

## **Activating youth 12 - 15 years in Rotterdam for circular behaviour - a strategic action plan for the municipality of Rotterdam**

In collaboration with: TU Delft and Gemeente Rotterdam

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## Reading Guidelines



For : highlights, designers personal contribution  
Goal: capture viewers attention  
Example: designs, icons..etc



For : process indication, research information  
Goal: create structure for the reader/viewer, deliver information  
Example: indicating pages/ locations, diagrams and figures...etc



For: Gemeente Rotterdam  
Goal: Every image/icon/illustration that affiliates directly with Gemeente Rotterdam gets this color (or a shade of it)  
Example: certain icons, arrows or cirkelsm goals of the municipality



# Abstract

This graduation project focusses on the circular economy as a broader topic and stimulating specific circular behaviour within adolescents as a scope. The municipality has a specific division called Rotterdam Circulair tasked with the assignment of accelerating the city of Rotterdam towards a circular economy. The designer of this project has done extensive research into the target group of adolescents 11 -15 years old (early adolescence) and has found a couple of interesting facts. This age group does not know the concept of circular economy, is highly influential through their peers and parents and are still conducting non-circular behaviours such as littering on the street and wasting food at school. In order to stimulate the right kind of behaviour (refusing to buy excessive products, sharing more products amongst each other and buying more experiences than products) different concepts have been designed. A short term-strategy concept is an escape van, in which all elements are in the theme of a circular economy and every action causes a respective reaction as also happens in real life on the environment. This van serves as a promotional van which can drive to any location in the city. Another short-term concept is a minimal emission game, in which the players ultimate goal is to finish the quest without using raw materials or by minimizing their CO2 emissions. This game can be played online and is promoted on the platform of the municipality. The third concept is a long term one, in which a special addition is added to the already existing Rotterdampas. A new valuta, the golden 'Deelders' is granted to everyone which experiences an activity in the city. With these Deelders the holder of the card can vote on green and circular projects online on the website of Rotterdampas. The projects with the most votes will receive funding of the municipality and will be carried out. This concept stimulates a democratic system where citizens are more actively involved in the sustainable aims of the municipality. Next to the concepts, 30 + ideas were turned into an idea card deck which can be used by the municipality in future creative sessions or projects. Critical criteria for designing for the target group are grouped in a list and can

serve as future knowledge when carrying out a project for this specific age group. An estimation of the business model of each concept is explained in detail, as well as a mini timeline in correspondence with the timeline of strategy of Rotterdam Circulair. The project concludes with a few recommendations for the municipality as to how they could proceed in the future: involving their target group more in sessions, using the idea card deck for inspiration and involving multiple divisions of the municipality to make the concepts work.

# Preface

Hello and welcome to my final thesis for the master Strategic Product Design.

This project is carried out in collaboration with the TU Delft and Gemeente Rotterdam. I have worked with pleasure on this project, mainly because I got the space to completely form the project myself.

I want to thank my graduation support team for their guidance during this project.

JC, thank you for your continuous positivism and spirit. Every meeting you manage to give me inspiration for the next step and your (many) words are not taken for granted.

Willemijn, thank you for the many professional and non-professional chats we have had. You have given me confidence that I could actually do this project and that I was on the right track.

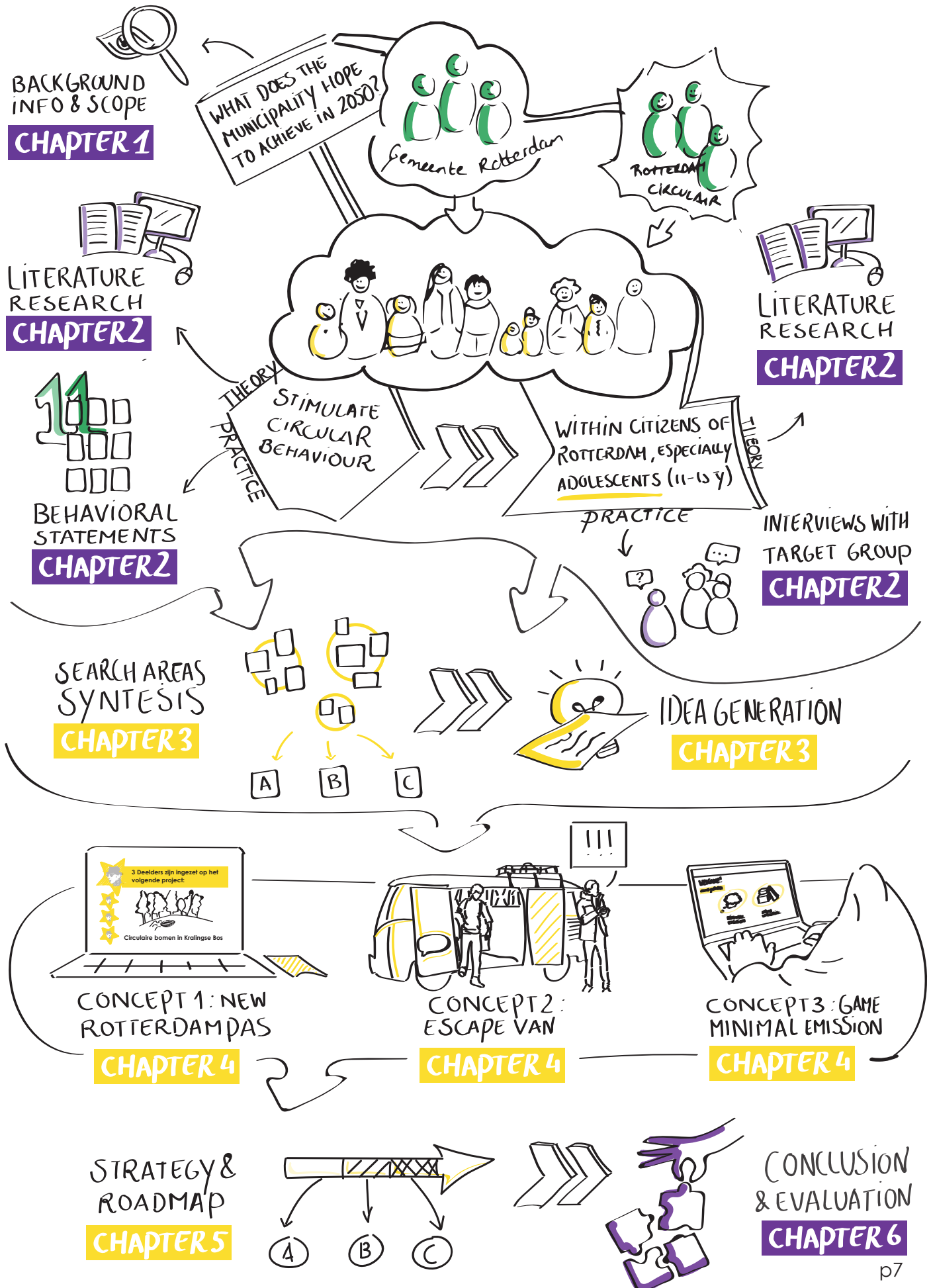
Nadia, thank you for believing me from a municipality point of view and for letting me be free as a bird. Your support has given me strength to continue with my project, no matter what.

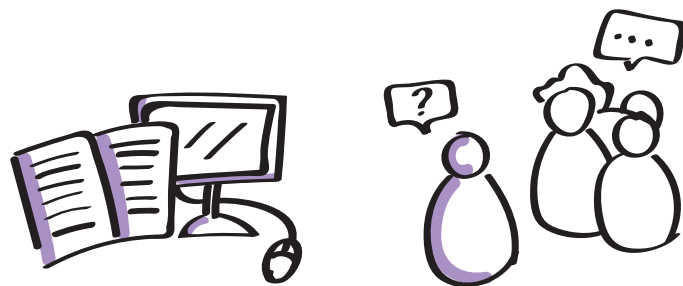
And thank you for my family, my boyfriend and roommates for putting up with me during this project. It lasted a little longer than expected, but your faith kept me going to the end.

Enjoy reading,

Celia de Vries

# Visual Overview





## Part 1 - Analysis

## Chapter 1: project definition

This chapter explains the aim of the project and its relevance. It gives an illustration about the context. Who is the client of the project, what is the problem and why does this problem need solving? Furthermore it provides a reasoning for the chosen scope and a respective overview. The general purpose of this chapter is to provide enough background information in order to fully understand the aim of the graduation project.

# 1.1 Collaboration partners

In this section, I will elaborate on the collaboration partners that form this graduation project: the TU Delft and the Municipality of Rotterdam.

## TU Delft

During this graduation project, the student represents TU Delft and will execute, plan and deliver the project. The student is final responsible for the outcome of the project, and will hopefully be skilled enough to comply with the learning goals and standards of the TU, as well as the demands and expectations of the municipality of Rotterdam.

(CBS, 2019).

The government consists out of 6 clusters (see figure 1). This graduation project is started for the programme Rotterdam Circulair, which officially falls under the cluster 'Stadsbeheer', but this does not mean that this project's purpose will only serve this cluster. The outcomes of this project might also be of interest to people working for a different cluster: 'Maatschappelijk Ontwikkeling' for example. Since the character of this project has a social and psychological dimension, the outcomes could be actionable for projects and people working in different parts of the organisation.

## Municipality of Rotterdam

The client of this graduation project is the municipality of Rotterdam. With a total of 11.000 full time public servants (König, 2018), the municipality of Rotterdam is a large, non-for profit governmental organisation which aim is to serve all 647.453 residents living in the city

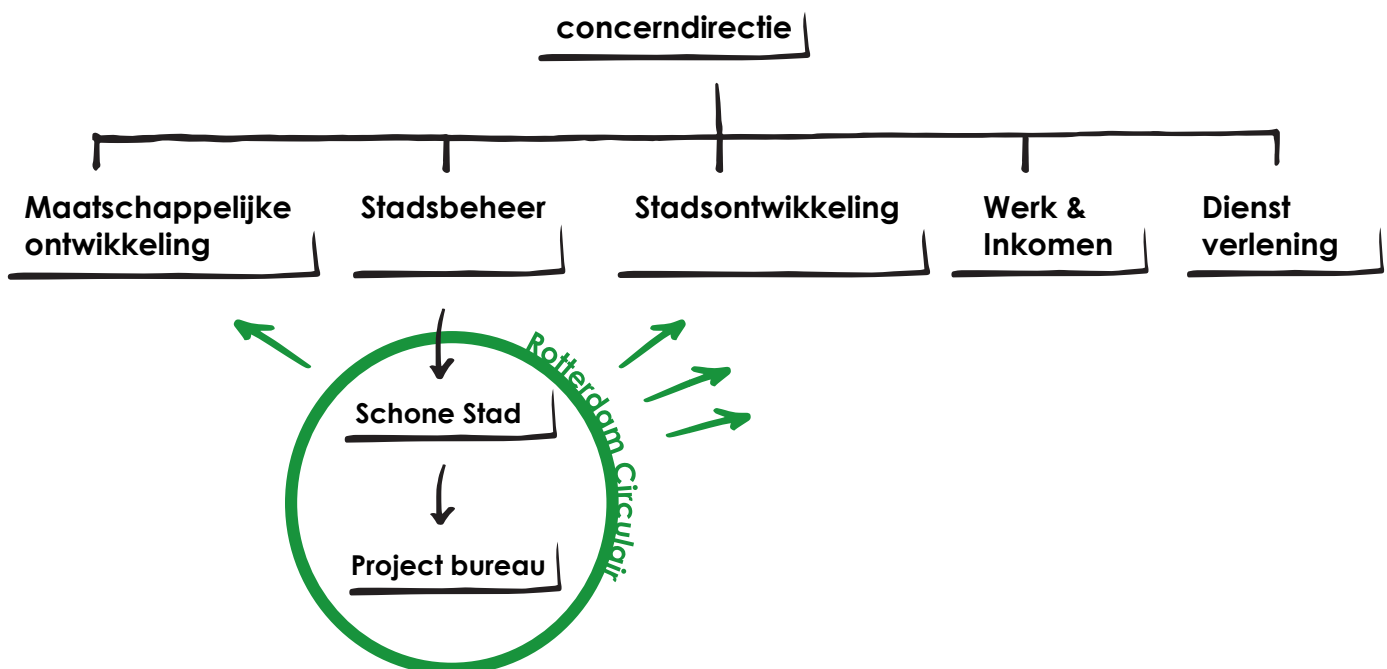


Figure 1: simplified organogram structure municipality of Rotterdam

## 1.2 Klimaat Akkoord Rotterdam

In this section, I will give background information about the climate agreement and how the municipality of Rotterdam is trying to adapt to this agreement.

On the 28th June 2019, the Dutch government signed their climate agreement A 250 page document explaining how the whole of the Netherlands with all its stakeholders can achieve the overarching goal of reducing the emission of greenhouse gasses with a 49% by 2030 compared to 1990. (Ministerie van Economische Zaken en Klimaat, 2019). In this document, all governments of the Netherlands are urged to develop guidelines, actions and measures to ensure this goal is met.

In Rotterdam, this is translated into strategy by developing a specific climate agreement for the city of Rotterdam. The overarching goal remains the same as the national agreement: a reduction in greenhouse gasses of 49%. The Rotterdam climate agreement has been under construction since May 2019, and will be presented on the 22nd of November. Organizations, companies and students gathered around 5 different 'Klimaat tafels', (see figure 2) to make challenging agreements which aim to reduce the amount of greenhouse gas emissions in and around the city of Rotterdam. The Klimaat tafels each support one overarching theme.

Within this theme, organizations, companies, students and the government participate in workshops and meetings to achieve consensus about rules and policies needed. More than a hundred different stakeholders are participating in this project, each having their own stake in the project (Gemeente Rotterdam, 2019). Each Klimaat tafel is urged to come up with concrete projects that will have the focus the coming years. Examples include the creation of a toolbox for real-estate agents which aims to educate buyers on which steps they can take to make their homes more sustainable, the recovery of residual heat in the port of Rotterdam and the GFT waste separation in high rise buildings in Rotterdam. These are just 3 examples projects, there are many more to be presented the 22nd of November.

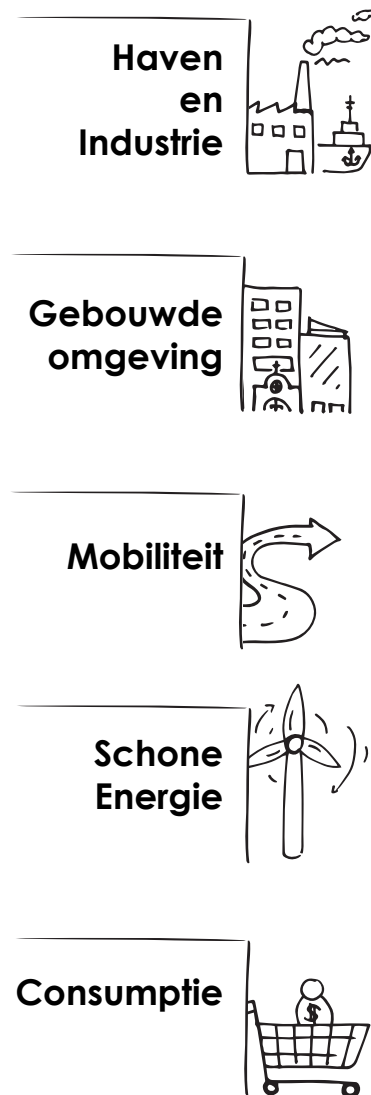


Figure 2: categories of 'Klimaat tafels'

### Key Take Aways



**The ultimate goal of the klimaat tafels is to reduce greenhouse gasses. The reduction of greenhouse gasses is an indicator if a project is successful or not.**

## 1.3 Rotterdam Circular

As stated in the previous paragraph, the success of climate deal related projects is ultimately measured in amounts of greenhouse gasses reduced.

Next to the goal of reducing greenhouse gasses, another slightly different, approach to the climate crisis emerges: closing resource and material loops to ultimately need 'less' primary resources of the earth. Primary resources include materials or substances used in the primary production or manufacturing of goods or construction. The term 'circular economy' has been widely used and become increasingly popular since the establishment of the Ellen Mc Arthur foundation. The meaning of the term will be explained further in paragraph 1.5.2.

The municipality of Rotterdam embraces the term and the circular philosophy: ensuring raw materials keep flowing in resource loops and never losing their value (closing material loops). The goals in this different approach to climate crisis are as follows: a **50% in reduction of raw materials in 2030**, ensuring as well that 'circularity' is the criterion in all of their processes. To achieve this, a 4 year programme has been constructed by 'Rotterdam Circular', a sub division of the municipality. This 4 year programme (Rotterdam Circular, 2019) follows two focal points (figure 4).

### 1.3.1 Focal points of strategy Rotterdam Circular

1. Enlarging circular awareness amongst the citizens of Rotterdam with a focus on the target group 'youth' (4 – 18 years old). The key performance indicator for this goal is the % of increase in circular behaviour.

2. Enlarging employment opportunities and economic development within the circular economy. The key performance indicator for this goal is the amount of new circular initiatives started in the city.

Research Institute Metabolic performed an analysis (Circular Rotterdam, 2019) on the opportunity areas in which the city of Rotterdam could make the most impact and came to the conclusion that the following sectors would be the most attractive in terms of environmental impact and increased job opportunities: hospitals, consumer goods, green currents and construction.

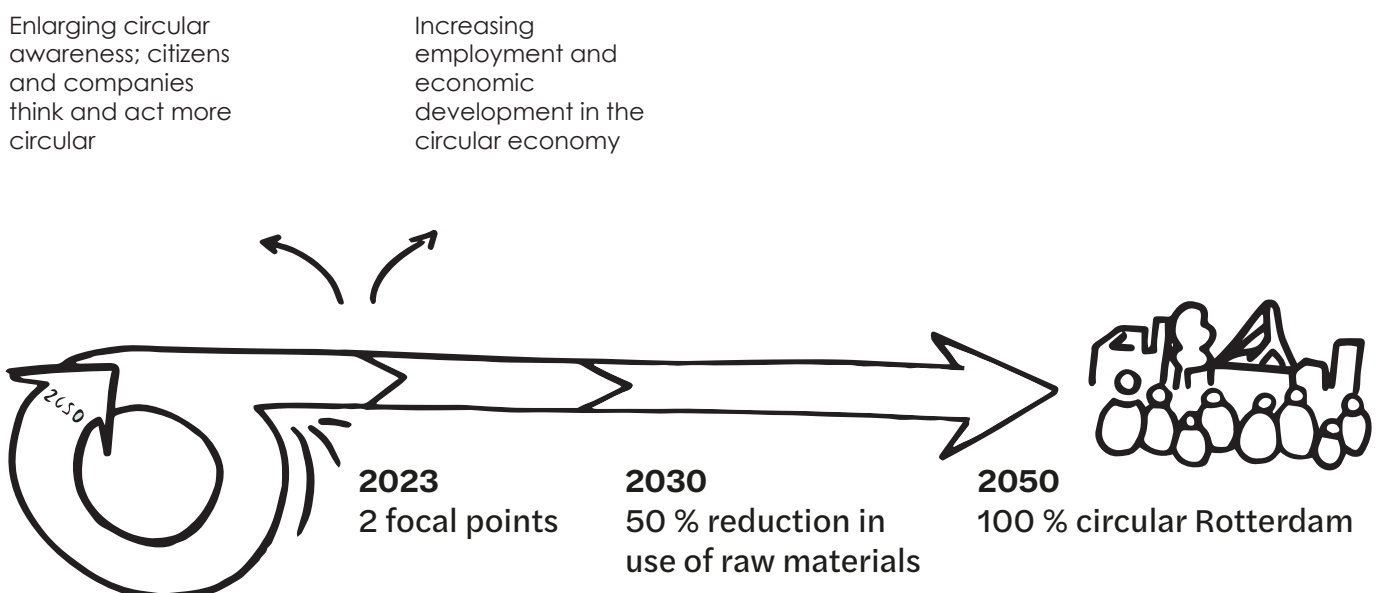
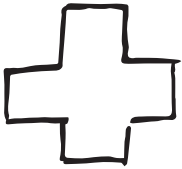


Figure 4: Simplified strategy of Rotterdam Circular including their focus points for 2023



### 1.3.2 Identified Opportunity Areas

#### Hospitals



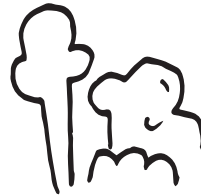
Hospitals of Rotterdam are amongst the top in terms of continuous innovation. The municipality of Rotterdam considers this sector as a priority because they see opportunities for improvement in energy streams, waste streams and purchase of materials. When speaking about circularity, the municipality speaks of material streams, but also about energy streams. Instalment of medicine-filters, filtering out dangerous and hazardous materials out of water streams, is named as a concrete project in this sector.

#### Consumer Goods



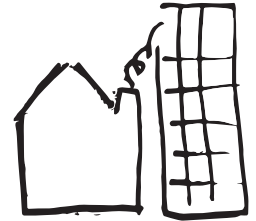
When speaking about products, the municipality of Rotterdam speaks of household and office consumer goods. When speaking about materials, they refer to the materials used for these household consumer goods. 66% of the materials used in these products end up in the incinerator. These materials hold possible high value in other streams of use when upcycled, re-used or re-cycled. An upcycle mall, better options for recycling of plastic and less litter are named as projects in this sector.

#### Green Currents



Green currents are all bio-based materials circulating in the city. The municipality of Rotterdam wants to make sure that green currents such as food(waste) are being utilized in the most efficient way, because as of this day approximately 14 % of food is being dissipated. In 4 years time, all households in Rotterdam must have the opportunity to recycle their 'green current waste' GFT/E. This is named as the primary project of focus in this sector.

#### Construction



The municipality interprets this as elongating the lifespan of a building as much as possible. Whenever a building needs to be taken down, one must look into all the opportunities for efficient re-use of materials, so that less primary resources are needed when building a new construct. A digital market place for materials, construction 'hubs' and a material passport are named amongst concrete projects

This graduation report will focus on the first focal point and the last sector of the 4 identified by Rotterdam Circulair. Creating awareness about circular economy: what it means for the citizen, and how to stimulate behaviours that favour this economy within the sector of consumer goods. In this sector, no projects are yet in place that concentrate on elongating the life-span of products. Yet, this is the goal that is clearly mentioned within this sector. Therefore, this sector is interesting to look into. In section 1.5 the scope is elaborated and explained more in detail. The citizen of Rotterdam is a wide spread term. To call this the scope of the project would be too broad, the population of Rotterdam is very divers in many different aspects (age and background). Therefore the scope of the project needs to be narrowed down further into a specific age group: youth.

### Key Take Aways



The municipality of Rotterdam sometimes uses different viewpoints when they talk about circular economy. In the construction and consumption sector it is about materials and material flows, while in the healthcare sector they talk about waterflows and energyflows.

In the consumption sector, the goal is to diminish and elongate use of products. The projects suggested however, are more focused on elongating the life span of products than diminishing the need for them. In fact, no project is mentioned which is actively pursuing the goal of diminishing the need for products at all.

## 1.4 Prior Research

As mentioned, this graduation project will focus on the first focal point of the 4 year programme of Rotterdam Circulair and a specific age group:

*'Enlarging circular awareness amongst the citizens of Rotterdam with a focus on the target group 'youth' (4 – 18 years old).*

To formulate a research question, 2 separate climate initiatives are researched in order to locate the gap in knowledge which the research question can address. Further information about these initiatives can be read below.

A draft of this overview was provided by the chairwoman in excel-format, and figure 5 shows the categories and the amount of initiatives located.

### 1.4.1 Klimaat tafel Consumptie

The Klimaat tafel Consumptie (Gemeente Rotterdam, 2019) is one of the 5 klimaattafels (figure 2) which gathered in May to formulate clear goals and projects to comply with the Climate Agreement of Rotterdam.

In this particular group, students gather together with public servants, start-ups & other relevant organizations to make citizens of Rotterdam more aware of their consumption patterns in their daily life. (Over) consumption of meat and clothes are named as problem areas of focus. This is why, 2 of the 3 concrete projects they suggest to start in this year are in this area:

*1. Stimulating consumption of plant-based food in stead of meat-based food*

*2. Reducing food-waste in the City of Rotterdam.*

Next to concrete projects, the goal of the Klimaat tafel Consumptie is to also create an overview of initiatives related to the subject for the citizen of Rotterdam.

In cooperation with the Architecture Institute Rotterdam, they want to visualize this overview to make it easy and simple for a citizen in Rotterdam to make a sustainable choice while consuming.

#### Key Take Aways



**Almost all concrete organizations mentioned are concerned with waste and material streams and how value can be restored from these.**

**A small portions of initiatives are focused on repairing or re-using products.**

**There is no concrete organization or initiative which aims to stimulate citizens to buy less and consume less products (yet)**

**Time and energy is being spent on creating overview for the consumer on how to consume [sustainability]**

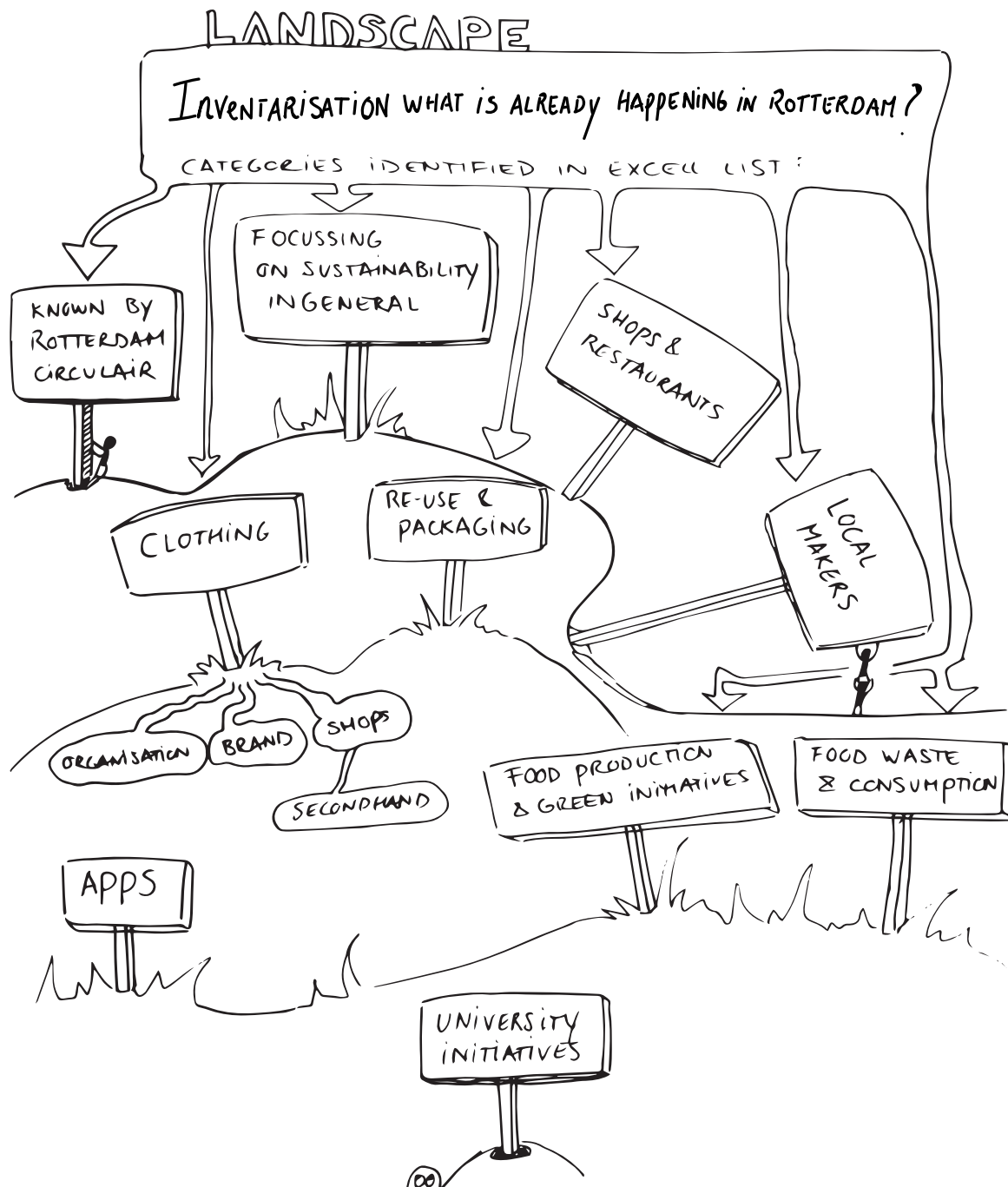


Figure 5: categorical overview of research performed by Klimaattafel consumptie.

Note: as this list/map is still under construction, it could be possible that there is a concrete organization or initiative focussed on stimulating to consume less, but it has not been located yet.

## 1.4.2 Prior internal research 'Jeugd, Jongeren & Circulaire Economie'

At the beginning of 2019, the municipality of Rotterdam ordered for an explorative research into the topic 'Youth and Circular Economy'. In the research, a specific choice was made as to which aspect of circular economy has priority when communicating with the youth. The focus was the following:

Stimulating and inspiring youth to consume less and to use products for a longer time.

Many conversations were held with people from both inside the municipality as outside of the municipality. For example: people from different divisions as 'Schone Stad' and 'Sport', but also people from smaller working groups as 'grondstoffen'. People from 'Culture and Resilience' were targeted, but also from 'Milieupark'. Different organisations apart from the municipality were also interviewed, start-ups and scale-ups such as 'BroodNodig' and 'Buurman' respectively. One session with children from Young010, a platform focussing on development of youth, was organized. In this session, 8 adolescents were present, 2 of them were still going to school. The rest were studying.

The researcher brainstormed about many different ideas and opportunities interesting for the municipality of Rotterdam to join or start. These ideas have not yet been selected. However, 4 opportunities have been selected on the base of 'relevance for the municipality' for immediate sequel.

### Overview for schools



Creating an overview of what the municipality can offer schools for the subject of circular economy. Schools often approach the municipality with specific questions about recycling and waste, and often the municipality does not have an immediate response to these kind of questions.

### Recycling at schools



Creating the possibility for schools to recycle their waste. Currently this is not being done because waste on schools is considered industrial waste and industrial waste is not being collected by the municipality.

### Circular Day



Organising a circular day in which children and entrepreneurs can join to learn and teach about circular economy. Blue City has expressed interest in this idea.

### Overview for schools



Join current event Jeugdvakantie land. Many children visit this event yearly and it could be interesting to see where and how the principles of circular economy can be applied.

### Key Take Aways



**The people who got interviewed during this research were mainly adults, working for the municipality in a specific context.**

**Little attention has been given to the youth itself, the actual target group 'youth', defined as 4 to 18 years old, has only been spoken twice.**

**Initiatives that focus on education are often targeted at children attending primary education. There are little to no initiatives that focus specifically on children attending secondary education.**

## 1.5 Scope

This project deals with a large, abstract concept 'circular economy' and to prevent miscommunication or – understanding it is crucial to get a grip on which aspects and people are meant while doing research on or with them.

### 1.5.1 Circular Economy: zooming in

According to the Ellen MC Arthur foundation the circular economy '*aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system*' (Ellen MC Arthur Foundation). Thus, it aims to make waste an obsolete element. Waste should no longer exist in a society in which a circular economy is embedded for 100 percent. All products and materials used are kept in the system, creating and retaining value for different purposes without ever losing it. One can imagine that this ideal systemic picture is an ambitious one; as multiple people, organizations and networks need to work closely together and

are interdependent on each other to make (part of) it work. Zooming in on the systems components [figure X], important participants can be seen: manufacturers, providers, maintenance companies, farming businesses, energy providers etc... They all form part of different 'loops' or 'cascades'. Each loop represents material flow; for example; from the mineral cobalt extracted from mines in Congo (NOS, 2019) to a battery in your mobile phone, to a mobile phone for second hand use (Schiphol, 2017) to disassembling the phone to retrieve the battery and eventually retrieve the mineral Cobalt to produce a new battery and so forth.

Next to all the businesses involved in making this material flow work, there is one element of the loop which is recurrent in multiple material flows: the user and/or consumer. The Ellen MC Arthur Foundation makes a distinction between consumers and users, in which both make use of material flows in the system. Consumers and users most of the times are the same person, but the difference lies within the existence of

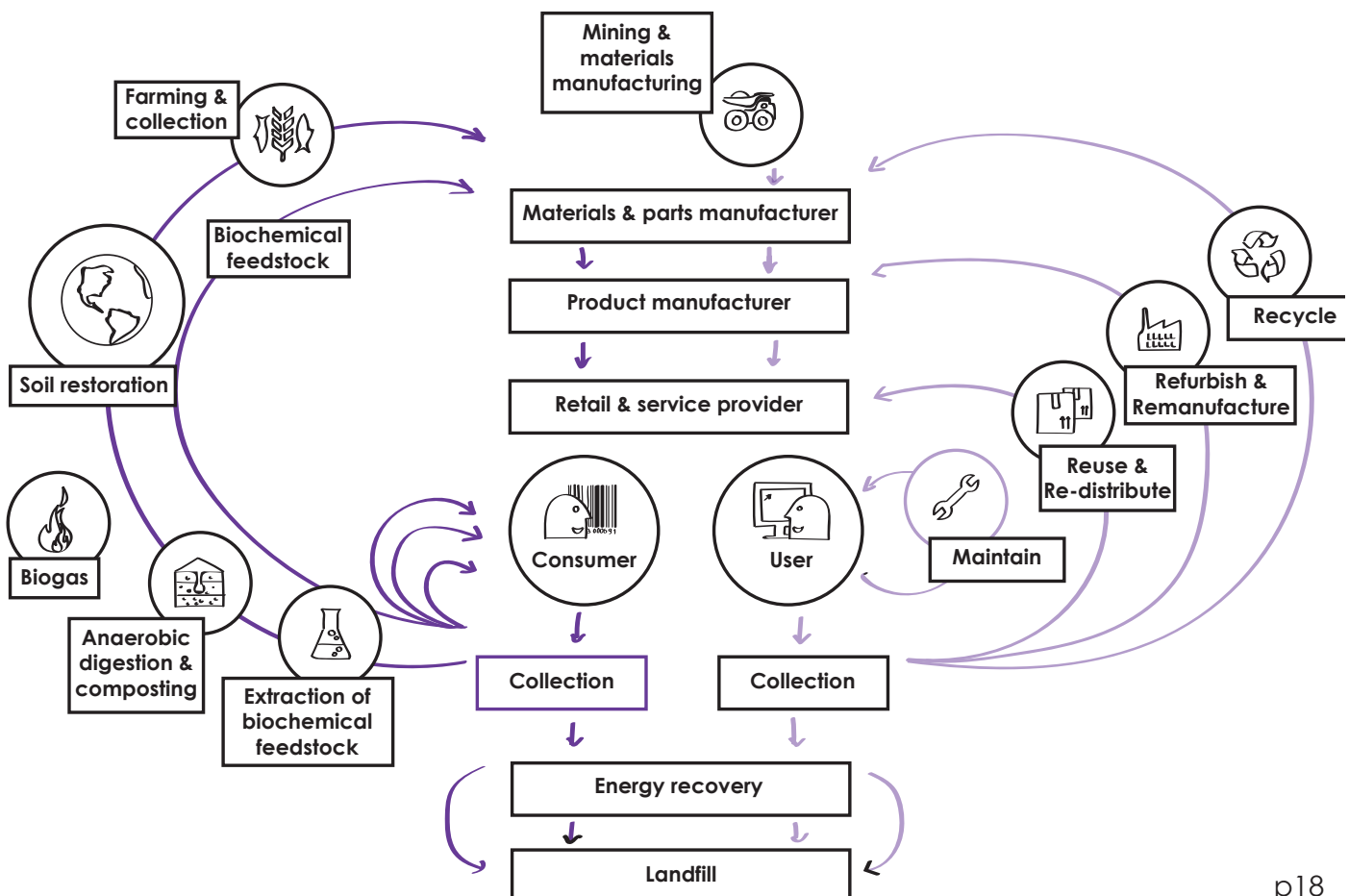


Figure 6: systemic overview of the interpretation of a circular economy according to the Ellen Mc Arthur Foundation



interaction with the product or not. You are a monthly consumer of Netflix for example, but every time you watch a series on it you are considered a user of Netflix. Consumer or user; they are both equally important links to the material flow cascades. They are central in the whole system because they show different kind of behaviours which can impede or stimulate organisations with a circular business model. It is interesting to zoom in on processes happening at the centre of this consumer and user, as they seem to have critical influence on the cascade flows of materials. If we want to create climate friendly behaviour, we need to make consumers (and users) more aware of their behaviours and impact on the system, as currently there is little responsibility taken by them and, in cases, insufficient knowledge about negative outcomes of their behaviour (Mugge, 2018). Therefore, in this project, the scope will centre around this specific element of consumers and user: their behaviour and knowledge about and towards the circular economy.

### 1.5.2 Target group

As previously discussed, this project will centre around the consumer and user's behaviour in the circular economy system. Placing the project in the context of the city of Rotterdam, one could speak about all citizens of Rotterdam as an initial target group. However, this type of scoping is still too broad as the city of Rotterdam is very diverse and has many different cultures, backgrounds and ages (Wijkprofiel, 2020). Therefore, some additional scoping in the target group is needed. In their program (Rotterdam Circulair, 2019) the municipality of Rotterdam has categorized 'youth' as a specific target group to focus on for the coming 4 years. The importance of creating awareness throughout an early age in education is stressed. According to the municipality of Rotterdam, 'youth' is categorized as a person between the ages of 4 to 18 years old. And within this age range, multiple different educational institutions and levels can be distinguished. If the municipality of Rotterdam wants to be able to know how

to approach and stimulate the 'youth' in their city, it is important to make further distinctions in age groups where possible. In literature, the phase between 11 years old and early years is referred to as adolescence. Since this is still a broad spectrum of ages, it is specified further into 1. early adolescence (11 - 13 years), 2. middle adolescence (14 - 18 years) and 3. late adolescence (18 - early twenties). In high schools in the Netherlands, there is a distinction between *onderbouw* (11 to 15 years old) and *bovenbouw* (15 to 18 years old). Since the outcomes of this project need to be actionable, this project will scope around youth of between the ages of 11 to 15 years old. In terms of literature this would be early to middle adolescence. This age group is chosen due to the following:

1. Prior internal research (Appendix A) shows a clear distinction between youth from 4 to 18 years is needed. A child of 4 must be approached differently than a teenager of 18 years old.
2. Much of the initiatives that are already taking place, such as Afvalbaskets, Catching plastic in the sea, craftwork during the WereldHavenDagen...etc are orientated towards children attending primary education, with the respective educational levels. No specific initiative is being designed for youth that has just transferred to a high school, ages 11 to 15 approximately.
3. This target group between 11 to 15 years old, will form the younger work force in 2030, a potentially interesting target group for the Gemeente Rotterdam in terms of potential new employees who might be interested in the exciting new and relevant projects that they are working on currently.

Currently, little to no attention is being given to this group of young adolescents coming from Rotterdam Circulair. This is not surprising, since this program has just started 1,5 years ago and has big, overarching and ambitious goals to stimulate a circular economy, and with this, different priorities and mindsets. It is interesting to explore this target group though, since between the ages of 12 to 15

years old children become more autonomous and independent, with increasing interest in the future (McLeod, 2013). They could potentially be triggered from a young age to contribute to a circular economy, but it is important to do research into this group to understand their world view and get a grip on their priorities and concerns, before one can say anything about changing specific behaviours that contribute to a circular economy. Once this is clear, the possibilities of the municipality of Rotterdam can be explored. How can the municipality of Rotterdam best get into contact with the target group? How should they communicate their message? And are there possibilities for cooperation for example?





## 1.6 Initial Challenge

Figure 7 shows a visual overview of the scope of the project. The programme of Rotterdam Circulair has multiple overlapping projects in different sectors. It is a new programme, and the projects created have touchpoints across a wider spectrum of the municipality of Rotterdam. The program of Rotterdam Circulair itself is part of a broad strategy as explained in 1.2 and 1.3. It details which areas are of focus the coming 4 years: construction, green currents, hospitals and consumer goods. Each of these area's have an overarching goal in which all projects done at the municipality should match. Some area's already have concrete projects in place, such as a project which enables the collection of putrescible waste in high rise buildings (Green Currents) or the development of a material passport and material collection hub (Construction). Projects suggested in the area of consumer goods remain more vague: better recycling, less stray waste and the development of an upcycle mall. Meanwhile, the goal of this area is clear; promoting and stimulating diminished use and elongated use of products. Two out of three projects suggested deal with the problem of

waste and what to do with waste streams. The goal however, is to insist on waste prevention, the non-creation of waste by making sure less products are being consumed by people (diminished use) and products are used for a longer period of time (elongated use). This subgoal within the area of consumer goods party overlaps with the broader goal of the programme: stimulate circular behaviour within the citizens of Rotterdam. They both put people (consumer and user) and their behaviour central. However, it is not stated specifically how the municipality wants to achieve this goal. It remains unclear which actions are needed, when these need to be performed and how. Therefore, the initial design challenge will be the following:

*Develop a strategic action plan for the municipality of Rotterdam with accompanying interventions in order to stimulate circular behaviour under adolescents of 12 to 15 years old.*

People and their behaviour; when, how and why they use products for example, will be the key factor to understand and research in order to know how to stimulate them to demonstrate circular behaviour.

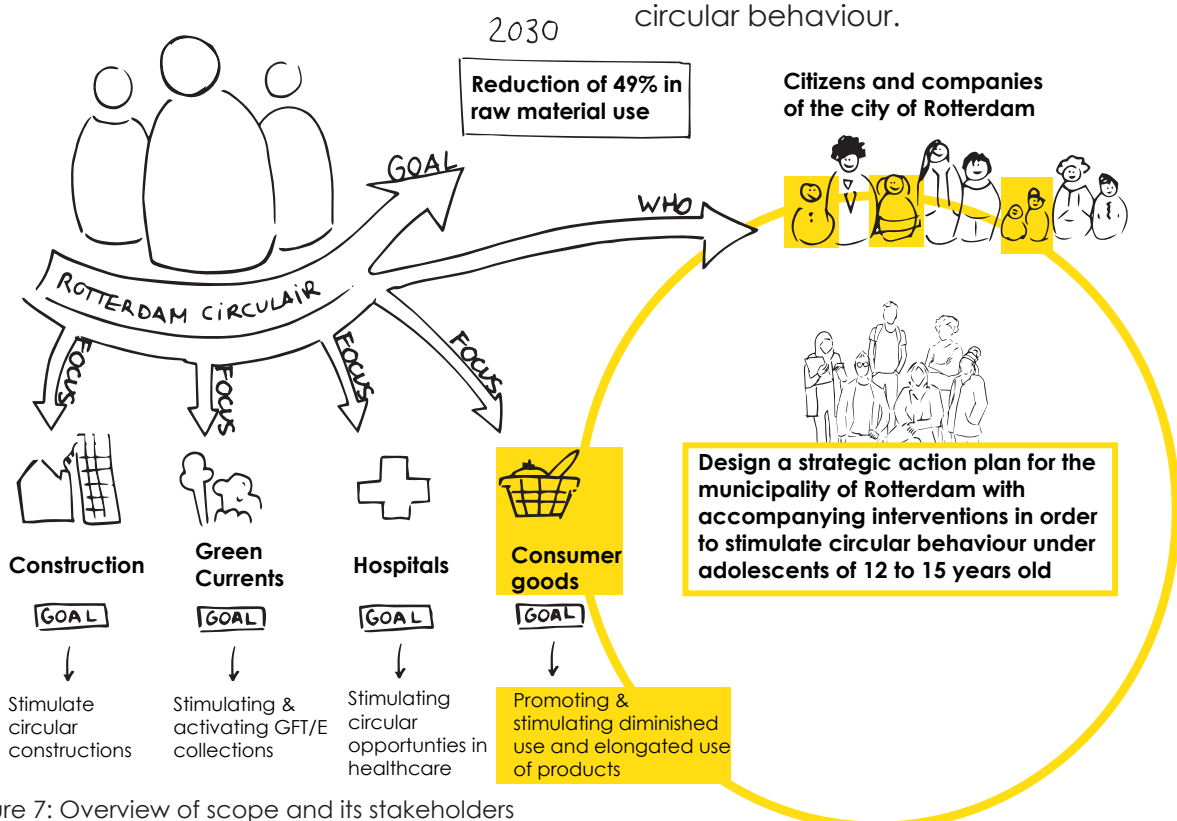


Figure 7: Overview of scope and its stakeholders

## 1.7 Approach

The project will address a complex scene and topic: the circular economy is a broad and abstract term and researching people and their behaviours is a rich yet difficult task. Therefore, the project will follow the approach of the basic design cycle according to The Delft Design Guide. This approach consists out of 5 phases which continuously interlink with each other. Analyze, Synthesize, Simulate, Evaluate and Decide and Iterate. During this process, the problem and the solution evolve and become more clear as the project evolve.

A couple of topics are analyzed and combined during the analysis and synthesize fase: The concept of circular behaviour is researched. What does circular behaviour mean for the municipality of Rotterdam and what is said about it in literature? The people involved, the adolescents, are also researched. What is their world view? How do you approach them?

How do they behave in relation to consuming products? Insights that arise from this research are analyzed and combined into opportunity area's for design. Together with the target group these area's are created and evaluated, during the Simulation and Evaluation phases. Next, a design challenge is created and solutions to it are invented, creating a second synthesizing phase. These solutions will form interventions which will be incorporated in an action plan for the municipality. The evaluation of these interventions will take place during the Decide phase. When researching people and their behaviour, it is crucial to get a rich understanding of the context. The 'why' behind their actions must be discovered in order to locate a relevant problem and create an interesting solution.

Therefore, the methods of research include literature research, contextmapping, analysis on the wall, semi-structured interviews, generative research (creative session) and desk research (Delft Design Guide, 2014).

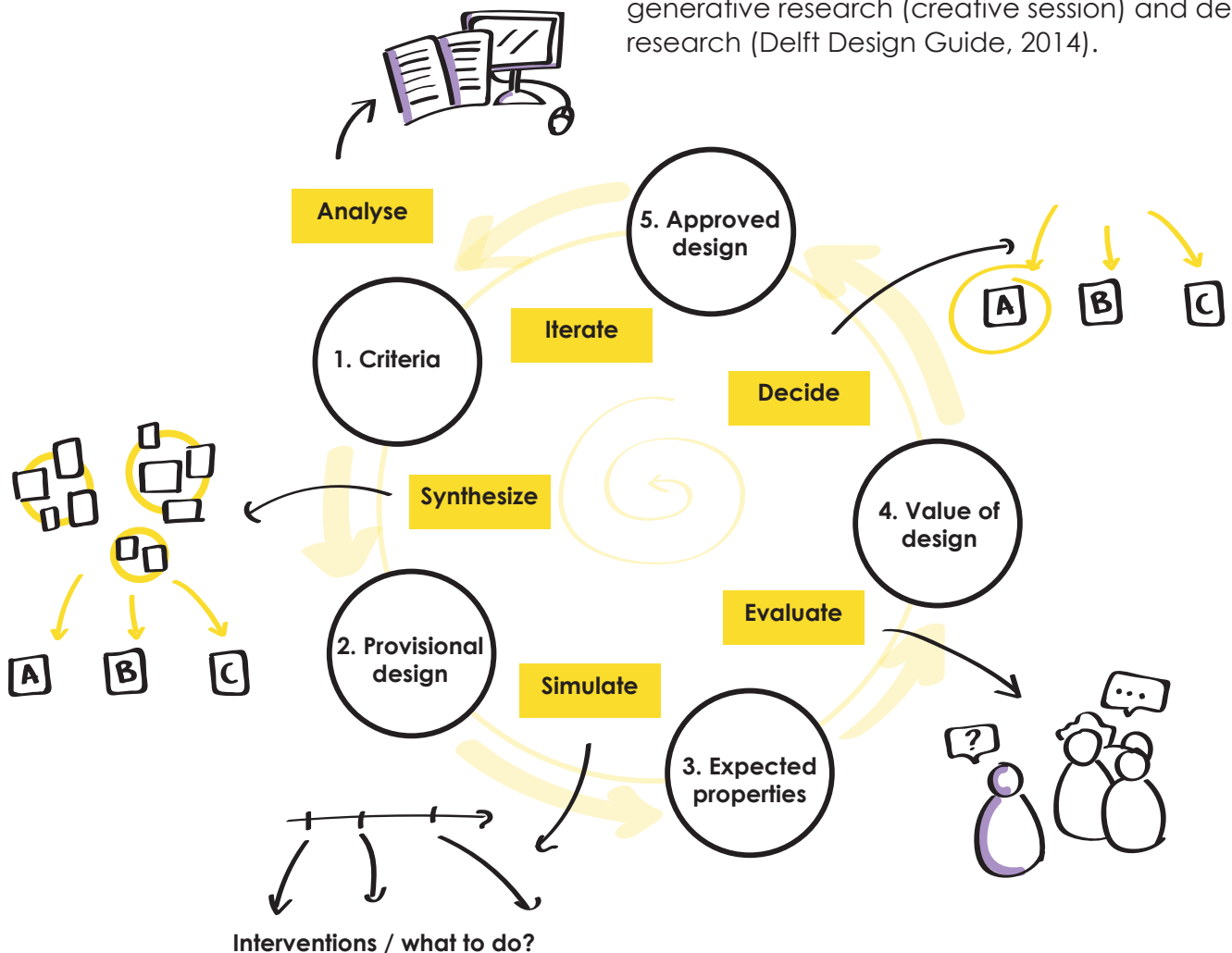
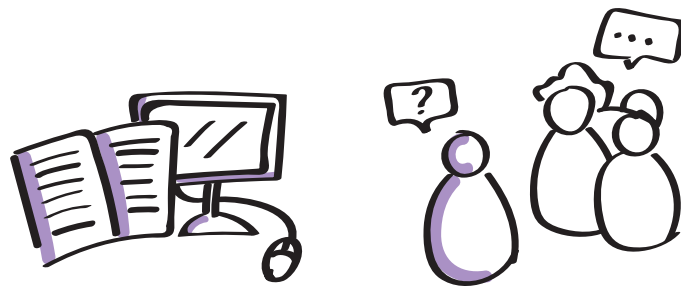


Figure 8: Basic Design Cycle, based on Delft Design Guide (2014)





## Part 1 - Analysis

## Chapter 2: research

This chapter explains the research phase of the project. It gives an overview of what the literature says circular behaviour means and what the municipality interprets as circular behaviour. A gap in literature is found: little attention is given to specific desired behaviours during the phase of acquiring a new product. This chapter also provides an insight into the chosen target group. What is most important to them at the ages of 11 to 15? It concludes with results from the analysis on the wall containing six different search areas with corresponding design challenges. A choice between these areas is made and based upon the outcomes the designer creates a design brief.

## 2.1 Circular behaviour within literature

This section contains a literature review of circular behaviour from different perspectives:

- models with strategies for circular behaviour
- models with actions for circular behaviour
- the central role of the user and circular behaviour

At the end, to understand why specific behaviours are so important, the concept of circular business models is explained with different types of circular business models. This is done to give an understanding about why circular behaviour is desired and so important.

### 2.1.1 The role of the user

In a recent study, scholars emphasize the lack of attention given to the potential important role of the user/consumer in the circular economy system. They argue that a circular economy is enabled by novel business models and responsible consumers (Kirchherr, Reike &

Hekkert, 2017).

Other scholars emphasise the importance of the role of the user in the circular economy too. Research into behavioural factors influencing users in order to accept different kinds of circular business models, can contribute to 'a wider introduction and diffusion of circular business models, products and services in the market' (Piscicelli & Ludden, 2016). This behavioural factors include user and consumer attitudes towards new ways of consumption (circular business models) e.g what they will accept, what they expect and what they desire (Lofthouse & Prendeville, 2017). Thus, the role of the user plays a central role when speaking about circular behaviour and thus it also is important for this graduation project.

### 2.1.1 Models of circular behaviour

The circular economy concept has been gaining widespread momentum throughout the world. With around 114 existing different

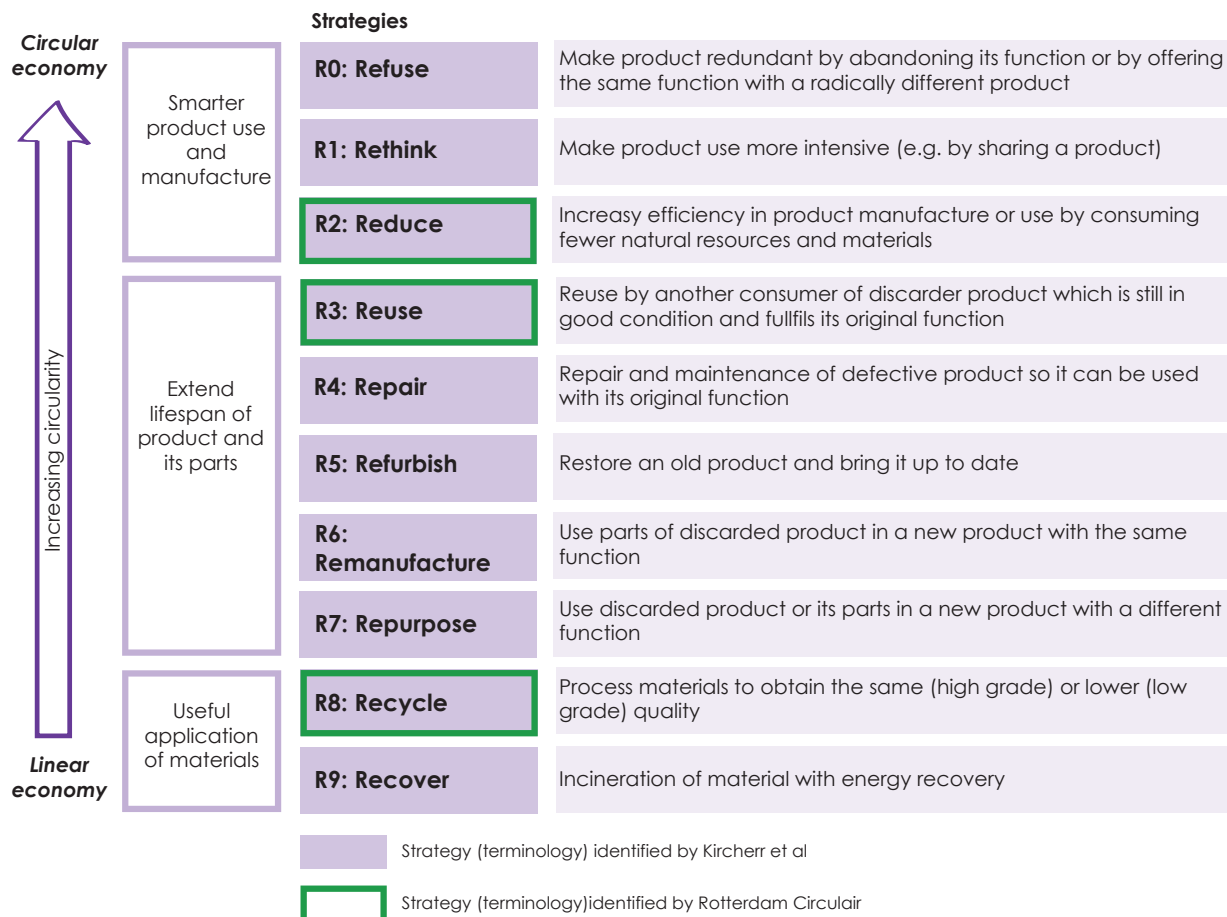


Figure 9: model for circular behavioural strategies based on Kirchherr et al, 2017

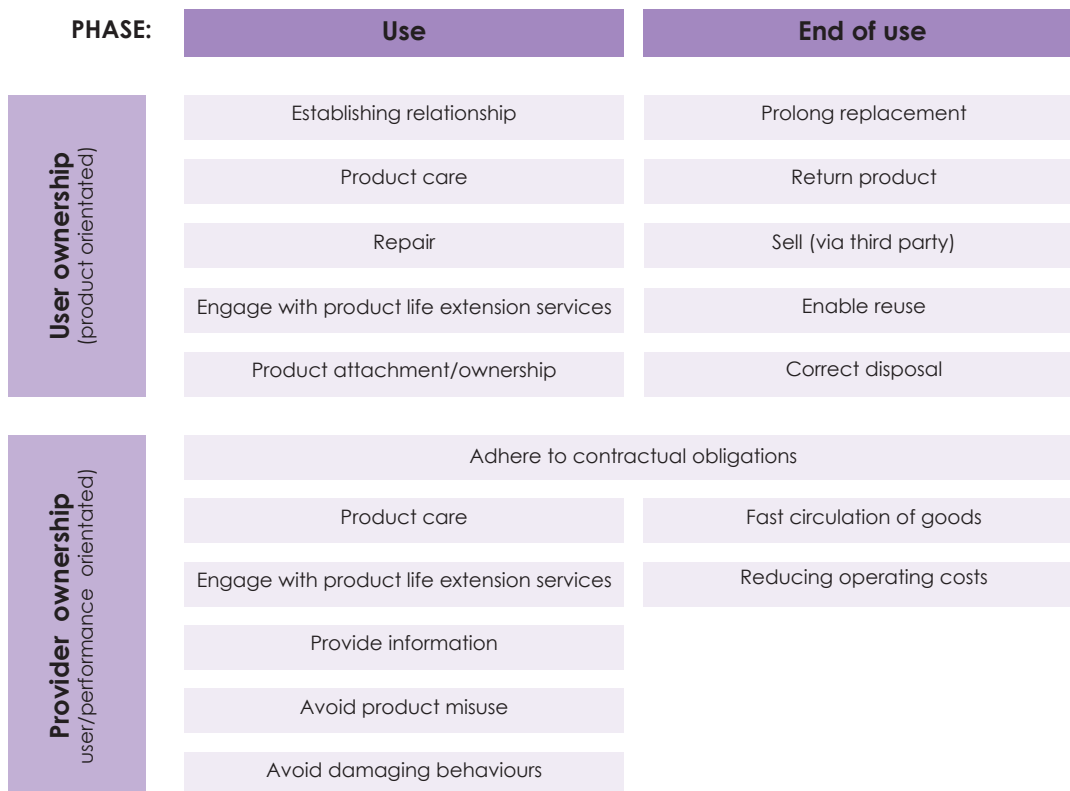


Figure 10: model of circular behavioural actions based on to Wastling et al, 2018

definitions (Kirchherr, Reike & Hekkert, 2017), it can be difficult to reach consensus about the concept. Kirchherr et al argue that reduce, re-use and recycle activities are amongst the most frequently named themes amongst scholars and practitioners when speaking about the concept of a circular economy. After analysing the 114 definitions, Kirchherr and scholars come up with an adapted framework called the 9R framework [see figure xx!] with a couple of more strategies than the frequently used 3R's. The framework contains strategies such as Refuse, Rethink and Reduce, which are positioned on top of the hierarchical ladder going from a linear to a circular economy. The strategies suggested in this case are respectively guidelines such as 'make product redundant by abandoning its function or by offering the same function with a radically different product', 'make product use more intensive' or 'increase efficiency in product manufacture or use by consuming fewer natural resources and materials'.

These strategies are formulated to mostly address manufacturers, designers and providers

of products. They could be useful to use as guidelines for innovation strategies. However, where there is a product there is a user using it. And according to different scholars it is this part that is underexposed in literature about circular economy and designing for a circular economy; customer or user behaviour, the things a person does with a product when they have it, is an important element to consider when wanting to design for a circular economy system (Wastling, Charnley & Moreno, 2018). The scholars created a model (figure 10) which tries to make explicit which user behaviours are desired when wanting circular business models to work. To structure their work, they define 3 different phases of customer engagement with a product: Acquiring the product (1), Main use phase (2) and End of use phase (3).

### 2.1.3 Similarities and differences between models

Phase 2 and 3, are incorporated in the model as can be seen in Figure XX.. When comparing both models, similarities and differences arise. Both cover the action of prolonging life

extension of products; making sure a product is used for a longer period than average and avoiding the accumulation of extra material flow. Different behaviours can come into place here: repairing products, establishing a relationship with the product, sharing products with others, re-using the product by another user...etc. However, there are also some differences between the two models itself. Wastlings' model makes a distinction between user and provider ownership, depending on when a product is owned by whom. Kirchherr's model does not make such a distinction in user ownership. Their model defines strategic guidelines formulated specifically for designers and businesses. They can use this model to know how to adapt their practice in order to make circular business models work in the future. Wastlings' model provides actions to be taken by designers and businesses, but also actions that can be taken by individual users. Examples such as 'product care' 'sell' and 'return product' are behavioural actions to illustrate this. Actions and behaviours like the ones found in both models contribute to make circular business models work. Section 2.1.4 will provide a brief overview with insights about circular business models.

## 2.1.4 Circular Business Models

According to scholars, a circular business model entails the rationale of how an organisation creates, delivers and captures value to close and slow material loops (Bocken et al, 2016; Antikainen and Valkokari, 2016). Others prefer to refer to circular business models as specific type of product service systems (Wastling, Charnley & Moreno, 2018). To build their model for desired circular behaviour, they make a distinction between 3 types of product-service-systems (PSS):

- Product-orientated
- Use-orientated / Access- model
- Results-orientated

In a product-orientated PSS, the value a

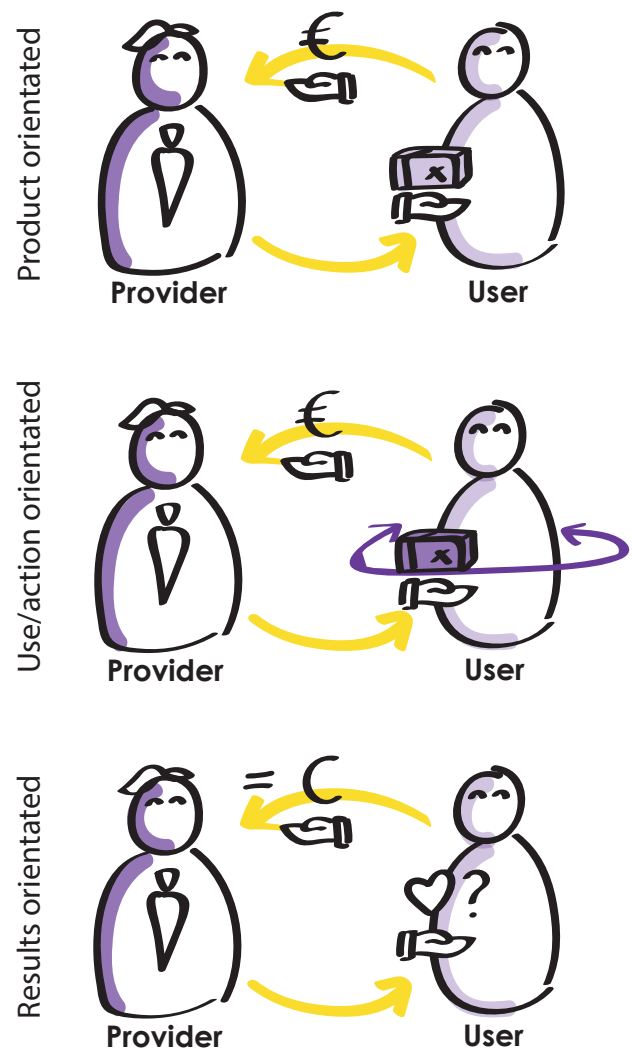


Figure 11: Types of product service systems according to Wastling et al, 2018

producer gets is based on the profit they get from selling a product and the user owns the product for itself. In a use-orientated PSS, the product remains property of the service provider, and the value the user gets is the service around the product. In a results-orientated PSS, the value the user gets is based on a specific need of them without having to use a product at all (figure 11). This distinction between the different kinds of product service systems is important, because in each of them value for the user is created and translated differently. And this difference is important to note, because it may require different types of behaviours required from the user while interacting with the product or service. Scholars admit it is difficult to make a clear distinction between these different types of



behaviour. Yet, it is noticeable that ownership was found to be the 'key differentiating factor' between behaviours related to use & result-orientated and product-orientated business models (note the appearance of 'ownership' in the actual model of Wastling). When a product is owned by the user, the user is in control of this product. When a product is owned by the producer, 'a business or organisation generally has little control over what somebody does with a product when they have it.' Ownership and control of the product, physical or not, seems to be an important criterium in categorizing desired circular behaviours.

When referring to the phases of customer engagement mentioned in 2.1.1, the first phase of acquiring a product, is out of scope of Wastlings' model of desired circular behaviour. However, during this phase of acquiring a product, the behaviour of the user is still relevant as a potential circular behaviour. Although not specified, scholars do refer to work about certain barriers during this phase. One such a barrier is a need for psychological ownership (Baxter et al, 2015). Baxter et al define this as a 'mental state in which an individual claims an object as theirs.'

Claiming an object as yours could become a problem if you encounter a company which does not sell objects to you. Instead, the product can only be leased to you, lend out to you or you are forced to share your product with someone other than you for example. If a user has a need for psychological ownership, he or she will be more inclined to buy a product which he or she can own for themselves.

Mentioning this type of barrier is relevant, as removing it could lead to a faster and smoother adoption of circular business models. Research into the first phase of customer engagement (acquiring a product) related to specific types of circular behaviour required is scarce. However, it is relevant to understand more about this phase; the relationship a user has with products, why he or she wants them and what they eventually acquire.

These topics will form the basis for the explorative research with the target group.

To conclude this section it becomes apparent that circular behaviour can be interpreted in many different ways, and there is no consensus about one particular definition. However, it is clear that the behaviour the used displays is of great importance on how much impact he or she has on a circular economy. Therefore it is crucial that the used needs to be understood deeply. What he or she does can be high on impact (for example refusing to buy, or re-using a product) or it can be of low impact (for example recycling or recovering).

Next to the user, it is clear that there is little attention for the moment in which people decide to buy a product or not. This moment is not taken as a phase in any literature model, but it has the highest impact on the scale towards a circular economy. This is a gap in literature that this project will adress.

### Key Take Aways



**1. The user as key enabler of a circular economy needs to be understood deeply. His/her desires, beliefs and needs may play a role when accepting or declining different types of circular business models.**

**2. Research into specific circular behaviours related to the process of acquiring a product (phase 1 of customer engagement) is underexposed. This phase determines if a product is sold or not; if it is manufactured or not; and eventually; if raw materials are needed or not.**

**3. The explorative research will focus on questions like: How do adolescents aged 11-15 year relate to products they use in their daily life? Which products do they want, need and use? How and when do they consume them? And why?**

## 2.2 Circular behaviour within Rotterdam Circular

In the previous section, the concept of circular behaviour was analysed through the understanding of academics and scholars. Knowledge about this area is mostly theoretical and speaks of general strategies and guidelines. These guidelines work for people directly involved in the chain of material loops of the circular economy system, as their job and influence on the system is defined. However, for people working at the municipality and Rotterdam Circular the case is different. The municipality of Rotterdam is a large non-profit governmental organisation which aim is to serve all citizens of Rotterdam. They gather insights from academic research and translate them into actionable concepts which are often used on the spot to support campaigns and policy decisions. In this section, the meaning and application of the term 'circular behaviour' is researched from the practical angle. How do people from Rotterdam Circular interpret circular behaviour?

### 2.2.1 Behavioural statement cards

Municipality workers often call upon the expertise of research institutes to gather relevant data about a certain topic they want to create policy for, or to track results about specific goals that have been set by them. At Rotterdam Circular, this mechanism was also used in order to support the campaign 'Van Zooi Naar Mooi', the central campaign around the 4-year programme. This campaign wants to make all citizens aware of the concept of circular economy, why it is important and how much people are already (or not) contributing to it. In short, it wants to be able to say something about the circular behaviour of citizens of Rotterdam while making them aware of the concept at the same time. Research Institute Blauw was contracted to do a survey (Blauw Onderzoek, 2018) amongst citizens of Rotterdam. This survey would be performed a couple of times to track possible increases in knowledge and corresponding behaviour related to circular economy. In order to say something about desired behaviour of citizens, it is required to know something about

their current behaviour. Rotterdam Circular and Blauw Research Institute formulated 11 behavioural statements, and or actions, which reflect if they are behaving circularly active or not. figure 12 shows the 11 statements of behaviour used to measure how circular the citizen of Rotterdam is. The statements include behavioural actions like giving products a second life, only buying what you are actually going to eat, bringing old electrical equipment to a 'milieupark' to recycle..etc. The statements are formulated into concrete action steps in which every citizen can decide for him/herself if he or she carries out the action in daily life. It is decided by Rotterdam Circular and Blauw that a citizen is a circular active citizen, if at least 8 out of 11 statements are done frequently. A non-circular citizen is the one which does 3 or less statements frequently.

### 2.2.2 In context: statements and models of desired circular behaviour

To illustrate the differences between terminology used about circular behaviour in literature (section 2.1) and in practice (section 2.2), the behavioural statements of figure 11 are analysed within the context of the two theoretical models of figure 9 and 10.

#### **Statement 1: I give products I no longer need a second life**

Kirchherr: Re-use

Wastling: Repair product / return product / sell (to third party)

Explanation: ensuring a used product is getting a second purpose is making sure the products life cycle is enlarged. The product will be used for a longer period of time prolonging the moment in which it would have turned into waste.

#### **Statement 2: Whenever I need new products, I always look if I can find a second-hand version of it first.**

Kirchherr: Re-duce

Wastling: X

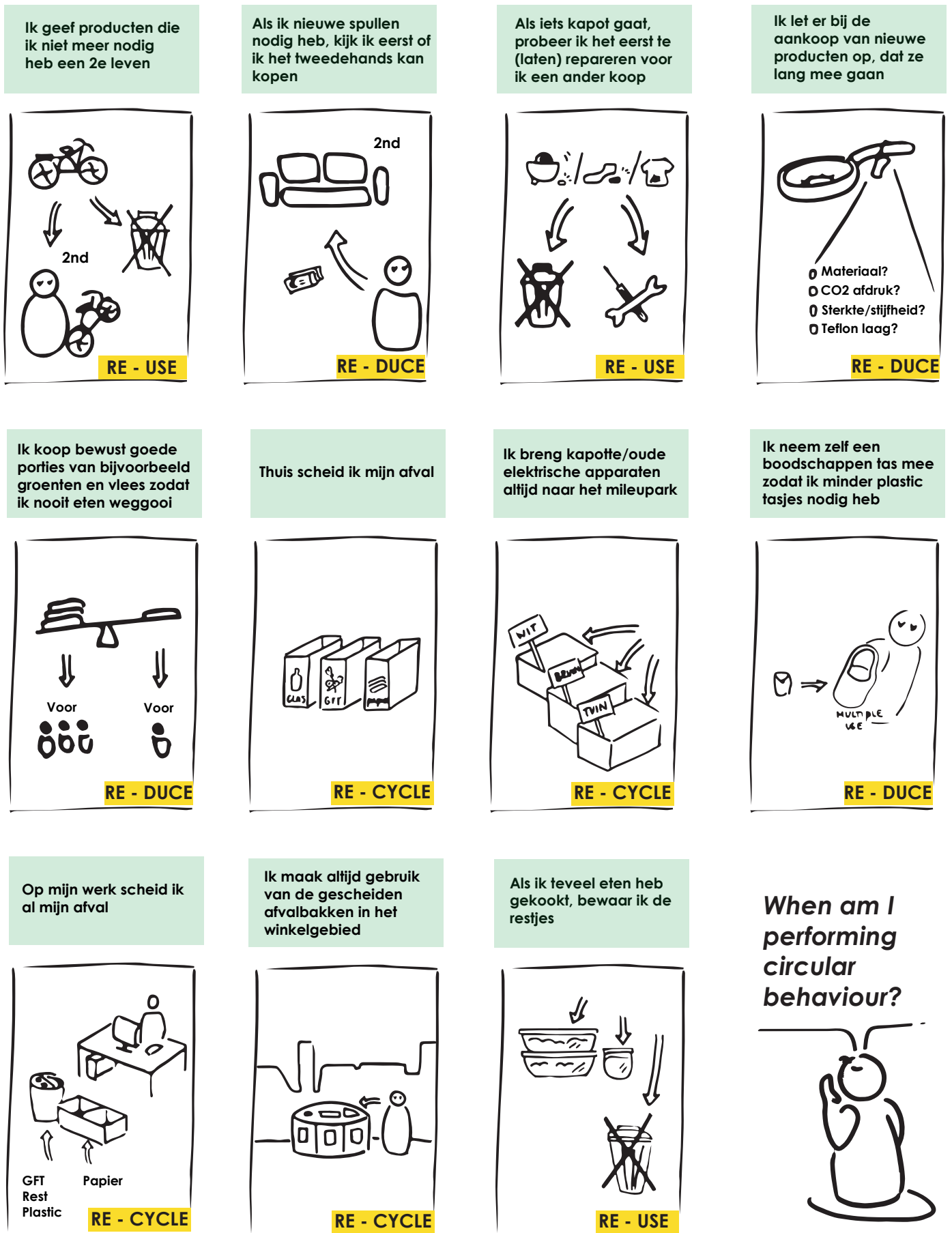


Figure 12: Behavioural statements according to Blauw Onderzoek

Explanation: Replacing a (otherwise new) product with one that has already been made, reduces the need for natural resources and materials. This action can be seen as an efficient way in product use, and matches the Re-duce strategy of Kirchherr's model. Wastlings model does not specify an action like the one above because it falls out of scope of the model; (e.g the action defines one which happens in the 'acquiring a product'-phase of customer engagement).

**Statement 3: *If something breaks down, I first look if it can be repaired before I buy something new***

Kirchherr: Repair

Wastling: Repair / avoid damaging behaviours

Explanation: The moment a product has a malfunction or breaks down, one can choose to throw it away or repair the damages. Performing the latter ensures the products life cycle is enlarged. It could indirectly also cause for less new products to be manufactured. This behavioural action is defined the same in both models.

**Statement 4: *I make sure they last a long time when buying new products***

Kirchherr: Reduce

Wastling: X

Explanation: New products made of high quality materials will last much longer and thus, they remain much longer in their life cycle. Buying (only) lasting products can indirectly cause for a decrease in need for natural resources and materials. This way, this reflects on the Reduce strategy of Kirchherr's model. Again, this action falls out of scope when looking at Wastlings model.

**Statement 5: *I deliberately buy good portions of vegetables or meat (for example) so that I never have to throw anything away***

Kirchherr: Reduce

Wastling: X

Explanation: When consuming food, one is bound to the portions created by the provider (e.g supermarket). If food is only bought in measured portions considering everything

is going to be consumed, it could indirectly contribute to a decrease in need for natural resources and materials. This action does not explicitly cause a reduction in natural resources, but it contributes indirectly to it. It reflects the Reduce strategy of Kirchherr's model and it falls out of scope for Wastlings model.

**Statement 6: *I separate my waste at home***

Kirchherr: Recycle

Wastling: Correct disposal

Explanation: Separating waste means recycling it and giving remanufacturers the option to add new value to your waste streams.

**Statement 7: *I always take broken and old electrical appliances to the environmental park***

Kirchherr: Recycle

Wastling: Correct disposal

Explanation: Instead of throwing away electrical appliances together with all other household waste, it can be taken to an environmental park where every different product is sorted, weighted and given a new destination. The action of making sure these appliances are taken to the park equals the action of recycling. In Kirchherr's model, this would be categorized as a Recycle strategy. In Wastlings model, this would fall under correct disposal.

**Statement 8: *I bring my own shopping bag, so I do not need an extra plastic bag***

Kirchherr: Reduce / Re-use

Wastling: Enable reuse

Explanation: Using a single use product for multiple times could decrease the need for extra single use products and thus, it slows the material flow at the beginning of any material flow (e.g the need for natural resources and materials). This can be associated with the reduce strategy of Kirchherr. Since this plastic bag is also re-used multiple times it could also be associated with the Re-use strategy of Kirchherr. In the model of Wastling, the statement could be associated with the action of 'enabling reuse'.

**Statement 9: I separate all my waste at work**

Kirchherr: Recycle

Wastling: Correct disposal

Explanation: Separating waste is crucial in order to be able to recycle the different material streams so they can be of added value. At work, this is no different. This statement can be categorized within the Recycle strategy of Kirchherr and the 'correct disposal' action of Wastling.

**Statement 10: I always use the separate waste bins in the shopping area**

Kirchherr: Recycle

Wastling: Correct disposal

Explanation: Separating waste is crucial in order to be able to recycle the different material streams so they can be of added value. Creating waste can be done anywhere, as well in the shopping area. Again, this statement can be categorized within the Recycle strategy of Kirchherr and the 'correct disposal' action of Wastling.

**Statement 11: If I have cooked too much food, I will keep the leftovers**

Kirchherr: Re-use

Wastling: Enable re-use

Explanation: Throwing away excess food creates waste. Consuming the leftovers at another point in time, is essentially re-using the food itself. It may therefore apply to the Re-use strategy of Kirchherr and the enable re-use action of Wastling.

To conclude, it can be seen in section 2.2.2, that the statements created for the research of Blauw and Rotterdam Circulair are all directed towards the user and/or consumer. This is logical, the target group for the survey was aimed at citizens of Rotterdam. It was not specifically aimed at certain companies, NGO's or providers. Both models of circular behaviour, however, do incorporate some terminology directly aimed at these types of businesses. Actions like 'fast circulation of goods' or 'reduce operating costs' (Wastling) are not part of a user/consumer's daily life

routine. The same principle applies for strategies as 'Recover', 'Remanufacture' or 'Refuse' (Kirchherr). The difference in audience is important to note, since multiple different kinds of circular behaviours and strategies circulate in this world and it can be easy to get lost in them. As a consumer or user, but also as part of a company or NGO for example.

In this project, the 11 statements presented will serve as a knowledge guide during research with the target group. Much of the statements presented include examples of behaviour of adult persons (e.g: recycling at work, cooking food). Some of the statements can also be applied to the target group. However, more research is needed about young adolescents to be able to put their behaviours into context as was done with the statements. In addition, the relevance of this topic must be tested during research with the target group. Which topics are top of mind with them? What do they associate with a circular economy and according behaviours? Section 2.3 will elaborate on the set up for research into the target group.

**Key Take Aways**

1. Rotterdam Circulair and Blauw have opt for defining desired circular behaviour in the form of behavioural statements, in which examples of products are named. Both models in literature remain vague about the type of products meant in their strategy and offer a more holistic view on desired circular behaviour.
2. The type of product needs to be specified when defining behavioural actions for statements presented in figure 11. How one deals with products you can have, touch and use (= interaction) is different than how you deal with products you can consume but not really use (e.g food, energy).
3. The 'reduce' statements illustrate what could be done in the first phase of customer engagement (an underexposed area in literature, section 2.1).



## 2.3 Research Approach for target group

In sections 2.1 and 2.2, the concept of circular behaviour is analysed in literature and practice. The initial challenge of the project aims at creating an action plan with interventions stimulating circular behaviour amongst adolescents of 11 to 15 years old. Amongst the key insights of both sections, the role of the user is highlighted as being an enabler of the circular economy. His or her beliefs are central to behaviour he or she will conduct or not. Therefore, the user, in this project adolescents of 12 to 15 years old, must be analysed thoroughly.

### 2.3.1 Applied methods

Literature research and desk research are performed in order to understand the psychological development of children at this stage in their life. Which elements are of most important to a kid aged 12 – 15 years old? Whom or what is of big influence on them? Insights from this type of research are used to carry out field research with the target group. The type of research with the target group will be of a qualitative nature, since a deep understanding is necessary which will in turn create an extensive set of data. The field research with adolescents will

be in the form of semi-structured interviews in an informal setting. Four different types of categories for questions are created with corresponding in-depth questions. During the interviews, supporting priming material is used to spark the conversation (Appendix B). This material is set up according to principles of the Convivial Toolbox (Sanders & Stappers, 2012), and is used to create a rich context around the conversations during the interview. After interviewing, results will be analysed and opportunity areas for design challenges will be selected. This selection will be together with the target group, in the form of an online creative session to gather feedback, create buy-in and validate results. The same sort of session will be held with members of the municipality to validate if the chosen ideas are feasible for an organisation such as the municipality. At last, concepts will be detailed and put on a timeline to explain the strategy behind them.

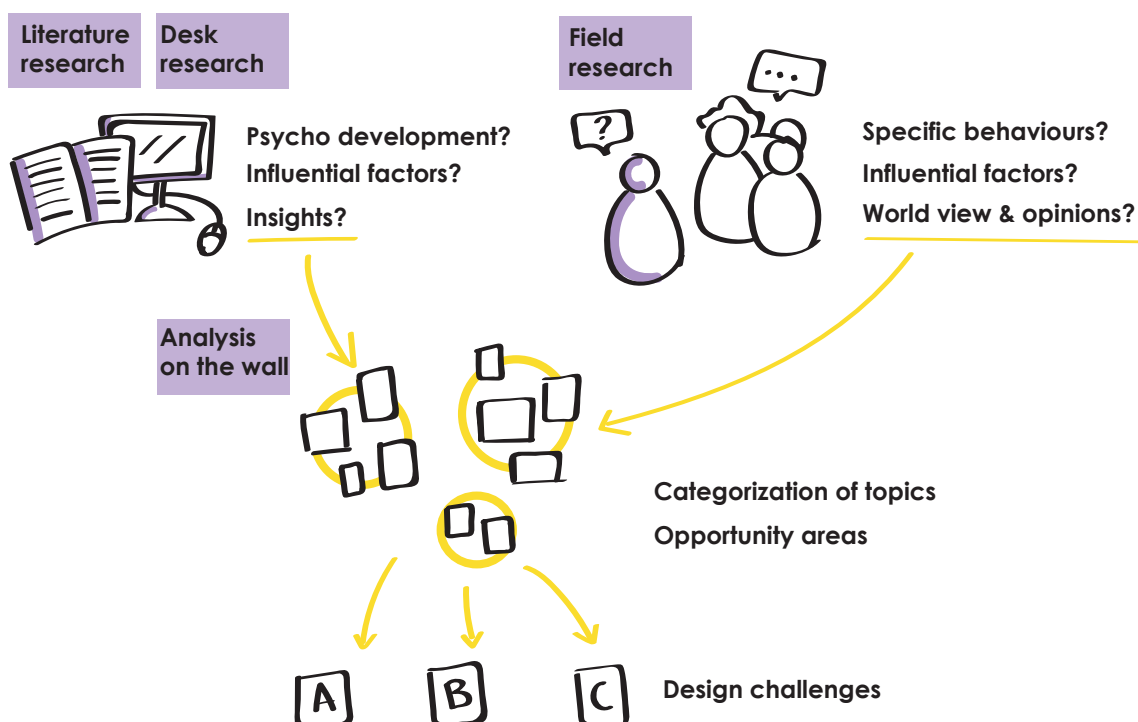


Figure 13: Research approach on target group

## 2.3.2 Research set-up

During previous sections, it became clear that there is an underexposed part in literature about circular behaviour: the part which covers behaviours related to the first stage of customer engagement with a product. This phase deals with the moment a customer orientates and decides to purchase a product or not. The lack of information in this area is leading for 3 crucial categories in which questions for field research are created:

### ***The relationship between the product and the child***

In this category, the researcher is trying to get a grip on the type of products a child typically uses on a daily basis and which of these is of high value to them. In order to be able to say something on the nature of the relationship between product and child. Furthermore, questions around sharing and lending of products are asked to deepen the understanding about how adolescents use products.

### ***Personal ownership of the product***

As discussed in 2.2, the need for ownership of products can cause a barrier in adoption of circular business models (Baxter et al, 2015). Since the goal of this project is to stimulate circular behaviour and use of circular business models, it is interesting to get an understanding about this topic, to know to what extent the ownership of products is of importance to adolescents.

### ***Consuming behaviour and desires***

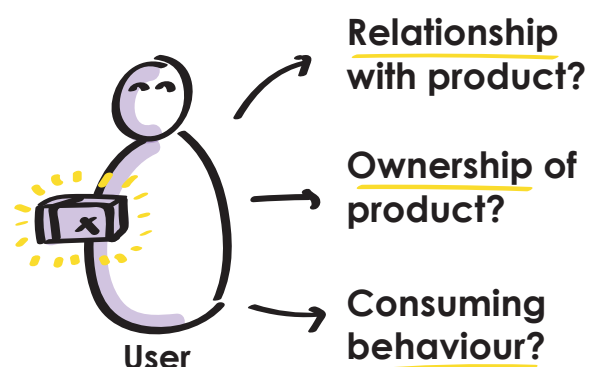
The project's scope lies within the acquiring phase of products. The moment a user (adolescent) decides to acquire a product and the process that happens before he or she has made this decision. Therefore, it is interesting to know more about spending behaviours of adolescents and to know which products are desired and why. Next to this, behaviour related to saving money is explored as it could tell something about desirability of future products.

Next to these categories, other additional data

is gathered which could be relevant. The target group is quite young, and it cannot be assumed their knowledge about circular economy and sustainability is the same as an adult. Therefore, it is needed to validate how much the adolescents know about these topics prior to elaborating on the student's research. Their association with the terms circular economy and sustainability are asked by means of a short controlling question. No more is asked in this area, since the topic of ownership and the relationship towards products is more leading and falls within scope of this project.

Furthermore, I would like to avoid creating conversations where adolescents only speak about large and broad terms; which is usually the case when speaking of circular economy and sustainability. It is rather needed they speak about their own behaviours and relevant world view. In the end, it is useful to know how this target group can be approached by people working at the municipality. The goal of the project is to create a tool or intervention map in which it is clear for people working at Rotterdam Circulair how they must act to stimulate circular behaviour in adolescents. Part of this, is knowing how these adolescents are influenced and by whom. As well as how they would like to be approached and which channels they use...etc.

A complete overview of questions set-up for field research can be found in Appendix B2.



## 2.4 Young adolescents: in depth

### 2.4.1 Influencing behavioural factors from literature

The period of adolescence has been researched extensively in the past 30 years. Some topics (parent-adolescent relationship, behavioural problems) more extensively than others (contextual influences). Adolescence covers a time period of roughly 10 years approximately, from the moment a child experiences biological changes in the body, to the moment they enter early adulthood. Scholars agree to divide adolescence into 3 periods of development: early adolescence (10 -13 years old), middle adolescence (14 – 17 years old) and late adolescence (18 to early twenties years old) (Smetana et al, 2006). The end of adolescence and beginning of adulthood is a grey area, as it remains vague as to which factors contribute to this shift.

The target group of the project forms part of the first two developmental periods: early and middle adolescence. The period in which children experience lots of biological, psychological and societal changes within a relatively short period of time. Within these years, often called 'turbulent years' or 'puberty', an adolescent encounters a number of challenges (Figure 14) (Christie & Viner, 2005).

As can be seen in Figure 14 the 4 challenges presented correspond to a different part

of research. The achievement of (sexual) maturation has largely to do with biological developmental changes of adolescents, whereas the development of personal identity, independence & autonomy largely correspond with psychological development of adolescents. Establishing relationships – romantic or friendships - and learning to deal with your surroundings has everything to do with social development. In short, puberty is 'characterized by biological, cognitive, emotional and social reorganization with the aim of adapting to cultural expectations of becoming an adult (Susman & Rogol, 2004). Some scholars argue that this adaption to change can cause for an emotional stressful period for adolescents (Susman et al, 1997). With so many changes happening at the same time, it is useful to make a separation between the types of changes adolescents go through during these times. There are 3 areas where adolescents experience growth:

1. Biological
2. Psychological
3. Social

It is interesting to dive into psychological and social developmental changes within adolescence, to discover how adolescents think, act and behave during puberty and to get a grip on the factors/persons/elements which most influence them. Biological

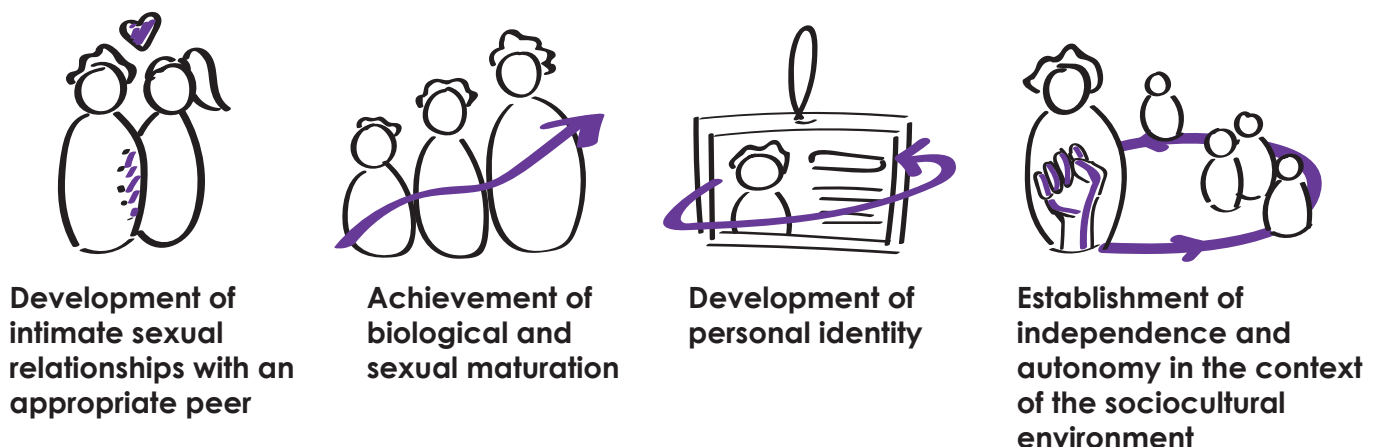


Figure 14: main challenges of an adolescent according to Christie & Viner, 2005



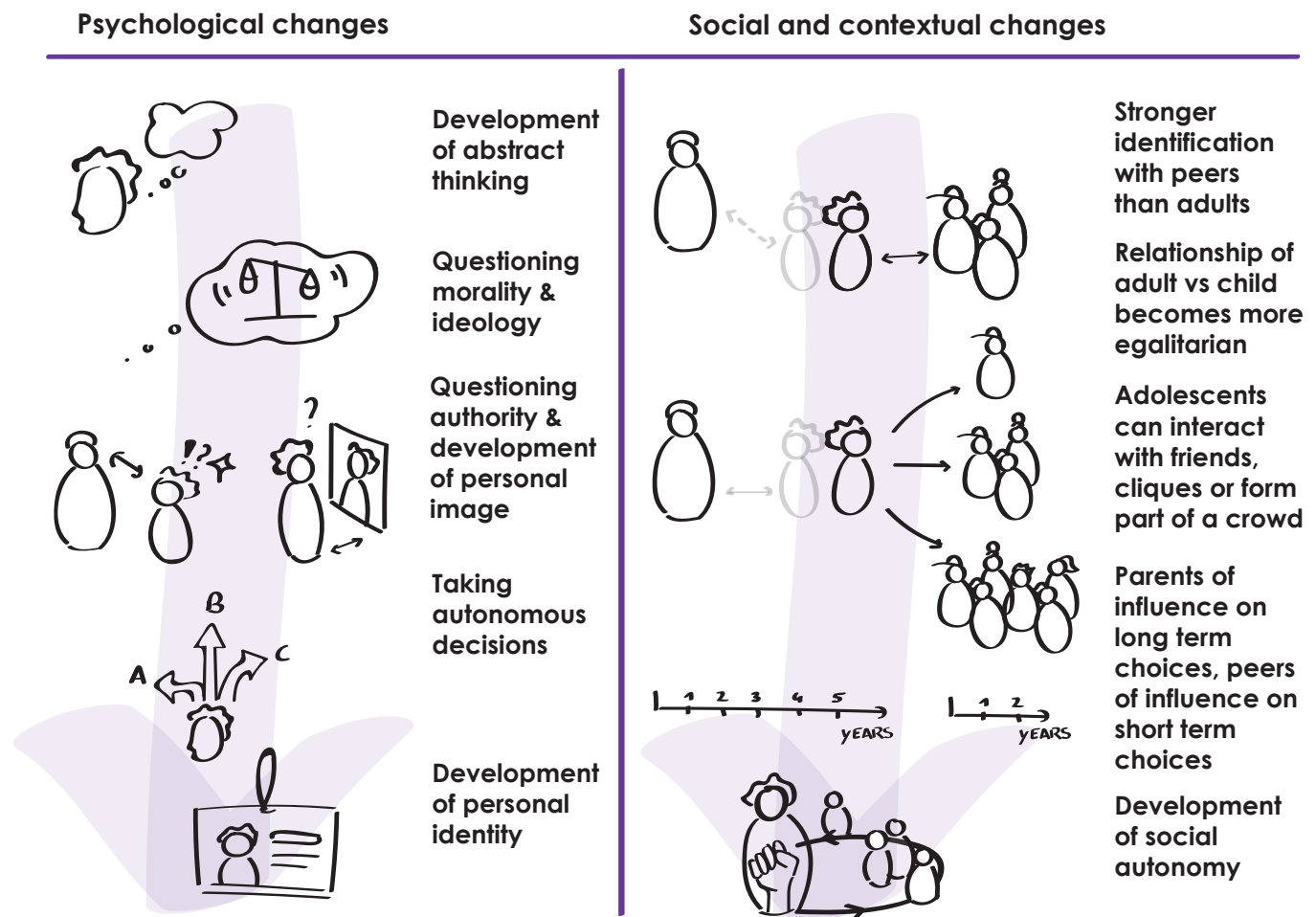


Figure 15: psychological and social changes for an adolescent

development is left out of the equation, since the scope of this research is about desired behaviours and often these are related to psychological or social elements rather than biological. Next to dramatic changes in the body, an adolescent experiences many different situations in which their psycho-social capabilities are put to the test. During early adolescence, boys and girls begin the process of emotional separation of parents. This means they sometimes take more risks, experiment more with 'forbidden' things like alcohol and drugs and they adapt an attitude of challenging authority (with their parents, but also teachers for example). Naturally, the parent-adolescent relationship changes during adolescence, as young people spend less time with their parents in general during this period, and more with their peers (Smetana, Campione-Barr & Metzger, 2006).

Young people will start to identify themselves strongly with peers and less with their parents, while at the same time exploring their personal image and identity. During late majority, the parent-adolescent relationship will transform from a hierarchical one to one which is more egalitarian.

Equal status in relationships seem to be of increasing importance as an adolescent develops through the years. During early adolescence, young people will start to acquire the skill of abstract thinking; the ability to think about problems, people and situations without the need for them being present. This skill is paired with an interest in morality and ideology; the question of what is 'right' and 'wrong' to do and which opinion to take within it. Thus, challenging the moral and social structure of society and

demanding specific rights for yourself. With the development of this skill, the personal identity further develops as well. When defining their own identity, they redefine their relationship towards others and the relationship with others towards themselves. Because of this focus on one's 'self', young adolescents sometimes may come across as self-centred or indifferent for the adult persons in their lives. Little value is attributed to knowledge passed down by adults (Christie & Viner, 2005). Rather, young people often believe that no other person can understand how they are feeling than themselves.

Rapid numerous changes occur during adolescence, and together with these changes, adolescents find a way to reach emotional and financial independence. The moment change happens, depends on the expectations from the environment and cultural differences within these environments (parents, peers, community). Thus, the context or system, where the individual adolescent lives in, is of influence. Expectations of others are very important during adolescence. Where parents are mostly of influence regarding long-term issues (norms and values, study choice etc), peers are mostly of influence of short-term themes like appearance, style and taste (Smetana, Campione-Barr & Metzger, 2006).

The interaction an adolescent has with peers can be described in three types: an adolescent can have a friendship-relationship (1) with someone else, he or she can form part of a clique (2) /small group of friends with the same age, race and socio-economic background and he/she can identify themselves with a larger crowd (3) with a shared reputation or image. Crowds for example, offer the opportunity to develop an identity since they provide a cultural context in which adolescents can interact with peers with similar views and reputations. In time, adolescents will reach social autonomy and independence and develop intimate relationships, an attribute which generally happens during late adolescence. Between the ages of 12 and 16,

peer influence/ peer pressure has less influence during the act of taking decisions for young people. (Steinberg & Cauffman, 1996). So peers do have a strong influence on the behaviour of adolescents during early adolescence; and this influence is different than the one parents have, but this influence decreases over time until the adolescent reaches maturity and becomes autonomous in his/her decision taking.

To conclude, the period of early to middle adolescence is one paired with numerous changes, physical and non-physical. Adolescents begin to think different and therefore also act different. Peers slowly begin to have more influence on them than their parents and this influence is in different areas of their lives. The goal of an adolescent is to become autonomous, in their thinking and in their needs, socially but also individually. It is a turbulent time, and a crucial one for the rest of their lives. During adolescence, a person is a easy target for influencing, but it also has to be in the right way. In which way exactly will become more apparent in the next chapter.

### Key Take Aways



**During adolescence, an young person experiences biological, psychological and social/contextual changes**

**Reaching social autonomy and independence are central challenges for adolescents.**

**Growing up, adolescents become able to think abstract, creating the need to challenge established ideas and morals and corresponding adults / parents imposing them.**

**For an adolescent, parents are of influence on long term choices/problems, whereas peers are of influence on short term choices/problems.**

### 2.4.1 Influencing behavioural factors from practice

During the research phase of the project, field research with the target group of adolescents is performed. Nine children were interviewed (figure 16) of different educational levels and age ranges. The aim of the interviews was to understand the target group better, to get a grip on their motives and perspectives around certain topics and to explore their world view. The setting was informal, and almost all adolescents were interrogated together with someone their age.

The conversations created a rich pool of data, which have been analysed and categorized into multiple different categories (Appendix B3 and C). Since the interviews were semi-structured, the data can not be categorized solely based on the categories set up for research in a previous phase (section 2.3). Other, different categories arise, shining a light on relevant topics among adolescents.

All the data gathered from the field research with adolescents is categorized using a technique called 'Analysis on the wall' (Delft Design Guide, 2014). In total, six themes have been distinguished as main themes contributing to the context of an adolescent in Rotterdam present time:

1. Knowledge
2. Specific behaviours
3. Use of time
4. School experience
5. Influences on the child
6. Beliefs and opinions

#### **Knowledge**

The theme of 'knowledge' is the least rich in data. This is due to the lack of knowledge from the adolescents about the topic of circular economy. None of the interviewed adolescents had any clue as to what circular economy means. However, they did have associations with the term sustainability. These associations were very diverse, ranging from 'eating less meat' to using 'more windmills' to the 'use of electrical cars' or 'throwing less garbage on the street'. All of these associations are related to sustainability, but they differ from each other respect to the implementation and practical side of sustainability. It is clear that the topic of 'sustainability' is a broad one, which can cover a lot of different actions and associations.

'Wat nu een beetje heel erg in is, elektrische auto's en opladers die met zonne-energie werken. Zulke dingen. En plantaardige dingen eten, geen vlees.'



#### **Specific behaviours**

During the interviews, the topic was intentionally brought to the one of specific behaviours. This theme is extensive in data. From the

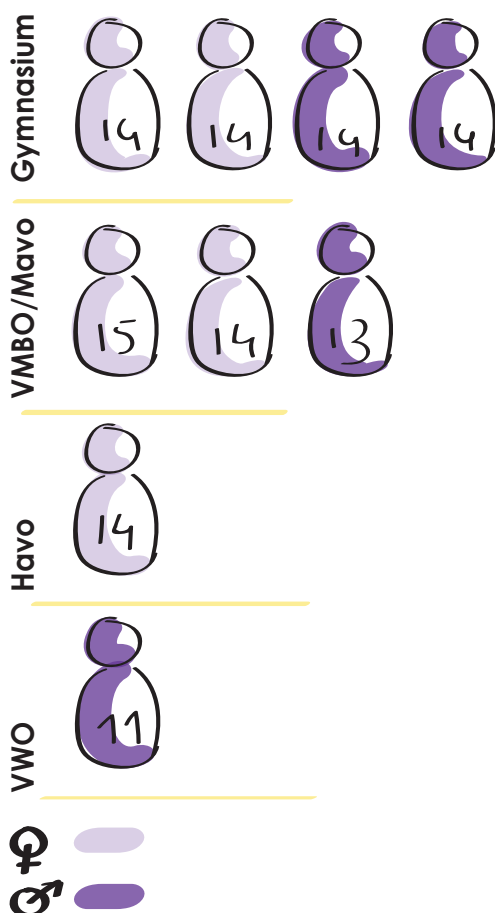


Figure 16: number and type of adolescents interviewed

categorization different types of behaviour arose: related to consuming food & media, related to consuming durables and clothing, related to waste, related to saving money and the costs of life and related to social behaviours and other peers. As seen, the subcategories are very divers. Media like Netflix are popular amongst youth, it is consumed a lot. Next to this, adolescents often consume food at schoolkantines, even if they already have their own home-brought food. Some schoolkantines have healthy and responsible options. However, it seems that the adolescents do not often favour this option. They would prefer a tasty option in stead of the healthy one. Zooming in on the subcategory of consuming durables it is notable that adolescents view 'shopping' as an activity to do with friends and

when asked about future dream belongings, clothes and technology are mentioned first. Adolescents often receive some pocket money and or clothing money, and if they want to save this money they need to have a goal in mind; otherwise they will spend it. The topic of money is a relevant one in the daily life of the adolescent, since between the ages of 11 to 15 their social circle expands and they like to spend money on their friends; often in the form of tailored gifts. Lastly, adolescents do not seem to care for waste as a valuable material. Littering on the streets and throwing away eatable food is still happening for example, as noted by some interviewed adolescents.

### Use of time

This theme explains which daily (desired) activities are performed by adolescents. In short, how they use their time in a day. The subtopic of the usage of mobile phones was a popular one during all interviews. Adolescents use their mobile phone frequently. In itself, this is not very surprising due to the increasing digital world of today. But, the adolescents sometimes frame the increased time they spent on their phone or the phone itself as a problem of which they are aware. Simultaneously, the phone is used for multiple purposes, often social. Examples include to connect with friends, to kill time, to get updated about schoolwork or to avoid socially awkward situations with unknown people. Multiple hours in a day are often spent on with or on the mobile phone.

'Veel jeugd van tegenwoordig, die denken van fuck it het komt wel goed. Maar ze doen er **niks** aan. En dat zie ik nu ook heel erg, dan **gooien** ze kauwgom, een flesje water of een zakje op de **grond** en dan zeggen ze 'ah joh, **een beetje** kan geen kwaad, ja hallo **iedereen** doet het, waarom kan ik het dan niet doen?'

Sommigen gooien heel hun **maaltijd** **weg**. Echt alles, echt 6 boterhammen ofzo, echt belachelijk.'



'Ik merk wel, sinds de middelbare school heb ik **meer vrienden** dus die verjaardagen, dat **kost** me ook wel wat geld...dan is het zo van, ok ik heb nu betaald voor jou verjaardag en over 2 maanden nog een en oh shoooot.'



'Ik weet toevallig dat het op mijn verjaardag Black Friday is, dus dan ga ik weet je wel, **lekker shoppen**.'

'Ik zou een **phone** kopen en heel veel **kleding** kopen.'

'Er zijn lekkerdere dingen, dus dan ga ik mijn geld niet aan een broodje gezond **uitgeven**. Als ik een keer iets koop dan wil ik wel graag iets kopen wat ik **lekker** vind.'



'Ik zou van mezelf vinden dat ik veel **meer naar buiten** zou moeten gaan, veel meer met mijn zusje **samen iets doen** dan alleen op mijn telefoon zitten.'



'Dat je jezelf **voorneemt** om er maar een uur op te zitten, dat wordt dan **4 uur**.'



'Als ik **niks te doen** heb, dan gaat de tijd ook **superlangzaam** en dan vind ik het ook weer **echt saai**.'





And sometimes, this causes adolescents to forget about what they saw or heard through them. Their sense of time, another subcategory, seems to be influenced by the level by which their attention is captured (e.g. by which they feel entertained). And often, this entertainment happens through their phone. Which is not always a desired outcome according to adolescents. Some acknowledge wanting to spend their time differently than they currently do. Meeting with friends, getting creative or going outside in the fresh air are amongst desired activities mentioned.

'Mijn telefoon kan ik wel zonder, ik krijg er ook best wel **veel hoofdpijn** van.'



'...en de dag duurt **veel korter** omdat je zeg maar 2 uur stopt in instagram en je **onthoudt** misschien 2 dingen eraan.'

'Voor appen, voor instagram, **voor alles**. Ook als je **verveelt** of in een gesprek bent met een persoon en je vind die persoon heel vreemd enzo, dan ga je 'oh sorry' op je telefoon zitten. Of als je in een kamer vol mensen komt en je **kent niemand** dan ga je op je telefoon zitten, zodat je een soort van  **bezig bent**'.



### School experience

Every adolescent is in need of education and is required to go to school. Therefore, the theme of 'school experience' might not come as a surprise. This topic was a general one which often appeared in introductions or in between other topics. In general, adolescents find it crowded at their school, during class and break time. This causes difficulties to concentrate during lessons and it might be one of the sources of the current stress perception of multiple adolescents. At school, lots of different things happen and multiple people are present. This equals multiple impressions on a day. Next to this, adolescents often have to travel far to go to their respective schools, which requires more effort from them, in their perspective. At school itself, some courses

are found more interesting than others. Which courses are interesting and which not, differs per person. However, elements which often make or break courses can be interpreted as similar. Too much listening and strict regulations are mentioned as factors which make a course dull or uninteresting. On the contrary, making and creating something, physical activity or interactive activities could make a course interesting for them.



'We zijn **allemaal** met elkaar aan het gillen, iedereen is **druk**'.



'Als je heel **veel uitleg** krijgt en het vak moeilijk is, ik vind **stilzitten** een beetje **saai**'.



'School **put ons gewoon uit**. Je hebt zoveel, je hebt werk, je hebt verwachtingen van je leraar...'

**Tekenen** vind ik leuk, dat vind ik lekker **vrij**'

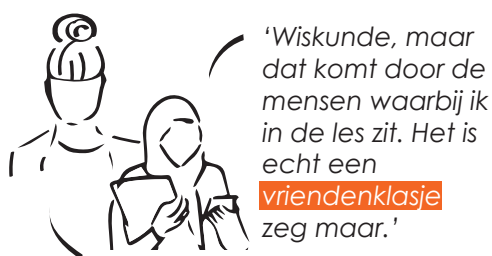
### Influences on the child

As previously discussed, an adolescent encounters multiple impressions on a day. Some might have an influence and some not. This theme, to figure out what or whom is an influence on the child, is therefore one of the 6 themes encountered. Several subcategories have been created: influences at school and outside of school, ways to approach adolescents and ways in which not to approach them and triggers to capture their attention. At school, the teacher is of substantial influence on the adolescent. He or she forms an important factor for if a course is attractive or not. Teachers with authority can have an impact in stimulating adolescents and motivating them, appreciation from them is welcomed. Next to the teacher, peers and

friends also have an impact on the opinions of the adolescent on the courses. Outside of school, specific music and youtube seem to be of influence on the child (it is not specified which music or people on youtube exactly). In order to approach them, adolescents would like rather want to be approached whenever they have the feeling that their free time is not under attack. They give suggestions about approaching them on school during class time rather than their free time. And if approached, they like to be asked about their own opinion instead of to be told information plain as it is. They use various digital channels to communicate (mostly with each other), but prefer face-2-face contact. To capture their attention, information needs to stand out and be weird or unusual. Information can also be packaged in the form of a quiz or an interactive session to capture attention. Promoting information which is meant to be educative on instagram may not be the best way to go for adolescents. The platform is mostly used for entertainment in their free time.



'Ik vind geschiedenis wel interessant, maar ik vind mijn docent heel irritant, dus dat maakt geschiedenis minder leuk.'



'Ik kijk bijvoorbeeld youtubers die gaan dan in een tweedehands winkel allemaal nieuwe merken zoeken en dat lijkt me dan wel leuk. Dat je dan heel goedkoop bijvoorbeeld, hele coole kleding kan kopen.'



## Beliefs and opinions

The last of the 6 themes contains beliefs and opinions from adolescents about specific topics: personal (non) attachment to someone or something, sharing and lending of belongings, stereotyping generations and sense of appreciation. All adolescents are attached to important people in their lives and acknowledge the importance of their existence. However, they find it difficult to specify which products they find of significant importance in their lives. Sharing or lending of products happens within their close network. They would rather know the one they are sharing something with than with a stranger. The type of products which are usually shared or lent fall within the category of food and schoolproducts. Products which are usually not shared have a big emotional value for the owner. Next to the conversations about use of products, a new subcategory stood out: the stereotyping of generations. If adolescents feel they are being stereotyped as one generation it triggers discussion amongst them. The concept of 'boomer' is an example of an outcome of such a discussion, where the main message is to avoid labelling adolescents of the present as 'digital natives' consumed by their mobile phones the majority of their lives.

'Ik weet het niet, echt niet. Ik vind het wel goed eigenlijk. Er is niet echt iets waarvan ik denk, wauw dat moet ik echt hebben.'



'Dingen met een grote emotionele waarde zou ik niet zo snel delen, het kan zijn dat het ooit heel duur is geweest of voor jou grote betekenis heeft zeg maar.'

'We zouden het wel van elkaar lenen denk ik. Als je goede vrienden bent dan is het niet zo erg.'

'Mijn vrienden natuurlijk en mijn familie dat wil ik sowieso niet kwijt. En qua spullen weet ik het niet eigenlijk, waarvan ik denk daar kan ik echt niet zonder.'



To conclude, adolescents are very opinionated about topics such as school, friends, social media, use of mobile phones and stigmas about their age generation. All adolescents interviewed did not know anything about circular economy. When talking about non-circular/sustainable behaviours, it becomes apparent that there is still food being wasted and waste being littered on the street. Sharing of products is no problem, if the one lending your product is your friend. If it comes to ownership of products it is unclear for the adolescents interviewed which products are of most value to them. It seems as if this generation is already more focused on experiences than products. However, 'shopping' is still considered a leisure activity and digital products are very popular amongst youth. To target this group they say it needs to be personal and at a time when they don't feel like their free time is taken away. Channels like Instagram and YouTube are leisure channels and branding from the municipality will be considered as advertisement.

### 2.4.1 Literature and practice side by side

As can be seen, the interviews with the adolescents covered a wide spectrum of themes. From their personal experiences at school and with their friends, to more specific themes about behaviour in relation to consuming products. When looking at insights from both, some overlapping themes can be identified. As discussed in literature, adolescents are influenced strongly by their peers on short term issues or choices and more on the long term by adults.

During the interviews, this became apparent, as multiple adolescents talked about their teachers being of importance when liking or disliking certain courses for example, or their parents when wanting to purchase expensive products for the years to come. As for short term behaviours, some adolescents talked about throwing away garbage or food because it was a 'cool thing to do' or 'everybody did it'. An indication of the influence of peers on their

behaviour. During the interviews, adolescents talked about moments of disagreement at school. These moments often happened whenever the adolescent felt like he or she was treated unequally in comparison with the rest. The desire to be treated equally, to challenge authority and to create more egalitarian relationships are factors which are also described in literature.

In short, there are many similarities found in practice which correspond to parts in literature. The difference is, that the insights from practice are richer in data and more specific than the insights from literature, which are more general and aimed towards creating models for the whole period of adolescence.

#### Criteria for design



##### Easy to do

Since time is precious for adolescents, the task at hand that is required from them is more likely to be done if it is an easy one.

##### Close to home

Everything that is known to an adolescent, is more likely to be adopted by them. The ones closest to them are peers and parents.

##### Captivating

Attention span of adolescents is short, but it can be captivated if done right.

#### Key Take Aways



An adolescent's time is considered precious. Most of it is spent with peers, on school or on the mobile phone.

Circular economy is not a known phenomenon for adolescents. Little to no associations are made with the term.

Unsustainable behaviour still often happens at school, such as littering and wasting food. When consuming, an adolescent often wants the cheap and tasty (attractive) choice. Sustainable considerations are often not made.

Face to face contact is the preferred way of contact, provided this will be in a familiar setting and without taking away 'free/spare' time.

It is unclear which products are of essential ownership to adolescents. When lending or sharing products a condition is familiarity with each other.



## 2.5 Conclusion of analysis

### 2.5.1 Area's of opportunity

After extensive research on the target group, the context of the project and the municipality of Rotterdam the students can create search area's analysing the most relevant topics. This is done through the method 'Analysis on the wall', also described in section 2.3. The analysis of the interviews with the subcategories is analysed for a second time, this time creating short statements per subcategory. Next to this, all key insights from previous chapters are used. Additional relevant information like the attendance to the signing of the 'scholierenakkoord', a debate of youth in Rotterdam about the climate agreement, is also used. Information about this signing can be found in Appendix E.

The process of Analysis on the wall is to identify mutual similarities, area's in which new ideas or innovation can take place. Since the general topic of this graduation project is so broad, the identification of these area's is essential.

After extensive analysis, six main search area's have been identified. For a complete overview see Appendix D.

#### **Search Area 1:** **Creating awareness through peers**



As indicated, adolescents still engage in behaviours that are unsustainable. Littering on the street, not recycling or wasting food are amongst them. This is a problem that needs attention and fixing. And as most of these behaviours occur in the presence of peers, this could also offer an opportunity to design for. If there could be a way in which adolescents create more awareness and gather more knowledge about desired circular behaviours and their importance, it could stimulate them to perform these tasks. This action could take place at school or somewhere other than school, the important factor in this area are the peers and their influence on each other. How could they positively influence each other? What is needed for that? And how will it take shape or form?

#### **Search Area 2:** **Anti-consumerism movement (at school)**



As is said, adolescents find it hard to point out the products and things of importance in their life, as opposed to finding it easy to point out the persons and living beings of importance in their life. One of the key areas, one not often covered in literature, is the moment a person decides to acquire a new product. The idea that this product is needed and wanted. What if there could be a way in which this idea is not stimulated anymore? A spark by

which adolescents start thinking more about their purchases before actually buying them? Which, perhaps, will change their mind into not buying it anymore? Because, what is it they actually really need in their lives? What would be needed to start such a movement, for example, at their school? How is this movement going to take place? And can it really be done?

### **Search Area 3: Breaking of habits**



Some behaviours are being done repeatedly every day, and it is often hard to change something in the pattern of these behaviours. But if the municipality wants to see change in the behaviour of adolescents, they need to find ways to break certain habits of adolescents. What information, action or spark is needed for adolescents to want to change their behaviour (such as littering, purchasing too many stuff, wasting food)? Are there interventions which could lead to positive change? And how are these interventions shaped? What do they look like and how do they work? As adolescents themselves point out, it is very difficult to change your habits, but it might not be impossible. As much time as they spent on social media and their phones, they could also be spending it for something else of more importance for example. Maybe the answer lies within the mixing of habits.

### **Search Area 4: Impact of experiences**



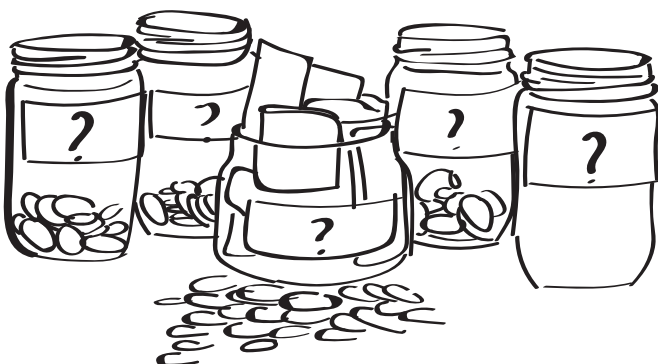
Adolescents spent more and more time with their peers as they enter adolescence. These become of influence and keeping these relationships and nurturing them is of priority. Attending birthdays and spending money on their friends is one activity which belonging here. This could be an opportunity when wanting to stimulate adolescents to spend their money on experiences rather than products. This area is about the impact of these experiences. If adolescents can somehow measure their positive impact by performing activities with experiences in stead of buying products, they could be stimulated to do this more and more, and in the process get educated about the importance of circular behaviours and the circular economy.

### Search Area 5: Attractive Alternatives



If one wants to change a certain behaviour of someone, then he or she must give an alternative for this person in exchange. As adolescents mention themselves, you can not expect to take away something without offering something in return. Mapping all the behaviours that must be taken away and then coming up with suiting alternatives is another area of opportunity. Which actions / experiences can replace the ones we do not want to stimulate anymore? What are the attractive alternatives for adolescents once they start to engage in circular behaviours? How can the municipality encourage more of this behaviour by offering alternatives?

### Search Area 6: Non-material savings account



Money is a trigger subject for most adolescents, when entering adolescence they often start getting their first paychecks. As adolescents themselves point out, saving money is an activity which is successful when having a goal. What if this goal is related in someway with circular behaviour? What if the municipality could stimulate adolescents to save for non-material things? Maybe the municipality can team up with other partners like a bank for example. Once adolescents reach their 'non-material goal' they get a reward and in the process, they get acquainted with the importance of circular behaviour for example..

In short, the search areas all have different key findings from the research and combined them with each other. Some of them are rather radical areas ( impact of experiences: how to measure something which you can not see ) but some are a little bit more mild (attractive alternatives: providing overview for the user).

This chapter has gathered insights in the target group (how they think and behave), circular behaviour( in literature and in practice) and has combined these insights into an analysis on the wall producing six different search areas to continue with. In the next chapter, these search areas will be used as an inspiration to create ideas which will be validated by the target group and the municipality. And finally, these ideas will be transformed into concepts and a roadmap.

## 2.6 Choosing search area

### 2.6.1 Defining criteria

In order to choose properly from the 6 identified search area's, it needs to be clear which criteria are important to consider when choosing. During the midterm presentation of the project, it became clear that some search area's are quite idealistic and thus, maybe hard to design for. A conclusion was made to choose two area's: one idealistic, meant for radical innovation and one more down-to earth, meant for incremental innovation. The first criterion for measuring the challenges is therefore on a scale of idealism: does the challenge call upon idealism and morality? And how much do ideals from adolescents need to change in order to fit the challenge?

Furthermore, the challenges need to be in line with the initial challenge from this project. It needs to address the first stages of consumerism: the moment people decide to buy or not to buy. The more the challenge invokes this stage, the more it scores on this criterium. The third and last criterium of importance is the fit with the municipality. Since the original client of this project is the municipality of Rotterdam, the challenge needs to be fitted in a way that the municipality can do something about it. Not every challenge is easy to implement from a municipality perspective, and so this third criterium is important.

All six different areas are interesting to pursue, but some are more convenient than other to do so. A classic Harris' profile (Rozenburg & Eekels, 1995) was used in order to scale the three criteria and see which areas come out best. In the end, two areas need to be chosen: they both need to be a good fit with the municipality and with the goal of stimulating diminished use. However, one of them needs to be on the idealistic side, and the other needs to be more down-to-earth. The area of creating awareness is an interesting one, but it does not really stimulate diminished use, it merely concentrates of expanding correct information

about the problem. This area is thus, left out of consideration. The anti-consumerism movement is one which really stimulates diminished use, but it does not have a fit with the municipality, as the movement needs to happen from within the peer group of adolescents.

So, this area is also left out of consideration. The breaking of habits- area is scoring relatively ok on the Harris Profile, but it is not scoring very impactful on the scales. Other areas score higher, does this area is left out of consideration. Creating a non-material savings account has interesting elements on the first two criteria and it seems to score positive on them. However, when looking at the fit with the municipality and the likeliness that the municipality can do something with this area, it scores low. This means it is also left out of consideration. That leaves two area's, the chosen ones.

#### **Search area 4: Impact of experiences**

The first one is the impact of experiences. Creating interventions in which adolescents can measure their 'circular' impact through activities. This area really does stimulate diminished use since adolescents do not need to buy stuff anymore, but are encourages to experience more activities in stead. It could also be a good fit with the municipality since they are the ones who can stimulate and create places where activities can take place. Or they can facilitate the intervention which measures the impact for example.

#### **Search area 5: Attractive alternatives**

The second area chosen is the one of attractive alternatives. It can be a messy world with loads of different options to do whenever someone wants to start behaving sustainable. Creating an intervention which makes it clear which alternatives exist and where, can make it easy for adolescents to behave circularly, since they are not required to spent extra time on the research on alternatives. And the municipality could encourage this information through their channels or in another way yet to be defined. The fit could be there.

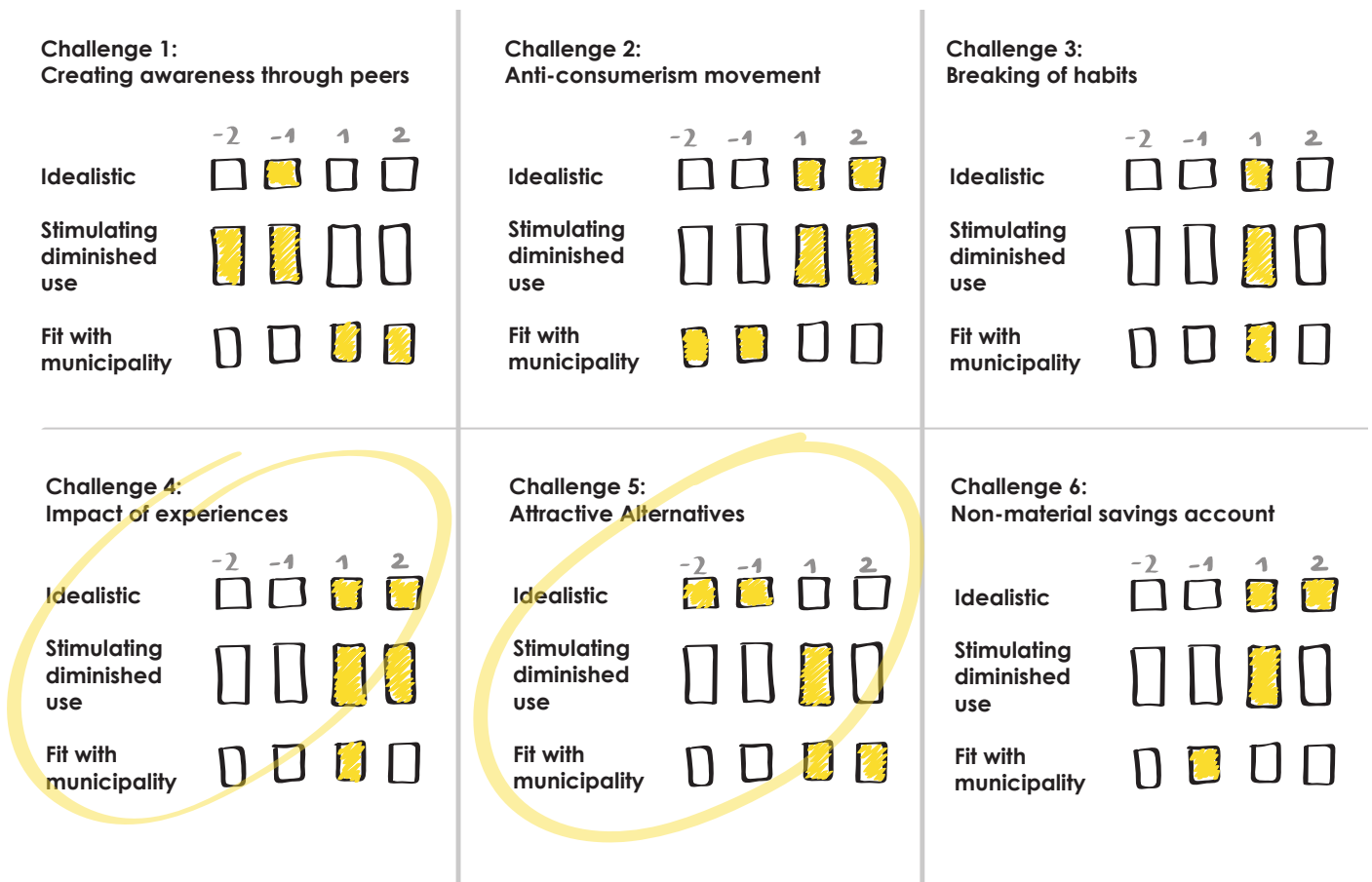


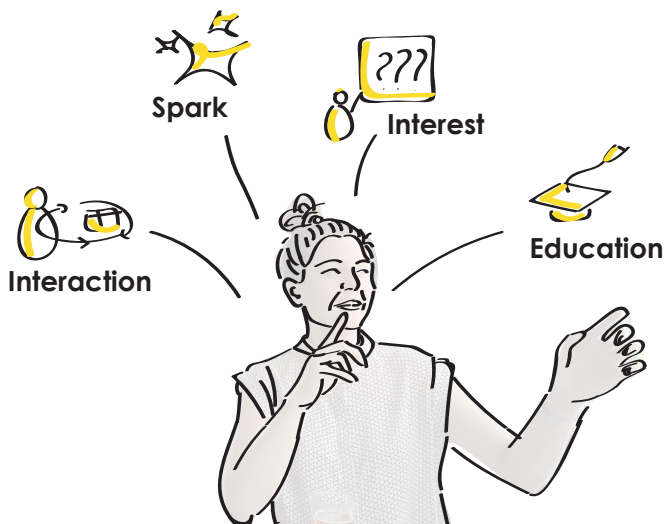
Figure 17: criterias and Harris profiles for choosing between search areas



## 2.7 Design brief

### 2.7.1 Designers vision

The designer in charge of this process chose this project for a reason: the target group. Despite it being important that every citizen, young and old, participate for a better future, the interest in youth is an important one. Attention from the municipality to this target group is given mainly in the form of goals, targets and documents. Little face-to-face attention is given to children and adolescents in real life. And it is this kind of attention that they mostly crave. They want to be heard, taken seriously and challenged. My personal vision as a designer is to be able to integrate the vision of these children into a workable concept and design. Into something which does something with them, which stimulates them. Personally, I like to design for interaction, spark, interest and education. This means that whatever is designed, it needs to be fun, yet informative enough so that something is learned from it. I strongly believe that you can learn best if you enjoy while learning.



In previous projects I have already experienced what it means to design for youth. From really young children (3-5 years old) to a little bit older (9- 12 years old). What they all enjoy is whenever they are allowed to do something for themselves and experience the design for themselves. It becomes even more interesting whenever they get to add their own input to it as well, or are asked to comment about a part of the design. Therefore, I have learned as

a designer, that listening to your target group is key to understanding them and getting them on board for a certain idea. Whenever someone gets to participate on an idea, the idea becomes part of them, it becomes theirs. Therefore, whenever it is time to execute the idea, they will be more inclined to participate since part of the idea is theirs. It makes them enthusiastic.

### 2.7.2 Brief

This graduation project will focus on youth and in specific early to middle adolescents. The overall research question is to discover how the municipality of Rotterdam can stimulate these adolescents to perform circular behaviour. Extensive research into the target group, circular behaviour and the municipality has been done to ensure a specific design brief in which creativity can flourish. 2 out of 6 search areas are chosen to ideate for.

#### Search area 1: Impact of experiences

The alternative to buying lots of products is often to go do an activity and have the experience as the product. In order to ensure more and more teenagers do this, it is interesting to let them know what benefits they get when doing so. Currently, there is nothing in place which 'tracks' the positive impact one does do whenever experiencing something. In other words, there is nothing which makes clear how much someone has 'saved' the environment in terms of CO2 or #rawmaterials. The design brief such contain this element. The brief is therefore the following:

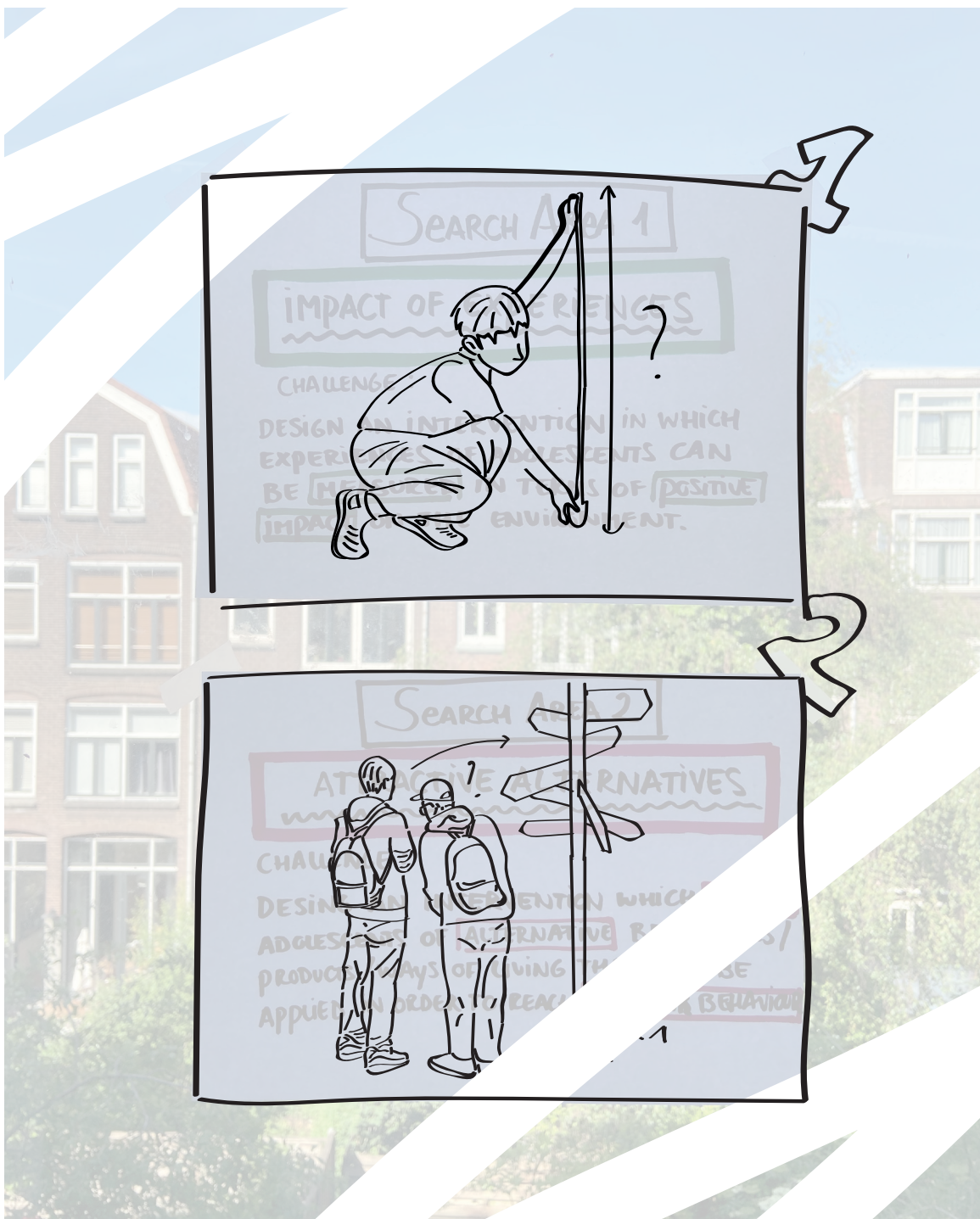
*Design an intervention/solution in which adolescents can measure their impact on the environment every time they choose to do an activity in stead of buying a product. Make the intervention so that it can be applied by the municipality and specify how it must be applied.*

#### Search area 2: Attractive Alternatives

When someone decides to act sustainably, it usually means they need to give up something.

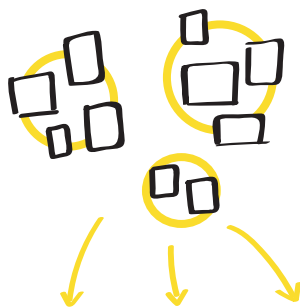
And usually there are many alternatives waiting to be used instead. Adolescents themselves have mentioned that it costs a lot of time to research all possible alternatives, and as we know by now, their time is precious. Especially their free time. So if there could be something which makes it insightful to know what alternatives there are to a certain behaviour you want to quit, it would be much easier for adolescents to apply in their daily lives. The design brief therefore is as follows:

*Design an intervention/solution in which adolescents can easily see what alternatives there are for them when wanting to quit a certain unsustainable behaviour. It needs to be intuitive and easy for them, as well as sparking. The municipality needs to be able to facilitate the intervention in some kind of way and it needs to be specified how exactly.*









## Part 2 - Synthesis

## Chapter 3: idea generation

This chapter will define the exact design and the phase that comes with it. First up, a creative session is conducted, from which multiple ideas are selected to undergo a second session, this time with the target group. Together with them, the designer aims to select the best ideas and turn them into concepts which could become actionable. The third session is conducted together with the municipality in which the concepts are analysed and evaluated: can they be applicated by the municipality? The concepts chosen from this session constitute the final design.

## 3.1 First idea generation

### 3.1.1 Process of creative session 1

For the project's ideation phase, a couple of creative sessions are organized. The first one is organized with fellow peers, students or people that have just started working. The people that participated in the first session did not have a background in design. The aim of the first session is to create as many ideas as possible for both search areas. The ideas can be as crazy as possible, they do not yet have to be feasible and detailed, that is for a later stage in the

ideation. The set-up for the session can be seen in figure 18. First, the two areas are introduced, then they are broken down into themes and sub-problems for which every participant is going to ideate. Second, this material is used as inspiration to create ideas from. Every idea is then rated with a star-sticker method and that concludes the end of the session. Many ideas were created during the session, for all ideas see Appendix F. All ideas are going to be turned into idea cards which are used in the second session, together with the target group.

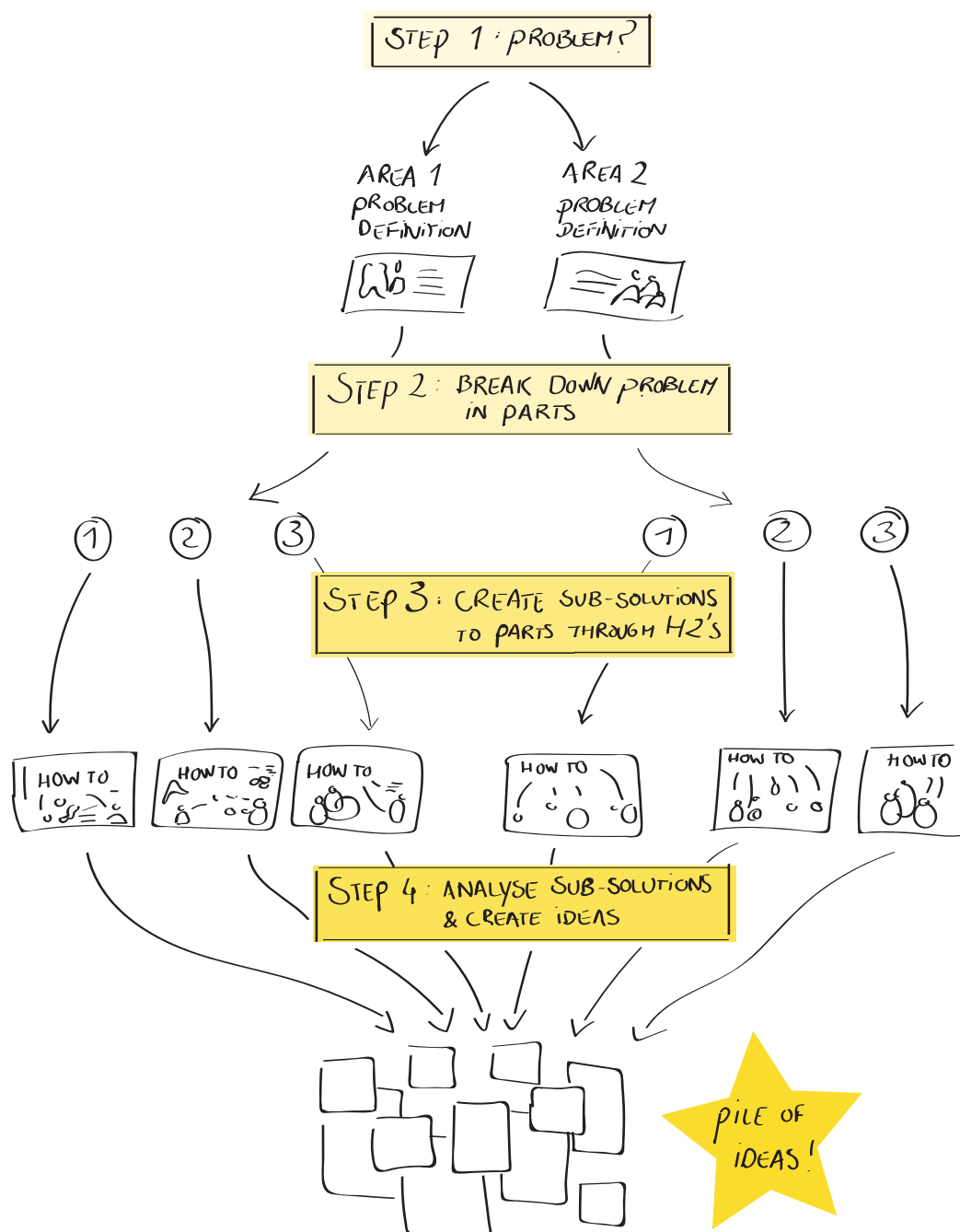
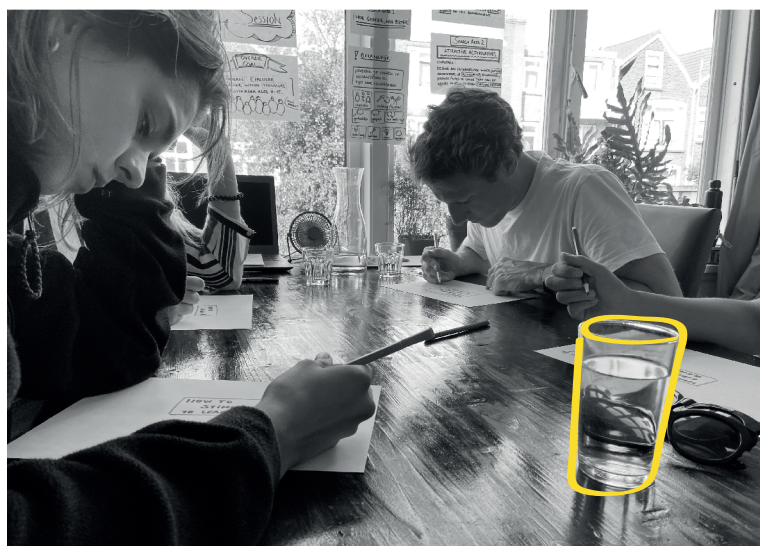


Figure 18: set-up for creative session with fellow students







## 3.2 Evaluation and idea generation with target group

### 3.2.1 Process of creative session 2

For the second creative session, the target group has been called again for help. All the ideas created in the first session are turned into idea cards and evaluated together with the target group. The medium used for this online session was Miro, a platform in which participants can add their own input and change input as well. The aim for the session is to gather feedback on the ideas and to get a grasp on which ideas are most favoured and why as well as to gather a list of do's and don't's

whenever it comes to designing for this target group. Unfortunately there are no pictures of the session itself. The session first started with explaining all ideas in brief and then asking the participants to choose one or two ideas which they liked the most and why. These ideas then got a sticker on them. Ideas which where bound to fail got a red sticker, and then participants where asked why they thought this idea would fail. After all ideas where rated, the participants where asked to rate the ideas they chose on a scale with on the horizontal

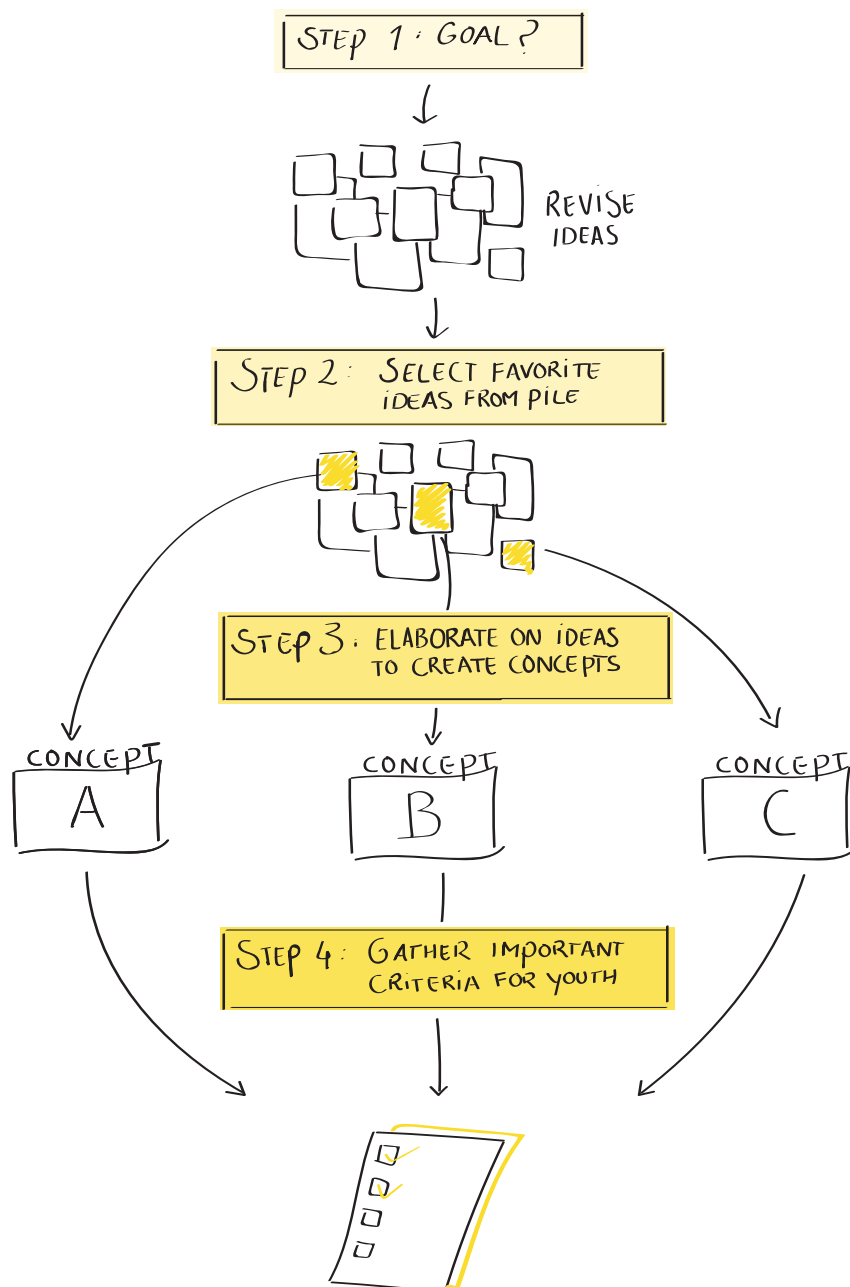


Figure 19: set-up for creative session with target group

axis 'popularity of the idea with the target group' and the vertical axis 'feasibility of the idea'. Ideas that fall in the upper right corner are therefore the most attractive according to the target group. Finally, the participants were asked to name a few reasons which would make an idea a good idea (hot) and a few reasons which would make an idea a bad idea (not).

### 3.2.2 Outcomes of the session

All ideas were discussed but a few of them stood out according to the target group:

#### **Idea 4 New Rotterdampas**

Every time you do an activity (an experience) this gets recorded as a point, and with these points the municipality invests in green projects. This feature could be added to the application of Rotterdampas for example, since a lot of adolescents already have this pas.

Why is this idea so popular:

The adolescents all mentioned it would only be beneficial to have this system in place, since for them nothing has to change and it works as kind of a bonus system. They added to the idea by saying it could also be interesting for local suppliers of activities to gather most points since then they could be sponsored by the municipality more. This way, all actors involved get a bonus in some way.

#### **Idea 26 Fashionshow**

Create the opportunity for adolescents to create new garments out of their old ones and give them a podium to present their new collections.

Why this idea is popular:

All adolescents have many clothes they do not want to wear anymore and they themselves point out that clothing is the thing they spent the most money on. If this activity could be facilitated by a school or be part of a class they would do it. However, they point out that probably not all adolescents would like

this idea, so in terms of targeting all youth, this idea would cover only a part. This is different than the previous idea, where probably most adolescents would engage in.

#### **Idea 29 Minimal Emission Game**

Digital game in which the goal is to have a minimal emission or minimal use of raw materials. This game could be a stand alone game (a new one) or the idea could be incorporated into an existing game (for example: Fortnite).

Why this idea is popular:

A large part of adolescents is active online and likes gaming or a game element. If this is used in an idea it could potentially be very popular amongst youth. They point out though, that the game does not have to be to choose between 2 options, because in that case, adolescents would already know all the 'good' answers to win. It would be too easy and the goal, to stimulate them to buy less and re-use products, is not met. The game rather needs to be one with a storyline in which you can build up something, or do a quest for example.

#### **Idea 31 CO2 - tag**

In every shop in Rotterdam every product has a CO2 -tag next to the price tag. This way it becomes easy for people to compare and choose the best alternative.

Why this idea is popular:

This idea is mainly popular because it requires little effort from the adolescent itself and it makes it very easy for them to compare products. However, the idea does not actively stimulate them to buy less, it rather provides the correct information for them, so it is more an idea which makes adolescents aware of the problem, but it does not really stimulate them to fix the problem. Next to this, the idea needs to be expanded into all shops in Rotterdam. Every manufacturer needs to incorporate the CO2-tag in order for the idea to work. The project for this idea would be a large one and for the longer term. But in return it delivers an idea that would work for all adolescents in Rotterdam.



## 3.3 Evaluation with client

### 3.3.1 Process of creative session 3

This last session takes part together with the municipality. The ideas that are favoured by the target group are revised and discussed in the session. Good and bad points are mentioned, and overall feedback is noted. The aim of the session is to discover how the ideas can be put to reality through the municipality. After all, they remain the final client of the project and the design is ultimately for them. After the feedback is gathered it is important to gather important criteria in order to design for the municipality.

The final design needs to meet these criteria. And as a last stage of the session, alterations to the ideas are discussed in order to turn them into concepts. After the session, several concepts are designed, for different stages in the future. The final outcome will therefore contain several designs instead of only one. This way the municipality can choose which strategy they want to apply to youth: short or long term for example.

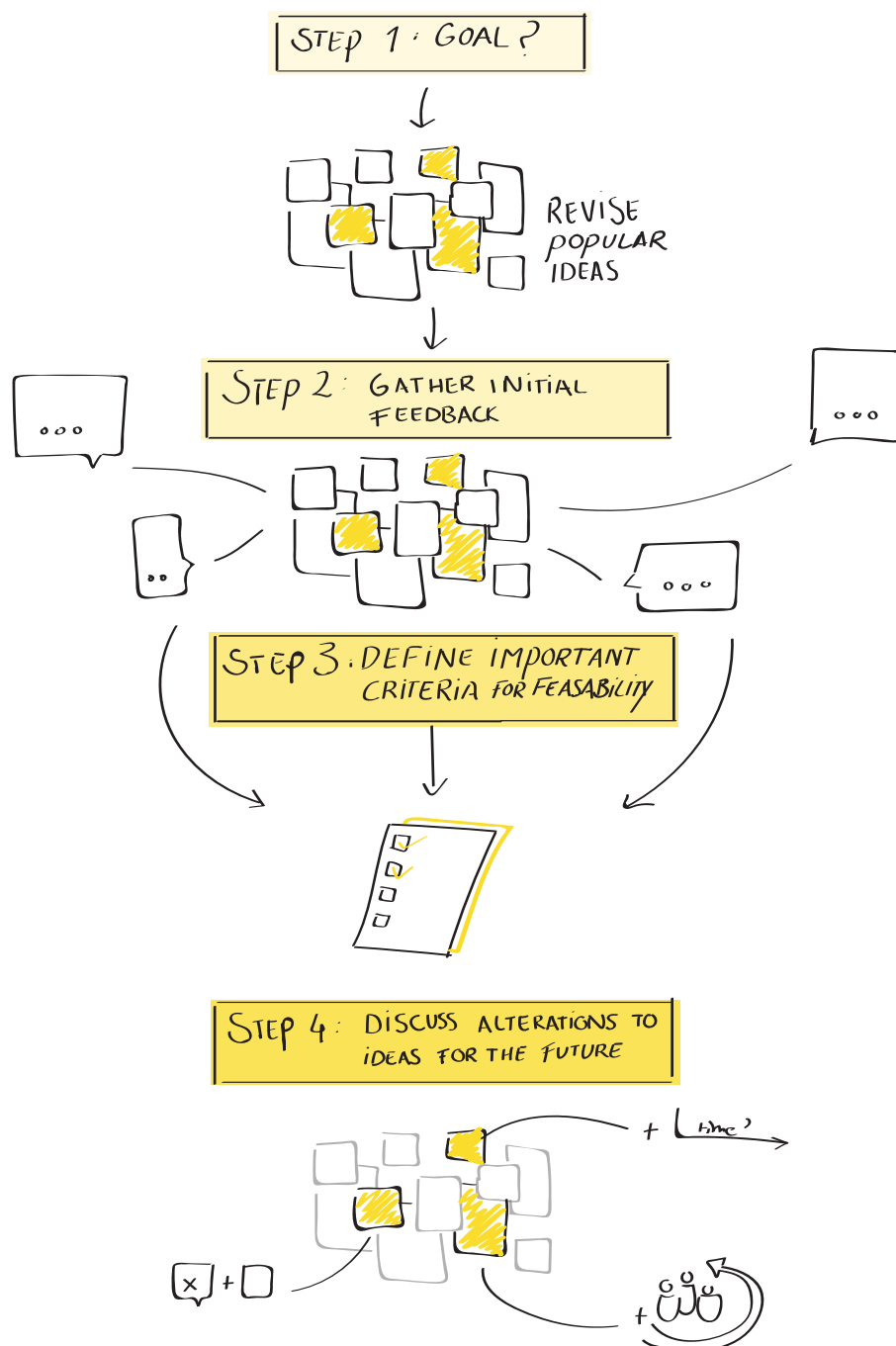


Figure 19: set-up for creative session with municipality

### 3.3.1 Outcomes of the session

In the end, the municipality favoured a couple of ideas over the others:

#### **Busje komt zo**

A green bus with an educational escape room about circularity travels de city and invites adolescents for a ride

#### **New Rotterdampas**

Every time you do an activity (an experience) this gets recorded as a point, and with these points the municipality invests in green projects

#### **Circular Debate**

Debate between adolescents in which experiences are measured between each other on circularity (with winner announced)

#### **Social Media Challenge**

Hashtags with challenges like #noclothsforayear or #shoppingkillstheplanet go viral through social media and influencers

#### **Minimal Emission Game**

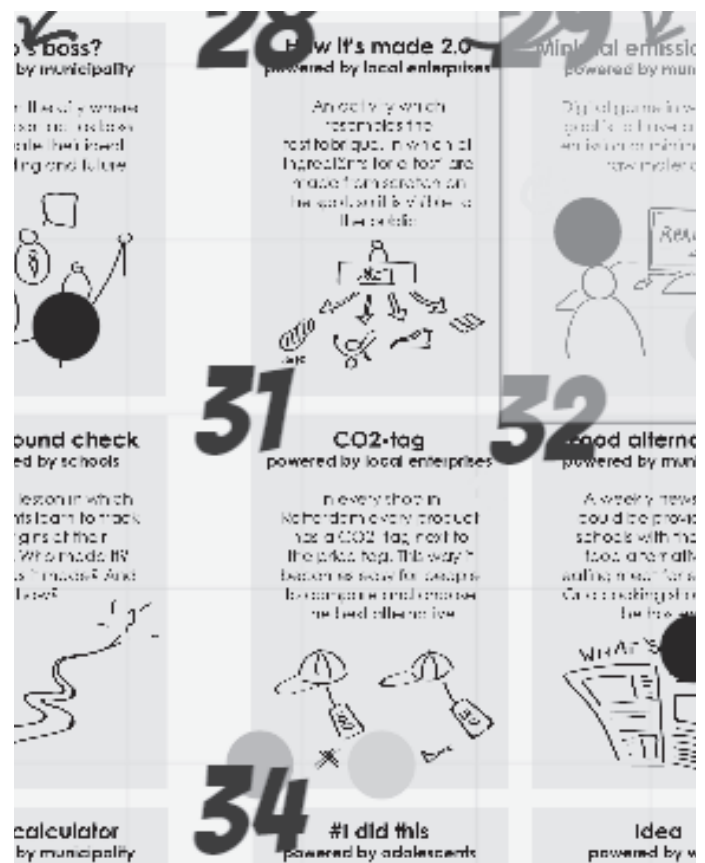
Digital game in which the goal is to have a minimal emission or minimal use of raw materials.

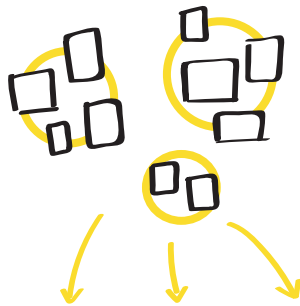
#### **#Ididthis**

Influencers and adolescents start using this hashtag on social media to showcase the sustainable actions they this, and it will hopefully create a movement.

The session took place online, and via the platform Miro. The same board was used as was used with the adolescents. This way, members of the municipality could see which ideas were favoured by the adolescents. First, all ideas were briefly explained to the participants. Then, feedback about the ideas was gathered. Some ideas were perceived as nearly impossible or difficult to realise because the participants were unable to imagine how for in the future. Other ideas were perceived as easy to apply. Interestingly enough, there

were some differences in opinion between this group and the adolescents group. Social media campaigns, with hashtags and going viral etc, were marked as not feasible by the adolescents, thinking they would not be perceived as planned by their age group. However, the participants from the municipality though these ideas were interesting and very much needed from the municipality! So, if the session with the adolescents would not have taken place, maybe ideas with social media at the centre would have prevailed. But now, it is important to listen to the target group carefully. Another difference in opinion where ideas that took place at school, such as a fashion show or circular. The adolescents were enthusiastic about these ideas, but members of the municipality were asking themselves what the role of the municipality would be exactly. Therefore, when designing the concepts, it needs to be clear what the role is of the municipality exactly. The role can be a facilitating one, or one more in the spotlights, if it is explained in the concept and in the strategic action plan.





## Part 2 - Synthesis

## Chapter 4: concept generation

This chapter will define the exact design based upon the ideas created in chapter 3. A list of criteria is set up based on the key findings found in chapter 1 and 2. Then, the favoured ideas from the creative sessions mixed into 3 concepts, taking the criteria into account. All 3 concepts are explained through the method of a scenario, to make it come alive. Concept 1 is a new version of the Rotterdamspas, the second concept is an escape room van and the third concept is the minimal emission game.

## 3.6 From idea to concept

Since multiple ideas were created and discussed during the sessions, it is important to create some clarity when moving forward. All ideas will be used as idea cards creating an idea deck which can provide inspiration at any given point in time for the municipality. From all ideas a couple of concepts will be created which will each represent a different part of the strategy of Rotterdam Circulair: short, middle and long-term. But how to choose? This is why the second and third session were set-up: to provide a list of criteria important to adolescents as well as for the municipality. The criteria for the target group have already been identified in Chapter 2 of this project.

### Criteria for adolescents:

#### Easy to do

An adolescents perceives their life as very busy, and their spare time is precious. Their busy lifestyle does not really allow for difficult new things to enter. A new idea which aims to approach them and engage them is certain kind of behaviour therefore needs to be easy to do for them. Easy means that it already matches their lifestyle or it is not far from it. Easy means it does not put the adolescent in awkward 'new' situations, but rather makes the step to engage in certain behaviour as little and non-scary as possible.

#### Close to known

The closer an idea gets to an already existing reality of adolescents, the more likely it is that it will be adopted by them. This target group does not really like to take risks, as they are highly influenced by the opinions of their peers. So if an idea is extremely new and unknown to them, they will most likely not want to engage with it.

#### Captivating

The attention span of an adolescent is short, due to their brain constantly developing during early adolescence. And currently, with social media and mobile phone use sky rocketing, this attention span is even shorter than before. If the idea is to be successful, it must be able to capture their attention within seconds.

#### Competitive

Adolescents like things or activities that have to do with a little competition. Debates, games or else are names amongst the examples. The element of being able to compete with or against your friends is a big plus for them. This target group is very much invested in their social circle, so anything that improves interaction with it is welcomed.

### Criteria for the municipality:

#### Internal Feasibility

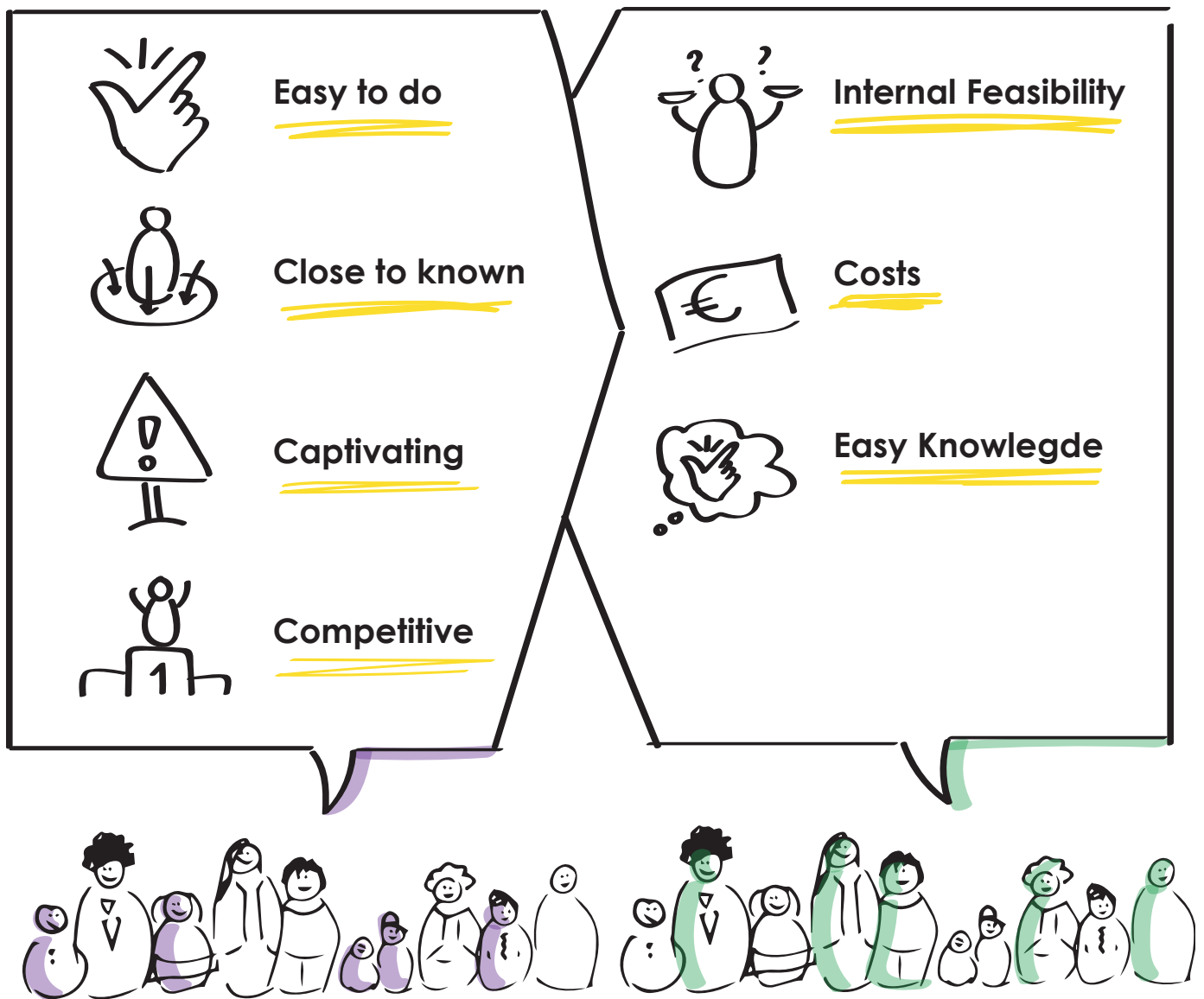
Concerning the municipality, a number of criteria are important to consider. First up is how feasible the idea is to realise within the municipality. One needs to realise that loads of projects carried out by the municipality are outsourced. So the more an idea is feasible from within the municipality, so making use of own resources, the faster it will be able to be carried out by the municipality.

#### Costs

Second up is the amount of money the idea is going to cost. The municipality is a good source of money, but the money is public property and made up of taxes of the people. Every investment therefore is carefully considered before spenden. The idea needs to have a good ratio between cost and revenue. If the idea is really risky and targets a small proportion of citizens but is very expensive, it might not be the best idea to invest in it.

#### Easy knowledge

The concept of the idea needs to be easy to understand and apply. The more this is the case, the municipality will be more inclined to carry out the idea. People working at the municipality are not experts in a specific field of knowledge. That is why they outsource many projects. But if the idea is easy to understand for a broad spectrum of people, it is easier for people of the municipality to carry out this project themselves, or even pass it on later on.



Since multiple ideas were created there must be a selection of the best ones. This does not mean the rest of the ideas are worthless, they are turned into an idea card deck (Appendix F). Ideas which captivated the adolescents' eyes were game-like ideas and creative ideas, such as the minimal emission game, escape room and circularART. Not all of these ideas are very feasible for the municipality. For example, the idea of circularART needs all schools of Rotterdam to cooperate and incorporate it into their schedules. As schools are overloaded with work and very busy this would be very difficult to achieve, according to the municipality. However, ideas which are not dependant

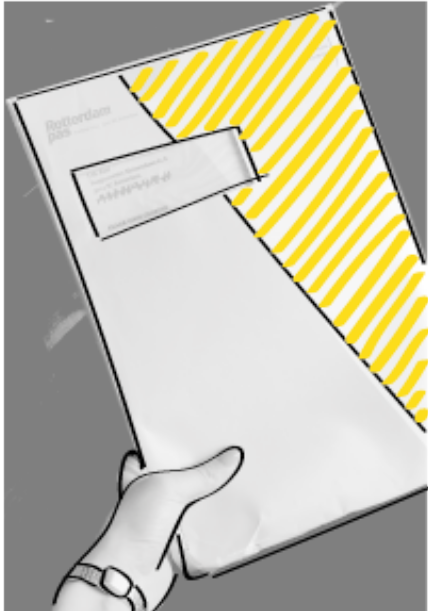
on schools would be far better to carry out. A riding van would be the perfect promotion material for Rotterdam Circular, so the idea of an escape room and an informing van are combined into a riding escape van as one concept. Also the idea of a game in which the goal is to have minimal emission or use of raw material was very appealing for the adolescents, so this will also be a concept. At last, the concept of a new form of the Rotterdampas was attractive for both adolescents and municipality since it is very easy to do (most teenagers already have a Rotterdampas) and it promotes sustainable projects in the city and a democratic atmosphere. Thus, this will be the last concept. For a detailed scenario plus key elements for each concept keep reading. p63



## 3.7 Concept 1 Rotterdampas 2.0

For each concept, the method of storyboards (Delft Design Guide, 2014) is used. This method was used as a prototyping phase, to give the

reader a grasp of how the concept would work in real life.



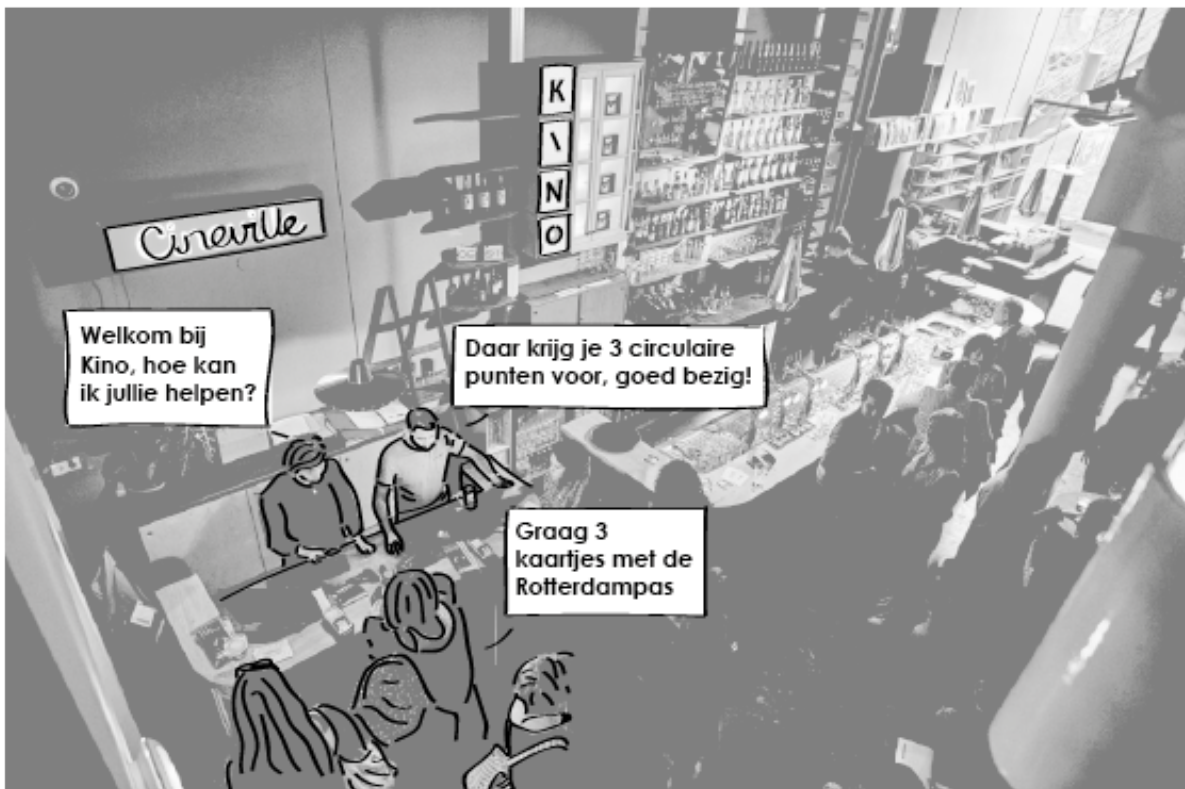
### STEP 1

Welkom bij de Nieuwe Rotterdampas! Waar duurzaam en leuk makkelijk samen gaan.



### STEP 2

Alsjeblieft, je nieuwe pas! Lever deze in bij onze 200 + activiteiten, krijg spectaculaire kortingen én spaar circulaire punten bij elke activiteit.



### STEP 3

Aangekomen bij de bioscoop levert Sarah en vrienden hun Rotterdampas in en krijgen per kaartje ook een circulair punt. Ze krijgen te horen dat met deze punten de Gemeente Rotterdam kan investeren in groene projecten.





#### STEP 4

Na de film genieten Sarah en haar vrienden nog even na. Een van haar vrienden vraagt zich af hoe het eigenlijk zit met de punten die ze nu gespaard hebben...



#### STEP 5

Op de website van de Rotterdampas en op de app kan je de verdiende punten inzetten in specifieke projecten die inzetten op duurzaamheid en circulariteit. Elk project heeft een target aantal punten voordat er in geïnvesteerd kan worden.



## STEP 6

Sarah besluit Deelders (circulaire punten) in te zetten op een project in het Kralingse bos.



## STEP 7

Bij het team van Rotterdampas komt bericht binnen van de Deelders op het project van het Kralingse Bos.



## STEP 8

Bij de ondernemer van de bioscoop komt ook bericht dat de Deelders die zij hebben gegeven zijn ingezet



### STEP 9

Een maand later herinnert een vriendin van Sarah dat je de Deelders ook kunt opsparen voor prijzen online. Ze kijkt en ziet dat ze 20 Deelders heeft op het moment.



### STEP 10

Sarah scrollt verder door de website en ziet de prijzen die je allemaal kan kopen met de gouden Deelders. yes! ze zou gratis naar de spa kunnen, maar die camera ziet er ook goed uit...





### Gouden Deelders

For this concept, the new valuta needs to be attractive and recognizable. Jules Deelder is a rotterdamish icon for years, and he was always advocating for a better Rotterdam. What better way then to introduce the gouden deelder, in stead of gouden daalder!



### Rotterdampas Team

For this concept, the help of the Rotterdampas team is needed. They are the accountmanagers of al local entrepreneurs that already have deals with Rotterdampas, so they should be the ones contacting them for the incorporation of the gouden deelders.



### Rotterdampas

For this concept to work, every adolescents needs to be in the posession of a Rotterdampas, the yellow card which allows for discounts at several local entrepreneurs in the city of Rotterdam.

### 3.8 Concept 2 Busje komt zo



#### STEP 1

Jeroen is aan het chillen met zijn vrienden in het skatepark, een plek waar ze graag komen.



#### STEP 2

Joanna, een van die vrienden, ziet iets merkwaardigs aankomen en seint haar vriendin.



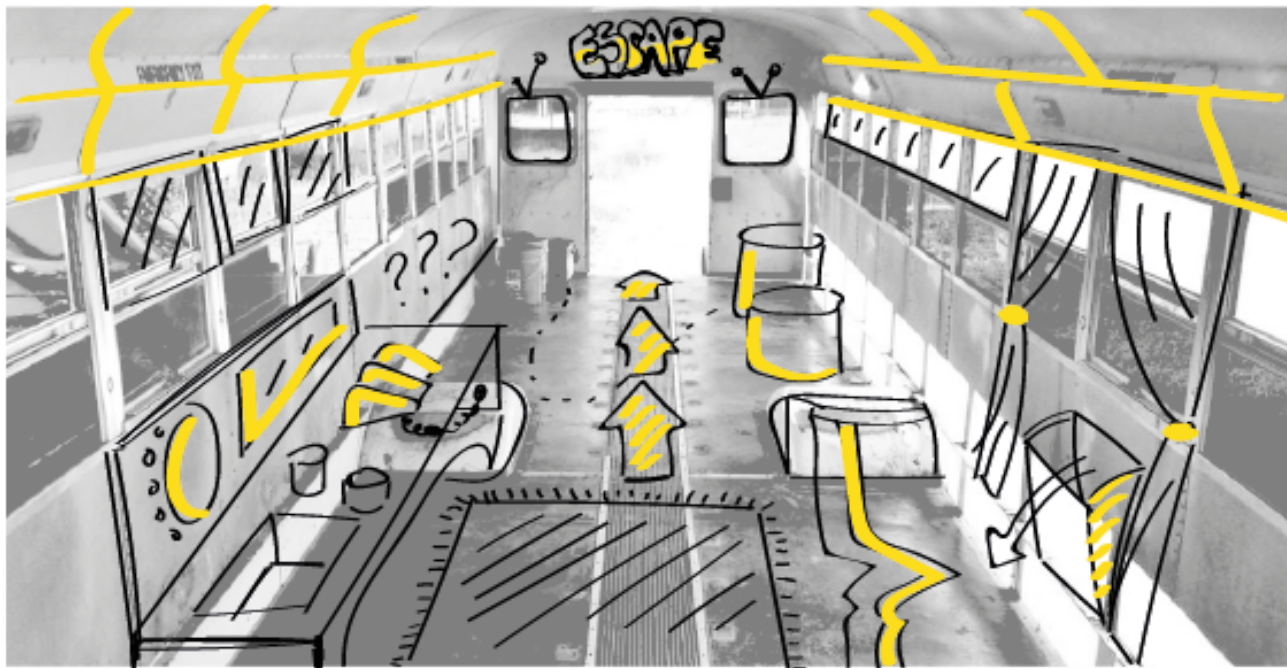
#### STEP 3

Een escape busje is aan komen rijden. Het trekt de aandacht van de adolescenten. Er staat iets van 'los jij het op?'. Jeroen, Joanna en co zijn nieuwsgierig geworden en gaan ernaartoe.



#### STEP 4

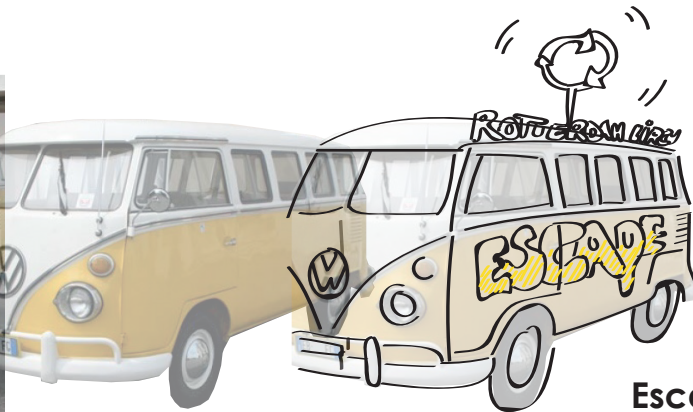
Naast de van, staat een man te promoten die het heeft over een wedstrijd met prijzen die te winnen vallen. Nu zijn de vrienden wel geïntrigeerd geraakt. Ze stappen erop af...



#### STEP 5

Binnen in de van ziet het er leuk uit! De vrienden worden opgesloten in de van en moeten er weer uit zien te komen. De puzzels gaan over het milieu en over de circulaire economie. Als ze snel genoeg zijn kunnen ze misschien de prijs winnen... geen tijd te verliezen dus!





**Escape Van**

For this concept, a van is needed in bright colors that scream attention, like yellow or gold. The inside of the van needs to be full of puzzles and games. The outside needs to be spray painted so that it is clear it is an escape van. Also 'rotterdam circulair' should be branded.



**Promo Team**

For this concept, a promotional team of rotterdam circulair is needed to draw adolescents in and to explain the concept and inform about circularity. The team needs to be recognizable, so they should wear golden clothes and caps like in the picture above.



**Game Designer**

For this concept, designers are needed to design the 'escape plan'. There is one van and not much space, so the design needs to be ingenious and clever. Furthermore, it needs to reflect choices you would do in real life concerning the climate and circularity.

### 3.8 Concept 3 Minimal Emission Game



#### STEP 1

Alex en Kiara komen op insta een reclame tegen van een spel dat er wel interessant uit ziet



#### STEP 2

Ze besluiten naar huis te gaan om het uit te proberen



#### STEP 3

Alex stuurt ook een bericht naar Julian, een vriend van hem



#### STEP 4

Julian had het spel ook al gespot en zit al klaar om te spelen



### STEP 5

Bij het starten van de game kunnen spelers kiezen tussen twee tracks: de minimal emission (CO2) of raw materials (circulair)



### STEP 6

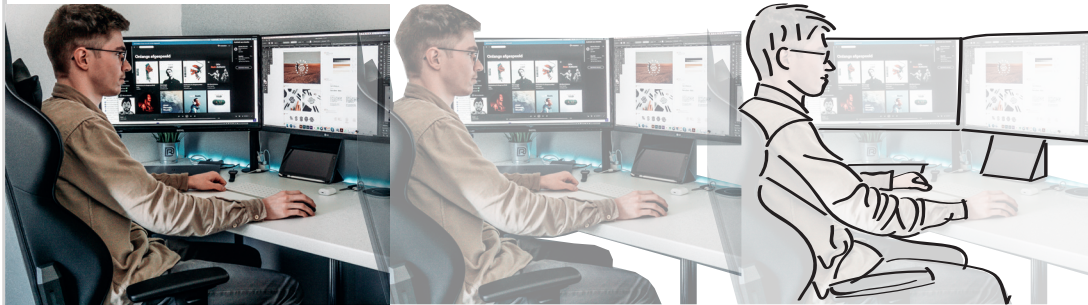
Na een tijdje spelen is Julian de winnaar van de drie!



### STEP 7

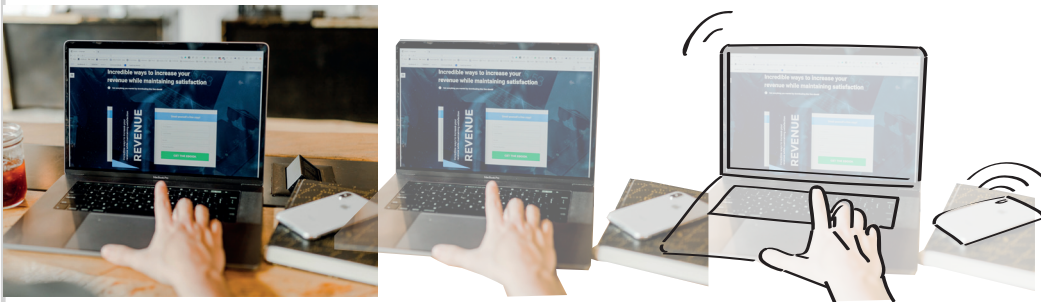
Hier hoort natuurlijk een victory pose bij!





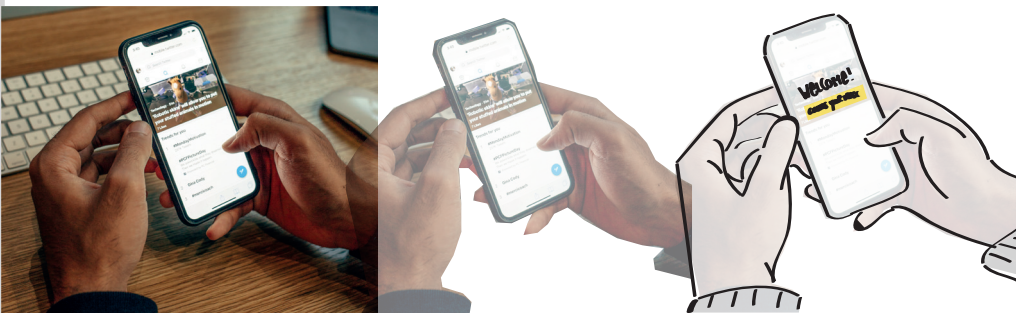
### Professional Game Designer

For this concept, the design of the game is essential. Professional game developers are crucial to a good and interesting game with good enough graphics. The game itself can resemble quest-games in which the characters need to overcome obstacles.



### Internet Platform

For this concept, a platform is needed online on which the game is played. This must be facilitated by the municipality so that everyone can play the game if they would like to do.

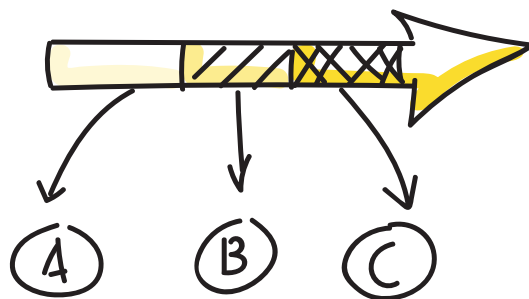


### Online Promotion

For this concept to work, it is needed that it is promoted online. Since the game is also played online, it is best suited to do the promotion also on the internet. It can be through channels on social media, newswebsites etc.

Normally, a designer would choose one concept at the end of the synthesize stage. Specific criteria would determine which concept would be the best one. After careful consideration with both the target group and the municipality it has been decided that all three concepts have potential for the future. Therefore, there will not be one specific choice between them. However, there will be some difference in elaboration between the 3 concepts. One of them will be detailed further to serve as an example for the municipality. Next to this, all 3 concepts will be elaborated further in the next chapter, which focuses on strategy and how the concepts fit within the strategy of Rotterdam Circulair. They will first be analysed in terms of business model components and then plotted on to timelines for the future.








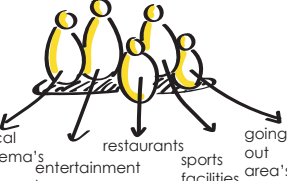
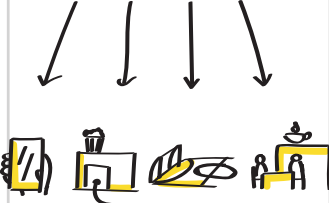


## Part 3 - Simulation



## Chapter 5: strategy

This chapter explains how the 3 concepts from the previous chapter fit within the strategy of Rotterdam Circulair. It first details the elements needed for the concepts to work, and then plots these elements on a timeline up to 2024, approximately the same amount of years that Rotterdam Circulair wants to achieve its first milestones in.

## 5.1 Business Model Elements


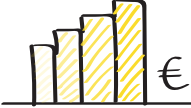

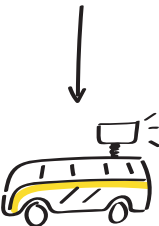
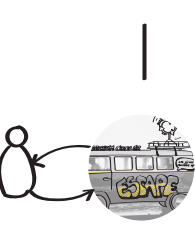
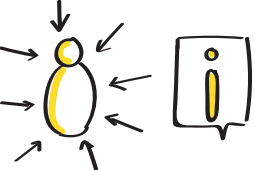
	<p><b>Value proposition</b></p> <p>A professional online game in which players can play against each other and in which the goal is to either use as less raw materials as possible or to exploit as few emission as possible. The one which achieves that wins the game.</p>
 <p><b>Needed investments:</b> Subsidy for projects Workforce team Rotterdampas</p>	<p><b>Resources and Investments</b></p> <p>The municipality would have to invest a budget for circular projects for the city. But other than that there is no real monetary investment in this concept. Nevertheless, this concept requires other big changes seen below.</p>
 <p><b>Multiple use</b> <b>Different options</b></p>	<p><b>Activities</b></p> <p>The main activity in this concept is explore activities in the city. There are multiple different ones and different projects to invest on</p>
	<p><b>Partners</b></p> <p>The partners for this concept are multiple and different from each other: the local entrepreneurs which work together with the Rotterdampas all deliver a different kind of activity.</p>
 <p>communication online and offline via mobile phone, local shops and restaurants and sports facilities</p>	<p><b>Channels</b></p> <p>The channels for this concept are both online as offline. Online one can vote with the Gouden Deelders on circular projects in the city. And offline one can experience different activities with which they can earn the Gouden Deelders.</p>
	<p><b>Customer relationship / interaction</b></p> <p>The relationship or interaction the user has with the concept is the activity someone decides to do, and the involvement someone has whenever they want to vote for a project online. As the projects keep changing, the experience is ongoing and plural (differential).</p>
 <p><b>Facilitating &amp; Informing</b> <b>Passive role</b></p>	<p><b>Role of the municipality</b></p> <p>The municipality needs to take part in loads of discussions and meetings with local enterprises, but they do already have a special team of the RotterdamPas to do that. Their job for this concept is to try to inform the adolescents as good as possible on the website about the projects and to facilitate the application and the use of a new valuta.</p>

All concepts have key elements which are important to realise for the concept to work. To make it more tangible for the municipality as to what exactly they need for each concept, the concepts are 'broken down' into parts or elements. This structure is inspired by the business model canvas structure (Osterwalder & Pigneur, 2010). In this structure, multiple elements need to be filled in to have a complete understanding of how the business model would work in reality. In this project, each concept has a business model too, however, since they are not detailed to perfection not all the elements of the business model canvas will be used.

First up is the concept of the new Rotterdampas with the gouden deelders. The value proposition of this concept is twofold: at first, it creates value for the user of the pass, since he or she gets 1 coin every time an activity is done. But next to this, the municipality also gets sort of an indirect value as they get direct feedback from the citizens of Rotterdam as to which sustainable projects must be carried out and which not. The amount of resources that need to be spent on this concept are relatively small (compared to the other two concepts). The investment goes largely into the subsidies for the projects. The rest of the concept can be carried out by the Rotterdampas team, which is already a part of the municipality, so it will not be a substantial extra resource needed. The main activity of the concept is simple: explore activities in the city of Rotterdam. Have fun and supporting a better environment at the same time.

Even though this concept does not take a lot of investments, it does take a lot of time to partner up with all the local entrepreneurs to get them to join with the gouden deelders. This concept has multiple partners, but it provides for different options to do for the user of the concept. At last, the role of the municipality is mostly to facilitate and inform the adolescents in the city. Facilitate through the Rotterdampas team, and informing through the different channels the user experiences while using the new Rotterdampas.

Figure 20: business model elements concept 1

	<p><b>Value proposition</b></p> <p>A van/bus driving around the city of Rotterdam promoting Rotterdam Circulair and inviting adolescents into the van to try to escape out of it. All the game elements in the van are connected to themes of circularity and sustainability.</p>
 <p><b>Needed investments:</b> Bus + equipment Escape room designer Promotional team</p>	<p><b>Resources and Investments</b></p> <p>The municipality would have to invest in escape room designers and in a promotional team working for the municipality which operate the van during the escape challenges. Game design and promo team are not cheap at all.</p>
<p><b>Single use</b> <b>Same option</b></p>	<p><b>Activities</b></p> <p>The main activity in this concept is trying to escape out of the van. This will be a one-time activity for the targetgroup.</p>
 <p>Van-builder      game designer</p>	<p><b>Partners</b></p> <p>The partners for this concept are mainly the building company for the van and the designers of the escape game. The promotional team will be from within the municipality.</p>
 <p>communication via face to face, though the bus</p>	<p><b>Channels</b></p> <p>The channel for this concept in a uniform one: the bus is the place where the adolescents come into contact with the concept. There is no real other channel through which the escape van can be done.</p>
	<p><b>Customer relationship / interaction</b></p> <p>The relationship or interaction the user has with the concept is the playing of the game on the spot. Afterwards, there is no interaction with the concept anymore. It is a one-time experience.</p>
 <p><b>Stimulating &amp; Informing</b> <b>Active role</b></p>	<p><b>Role of the municipality</b></p> <p>The municipality needs to be actively involved in this concept. It needs to train a promotional team which can convey the message of Rotterdam Circulair, as well as stimulating adolescents to participate in the activity of the escape van.</p>






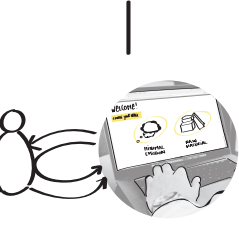

For the second concept the value proposition is mostly one-fold: the adolescents learn about circular economy while they have fun playing a game. It could provide for an unforgettable experience for the adolescent. The concept does require a lot more investments and resources. First up, the van needs to be acquired. It is only one van, but it needs to be customized completely. Inside and out. Then, a game designer needs to create an escape room inside the van in which all activities are related to environmental dilemma's of the consumer. Everytime you do something in the escape van, something else will happen reflecting the current environmental problems in the world. Action is reaction, so they say.

Next to the van and the designer, a promotional team needs to be educated and deployed to operate the van. They need to know about circular economy and promote the van on location, making it attractive enough for adolescents to come and take a look inside. So compared to the previous concept, this concept requires far more investments to make. However, since the van is mobile, it can be used in different locations and events, so it could be used the whole year around.

The amount of people that are targeted by this concept stays limited though, since everyone can do the escape room only once and it is a timely procedure. The interaction the user has with this concept is a very interesting one and educating one, but it is not a recurring one. It is a one-time experience.

This concept requires a more active role of the municipality. Next to informing adolescents about the circular economy on the spot, the team also needs to stimulate them to participate in the escape van. Comparing this to the previous concept where adolescents do not have to be enticed to participate in activities, makes it apparent that the role of the municipality is an active one.

Figure 21: business model elements concept 2

	<p><b>Value proposition</b></p> <p>An improved version of the Rotterdampas with which the owner receives gouden Deelders (a new valuta) each time he/she does an activity in the city. With this valuta he/she can vote for green and circular projects in the city.</p>
 <p><b>Needed investments:</b> Professional game designer Marketing of game</p>	<p><b>Resources and Investments</b></p> <p>The municipality would have to invest in professional game designers which make a game as interesting as popular games nowadays such as Fortnite. This procedure is usually a costly one, so the investments are large.</p>
 <p><b>Multiple use</b> <b>Same options</b></p>	<p><b>Activities</b></p> <p>The main activity in this concept is trying to win the game. As there are two tracks, the game can be done multiple times.</p>
 <p>game designer</p>	<p><b>Partners</b></p> <p>The partner for this concept is one big one: the designer of the game. As this is the central part of the concept it is crucial the partner is a capable one.</p>
 <p>communication online via computer, mobile phone or Ipad</p>	<p><b>Channels</b></p> <p>The channels for this concept are all about online. The game can be played mainly on the PC, but it also works on tablets and mobile phones. It needs the internet to establish connection between players.</p>
	<p><b>Customer relationship / interaction</b></p> <p>The relationship or interaction the user has with the concept is the paying the game multiple times over until someone wins or gets tired of the game. The interaction is ongoing, but the experience is singular and the same.</p>
 <p><b>Facilitating</b> <b>Passive role</b></p>	<p><b>Role of the municipality</b></p> <p>The municipality needs to find the best match for the design of the concept, but then they actually take on a passive role. The municipality does not have the expertise to design a game themselves, they do however have the resources and the connections with the right people.</p>

The last concept, the game, has a straightforward value proposition. It provides entertainment for adolescents while hopefully creating awareness about the important measures that need to be taken to act sustainability.

It could also provide valuable data for the municipality, since the amount of adolescents playing the game provides an indication of how many of them are aware of the problem and the necessity for a circular economy. Designing a professional game with advanced graphics is a costly procedure though, it will be a large investment the municipality has to make. But, if made, the game could potentially target a large portion of the adolescents in the city of Rotterdam.

A good feature of the game is that it is a repetitive activity, and the more you repeat an activity, the more you remember about it. There are 2 tracks that can be done in the game, so there are some options, but once you have reached the maximum level on both there are no other options available. The game is therefore playable to a certain limited amount of time.

It is no long term concept, rather middle to short term. The channels through which the game will be played and promoted are all online, computer, tablet or phone, if it has an internet connection you can play the game. From all concepts, this one is probably the one where the municipality is least involved. Their role is to find the best game designer for this game and facilitate the design of the game that way. Furthermore, they are rather on the background.

Figure 21: business model elements concept 3

## 5.2 Mini Roadmap

The business model elements of each concept can not all be mapped on a timeline. Elements like channels, activities and value proposition are all-encompassing and are not limited to a certain period. However, some other elements can certainly be mapped on to a timeline. The timeline chosen for the mini roadmap is one of 4 years, up till 2024. This is done because the closest strategy of Rotterdam Circulair is also one of 4 years. This way it becomes easier to see how the concepts could be developed in this period of time. All concepts are lined up under each other to make the difference in timing apparent.

Elements that will be plotted on to the timeline are resources and investments, partners and customer interaction. As every project starts with the funding of it, the resources and investments are the first part of every concept that the municipality should focus on. The biggest investments of all three concept is the one for the escape van, so it will take the longest of all three concept to gather all resources. In comparison, the investments for the new pass concept are the ones which will probably take up the least amount of time to gather. The concept of the professional game take almost the same time as the investments for the escape van.

The amount of partners needed for the concept determines the amount of time it will take for the concept to be fully working. For both the escape van as the professional game the amount of partners is limited to 1 or 2. So as soon as they found the partners, they can begin to execute the design of the concepts. For the Rotterdampass concept though, loads of partners are needed to be able to set up the concept. And on top of this, the Rotterdampass is a yearly returning event, so the calendar for launching new concepts is bounded to this yearly appearance. This is why it will be the longest to execute this concept, but if done, this concept will stay and be used for the longest period of time. This is because there are multiple options an adolescent can do. He/she can go swimming, to the movies, lasergaming,

reading, painting etc. And everytime they get gouden deelders for it. Also, the municipality can keep changing the type of projects that can be voted on on their website. Because there are so many options, this concept can be carried out for years and forms part of the long-term strategy of Rotterdam Circulair. For a shorter term – middle term strategy, the advice is to invest in the professional game. With a large reach and a repetitive message, the amount of adolescents targeted in the city of Rotterdam will grow over time. But the concept will not last forever. The game has its limits, and whenever someone has played both levels there is nothing captivating the attention of the adolescent anymore. This game, however, could be expanded into other cities, so its reach will even become bigger. This is different than the previous concept where the limits are within the city of Rotterdam because of the specific pass.

The third concept of the van can also be used in the whole country for a bigger reach but will probably not be suited for a long term strategy. Rather, this concept is perfect for the short-term strategy of Rotterdam Circulair. As there is only one van that needs to be made and this van also fits the promotional material perfectly, it could probably be used already for an event somewhere next year. However, its reach will be the least of all three concepts. Only a limited amount of adolescents can ride in the van at the same time. It will also be a one time experience for the teenagers, so the impact of it must be big. The design of the escape van therefore, needs to be carefully thought out.

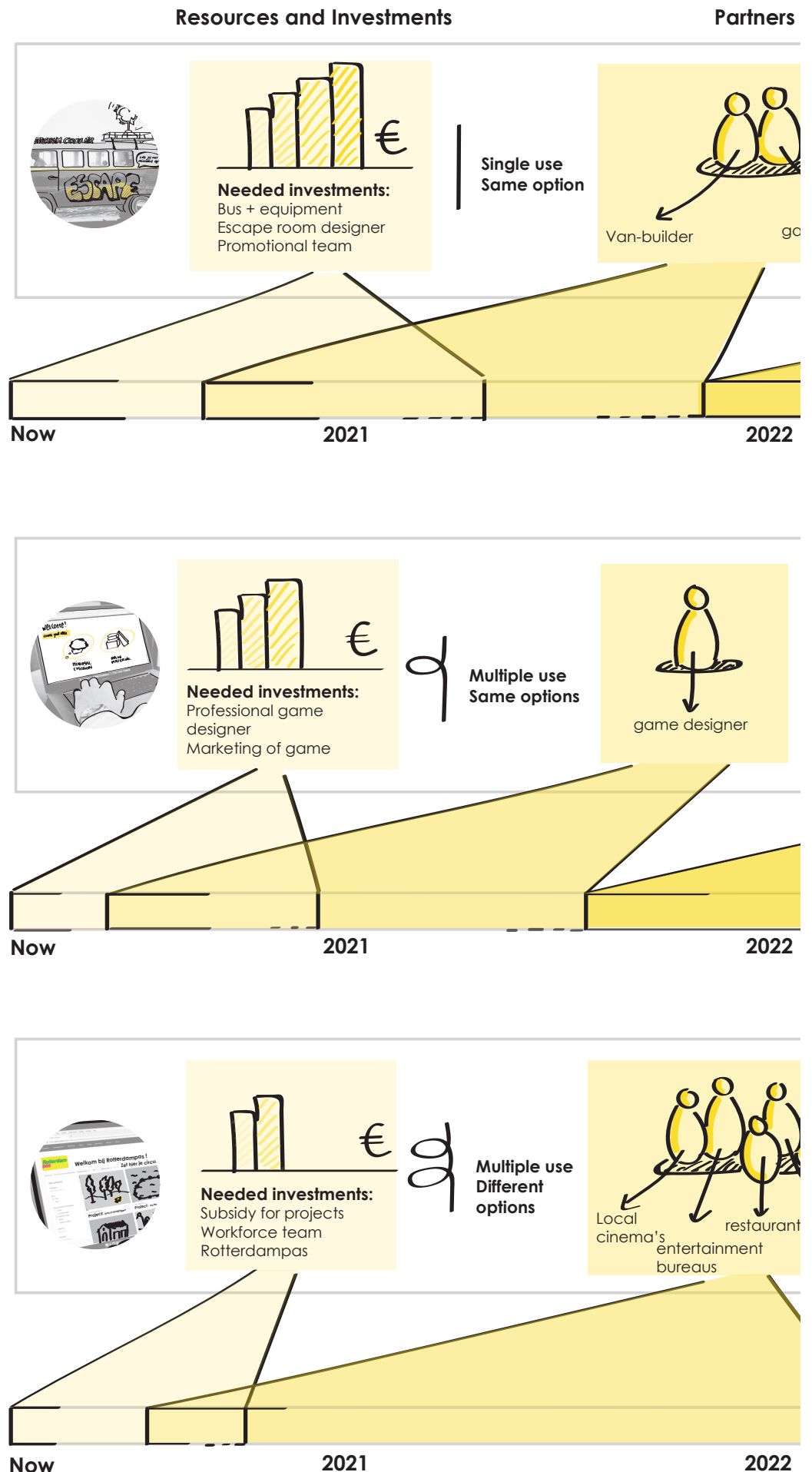
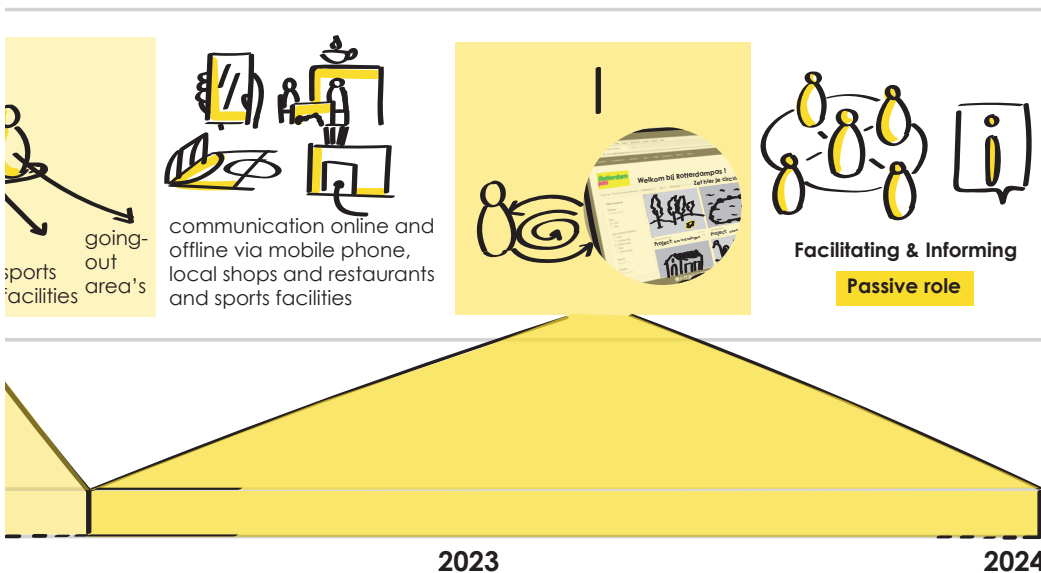
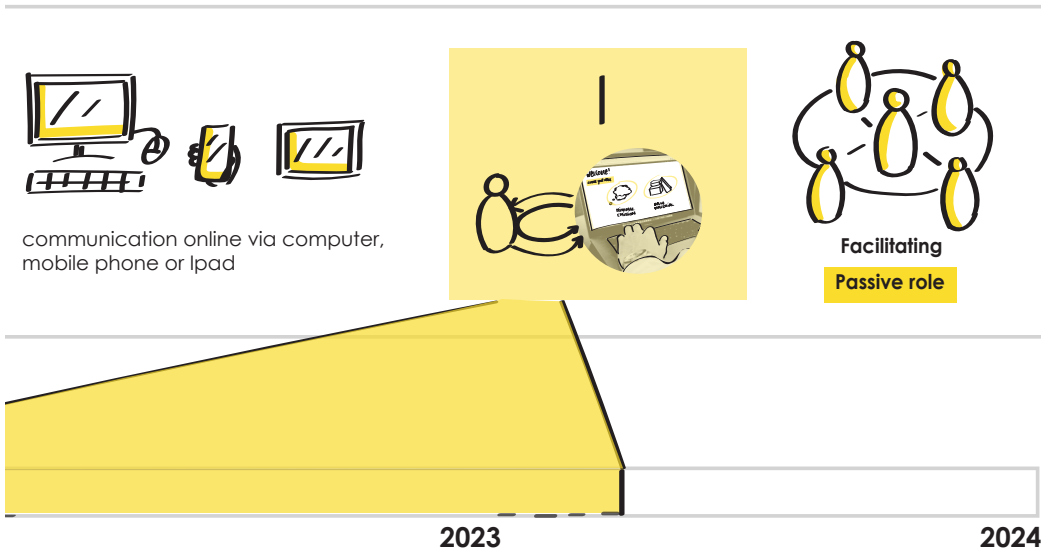
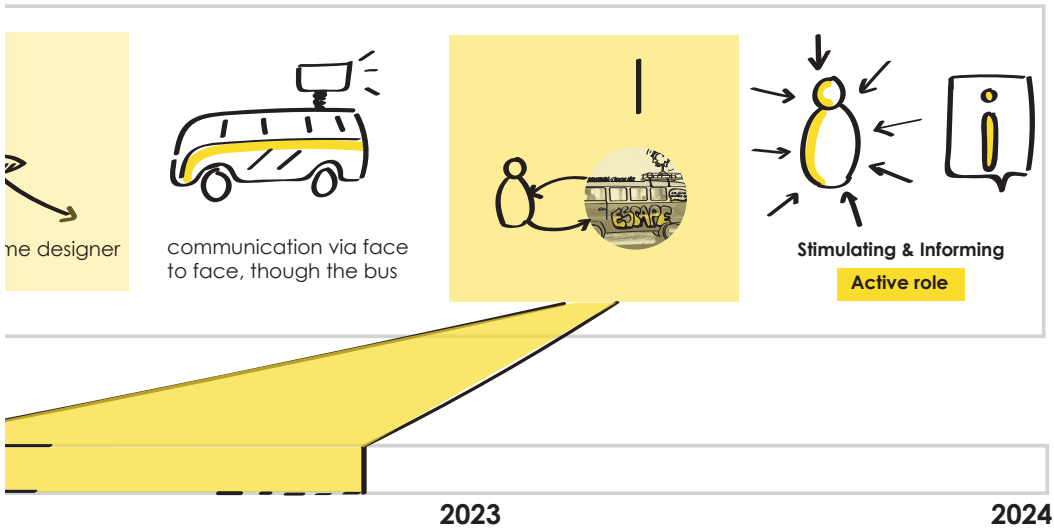


Figure 22: plotted business model elements on timeline



## Customer Relation & Interaction



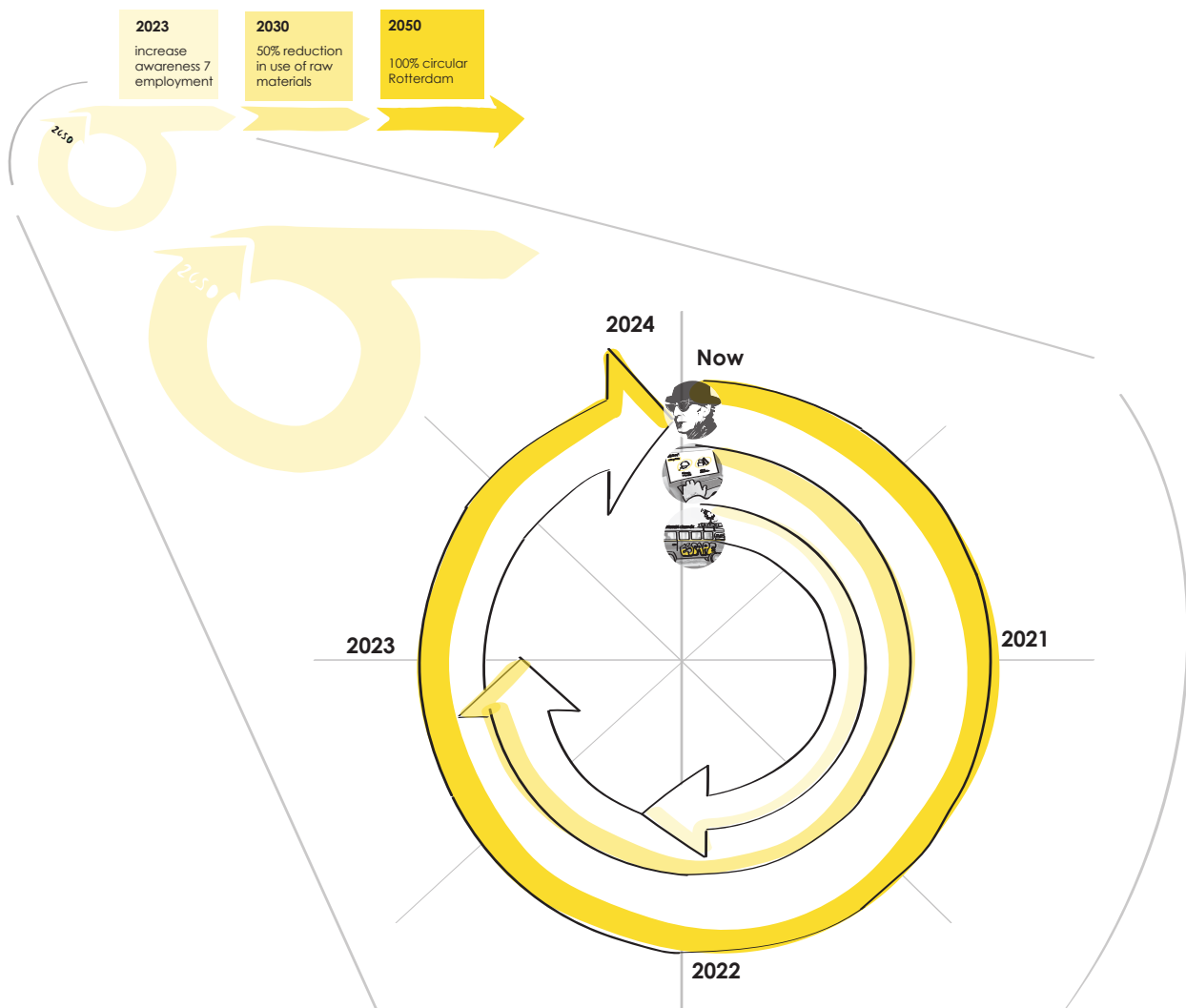


Figure 23: plotted concepts against strategy of rotterdam circular

Looking back at the overarching goal of Rotterdam Circular it is clear that by 2030, a 50 % reduction in use of raw materials is the key performance indicator. By 2023 all citizens of Rotterdam need to be aware of the circular economy and the amount of circular citizens needs to go up from 20 % to 30%.

That leaves the third concept of the game, which because of its repetitiveness, is closer to the goals of Rotterdam Circular than the van, but because of its lack of options will likely lose its popularity over time. . Therefore this concept sits within both other concepts on the circular timeline (figure 23).

When plotting all 3 concepts into a 'circular' timeline, it becomes clear that the New Rotterdampass is the concept which is closest to the goals of Rotterdam Circular. This is mainly due to the repetitive use and the long period of use of the concept. The concept of the escape van is a short-term strategy so it will only shortly impact citizens of Rotterdam.





## Part 4 - Evaluation

## Chapter 6: conclusion

This chapter offers an answer to the initial research question of the graduation project. Next to this conclusion, it gives recommendations for the future to the municipality: how should they carry on this project? Which elements do they need to take into account? The chapter finishes off with a personal reflection from the designer.

## 6.1 Conclusion of the project

This graduation project has focussed on circular economy and a specific target group: adolescents in Rotterdam. In order to conclude, let's take a look at the original goal for this graduation project:

*Develop a strategic action plan for the municipality of Rotterdam with accompanying interventions in order to stimulate circular behaviour under adolescents of 12 to 15 years old.*

It has become apparent that the municipality of Rotterdam has a special division called Rotterdam Circulair which focus is on accelerating towards a circular economy. Within their strategy, they plan to target youth in Rotterdam. That is why the original target group is youth. Through desk research and field research the target group of adolescents was thoroughly studied, mainly on topics about sharing, lending and using products. Since these topics have the most relations with circular behaviour, they are the most important ones to address. It is clear now that adolescents do not know the term 'circular economy'. They do have associations with the term 'sustainability', but they are all very different from each other. At schools, but also on the streets, adolescents still litter on the streets and therefore, do not recycle. Also loads of food gets wasted primarily during school time. Clearly, the urgency of circular behaviour has not been stimulated enough within this target group.

Furthermore, adolescents themselves point out they would like to engage more with their friends and go outside, instead of being hooked on their phone. They are easily influenced but distracted just as easily. Their attention span is short, which is important to remember for the municipality. Even though social media is frequently mentioned as an opportunity area to get into contact with adolescents, they themselves warn that this might not be the best way to approach them. The better way is during school time or during a time when they themselves do not feel

intrude and when their personal free time is not at risk. Because the day of an adolescent is a busy day (according to themselves). They feel stressed a lot of the times, and often they feel like they do not get enough time to do everything they must and want to do. It is not very strange they feel this, as this time of adolescence goes paired with numerous physical, psychological and social changes and challenges.

Next to this thorough research on the target group and the concept of circular behaviour, creative sessions took place together with the municipality and adolescents to come up with creative ideas for interventions. Sitting down with the target group turned out to be a good initiative, since they are the experts about their age group and can tell the designer exactly what they like and what they do not like and their reasons for it. The same applies for the session with the municipality. The three concepts, together with the 33 idea cards, constitute a vast amount of interventions that the municipality could apply in order to stimulate circular behaviour within youth in Rotterdam. The good thing is that these interventions were scored by the target group themselves, so they have some kind of validity.

Part of the goal of this project was to develop a strategic action plan. This translates into the form of a roadmap with different elements plotted onto it. These elements consist out of business model elements of each concept, think of 'key partners', 'resources needed' or 'customer relationship'. These elements have been defined in detail (Chapter 5) and they have been plotted on to a timeline of 4 years. Looking at the three timelines of the concepts one can see the difference between them if you would want to implement them. The concepts have also been 'measured' in terms of how circular they might be during those years. It appears that the concept of the new Rotterdampas is the one which, on the long run, is the most circular and is likely to have the biggest impact. That does not mean the other two concepts can not be implemented, they



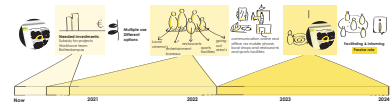
would be ideal if the municipality would like to try out something for the short term. So both the business model elements as well as the timelines together form the strategic action plan.

In short, both elements combined conclude the original goal of this project. It is not a matter of one solution, because multiple solutions could apply. The circular economy is a vast concept, with multiple actors involved. One might even say it is a wicked problem. And as all designers know: wicked problems require wicked solutions. Not one solution, but multiple. Personally I would like to believe that my solution could be one of them.



**Design a strategic action plan for the municipality of Rotterdam with accompanying interventions in order to stimulate circular behaviour under adolescents of 12 to 15 years old**

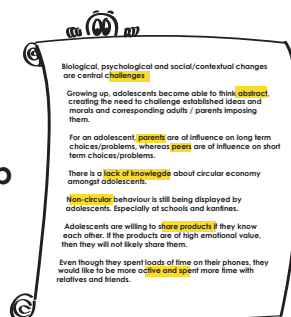
### Mini roadmap with business model elements



### 3 concepts and card deck with 30 + ideas



**Extensive research and design into target group + key take aways**



## 6.2 Recommendations for the future

After the designer retrieves from this project, it is recommended that the municipality continued with the outcomes of the project. First up, it would be smart if the criteria for designing for the target group are adopted into further projects or policies written by the municipality. Multiple project targeted at this specific age group are carried out every day, and it could be of use to keep the important criteria in mind. Second, if the municipality is serious about the concept with the Rotterdampas, some research is needed as to which green projects in the city are of interest to invest in. The team of Rotterdampas needs to have new instructions and a budget and further necessary resources needs to be invested in.

The municipality's strength is to find the right partners for a project, and I would advise they would play to their strength when wanting to implement the other two concepts. Finding a good game designer is key to the success of these concepts. And furthermore, if neither concepts are good enough or turn out to be too expensive, members of Rotterdam Circulair can always use the card deck with idea cards to come up with new concepts themselves. The card deck could serve as an inspirational source to creativity.

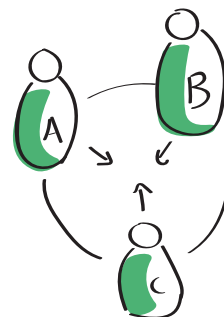
Rotterdam Circulair is just one team within the large organisation of the municipality. To be able to make the concepts work, for example the new Rotterdampas, different divisions of the municipality need to work together. The budget division, Rotterdam circulair, but also the 'youth and education' division for example. This concept could bridge these divisions together and make the idea of a circular economy easier to grasp and closer to everyone. As the concept of a circular economy is not yet imbedded in the whole organisation, a concrete idea might be the solution to do so. A suggestion therefore, is to organize sessions in which the concepts are discussed with members of all the different divisions and not just Rotterdam Circulair. Invite everyone to participate in the creative session, gather feedback on the concepts and stimulate to

come up with new ideas or alterations as well. Creating buy-in in the rest of the organization of the municipality is very important to make the concepts work.

Adolescents have pointed out that they like to give advise and be taken serious. Creating a place for them where they could speak up and engage with members of the municipality could stimulate for better and more creative solutions in the future. At the moment, there is an organization that already tries to engage youth in policies: young010. The advice for the municipality is to first attend a few sessions with this group and to secondly try to mimic this organization or to merge with this organization for Rotterdam Circulair. Once you start to take adolescents serious, they are keen to participate. So in order to stimulate them for specific behaviour, it is needed that they are involved in the problem-solving process.



**Take adolescents serious and involve them in future projects**



**Involve multiple divisions of the municipality to make the concept work**



**Make use of idea card deck during future creative sessions**

## 6.3 Personal reflection

This graduation project has been a rollercoaster for me. At the beginning I was very enthusiastic about almost everything that had to do with adolescents and circular economy. I wanted to know everything. But I found out rather quick that it is impossible to know everything in the time that is scheduled for this project. I was interested in the psychological part of adolescents brains, the changes they encounter and their opinions about life. But of course I could not become a psychologist expert of this target group over night. In the project brief I wrote I hoped to learn about doing research with the target group. Looking back, I think I learned this part quite well. I performed interviews in which adolescents gave me a lot of information and feedback, where they became opiated and started discussions amongst themselves. Honestly, I did not expect that when I first started the research. After every interview I heard from them that they liked it and that the time flew by in seconds. I will take that as a compliment. Next to the target group, I also wrote I wanted to learn how to validate strategic concepts since we did not really learn that in the master. This part I think I partly learned, since I validated ideas directly with the municipality and the target group. But I still do not really know how to validate further from that. I made a timeline for 2024, but how to make sure that this is also going to work in the future? In my future work as a designer I hope I can find an answer eventually.

Looking back at the graduation project as a whole, I enjoyed my time at the municipality. They let me be free as a bird, and I found out that that is what I need if I want to flourish in a project. However, a little bit more structure at the beginning of the project would have been nice. I think I over-researched some topics to the point that I had too much information all over the place and I did not know how to categorize the information anymore. This part, the categorization of data, is by far the part that has cost me the most time during the project. For a future project, I think I would distinguish 2 or 3 main categories I want information about and leave it at that.

Hopefully, this way the data will not be too scattered and a little bit more workable. During the project, I found out that close cooperation with the target group really works well. Usually they like it when they get approached as 'the expert' and get listened to. When I was done with the interviews, I came up with the idea of also performing a creative session with the target group and the municipality. This idea was key in order to come up with the criteria which are of importance when designing for these people. Also, I had a lot of fun while doing it. In the project brief I wrote that I wanted to experience what it was like to get to know and fully understand the target group, and I believe I have accomplished that.

If I am being honest, I would say that I am not really a strategic designer or an interaction designer. I think I am something in the middle. During the project, I found out that I really want to be close to the people that I am designing for and I can not stand the idea of not doing that, as I think it is critical in any design project. This also explains my difficulty to choose between the masters SPD and DFI. In the end, I am glad that I got to form my own graduation project. I learned a lot from the municipality and the target group, and eventually myself as well.



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