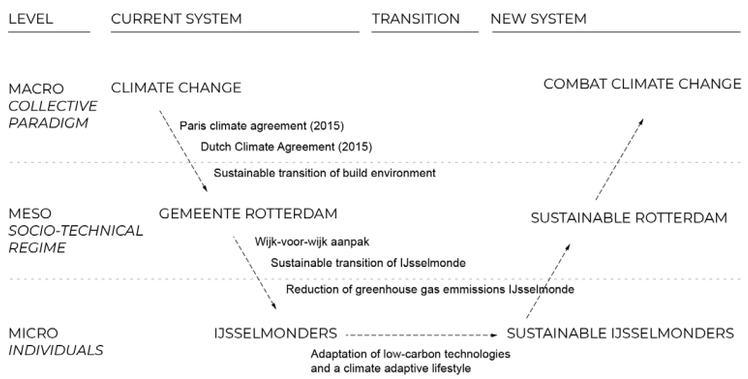


Figure 4: the research context structured in map

Use of map 2: creating a transition path

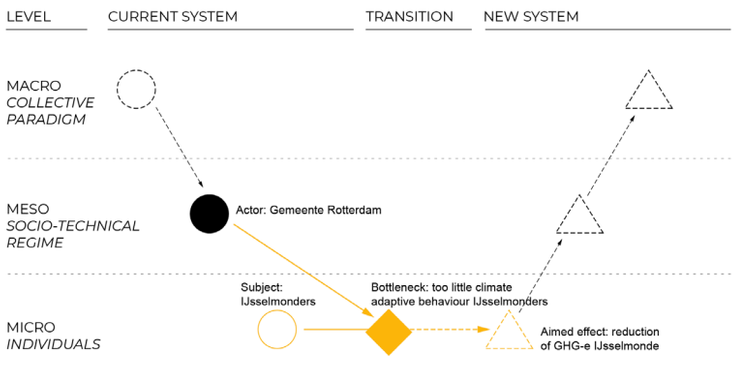


Figure 5: the transition path in map

Introducing the element: project approach based on 1:10:100

For the case-study, the research context is structured and the transition path is set out, both with use of the introduced map. As explained, the use of this map is expected to address indicated limitations, and to explore research directions. However, the map is an analysis tool that can be used to structure complexity. Therefor, to explore *research direction 2: explore an approach to move from analysis to action*, a *second element to address the limitations and research directions for transition design is introduced: a design approach based on the 1:10:100 method*.

The 1:10:100 method
The 1:10:100 method is a relatively unknown design method based on design sprints that increase in time-span. The numbers represent (an indication for) the number of days of three design sprints. This increasing time-span allows to start with discovery, and then to go into detail. It was originally developed to tackle the complexity of wicked problems (van Turnhout et al., 2013).
The difference between 'normal' design sprints and the 1:10:100 method, is the increase in time-span. Thereby, this methods enables to gradually allow more depth in the design process, and to set the a direction to go into depth based on knowledge from previous sprints, without investing much time and resources.

The 1:10:100 method and transition design
Due principles of 1:10:100 method, design sprints an increasing time-span, this method is expected to be useful:

1. The time limitation of sprints enforces to move from analysis to action.
   Due to the time-limitation, using sprints is expected to address the limitation too big picture, and explores research direction 2: an approach to move from analysis to action
2. Working in sprints, enables quick learning without high time and resource investment
   The learnings enable a better understanding of the context in which is operated, and a better understanding of the context will help to overcome the limitation too big picture
3. The increasing time span of sprints in the 1:10:100 method, allows to gradually add more depth in the design process
   Based on this notion, using this method has an advantage over 'regular' design sprints: complexity and depth can be added in the design process, which is expected to be useful as the design process aims to create a design for a complex context

Creating: a design approach based on 1:10:100 for this project

Adaptation of the 1:10:100 for this graduation project
Due to the time-restrictions of this graduation project (100 days), the 1:10:100 method is adapted to a project approach for this project. This project approach is using the principles of the 1:10:100 method: it uses three sprints that increase in time-span. Before the first sprint, between the sprints and after the third sprint, time for evaluation and preparation is scheduled. The time-indication of each stage and sprint is listed in table 1, and the project approach is visualised in figure 6.

Phase	Duration in weeks
Preparation sprint 1	2
Sprint 1	1
Evaluation sprint 1, preparation sprint 2	2
Sprint 2	4
Evaluation sprint 2, preparation sprint 3	2
Sprint 3	3
Evaluation sprint 3	2
Wrapping up the project	4
Total	*20 weeks*

Table 1: time-indication of project phases

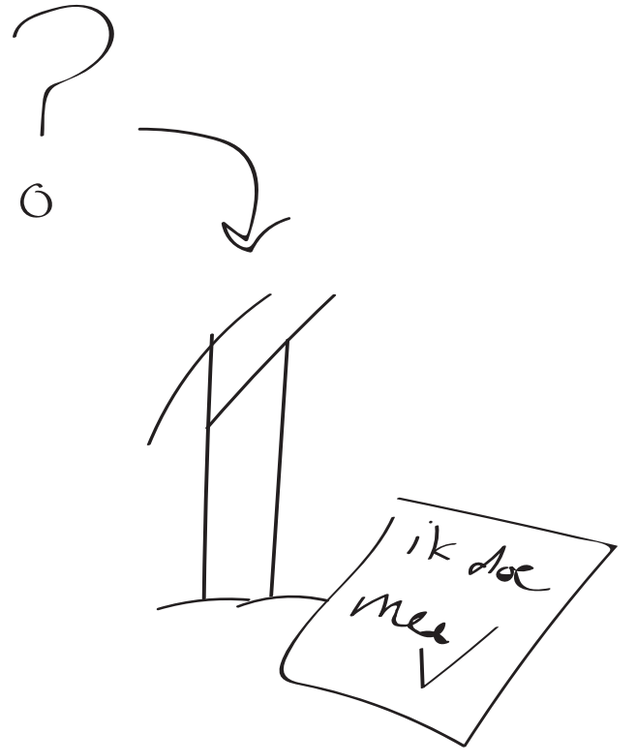
Figure 6: visualisation of design approach

Ready, set, go!

With help of the introduced map, the project context can be structured and the transition path can be set out - and a design approach based on the 1:10:100 is created. Now, it is time for exploration!

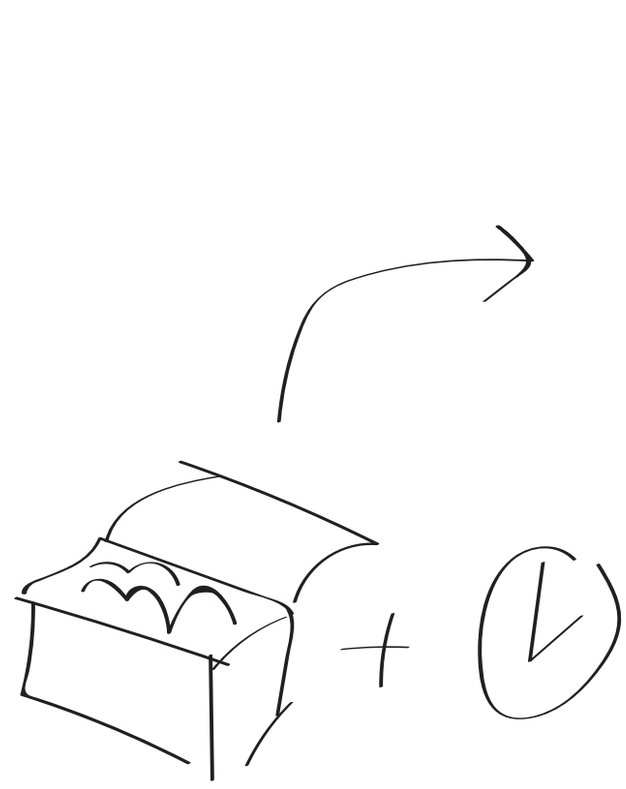
Part 2

In this part, the design process of the project is reported. The design process consisted of three sprints. In the first sprint, a climate adaptive product/ service solution was created. IJsselmonders indicated not to adapt this solution. Based on this insight, the design in sprint 2 is created to make IJsselmonders receptive for climate adaptive behaviour. This design was evaluated positive, and is further developed in sprint 3. The end-point of the design phase, is the design as created in sprint 3 and the recommendations for further development based on the evaluation of sprint 3.



Sprint 1: shared solar panel park,
with solar panels on subscription model

Sprint 2: Schoonschip Week, an organised declutter week with provided declutter-facilities in the form of a declutter-market



Sprint 3: an opening challenge of the Schoonschip Week, to engage IJsselmonders

Starting point

The starting point of the design process is the question of Gemeente Rotterdam "***what else can we do to realise the sustainable transition of the build-environment, and life-style, in IJsselmonde?"*** This question is mapped in the introduced landscape for transition design, and translated into a transition path. Based on this, the solution strategy for the firs sprint is chosen.

Below, the map with context of this project:

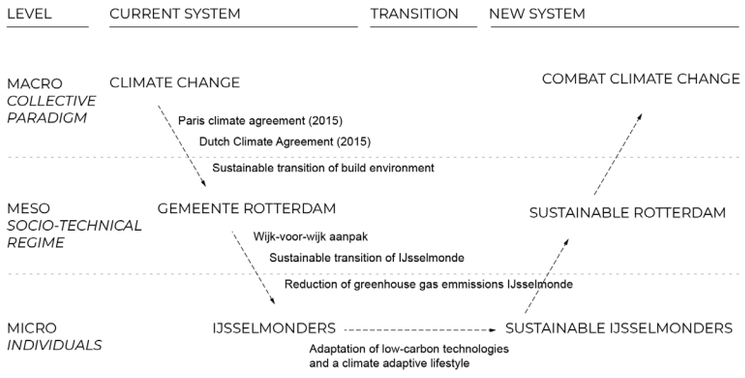


Figure 7: project context

The context of this project is from a global goal (reduction of world wide greenhouse gas emissions to combat climate change), as agreed in the Paris Climate Agreement (2015), to a local challenge for Gemeente Rotterdam (local reduction of greenhouse gas emissions).
In line with the national strategy, one of the strategies to reduce greenhouse gas emissions is through the sustainable transformation of the build environment, with a *"the structured approach of tackling one district at a time" (Dutch Climate Agreement, 2019).*
In Rotterdam, the district IJsselmonde is one of the districts in which the sustainable transformation of the build environment is taking place. This means, IJsselmonders have to adapt low-carbon technologies to reduce their energy consumption, in order to reduce greenhouse gas emissions.
As acknowledged in the Dutch Climate Agreement, this is mainly a social challenge, and an opportunity to also address other aspects of a sustainable lifestyle. It is noticed by Gemeente Rotterdam it is difficult to engage IJsselmonders in the sustainable transformation. Building upon the work of Grothmann & Patt (2005), engagement in the sustainable transformation requires *climate adaptive behaviour of individuals - in every aspect of their lifestyle.*
In other words: to engage IJsselmonders in the sustainable transformation, IJsselmonders have to adapt climate adaptive behaviour - ultimately, in every aspect of their lifestyle.

Below, the map with the transition path of this project:

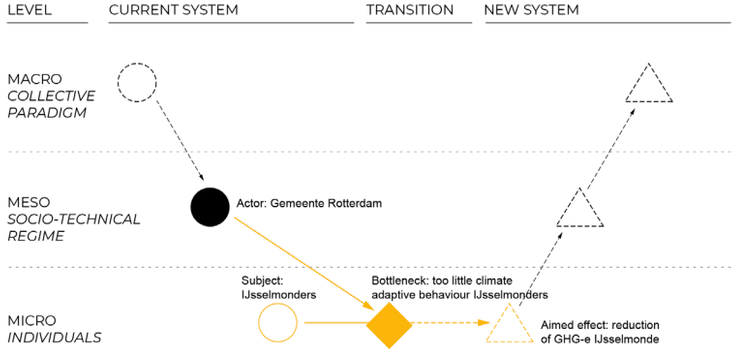


Figure 8: transition path

Based on the context, the transition path for this case is set out as following:

- The aimed effect: reduction of greenhouse gas emissions in IJsselmonde
  The goal of the sustainable transformation of the build environment is reduction of greenhouse gas emissions - but as mentioned, the reduction of greenhouse gas emissions concerns every aspect of individual lifestyles. To enlarge the solution space during this project from the home-environment to the lifestyle, the aimed effect is formulated as above
- The bottleneck: too little climate adaptive behaviour of IJsselmonders
  As experienced by Gemeente Rotterdam, it is difficult to engage IJsselmonders in the sustainable transformation, and building upon Grothmann & Pratt (2005), this can be formulated as too little climate adaptive behaviour
- The actor: Gemeente Rotterdam
  This project is in commission of Gemeente Rotterdam, and their question is what they can do...
- The subject: IJsselmonders
  ... to realise the sustainable transition in IJsselmonde

Solution strategy sprint 1

For the first sprint, the following solution strategy is taken on: *reduction of greenhouse gas emissions through climate adaptive product/ service design for IJsselmonders*. Adaptation of climate adaptive product/ service solutions will (almost) directly result in reduction of greenhouse gas emissions. Adaptation of climate adaptive product/ service solutions is also considered to be climate adaptive behaviour. This could be an effective way to reduce the greenhouse gas emissions in IJsselmonde, and to engage IJsselmonders in climate adaptive behaviour.

Sprint 1

Goal sprint 1

Test if a shared solar park with solar panels on a subscription model, is adapted by IJsselmonders.

This shared solar panel park is a climate adaptive product/ service, and adaptation should result in (direct) reduction of greenhouse gas emissions. This could be an effective way to reduce the greenhouse gas emissions in IJsselmonde, and to engage IJsselmonders in climate adaptive behaviour.

Research

Research details

4 semi-structured interviews with IJsselmonders (contacts of the Duurzaamheidswinkel), about the adaptation of low carbon technologies, home environment and lifestyle

Research findings

The experienced barriers for adaptation low-carbon technologies are: *high commitment (adaptation of low carbon technologies requires extensive research) and high investment (costs of low carbon technologies)*. The interviewee's have overcome those barriers, motivated by living comfort and reduction of the energy bill. They explain most neighbours don't feel the need, or share the motivation to overcome the barriers: the common opinion in the neighbourhood towards climate adaptive behaviour is quite negative. Most IJsselmonders do not see or feel how their behaviour has an impact on climate change, and that this might be causing the lack of motivation.

Insights

Removing the barriers high-commitment and high-investment might lower the threshold to adapt low-carbon technologies for IJsselmonders. Based on this ground, a climate adaptive product/ service solution that removes those barriers is designed, and it is tested if it will be adapted by IJsselmonders.

Limitations of research

It is important to mention that it is a key-assumption in the design process that the barriers high-commitment and high-investment are representative for (most of) IJsselmonde. It might be wise to verify if those barriers are indeed representative for the neighbourhood IJsselmonde before the results of this project are taken for further development.

Design

A shared solar panel park, where IJsselmonders can rent solar panels on subscription model, and engage in other sustainable-living-activities

Figure 9 and 10, design and prototype sprint 1

This design removes the barriers high commitment and high investment through the subscription model: ***IJsselmonders only have to decide if they want to participate, no other action is required. Thereby, this product/ service design is the easiest way to adapt climate adaptive behaviour:*** *nothing in, or around the house has to be changed and no action is required.*

Evaluation

Evaluation details

The paper prototypes (figure 9 and 10) are used to ask IJsselmonders in the shopping mall Keizerswaard if they would participate in a shared solar panel park. In total, 10 IJsselmonders evaluated the concept.

Evaluation result

Most IJsselmonders (8) react that they would not participate in the shared solar panel park. Some (2) indicate they would consider to participate in the shared solar panel park. The reactions of the IJsselmonders that do not want to participate are mainly of a negative nature (why should I do something like this? They should do something about the climate in China!), and sceptic (I don't trust the parties organising this solution, if I would do something, I would do it myself. But I won't do something).

The reactions of IJsselmonders (2) that would consider to participate, are moderately enthusiast (that would be easy, however I don't know if it is for me. I would have to think about it and discuss it with my partner).

Interpretation of evaluation results

There was no IJsselmonder that reacted positive, or enthusiastic, on the shared solar panel park. The best reactions were moderately enthusiast. Most reactions were negative or sceptic. In other words, this product/ service design does not appeal to IJsselmonders. Although this product/ service design requires minimum effort, and minimum change of behaviour, the lack of personal motivation or relevance to adapt the product/ service is a barrier to adapt the product/ service design. This is in line with what the interviewee's already indicated: there is a lack of motivation to adapt low carbon technologies. However, it is surprising that removing the barriers and making the threshold to adapt low carbon technologies as low as possible, is not enough to overcome the lack of motivation.

Limitations of evaluation

It is important to mention that the interpretation of evaluation results is based on 10 random street interviews in IJsselmonde. Due to the time-limitation of the sprint (1 week), this evaluation is assumed to be representative for IJsselmonde as neighbourhood. This is a key-assumption in the design process, as it that is wise to verify before taken this project results for further development.

Concluding sprint 1

The goal of this sprint was to test if the climate adaptive product/ service proposal "shared solar panel park with solar panels on subscription model" is adapted by Ijsselmonders. This is not the case, due to lack of personal relevance and motivation to adapt the product/ service proposal.

From sprint 1 to sprint 2

The learnings of sprint 1, form the base for the direction of the preparation of sprint 2. In sprint 1, it is found that a climate adaptive product/ service solution is not adapted by IJselmonders. Based on this finding, a new solution strategy for sprint 2 is prepared.

Learnings sprint 1

No adaptation of low carbon technologies through climate adaptive product/ service solution

The climate adaptive product/ service design "shared solar panel park, with solar panels on subscription model" is not adapted by IJsselmonders. Offering such a product/ service to IJsselmonders, which is considered to be the most easy way to adapt climate behaviour, is not resulting in climate adaptive behaviour.

Adaptiation of climate adaptive behaviour?

This indicates, that engaging IJsselmonders in climate adaptive behaviour requires more than a product/ service solution that enables this. In other words: it is needed to create receptiveness for climate adaptive behaviour among IJsselmonders. In the reserach interviews of this sprint, it is mentioned that the common opinion towards climate adaptive behaviour in IJsselmonde is negative, propably because of the feeling *"not having impact, or making a difference, with my individual behaviour"*.

Based on the insights of this sprint, it is learned that receptivity towards climate adaptive behaviour among IJsselmonders has to be created, and that this should done in a personal relevant way.

Limitations sprint 1

The design process of this sprint is based on a limited research (4 interviews) and a limited evaluation of the product/ service design (10 interviews), due to the time-limitations of the sprint (1 week). Within this design process, the results are assumed to be representative for IJsselmonde.

Preparation sprint 2

Making people receptive to behaviour change, in a personal relevant way, is a whole different design challenge than the creation of a climate adaptive product/ service design. Considering this, the field of behaviour change is researched. Based on this research, the principles of behavioural economics and the double loop learning model are used to create a solution strategy for the second sprint.

The principles from the field of behavirouel economics are used, as this field has proved to be very effective to realise behaviour change. However, this behaviour change is caused by external factors.

The principle of the double loop learning model is an internal change of cognitive rules, which results in behaviour change. As this results in behaviour change that is not depending on external factors (as with behavirouel economics) this is considered to be more effective, and thus more desirable.

Behavirouel economics

The field of behavioural economics "*uses psychological experimentation to develop theories about human decision making"* (Samson, 2014). Due to its effectiveness behavioural economics is nowadays widely applied to influence human behaviour, but many ethical questions rise to this application (Samson, 2014). The principles of behavioural economics will be used to create a solution strategy that is attractive to IJsselmonders - they will not be used to influence behaviour.

The principles based that will be used are:

1. make it personal
2. make it easy
3. make it fun

(based on Thaler & Sunstein, 2019; Remarque, 2019; Harford, 2019; Thaler, 2017; Kahneman 2011)

Double loop learning

Argyris wrote the article "teaching smart people how to learn" (1991) about the importance and the difficulties of learning (within organisations):

*"**But if learning is to persist, managers and employees must also look inward. They need to reflect critically on their own behaviour** […] **Double-loop learning is about changing the cognitive rules people use to make decisions:** "effective double-loop learning is not simply a function of how people feel. It is a reflection of how they think—that is, the cognitive rules or reasoning they use to design and implement their actions"* (Argyris, 1991).

In other words, double loop learning is a reflection on the cognitive rules people use to act. This reflection leads to insight, and adaptation of cognitive rules and thereby behaviour change. Although this knowledge is developed in the context of organisational learning, the principles can also be applied in this context as following: reflection on behaviour in regard to climate change, should make people aware of the impact of their behaviour in regard to climate change. As learned during the first sprint, the feeling of *"not having impact, or making a difference, with my behaviour"* is experienced by IJsselmonders. The insight and awareness of how individual behaviour has an impact on climate change, is expected to make IJsselmonders more receptive towards climate adaptive behaviour.

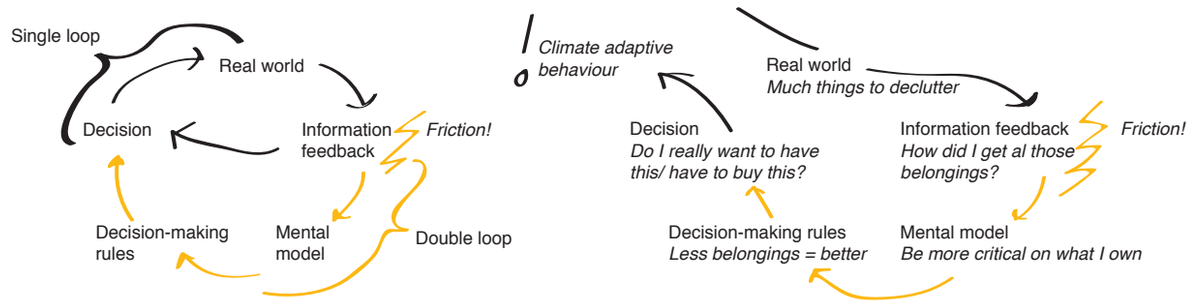


Figure 11 and 12: the double loop learning model, and double loop learning in this project context

Solution strategy sprint 2

Based on this research into behaviour change, the solution strategy for the second sprint is: **to create a design intervention that leads to double loop learning in regard to climate adaptive behaviour, based on personal relevance of IJsselmonders**.

Sprint 2

Goal sprint 2
Test if the Schoonschip Week, an organised declutter week with provided declutter-facilities in the form of a declutter-market, appeals to IJsselmonders. *Decluttering is expected to be a personal relevant to IJsselmonders, and is considered to be a reflective activity in a climate adaptive behaviour category: it might make IJsselmonders receptive towards climate adaptive behaviour.*

Research

Research details
- Research into personal relevance of IJsselmonders: report “5 tinten groener” by Motivication (2018): a research into the characteristics, values and lifestyle of Rotterdammers
- Research into global themes and dynamics: research into trend reports, essays and (newspaper) articles (Fjord 2018; Steinmetz 2019; Kreiner 2019; Torfs 2019; Havelaar, 2019; Liekens, 2019; Croonenberg, 2019; Vonk, 2019)
- Research into climate adaptive behaviour and categories (Volkskrant klimaatgids 2019; Porcelijn 2016)

Research findings
- Research personal relevance: IJsselmonde consists mainly of the groups structuurzoekers & statusbewusten. The common denominator found is *health and the health of their direct environment* (Motivication, 2018)
- Research global trends and dynamics: physical and mental health are themes present within our society. The attention that is payed to physical health is mainly about fitness and food; the attention that is payed to mental health is mainly about how not to loose it in the chaos and complexity of our contemporary society. The increasing chaos and complexity of our society, is accompanied with a decrease of feelings of security, order and control of individuals. The decrease of feelings such as security, order and control leads to a decrease in mental health
- Research climate adaptive behaviour: climate adaptive behaviour can be divided into four categories: home / transport / belongings / food (VK klimaatgids, 2019; Porcelijn, 2016)

Interpretation of research findings and Marie Kondo: decluttering?
With those findings in mind, the personal theme for IJsselmonders could be increasing mental health, by increasing the feelings of security, order and control, on and within, their direct environment. According to Marie Kondo’s *“life-changing magic of tidying up”,* this can be achieved through decluttering and organising your home environment.

Indicated effect of decluttering: increased mental health
Le Beau Lucchesi wrote an article for the New York Times (2019) about the effects of clutter and reports *“[there is] a growing body of evidence that clutter can negatively impact mental well-being, particularly among women. Clutter can also induce a physiological response, including increased levels of cortisol, a stress hormone”.* A study by Ferrari & Roster (2018) reports *“Clutter problems led to a significant decrease in satisfaction with life among older adults”*. It also found that there is a relation between behavioural procrastination, indecision and clutter. This indicates that clutter indeed has an impact on the mental well-being of people. It is expected, based on the relation between procrastination, indecision and clutter, that decluttering leads to increased feelings of security, order and control: it feels good to finally do what is procrastinated, to make decisions, and to clear out clutter.

Decluttering and reflection: potential for double-loop learning
According to Marie Kondo, there is even more magic to decluttering: *“the question of what you want to own is actually the question of how you want to live your life.”* (Kondo, 2014). So, decluttering could leads to the reflective question: how you want to live your life? Such a reflective corresponds to mechanism of double loop learning as explained by Argyris (1991). Thereby, *decluttering is considered to be a reflective activity.*

Decluttering for IJsselmonders: a personal relevant, reflective activity ánd climate adaptive behaviour?
Next, decluttering is about belongings. Belongings is one of the categories of climate adaptive behaviour (Porcelijn, 2016). Together with CE Delft, Porcelijn made the “Impact top 10” to indicate what has most impact on the environment. On the first place: belongings. This makes decluttering a reflective activity, in a climate adaptive behaviour category.

Based on those insights, decluttering is chosen as principle for a design intervention. It is expected to be personal relevant, and to lead to reflection on behaviour in a climate adaptive behaviour. Thereby, it is expected to have the potential to make IJsselmonders receptive towards climate adaptive behaviour, *from an unexpected angle.*

Limitations of research findings:
- Personal relevance: the research is based on the report 5 tinten groener by Motivication (2018). This report is recently created in commission of Gemeente Rotterdam, and based on human research. Therefor it is assumed to be accurate and reliable. Based on the information in this report, the common denominator health is found. Although there is no significant change expected in the characteristics of IJsselmonders, it is not verified with IJsselmonders if health is indeed a personal relevant topic, due to the time limitations of the sprint
- Research global trends: this research is based on trend reports, essays and articles. This information is translated into themes, and how they relate to each other (dynamics). This translation is an interpretation of what is happening in the world, which is to a certain extend influenced by the person making this interpretation
- Research climate adaptive behaviour categories: those findings are based on the work of Porcelijn (2016), and the Volkskrant Klimaatgids (2019), which are considered to be validated and verified information

Design

Maak
Schoon Schip
tijdens de
Schoonschip Week!

Huis opruimen, spullen naar de Schoonschip markt

Jij een opgeruimd huis en hoofd, en spullen een nieuwe plek of nieuw leven

Figure 13: design and prototype sprint 2

De Schoonschip Week: an organised an declutter moment for IJsselmonders. It is an invitation to declutter (a personal relevant activity), and the municipality will provide declutter-facilities in the form of a ‘declutter market’. On this ‘declutter market’, declutter-facilities such as a pop-up recycling station, charity shop station and repair station can be found. Those facilities are provided to make decluttering easy: there is a place to lose and sort out the clutter (making things easy is one of the indicated behavioural economic principles). Besides, the collective moment and provided facilities should also make it fun: doing it together and the coziness of the ‘declutter market’ where experiences can be shared (making things fun is one of the indicated behavioural economic principles).

Schoonschip refers to ‘schoon schip maken’. This is a Dutch saying and it refers to making a new start, sorting out, and leaving behind the old. This expression resonates with the ultimate goal of this design intervention: to leave an old way of thinking about consumption and belongings behind, and to adapt new, climate adaptive consumption behaviour.
It is a Week, in order to allow IJsselmonders to participate at their own preferred time.

This design intervention is based on the personal interest health (behavioural economic principle), combined with the reflective activity decluttering, that is expected to lead to a reflection of behaviour and thereby, double loop learning principle. In the design, the other behavioural economic principles ‘easy’ (provided facilities) and ‘fun’ (in the form of a market) are also applied.

Evaluation

Evaluation details
A paper prototype (see figure 13) is used to ask IJsselmonders (8) in the shopping mall Keizerswaard what they think about the idea and if they would participate.

Evaluation results
All asked IJsselmonders (8) reacted positive and enthusiast on the Schoonschip Week, and indicated to participate if it is organised. This enthusiasm is based upon:

1. The idea of an organised home-environment (feelings of mind space, ease and overview)
2. The event is a trigger to declutter. This is something most people want to do, but have not done yet (personal relevant: if this is organised, I would finally clear out my garage!)
3. The ease and “respectful way of getting rid of belongings” with help of the provided facilities (now, someone else can use it, and that makes me feel good)
4. The convenience of the organised facilities (easy “I can separate waste without having to go to the recycle center!”)

Interpretation of evaluation
All IJsselmonders reacted positive and enthusiast on the Schoonschip Week. Ijsselmonders indicate to feel personal relevance to participate in the Schoonschip week, and ease and fun in the provided facilities. The provided facilities are a trigger to participate (they are temporary!), and give IJsselmonders a good feeling as they allow to dispose their belongings in a respectful way (they can be re-used or recycled). This evaluation indicates that the theme mental health, and the activity decluttering, are personal relevant to, and resonating with, IJsselmonders.

Limitations of evaluation
It is important to mention that the interpretation of evaluation results is based on 8 random interviews street interviews in IJsselmonde. Due to the time-limitation of the sprint (4 weeks), and the uniformity in reaction of IJsselmonders, this evaluation is assumed to be representative for IJsselmonde as neighbourhood. This is a key-assumption in the design process, which is wise to verify before taking the project results into further development.

Concluding sprint 2
The goal of this sprint was to *“test if the Schoonschip Week, an organised declutter week with provided declutter-facilities in the form of a declutter-market, appeals to IJsselmonders”*
The positive evaluation of the Schoonschip Week indicates that it is appealing to IJsselmonders. It is evaluated as personal relevant, easy and fun - the used behavioural economic principles.
Next, is to find out if this design intervention can make IJsselmonders receptive to climate adaptive behaviour.

From sprint 2 to sprint 3

The learnings of sprint 2, form the base for the direction of the preparation of sprint 3. In sprint 2, it is found that the design intervention Schoonschip Week is appealing to IJsselmonders. Next, it is to find out if this design intervention creates receptiveness for climate adaptive behaviour. This is further researched in sprint 3.

Learnings sprint 2

Adaptation of design intervention based on personal interest
The design intervention Schoonschip Week is appealing to, and resonates with IJsselmonders. The asked IJsselmonders (8) all indicate to participate, and participation is experienced as personal relevant and beneficial.

Decluttering and mental health for IJsselmonders
The effect IJsselmonders expect from decluttering is increased mind space, ease and overview of their home-environment. This corresponds to the feelings of security (mindspace) order and control (ease and overview) and is expected to have a positive effect on mental well-being.

Further development
There is not yet an indication, if this intervention also leads to receptivity of climate adaptive behaviour. To explore this, the design intervention needs to be further developed and tested. Based on the positive evaluation of IJsselmonders on this design intervention, it is decided to further develop this concept in the next sprint to explore the potential this design intervention has to make IJsselmonders receptive to climate adaptive behaviour.

Limitations sprint 2
As mentioned before, the design process of this sprint is based on desk research and a limited evaluation of the product/ service design (8 interviews). Due to the time-limitations of the sprint (4 weeks) and the unity of evaluation reactions, the results of this sprint are assumed to be representative for IJsselmonde. Before taking the project results for further development, it is recommended to verify the assumptions made during this design process.

Preparation sprint 3

As the third sprint will further develop the concept Schoonschip Week, no additional research between sprint 2 and 3 is carried out.

Solution strategy sprint 3

Refine the design intervention Schoonschip Week to evaluate if decluttering leads to reflection, and thereby results in receptiveness to climate adaptive behaviour.

Sprint 3

Goal of sprint
Refine the design intervention Schoonschip Week to evaluate if decluttering leads to reflection, and thereby results in receptiveness to climate adaptive behaviour

Research

Research details
For this sprint, research into design methods to refine the design intervention is done:

- How to design for a festival experience (de Kat Angelino, 2018)
  This is researched because the Schoonschip Week *is an event*
- Safety frames from Design for emotion (Desmet, 2019)
  This is researched because the threshold of participation in the event should be as low as possible, and this can be achieved through the use of safety frames

Research findings
The festival experience will be design based on the following stages and their functions

- Priming: cue's that evoke interest (on a sub-conscious level)
- Trigger: something that catches the attention and leads to a decision moment
- Consideration: a personal consideration of participation
- Action: to participate (or not participate)
- Discovery, when it is decided to participate

Safety frame: a control frame. In a control frame, people have control and overview over the stimulus, and thereby they trust themselves to handle the situation.

Interpretation of research findings:
The research in this sprint is about design methods, so there is not really a personal interpretation.

Limitations of research findings
However, the researched methods are just two of the many available design methods out in the world. Although they seem applicable for this sprint and design intervention, other methods might also be relevant

Design

The design of the Schoonschip Week consists of two elements: the declutter event, and an opening challenge. Due to the time-restrictions of this sprint, only the declutter challenge is evaluated - and therefor presented in this sprint. The design of the event week, is presented in the end-point.

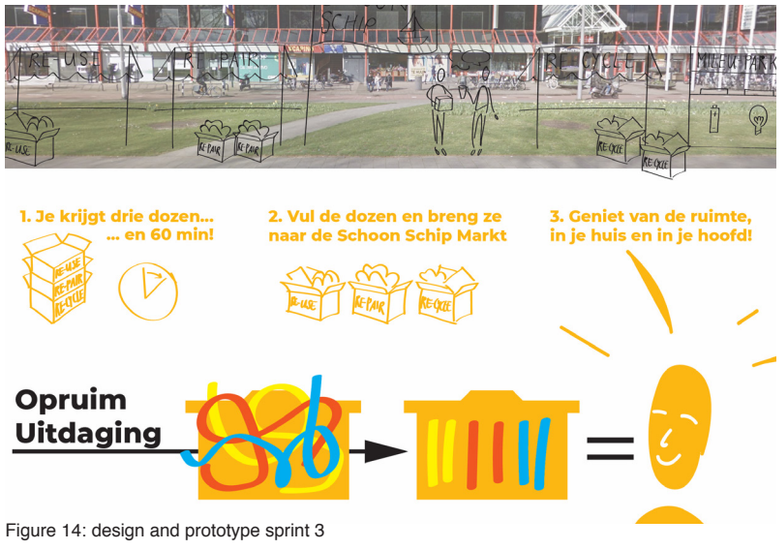


Figure 14: design and prototype sprint 3

Opening event: declutter challenge
To catch the attention of IJsselmonders and to introduce the Schoonschip Week, an opening event in the form of a declutter challenge is designed. *The declutter challenge is designed based on a control frame (Desmet, 2019), to lower the threshold for participation*. The elements that enable the control frame are: restricted time (for example, 60 min) and a comprehensible challenge (for example, 3 boxes). By clearly indicating the time for the challenge, and by making the challenge comprehensible, this challenge is fun and easy to engage in. By completing the challenge, Ijsselmonders will go through the decluttering process, making them familiar and comfortable with this decluttering process. It is expected, this lowers the barrier for elaborate decluttering.

Evaluation

Evaluation details
With a paper prototype (see figure 14), evaluation of the declutter challenge in the shopping mall Keizerswaard with 10 random IJsselmonders

Evaluation results
The first reaction on the Schoonschip Week is positive by all IJsselmonders (10).
Next, most IJsselmonders (7) indicate to participate in the event, and some (3) indicate that they would consider participation. The IJsselmonders that indicate to participate in the event, indicate that decluttering is something they would like to do, and that this event is a trigger to actually do this. The provided facilities are experienced as easy and fun. This is in line with the evaluation results of sprint 2. Some (2) of the IJsselmonders indicate that they would mainly participate for the social aspect of the event. The IJsselmonders that indicate they would consider participation, are doubting because they don't know if they will have the time at the moment this is organised and they don't know if their home-environment is in need for decluttering ("my house is already very neat and organised, and I don't have any belongings to get rid off").
Remarkably, all participants evaluated the idea of the Schoonschip Week, instead of the declutter challenge, and *when probing on the effects of decluttering, IJsselmonders don't 'pause' to reflect on their home-environment and belongings.*

Interpretation of evaluation
This evaluation affirmed the evaluation of sprint 2, the Schoonschip Week appeals to IJsselmonders. Remarkably, the declutter challenge did not catch the attention of IJsselmonders - they all reacted on the concept (an organised declutter moment, with provided facilities), and probing IJsselmonders to think about decluttering, did not lead to reflection. This evaluation did not result in more in-depth insights relative to sprint 2.

Limitations of evaluation
The evaluation is based on 10 random interviews street interviews in IJsselmonde. This is due to the time-limitation of the sprint (3 weeks).

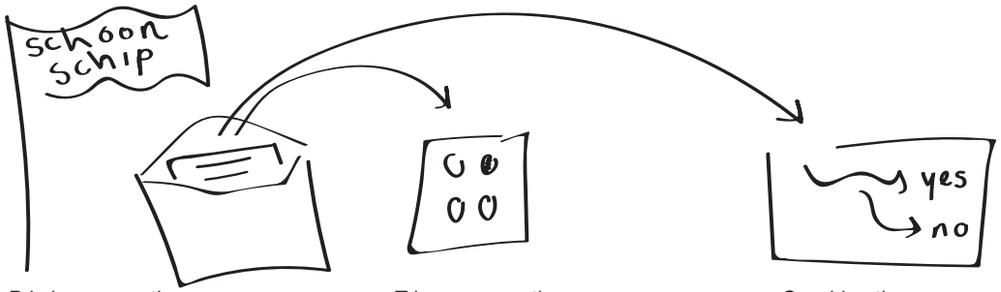
Concluding & learnings sprint 3
The goal of this sprint was to "*refine the design intervention Schoonschip Week to evaluate if decluttering leads to reflection and thereby results in receptiveness to climate adaptive behaviour*"
As in sprint 2, the Schoonschip Week is evaluated positive, which indicates it is appealing to IJsselmonders. There is no indication if decluttering leads to reflection: when probed about the effects of decluttering, IJsselmonders do not start to reflect. But, before jumping to the conclusion it does not lead to reflection, it is important to think about the influence of the prototype method, and if this is method is able to answer such a question. Probably, the setting of a streetinterview with a paper prototype is not able to answer such a question. Thereby, the design intervention is refined in this sprint, but it is not evaluated if this design intervention leads to reflection. It is learned, that evaluating such a question, requires another prototype method.

End point

The three sprints of this design process, resulted in the design proposal Schoonschip Week for Gemeente Rotterdam: an organised declutter week, with provided facilities and an opening challenge. This event is based on the personal relevant topic health for IJsselmonders. It combines this topic with the climate adaptive category belongings. The expected effects of decluttering are: increased mental well-being due to a feeling of security, order and control on the direct environment, and reflection on belongings. If this reflection on belongings (why do I have this?) leads to a reflection on consumption (why have I bought this?), decluttering could result in climate adaptive behaviour: adaptation of consumption patterns. When this is the case, IJsselmonders might experience climate adaptive behaviour in a positive way (conscious consumption is personal relevant and beneficial: it results in an organised personal environment and saves money). It is expected that this positive experience, leads to receptiveness of climate adaptive behaviour.

Design

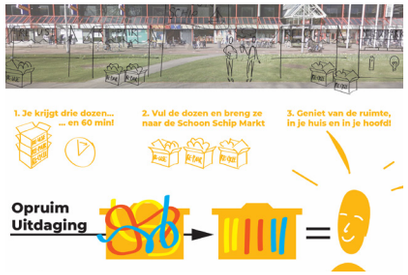
The design proposal for the Schoonschip Week consists of two elements: an event, and an opening challenge. The design of the event is based on the stages for festival design (de Kat Angelino, 2018), and for each stage ideas are created. Next, the opening challenge is designed, with help of the safety frame control (Desmet, 2019). This opening challenge is created for two reasons: first, to catch the attention of IJsselmonders and to introduce the Schoonschip Week. Second, to lower the threshold for participation through a try-out challenge. Gemeente Rotterdam can use this design proposal to further development to carry out the event.



Priming suggestions
- personal paper invitation (including stamp-book, which leads to the trigger, and infographic to support consideration)
- physical promo in Ijsselmonde
- digital promo for neighbourhood/ street whatsapp

Trigger suggestion
- a savings action that results in, for example, free drinks at the declutter market. The stamp-book for the savings action is sent to IJsselmonders, together with the personal invitation

Consideration
this is a thought process of individuals; but can be supported by for example an infographic. The infographic for consideration is sent to IJsselmonders, together with the personal invitation



Action
Opening declutter challenge with time-limitation and clear assignment

Discovery suggestion
Facilities at Keizerswaard for a period of time (1-2 weeks), so IJsselmonders can use them in their own time

Feasibility
Organising the Schoonschip Week is considered to be feasible: it requires a permit (of the municipality), market stands (with volunteers or social initiatives such as charity shops), promotion and participation - nothing high-end or that is not done before.

Viability
The Schoonschip Week is also considered to be viable: it would be organised by the municipality, and carried out by the Duurzaamheidswinkel. It is indicated there is budget, time and enthousiasm to do so!

Desirability
In both sprint 2 and 3 the Schoonschip Week was evaluated positive and IJsselmonders indicate to participate, so it is considered to be desirable.

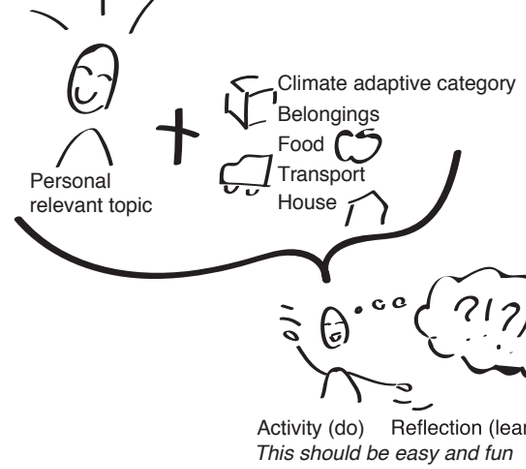


Figure 15: solution mechanism

Recommendations

Based on the evaluation in sprint 2 and 3, two main recommendations for further development are found:

- *Explore how to involve elderly*. There are many elderly people living in IJsselmonde, and as mentioned by some IJsselmonders during the evaluation of the Schoonschip Week, it is important to take this into consideration.
  An idea could be to use a buddy-system, that links elderly IJsselmonders to younger IJsselmonders. This would also bring an extra social dimension into the concept
- *Explore how to facilitate reflection*. In sprint 3, it is found that the step from decluttering to reflection is not natuarally made by IJsselmonders. Though this finding is strongly influenced by the prototype method, the desired effect of this design intervention relies on reflection. Thereby, it would be wise to facilitate this reflection
  An idea could be to use "influencers" during the event, to ask questions about the experience, the effect of decluttering and provoke evaluation

Concluding the design phase
In the Dutch Climate Agreement, it is already mentioned that the sustainable transformation of the build environment is mainly a social challenge. It is not unexpected, but surprising, that *making things easy is not enough for IJsselmonders to adapt climate adaptive behaviour, as found in sprint 1. This led to the insight, that before adapting climate adaptive behaviour, receptivity to climate adaptive behaviour has to be created - in a personal relevant way.* Based on this insight, the design intervention Schoonschip Week is created. It aims to create receptiveness for climate adaptive behaviour among IJsselmonders from a personal relevant, unexpected angle: at first, it seems a personal relevant activity. After reflection, it is learned that climate adaptive behaviour can also be personal relevant and beneficial.
The positive evaluation of IJsselmonders on this concept, indicates the idea resonates with IJsselmonders. However, if it is able to reach the aimed effect (receptiveness for climate adaptive behaviour), needs further research and development. Exploration of the indicated recommendations, and more in-depth prototyping, are the first steps for further development.

Part 3

This part starts with a reflection on the design proposal. Next, it evaluates the value of the design proposal for Gemeente Rotterdam. Then, the use of the map and design approach within this project is evaluated, to inform the transition design practice. It ends with a reflection on the project and concludes with a personal reflection on the project.

Reflection on design proposal

The “Schoonschip Week” is *a design intervention based on a personal interesting, and climate adaptive relevant, reflective activity. The aimed effect is to create receptiveness towards climate adaptive behaviour among IJsselmonders**. Creating receptiveness towards climate adaptive behaviour among IJsselmonders is of great importance, as they have to adapt a climate adaptive life-style in order to combat climate change** - just like everyone else in Rotterdam, and moreover, world wide.*

The Schoonschip Week aims to demonstrate how climate adaptive behaviour can personal, easy and fun for IJsselmonders, and how such an approach can have a positive influence on sustainable transitions.

To the municipality, it aims to say: *“je vangt meer vliegen met stroop dan met azijn”* (honey catches more flies than vinegar). It aims to give the municipality insight on how to create a support base for climate adaptive behaviour, and thereby to contribute to the sustainable transition of the build environment. As indicated, creating this support base is highly challenging, but of great importance.

It is of great importance to demonstrate how receptiveness towards climate adaptive behaviour cán be created: despite the urgency and knowledge to adapt to climate change, the opinion towards (individual) climate adaptive behaviour is moving towards *unresponsive*. As explained by Remarque (from the Volkskrant Duurzaamheidsgids, June 14th 2019):

“we moeten nog veel meer: autodelen, rekeningrijden, vaker fietsen en met het ov. Minder vliegen, korter douchen, van het gas af, minder vlees eten, regenwater verzamelen. Minder laten bezorgen, minder voedsel verspillen, minder energie gebruiken, anders koken. Kerstboom en open haard: eruit. Ons spaargeld moet niet naar die vliegvakantie, maar naar warmtepomp en zonnepanelen. Het is begrijpelijk dat veel mensen verzuchten: mag ik dan helemaal niets meer?

Eind 2018 maakte bijna 80 procent van Nederland zich zorgen over klimaatverandering, in maart 2019 nog maar 65 procent. De eerste maanden van dit jaar kwamen er steeds meer concrete klimaatmaatregelen in het nieuws. Het lijkt er dus op dat we minder bezorgd worden zodra we er ook echt iets voor moeten doen. Eén op de vijf Nederlanders vindt al dat het kabinet minder moet doen voor het klimaat”

In short: the idea of personal sacrifice leads to a disinterest in climate adaptive behaviour.
To individuals, this design intervention aims to say: climate adaptive behaviour is not (only) sacrificing personal comfort; it is also personal relevant and beneficial (less consumption leads to an organised home-environment, and safes money). It aims to give individuals an action perspective, on how they can adapt climate adaptive behaviour, without sacrificing personal comfort.

Although this design intervention is not the solution to a problem, and despite the fact that its effect is difficult to indicate and to measure, the message of what it aims to demonstrate is clear: the required adaptation of a sustainable life-style of individuals, is not per definition sacrifice of personal comfort, and the municipality can create design interventions based on personal relevance, that are easy and fun, to communicate this. In this way, the municipality can create receptiveness towards climate adaptive behaviour, and this should help to realise the sustainable transformation of the build environment, and moreover, a sustainable lifestyle of individuals.

For Gemeente Rotterdam: what now?

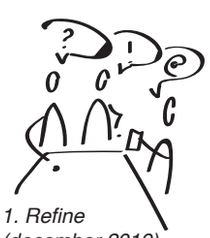
Now that the design proposal is created, explained and its value is reflected, its value for Gemeente Rotterdam is reflected, and the learnings and recommendations for further development of the Schoonschip Week are explained.

Value of design proposal for Gemeente Rotterdam: create a support base for the sustainable transformation in IJsselmonde, and other districts?
First of all, the positive evaluation of the Schoonschip Week indicates this design intervention is resonating with IJsselmonders. Based on this, and the potential of the reflective activity decluttering to lead to receptiveness of climate adaptive behaviour, it is recommended to further develop the Schoonship Week, and to carry it out. The Schoonschip Week is a relative simple and low-key which makes it relative easy to organise it.

It is expected that the Schoonschip week leads to receptiveness of climate adaptive behaviour and thereby creates a support base for the sustainable transition of the build environment and life-styles. When it is carried out in IJsselmonde, it can be evaluated if this is the case. If this is the case, this design intervention might be useful in other districts in Rotterdam as well to create a support base for the sustainable transition, and thereby this design intervention has the potential to be valuable not only for IJsselmonde, but also for Gemeente Rotterdam.

Learnings of design proposal for Gemeente Rotterdam: design intervention mechanism
Secondly, this project and design intervention provide insight in a mechanism that can be used to create a support base for the sustainable transition of the build environment, and life-styles: find a reflective activity that is easy and fun, based on a personal relevance, combined with a climate adaptive category. If the Schoonschip Week does not resonate with other districts in Rotterdam, this mechanism can be used to create a design intervention that resonates with the district - which should be relative easy, as the mechanism for the design intervention is known.

Recommendations for further development of the Schoonschip Week
In order to further develop and carry out the Schoonschip Week the following steps and time-lime is suggested:



1. Refine
(december 2019)

2. Try-out
(jan/ feb 2020)

3. Carry out
(march/ april 2020)

4. Expand or re-design
(from march/ april 2020)

1.1 Generative session for in-depth feedback - the goal of this session should be to find out if, and how, the reflection on belongings and consumptions can be facilitated

1.2 Based on the insights of the generative session: refine design

2.1 Try-out as prototype - the goal of this try-out is to get insight in the motivation for participation, and if the reflection on belongings and consumptions can be facilitated

2.2 Based on the insights of the try-out: refine design

3.1 carry out Schoonschip Week (suggestion: as spring-cleaning activity)

3.2 Reflect on the effect of the Schoonschip Week in IJsselmonde

4.1 Explore if the Schoonschip Week resonates with other districts

4.2.A Organise Schoonschip Week for other districts

4.2.B Explore other design interventions to create a support base for the sustainable transition, with use of design intervention mechanism

For Gemeente Rotterdam: what more?

Now that the value of the design proposal for Gemeente Rotterdam is reflected, we take one step further back: this design proposal is created for a transition path. In order to understand the impact of the project, the project is evaluated within the transition path, and in the transition context.

Project impact on transition path

The indicated bottleneck of this transition path was “too little climate adaptive behaviour”, of the subjects citizens in IJsselmonde. For the actor in this transition path, Gemeente Rotterdam, the design proposal “Schoonschip Week” is created. It is expected that carrying out this design proposal results in receptiveness for climate adaptive behaviour. However, it requires further exploration and execution of the design proposal to evaluate if this is the case.
If this design proposal results in receptiveness for climate adaptive behaviour, it is expected to contribute to addressing the bottleneck, but it is not assumed to address the bottleneck by itself. Other design interventions, or regulations, should be created and carried out to fully address this bottleneck. This finding is food for thought for Gemeente Rotterdam: they are responsible for the realisation of the sustainable transformation of the build environment, and have to deal with the accompanied social challenge. This requires new skills, knowledge and way of working of the municipality.

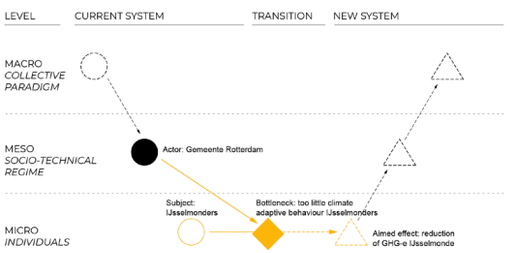


Figure 16: carried out transition pathway

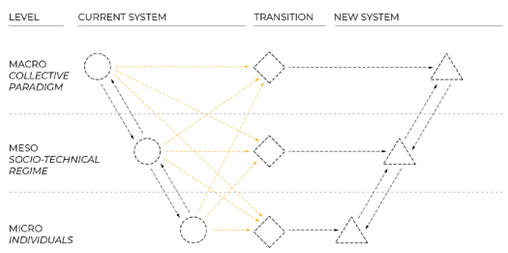


Figure 17: all other possible transition pathways

Project impact on transition context

The impact of the design proposal on the transition path, is contribution to removing a local bottleneck on micro level. Although every step in the right direction is valuable, the urgency of climate change requires rapid reduction of greenhouse gas emissions.
The socio-technical regime has great influence on the reduction of greenhouse gas emissions, and to gain the required rapid reduction of greenhouse gas emissions, the municipality has to act on this level as well. It is recommended to explore what role for design can play in this process for Gemeente Rotterdam a well: in the recent years, design has found it’s way to the policy-making. Although it is not yet known how design can be integrated into governmental institutions and policy-making, it is indicated to be an interesting field to explore (Mintrom & Luetjens, 2016).

Concluding

The question of Gemeente Rotterdam was: what else can we do to realise the sustainable transition of the build-environment, and life-style, in IJsselmonde? This project answers this as following: Gemeente Rotterdam can further develop and carry out the design intervention Schoonschip Week - it is expected to result in receptiveness for climate adaptive behaviour among IJsselmonders, and thereby to contribute to the realisation of the sustainable transition of the build-environment and life-style in IJsselmonde.

Moreover, if this design intervention is successful in IJsselmonde, it can be explored if it is useful for other districts in Rotterdam as well - as not only IJsselmonde, but all districts in Rotterdam have to undergo the sustainable transition of the build environment, and lifestyle. If this is not the case, the solution mechanism of the Schoonschip Week can be used to create other design interventions that contribute to the realisation of the sustainable transition of the build environment and life-styles.

Food for thought for Gemeente Rotterdam

Addressing the social challenge on individual level, that accompanies the sustainable transition of the build environment, requires new skills, knowledge and way of working of the municipality. As this project demonstrates, design could play a key-role in this process.
Based on this ground, it is recommended for the municipality to think about how they want to address this social challenge, and what role design and designers can play.

However, the municipality should not only act on individual level: the socio-technical regime has great influence on the emission of greenhouse gasses. In order to reduce greenhouse gasses in the required speed, it is recommend to explore what, and how the municipality can do to act on this level - and if designers could play a role in this process.

For the transition design practice

Next to answering the question of Gemeente Rotterdam, this project aimed to explore how to answer the question ***how to design for transitions.*** Based on the indicated limitations and research directions for designing for transitions, a map and design approach are introduced and used to carry out this project. In this part, the use of the map and design approach is evaluated, and this evaluation informs the transition design practice how to design for transitions.

Evaluation of map

During this project, the map is used in two ways: to structure the transition context, and to create the transition path. Both are experienced as valuable within this project.

The use (and observations) of this map for this project are as following:

1. In the beginning of the project: the map helped to create a comprehensible overview of the system by structuring the context. This helped to explain and communicate the context of the project with the supervisors of the TU Delft and Gemeente Rotterdam
2. In the beginning of the project: the map helped to move towards action by creating the transition path (identifying the actor, bottleneck, subject and aimed effect). This created a clear understanding of what the project is about and why it is relevant.
3. At the end of the project: the map enabled to evaluate the impact of the design proposal in the transition path
4. At the end of the project: the map enabled to evaluate translate the impact of the design proposal from the transition path, into the system

Below, the expectations before using the map are listed, and comments based on the experience during this project are made. An important note, is that this project created one design intervention, in one transition path, so it is not possible to evaluate all expectations of the map.

1. A schematic representation allows to structure the complexity of a system transition into a comprehensible overview, which results in insight in the system. *Based on this notion, using a map is expected to address the limitation too big picture, and explores research direction 1: a way to structure the system*
   Within this project, the map helped to address the limitation 'too big picture' and successfully explored research direction 1: it enabled to structure the system into a comprehensible overview at the beginning of the project.
2. Based on the schematic representation of the system, the location of design interventions can be strategically chosen and mapped, and design interventions can be related and to each other. *Based on this notion, using a map is expected to address the limitation linking innovations, and explores research direction 3: find a way to connect innovations*
   Within this project, the map was not used to link, or locate, innovations: this project created one design intervention on a location that is upfront decided. Although the map helped to locate the design intervention, based on the experience of the map within this project it is not possible to evaluate of this map is able to link and connect innovations - if this is the case, requires further exploration.
3. Once the design intervention is carried out and evaluated, the effect on/ in the system can be mapped.
   Based on this notion, using a map is expected to address the limitation endorsement, and builds upon research direction 5: how to asses the effect of solutions on the system
   Within this project, the map provided a structure to evaluate the expected impact of the design proposal in the transition pathway, and in the system context. However, within this project, the evaluation of the design proposal is an expected impact. It is not yet known, how to asses the actual impact of the design intervention. In order to map the impact of a design intervention in the transition path and context, ***a method or metric to asses the impact of a design intervention should be defined.*** *Then, the map can be used to evaluate the impact of the design intervention on the transition path and system.*
   Within this project, the transition path and map provide a structure to evaluate the impact of a design intervention, and based on this experience it is expected the map can be used to map the effect of design interventions within the system. However, how to measure the effect of design interventions, and how to define or identify the impact of a design intervention, requires further exploration

Concluding & recommendations for further research

Within this project, the map is experienced as valuable. As expected, it helped to address the limitation 'too big picture' and it successfully explored research direction 1: a way to structure the system within this project. Next, it enabled a structure to evaluate the design proposal within the transition path and transition context. But, the evaluation of a design proposal within the transition path and context not only requires the structure for evaluation, it also requires a method or metric for evaluation. This is not explored within this project. Based on the experience of this project, it is expected the map is able to provide a structure to evaluate the impact of a design intervention on the transition path and context, but it requires further exploration how this impact can be measured, and evaluated within this structure.

This project did not explore if the map can be used to link and connect innovations. If the map is able to do so, requires further exploration.

Based on the positive experience of using the map within this project, it is recommended to use this map in other transition design projects to further develop, refine and explore the value of this map.

Evaluation of design approach

The design phase of this project is carried out with a design approach based on the 1:10:100 method. The experience of using this method is as following:

Experience
- Sprint 1 and 2 are experienced as very useful within this project. The findings and insights of the exploration in sprint 1, led to a radical change of solution strategy between the sprint 1 and 2. The concept of sprint 2 was surprisingly successful, using the new solution strategy. Although it is not possible to say, this solution strategy would not have been discovered using another design approach, it is likely that it would have taken more time and effort without sprints.
- Sprint 3 is experienced as a 'hors concours' within this project. The evaluation of the concept did not result in more in-depth insight compared to sprint 2. This is, however, a valuable learning: in order to further develop and validate the concept in this sprint, it is of great importance that the prototype and prototyping method are more specific and close to the experience.

Below, the expectations before using the design approach are listed, and comments based on the experience during this project are made.

1. The time limitation of sprints enforces to move from analysis to action.
   Due to the time-limitation, using sprints is expected to address the limitation too big picture, and explores research direction 2: an approach to move from analysis to action
   This is indeed the case: working with sprints, enforces to move from analysis to action, and thereby it addresses the limitation too big picture, and successfully explored research direction 2.
2. Working in sprints, enables quick learning without high time and resource investment
   The first sprint of this project had a time limitation of one week, and the result of this sprint was the biggest learning in the design process: to take on another solution angle. Although it is not possible to say this solution angle would not have been found in a normal design process, the first sprint enabled this insight within one week - in other words, without high time and resource investment.
3. The increasing time span of sprints in the 1:10:100 method, allows to gradually add more depth in the design process
   Based on this notion, using this method has an advantage over 'regular' design sprints: complexity and depth can be added in the design process, which is expected to be useful as the design process aims to create a design for a complex context
   Due to the adaption of the 1:10:100 method for this graduation project, there was no increasement in time (moreover, a decrease in time) for the third sprint. This choice was made based on the assumption, that within the third sprint the concept only had to be refined, and that this required less time than the development of the concept in sprint 2. However, as observed, the results of sprint 3 did not lead to more in-depth insights then the results of sprint 2. This experience emphasis the value of the increasing time-span of the 1:10:100 method: after the quick discovery (sprint 1), and the concept development and exploration (sprint 2) refining the concept (sprint 3) requires even more time. It is for further exploration what time division of the sprints is recommended for transition design.

Design approach proposal for transition design

Based on the experience and evaluation of the design approach within this project, the design approach is refined to propose it to the transition design practice, for further exploration.
Based on the experience within this project, each sprint gets an assigned function*:

- Sprint 1: define problem
- Sprint 2: solution strategy
- Sprint 3: concept development & validation

** functions are inspired on Dorst's (2009) frame innovation method*

Within this project, the exploration of sprint 1, and solution strategy of sprint 2, where successful at the first attempt. It is however not a given, that within each transition design project the first exploration, or the first solution strategy, is found to be successful. In order to design effectively for transitions, it is recommended not to move to the next sprint, before the function of the current sprint is successfully fulfilled. To create room for multiple attempts to fulfill the function of a sprint, the design approach consists of three *stages* instead of sprints.

Below, the design approach for transition design, based on 1:10:100 and with some inspiration of Dorst, is visualised:

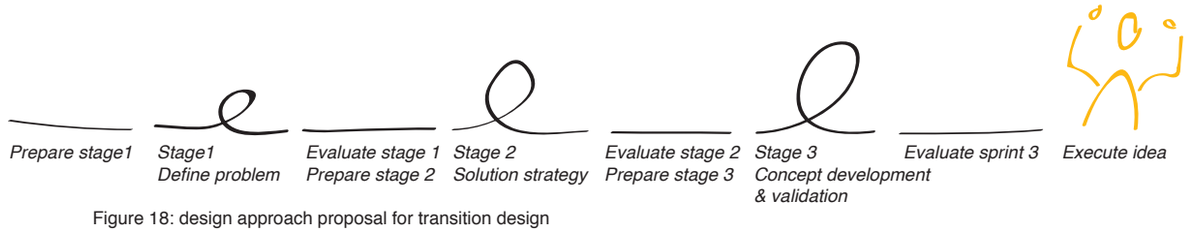


Figure 18: design approach proposal for transition design

Concluding
This project aimed to explore how to answer the question how to design for transitions. It answers the question: with a map to structure the transition context and to set out a transition path, with a design approach to create design interventions, and by evaluating the design intervention in the transition context with help of the map. *Though this answer is clear, it is only based on the evaluation of this project. Both the map and design approach have been of great value within this project, but before they can be called 'tools' or 'methods' for the transition design practice, they need to be validated and refined through use within other transition design projects. Luckily, the starting point for the next transition design project that makes use of this map and design approach, is already way beyond the starting point of this project.*

Project evaluation

After introducing, explaining and evaluating the research and design elements of this project, this reports ends with an evaluation of the project.

Evaluation of personal motivation and project impact

At the beginning of this report, I stated my personal motivation for this project as following:

“Our society has to adapt to climate change. Unfortunately, people often feel ‘I’ can’t, or have to, do anything about it. I care greatly about the well-being of our society and planet and I am concerned: while we are paying all our attention passing the buck who has to do something, rainforests are on fire and sea levels are rising. Within this project, I aim to discover how can we stop passing the buck and start adapting to climate change. This is done by designing for climate adaptive behaviour change in IJsselmonde, Rotterdam. The learnings of this project will be used to inform the practice of transition design, with the aim to develop this emerging discipline - hoping that results of this project, and the development of this discipline will lead to sustainable transitions”

I think my feeling about the project is best explained as following:

“I dream of flowers, but first, you must plant the seeds”

I realise, that within a graduation project of 100 days, it is not possible to plant seeds and see flowers grow and blossom. During this project, I kept dreaming of the flowers, but I worked on finding the right seeds, for the right place, and I planted them.

Ariane (one of the supervisors of Gemeente Rotterdam) is motivated to further develop the Schoonschip Week and to carry it out. I think the seed of the design intervention will grow into a flower. Hopefully, this flower will inspire the Gemeente Rotterdam to fling this seed out into the field (and organise this design intervention in other districts in Rotterdam). Next, I hope that this flower will evoke a conversation within the organisation of Gemeente Rotterdam about their role within the sustainable transition.

The map and design approach that are created to design for transitions, are two seeds for the transition design practice. Within this project, they flowered: they are experienced as very useful and valuable in the creation of the design intervention Schoonschip Week. However, the question if those seeds also flower in other grounds (other transition design projects) cannot be answered. Using the design approach and map within other design projects, will answer this question. Hopefully, those seeds can be flung out into the field of transition design, to find out if they flower in other grounds.

This being said, I think I paid my attention within this project to discovering how we can stop passing the buck and start adapting to climate change. I think this project demonstrates, stopping to pass the buck can be done in a personal relevant, fun way. I think it is important to demonstrate this, in order to break through the negativity and fear for personal sacrifice that underpin the passing of the buck.

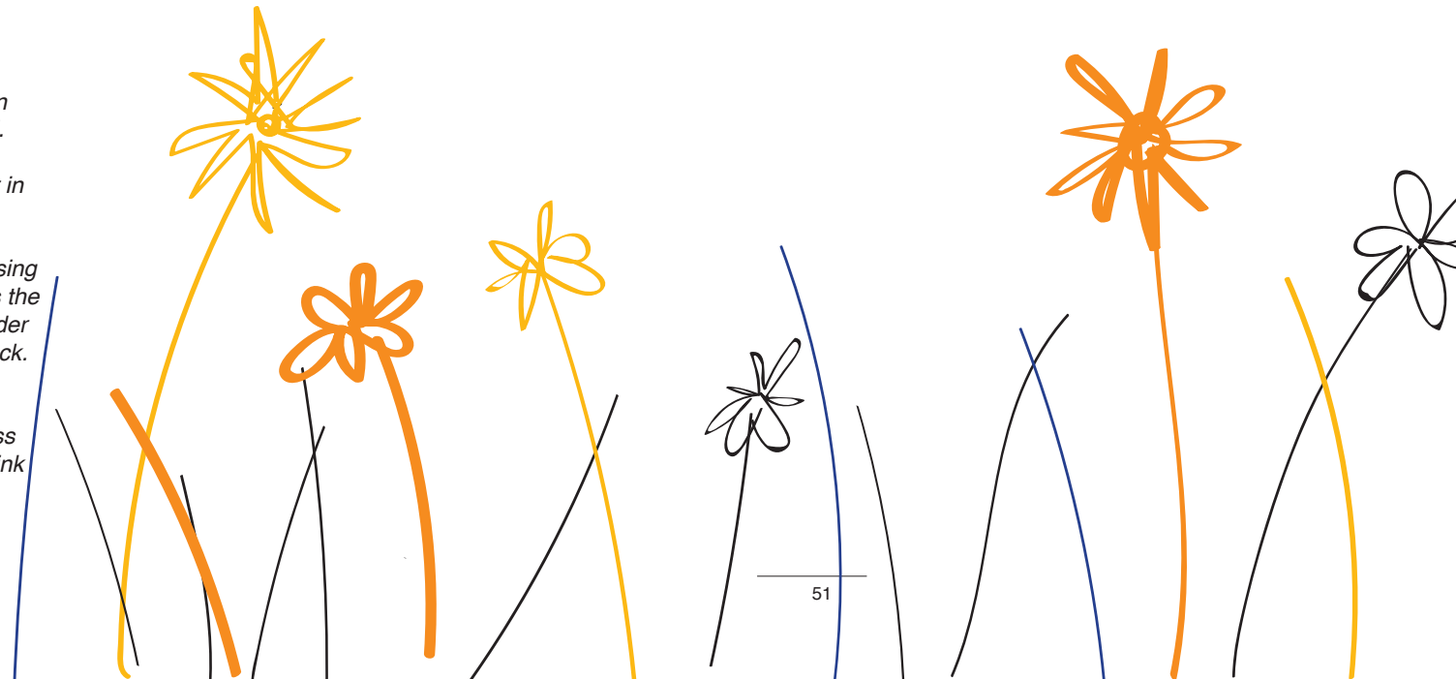
As this project created seeds for both Gemeente Rotterdam and the transition design practice, which are expected to flower and can be used to fling out, and demonstrates that stopping to pass the buck of who has to adapt to climate change can be done in a personal relevant, fun way, I think

Personal evaluation

In my design brief for this graduation project, I stated the following as my personal goal:

“During my graduation project I have one personal goal: to enjoy this project. I notice it is quite common for IDE graduate students to get sucked up in the project and often this period is not referred to, or remembered as, a good time. As I am happy I am in a place I feel healthy enough to start my project, and love working on design projects, I want to enjoy my graduation project. By scoping and creating a clear structure and approach for this project, I intended to set clear boundaries around the project, which will hopefully help me to enjoy it and to play around within those boundaries”

With great pleasure and sincere, I can say that I met this personal goal: I enjoyed working on this project. I set boundaries around this project in the form of a clear project structure (the design process based on the 1:10:100 method), and within those boundaries I played around and I learned a lot: about designing experiences, and the value and use of solution angles, and how to combine creativity with strategic thinking. For me, the biggest challenge (and thereby, learning) was to document this project in all its complexity and depth, in a comprehensive and understandable structure. Writing this evaluation concludes the documentation, and within this moment I find it hard to see and tell how well I pulled this off. But more importantly: I *feel* how many steps I have made, and how much I have learned in the past three weeks while writing this report. To me, that is the most valuable and important, as *I believe a graduation project is in the first place a professional and personal learning process.*



References

Argyris, C. (1991). Teaching smart people how to learn. Harvard Business Review. 69 (3): 99–109.

Ceschin, F., & Gaziulusoy, I. (2016). Evolution of design for sustainability: From product design to design for system innovations and transitions. Design Studies, 47, 118–163. doi.org/10.1016/j.destud.2016.09.002

Croonenberg, E. (2019, May 14th). Sociale media voor sociale insecten. Maarten! Retrieved from https://www.maartenonline.nl/index.html

Dorst, C. H. (2013). Academic design. Eindhoven: Technische Universiteit Eindhoven.

Escobar, A. (2015). Degrowth, postdevelopment, and transitions: a preliminary conversation. Sustainability Science, 10(3), 451–462. doi.org/10.1007/s11625-015-0297-5

Ferrari, J. R., & Roster, C. A. (2018). Delaying Disposing: Examining the Relationship between Procrastination and Clutter across Generations. Current Psychology, 37(2), 426–431. https://doi.org/10.1007/s12144-017-9679-4

Fjord (2018). Trends 2019. Accenture Interactive

Geels, F.W., 2002. Technological transitions as evolutionary reconfigura-tion processes: a multi-level perspective and a case-study. ResearchPolicy 31, 1257–1274

Geels, Frank. (2011). The Multi-Level Perspective on Sustainability Transitions: Responses to Seven Criticisms. Environmental Innovation and Societal Transitions. 1. 24–40. 10.1016/j.eist.2011.02.002.

Grin, John & Rotmans, Jan & Schot, Johan. (2010). Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change. Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change. 10.4324/9780203856598

Grothmann, T. & Patt, A. (2005). Adaptive capacity and human cognition: The process of individual adaptation to climate change. Global Environmental Change. 15. 199–213. 10.1016/j.gloenvcha.2005.01.002.

Hartford, T. (2019, August 2nd). Richard Thaler: 'If you want people to do something, make it easy'. Financial Times Weekend. Retrieved from newspaper http://ft.com

Havelaar, A. (2019, April 25th). HELP de wereld vergaat. Pshycologie Magazine. Retrieved from https://www.psychologiemagazine.nl

IPCC, 2018: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

Irwin, T., Kossoff, G., Tonkinwise, C., & Scupelli, P. (2015). Transition Design. Design Philosophy Papers, 13(1), 1–2. https://doi.org/10.1080/14487136.2015.1085681

Irwin, T. (2018). The Emerging Transition Design Approach. In C. Storni, K. Leahy, M. McMahon, P. Lloyd, & E. Bohemia (Eds.), Proceedings of DRS 2018. Volume 3, section 9, 968-989. doi.org/10.21606/dma.2017.210

Irwin, T. (2019). Intro to Systems. Presentation, Transition Design Seminar 2019

Kahneman, D. (2011). Thinking, fast and slow. New York: Farrar, Straus and Giroux

Kondō, M., & Hirano, C. (2014). The life-changing magic of tidying up: The Japanese art of decluttering and organizing (First American edition.). Berkeley: Ten Speed Press.

Kreiner, J. (2019, June 13th). Digitale afleiding voorkomen is monnikenwerk. 360. Retrieved from https://www.360magazine.nl

Le Beau Lucchesi, E. (2019, January 3rd). The unbearable heaviness of clutter. New York Times. Retrieved from http://www.nytimes.com

Liekens, R. (2019, July 4th). We staan voor de volgende omwenteling in de geschiedenis van de mensheid. HUMO. Retrieved from http://www.humo.be

Loorbach, D. (2014). To Transition! Governance Panarchy in the New Transformation. Erasmus Universiteit Rotterdam. Retrieved from https://drift.eur.nl/nl/publicaties/transition-governance-panarchy-new- transformation/

Mintrom, M. & Luetjens, J. (2016). Design Thinking in Policymaking Processes: Opportunities and Challenges: Mintrom and Luetjens. Australian Journal of Public Administration. 75. 10.1111/1467-8500.12211.

Motivication (2018). Vijf tinten groener: Nederlanders op weg naar een duurzamere samenleving. Gemeente Rotterdam

Mulder, I., & Loorbach, D. (2018). Rethinking Design: A critical perspective to embrace societal challenges. In G. Kossoff, & R. Potts (Eds.), Can Design Catalyse the Great Transition: Papers from the Transition Design Symposium 2016 (pp. 16-24). Dartington, UK: Carnegie Mellon University.

Porcelijn, B. (2016). De verborgen impact: alles voor een eco-positief leven. Amsterdam: Uitgeverij Q.

Raskin, Paul & Banuri, Tariq & Gallopín, Gilberto & Gutman, Pablo & Hammond, Al & Kates, Robert & Swart, Rob. (2002). The Great Transition: The Promise and Lure of Times Ahead

Remarque, D. (2019, June 14th). Benut ego-motieven om mensen eco-positief te laten handelen. Volkskrant. Retrieved from newspaper http://www.volkskrant.nl,

Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: Transition management in public policy. Foresight, 3(1), 15–31. doi.org/10.1108/14636680110803003

Samson, A. (Ed.)(2014). The Behavioral Economics Guide 2014 (with a foreword by George Loewenstein and Rory Sutherland) (1st ed.). Retrieved from http://www.behavioraleconomics.com.

Steinmetz, K. (2019, July 12th). Instagrams challenge. TIME. Retrieved from https://time.com
Thaler, R. H., & Sunstein, C. R. (2009). Nudge: improving decisions about health, wealth, and happiness. Rev. and expanded ed. New York: Penguin Books.

Thaler, R. (2017). Nobelprize lecture: from cashews to nudges, the evolution of behavioural economics [lecture slides]. Retrieved from https://www.nobelprize.org/uploads/2018/06/thaler-lecture-slides.pdf

Torfs, R. (2019, June 12th). Wat minder Boeddha en wat meer Christus: dat hebben wij nodig. Knack. Retrieved from http://www.knack.be

Turnhout, K. Van, Hoppenbrouwers, S., Jacobs, P., & Jeurens, J. (2013). Requirements from the Void : Experiences with 1 : 10 : 100, 31–40.

Vonk, R. (2019 May 18tj). Geef de oermens in jezelf niet de regie. Volkskrant. Retrieved from https://www.volkskrant.nl

Werbeloff, L., Brown, R. R., & Loorbach, D. (2016). Pathways of system transformation: Strategic agency to support regime change. Environmental Science and Policy, 66(December 2016), 119–128. doi.org/10.1016/j.envsci.2016.08.010

Graduation project Maaike van Selm
Supervised by Ingrid Mulder & Roland van der Vorst, TU Delft

In commission of the municipality of Rotterdam
Afdeling Stadsontwikkeling, Project Triple A
Supervised by Ariane Lelieveld, Marianne de Snoo & Oubbol Oung