Facilitating the change to a sustainable diet with a food box service

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Preface

One year after having obtained my bachelor's degree in Architecture and having worked at a small but innovative architecture company, I decided to go 'back to school' in 2019 because I wanted to learn more about strategic design. This turned out to be a great and valuable choice.

When I started the Strategic Product Design Master's programme at TU Delft I hoped to gain new perspectives on design and entrepreneurship. Moreover, I had the desire to start my own venture that would contribute to a (more) sustainable world. During the Build Your Startup course in the third semester, our team managed to validate a sustainable business idea, called Goodcase: a food box service that helps customers to explore a more sustainable diet. Three of us, Arwin, Gijs and I, decided to continue with the adventure to translate this idea into a sustainable business and the opportunity arose to develop this project further as part of my thesis.

This project could not have been executed without the contribution of my supervisors, family and friends. I am deeply grateful for the people surrounding me, who have helped me persevere during this, often challenging, time.

Erik Jan, thanks for trusting me to take on this project and allowing me to make it my own. You have always managed to guide me in the right direction by asking the important, critical questions on my approach and goals, and helped me to make the best out of the project.

Charlotte, thanks for always being available for help. You not only cared about the progress of my project but also reminded me to take care of my wellbeing. Our occasional meetings in person were a welcome change from all the online calls. Moreover, with your elaborate feedback on my report you really helped me improve my writing skills.

Matthijs, after the great experience during Build Your Startup with you as our coach it was very valuable to have you on the supervisory team to look at my project from a different perspective. Sometimes the influence from two research experts can make you lose sight of the entrepreneur's view, which you have always helped me to regain.

Thanks to my close family and Núria who support me without questioning. I could always count on you when I needed help, advice or just somebody to talk to. The same goes for my friends, some of whom even made the trip from Munich to spend some time with me in the Netherlands.

A special thanks to all the research participants that blocked some time in their schedules to take part. Your time and input have been very valuable for this thesis.

Lastly, I would like to thank you for reading my thesis report. I hope you will enjoy the read!

Thomas Doleschel

Executive summary

Consumers have an impact on the sustainability status of our world in many different ways. In this project the focus lies on food consumption. Dietary changes are considered a great opportunity for fighting climate change, especially through the reduction of meat consumption (Poore & Nemecek, 2018).

This graduation project is performed for Goodcase. The startup aims to accelerate the shift towards a sustainable diet by offering sustainable foods directly to the customer. The goal of this project is to empower food box customers to switch their diet to a more sustainable one by offering a support system that promotes long-term behaviour change.

Literature research indicated that self-efficacy and social norms play the main role when it comes to changing to more eco-friendly diets (Eker et al., 2019). Lead users reported that they had initially increased their self-efficacy to switch to a new diet by challenging themselves to perform the new behaviour for a certain time. Therefore, the design solution focused on self-experimentation through self-challenging, paired with the facilitation of social interaction with other users online. This combination is also applied in other behaviour change services, e.g. the Weight Watchers programme which helps consumers to eat healthier.

Based on these key insights, the design brief defined the following design goal: **To increase the self-efficacy of consumers trying to change to a more environmentally sustainable diet by facilitating self-experimentation with a food box**. Following this brief, a product-service system was designed which consisted of a food box with products facilitating vegetarian cooking, a physical guide that challenged users to reduce meat consumption, and an online group for users to motivate each other.

In a subsequent user test, qualitative research with eight consumers suggested that the food products triggered experimentation with vegetarian food which helped consumers to increase their self-efficacy to eat less meat. Vegetarian eating might have been positively influenced by the meat reduction challenge. However, many users found it too inconvenient to monitor themselves daily with the guidebook.

Finally, a second iteration of the design concept is proposed that incorporates the key learnings from the user test. The concept, called EcoEat, combines a food box with a supportive app which allows users to monitor and improve their behaviour over the long term and in a more convenient way. This design proposal could be tested in the future.

The main conclusion from this project is that providing real experiences with unfamiliar, eco-friendly food products can positively influence the consumer's attitude towards sustainable diets. It can open them up towards trying out more food of this kind and thereby helps them to switch to a more sustainable diet. More of these opportunities for trial should be provided to consumers. Food boxes are a good medium to provide these experiences regularly. With a complementary behaviour change service the experimentation with a sustainable diet can be upheld if the users are guided in a way that is convenient for them.

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1. Introduction

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1.2 Project aim and scope
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1.1 Introduction to Goodcase

1

The project was carried out with Goodcase, which is a sustainable food startup from The Hague. The author is one of the co-founders of the company. The mission of the startup is to facilitate the switch to a more environmentally sustainable diet. The company identifies food options with a low impact on the environment and makes them accessible to their customers using food boxes delivered to the customers' homes. Moreover, Goodcase aims to promote small food companies that do things in a more sustainable way, e.g. companies which produce alternatives for meat products, companies which upcycle food waste, or companies which only use sustainably grown raw materials for their products.

After running three pilot rounds with 10, 27 and 60 paying consumers respectively Goodcase launched their first product on their website. During the pilot tests, customers received around seven different food products in a box that could be used individually or combined with each other or with products beyond the box. The products included meat and cheese replacements, vegan sauces and prepared meals like curry and familiar products like pasta or wraps but with a high amount of vegetables inside. The food offering of the third pilot box can be seen in figure 1. Through bite-sized information in the box and additional content on Goodcase's website that could be accessed with a QR-code, customers could learn about the story behind the

Figure 1: Food offering of the third Goodcase pilot box (own image)

products. Even though it was possible to combine products from the box for meals, in contrast to offers like HelloFresh or Marley Spoon the pilot boxes were not meal boxes per se. Instead, they provided a selection of sustainable products from different categories that served as a starting point for vegetarian cooking together with other ingredients, an inspiration for sustainable grocery shopping, and a medium to learn more about an eco-friendly diet.

The first permanent product that was made available in May 2021 was a snack box in letterbox size. Due to the fact that the three Goodcase founders started to work on their graduation at the time, which was expected to be time-consuming, they decided to launch a box that was logistically easier to handle. A snack box with small-scale products and without the need of cooling was considered to be a good option. It included five snacks free from animal-based products that were produced by companies with a sustainable mission. Similar to the pilot boxes, consumers could learn more about the products online.

To be able to convince consumers to adopt a new diet, Goodcase needs to develop a service that makes the diet change as easy as possible for consumers, especially in the initiation phase. So far, the startup has only provided food accompanied by additional information about the products. Additional measures in the product offering need to be designed to help consumers reach their long term goal of eating in a more eco-friendly way. For this reason, research needs to be done into how consumers change to a diet that is environmentally more sustainable. Once this is better understood, measures can be introduced that facilitate the adoption of a more sustainable diet.

1.2 Project aim and scope

This project will work towards closing the gap between intending to change one's diet to a more sustainable one and actually doing it. This is referred to as the intention-behaviour gap (Grimmer & Miles, 2016; Leire & Thidell, 2005; Vermeir & Verbeke, 2006) and it will be discussed in detail in the literature research chapter. The goal is to empower consumers who are motivated to change their diet to follow through by facilitating the switch. The solution should combine the experience of actual food in a delivered box with accompanying tips and tools to help consumers. The strategy should be general enough to work for different people, but should also be adaptable to the specific needs of the individual. Specific behaviour change techniques will be used to guide consumers towards their goal of an eco-friendly diet.

The overarching research question of this project is the following:
How can a change to environmentally sustainable food consumption behaviour (ESFC) be facilitated with a food box?

The main sub-questions guiding this project are:
1. How do individuals change to more sustainable food consumption?
2. What behaviour change interventions can be effective to change consumers' ESFC behaviour with a food box?
3. What obstacles are experienced by consumers when changing to a more sustainable diet and what workarounds are used to circumvent these obstacles?

1.3 Project approach

The project was guided by the '**double diamond**' methodology (British Design Council, 2019), which is commonly used for design and innovation projects. According to this methodology, the design process consists of four phases: discover, define, develop, and deliver. Figure 2 presents how the report chapters correspond to the 'double diamond' approach. The different phases of the 'double diamond' can be distinguished by dedicated colours that support the design of the report.

Discover
The first part of the project was focused on research and discovery. First, a literature research was performed to shed light on the relationship between diet and the natural environment, to understand the challenge of changing one's diet and to discover ways of changing one's diet behaviour as has been shown in former research (chapter 2). Next, twelve interviews were conducted with people who had already changed their diet to a more sustainable one. These consumers were considered lead users (von Hippel, 1986) in terms of ESFC behaviour. In these interviews the main goal was to learn what had helped them to change and what challenges they had undergone during this period (chapter 3). In the third part of the research phase analogies to diet change interventions were investigated (chapter 4).

Define
Chapter 5 presents the main insights from the discovery phase and formulates a design brief that clearly defines the challenge based on these insights. The design brief clarifies what needs to be taken into account when designing for the startup Goodcase and for their target audience.

Develop
Chapter 6 deals with the development of the design solution. First, the ideation process is described. Based on first ideas, a design direction was defined. Subsequently, the concept of the new food box service is presented. Moreover, the chapter provides insights into the prototyping for the user test.

Deliver
Chapter 7 reports on the executed user test and presents an improved design proposal. The developed concept was evaluated with consumers that fit the target group of Goodcase. For the recruiting of participants, the author collaborated with the Future of Food Institute in Amsterdam. The organisation provided the opportunity to present the developed concept in an online community dedicated to the research of sustainable food innovations. After a first online evaluation of the concept, the food box was tested by a group of consumers and the reception evaluated by the researcher. Based on the learnings from the user test, an improved concept was designed that could be tested in the future.

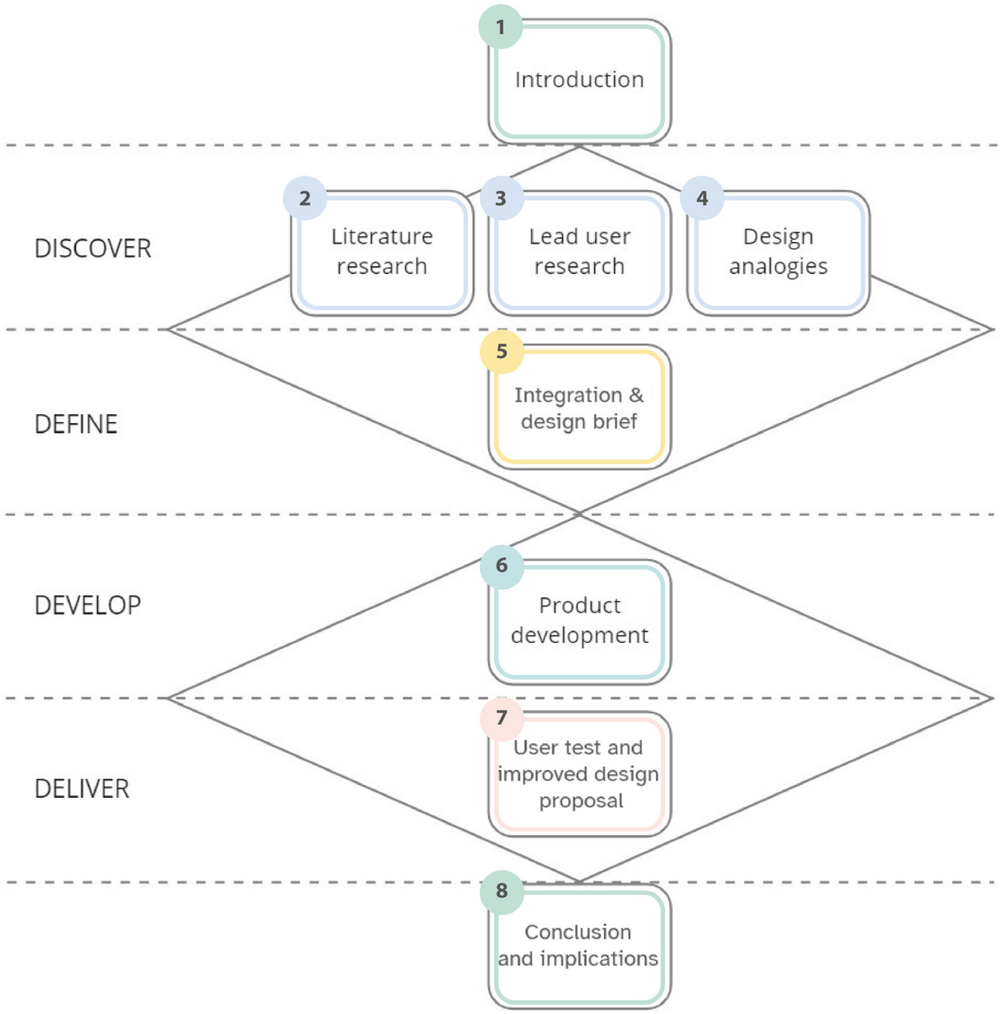


Figure 2: Double diamond structure of the report (own figure)

2. Literature research: Changing diet behaviour

Content:

2.1 Relevance of diet changes
2.2 Environmentally sustainable food consumption
2.3 The challenge of changing diet bwehaviour
2.4 Dietary change
2.5 Behaviour change interventions for dietary change

2.1 Relevance of diet changes

The production of food has a strong effect on the environment. It accounts for about 25% of global greenhouse gas emissions (Vermeulen et al., 2012). Additionally, natural ecosystems are greatly affected by agricultural land and water use, nutrient loss and fisheries. The main contributor to climate change in the food system is livestock production. According to Steinfeld and colleagues (2006) it is responsible for about 18% of global greenhouse-gas emissions which is a higher share than transport. Within the meat field, ruminants (cattle, sheep and goats) have the biggest impact on the environment due to their low feed-conversion efficiency, and because ruminants emit methane which is a potent greenhouse gas (Stehfest, 2014). Moreover, livestock production accounts for 70% of all agricultural land use. Land is needed for pastures and growing feed crops. Clearing land for livestock production results in the release of large amounts of CO2 and destroys CO2 reservoirs like tropical rain forests (Steinfeld et al., 2006). Land use changes are the cause of the largest part of CO2 emissions caused by the livestock sector (Steinfeld et al., 2006).

The demand for meat is growing in the world. In a time span of 50 years, from 1967 until 2017, the production of meat has more than tripled (Ritchie & Roser, 2017). Economic improvements and urbanisation intensify a global dietary transition that replaces traditional diets with diets higher in refined sugars, refined fats, oils and meats. If this path continues to unfold without interference, these dietary trends would be a main contributor to an estimated 80 % increase in global agricultural greenhouse gas emissions from food production and to global land clearing (Tilman and Clark, 2014). Changing diets has been identified as a new opportunity to contribute to climate change mitigation (Stehfest et al., 2009; Tilman and Clark, 2014). Especially in high-income countries, transforming food consumption is considered an essential condition for reaching global sustainability goals (UN, 2016). Consumers need to be supported in their efforts of eating in an environmentally sustainable way.

2.2 Environmentally sustainable food consumption

Environmentally sustainable food consumption (ESFC) can be defined as the use of food products "that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardize the needs of future generations" (Oslo Roundtable on Sustainable Production and Consumption, 1994). The effect of food production on the natural environment is influenced by many factors like the use of land, the farming methods, the processing of the food, the transportation, and the packaging. This multitude of influences means that there are a lot of angles the consumer can look at to improve the impact of his choices. However, it is striking that the choice of certain food products over others has a major impact on the greenhouse gas emissions that a diet produces (Poore & Nemecek, 2018). Poore and Nemecek (2018) point out that the "impacts of the lowest-impact animal products typically exceed those of vegetable substitutes, providing new evidence for the importance of dietary change." According to the study's lead researcher and University of Oxford professor Joseph Poore, "a vegan diet is probably the single biggest way to reduce your impact on planet Earth [...] It is far bigger than cutting down on your flights or buying an electric car," as he told the Guardian (Carrington, 2018).

Next to savings in greenhouse gas emissions due to animal farming, global reduction of meat consumption would also have a dramatic effect on land use, reducing land clearing, resulting in a large carbon uptake from regrowing vegetation, increasing cropland food productivity, and feeding more people per hectare of cropland (Cassidy et al., 2013; Stehfest et al., 2009; Tilman & Clark, 2014).

A diet without animal source food would have the least impact on the environment. However, for consumers, who are hesitant to change their diet, it is important to know that an instant shift to a vegan diet is not necessary to significantly lower one's impact. The reduction of certain products - especially ruminant meat - already has a significant impact (Schiermeier, 2019). This can be seen in figure 3. The figure presents the greenhouse gas mitigation potential if the world population adopted a variety of diets. The diagram shows that a diet with moderate meat but rich in vegetables would already avoid close to three gigatonnes of CO2 equivalent per year. If everybody changed to a diet that is completely free from animal-source food the greenhouse gas emissions that could be mitigated would be almost eight gigatonnes of CO2 equivalent per year which would equal the emissions that were avoided through the global use of nuclear power in 2018. Even though it is unrealistic that the world's population completely switches to a vegan diet, this diagram shows the potential of different extents of reductions in the consumption of food derived from animals. While a complete switch to vegan might be unrealistic, it might become common on a larger scale to only rarely eat meat. For consumers, the large CO2 emission savings resulting from diets lower in meat mean that a gradual shift over time towards less animal-based can make a significant difference for the environment.

Furthermore, the health aspect of diet changes deserves attention. By compiling and analysing global data Tilman and Clark (2014) quantified relationships among diet, environmental sustainability and human health. With projections based on these data they could "forecast global environmental implications of current dietary trajectories and [...] calculate the environmental benefits of diets associated with lower incidences of chronic non-communicable diseases." The authors found that dietary changes can both reduce greenhouse gas emissions and agricultural land use, but also substantially reduce individual health risks, like getting type II diabetes, coronary heart disease or cancer. Foods that are similar in nutrition and impact on health can have greatly different life cycle environmental impacts. The researchers highlight however that minimizing environmental impact does not necessarily maximize human health. Processed foods high in sugars, fats or carbohydrates can have low greenhouse gas emissions but be unhealthier than foods they displace. Therefore, solutions for improved diets should both take environmental impact and health into account and not just minimize greenhouse gas emissions. It is good to know that diets that are already chosen by many, like the pescetarian diet or the vegetarian diet, would offer global environmental and public health benefits if widely adopted (Tilman & Clark, 2019). Lowering meat and dairy consumption and reducing items high in sugars, fats or carbohydrates not only has a positive effect on the environment but also on the consumer's health. Making consumers aware of this double benefit can help to convince them to change their diet.

Next to what we do eat, we also need to pay attention to what we do not eat due to disposal. Food waste causes negative economic, environmental and social effects.

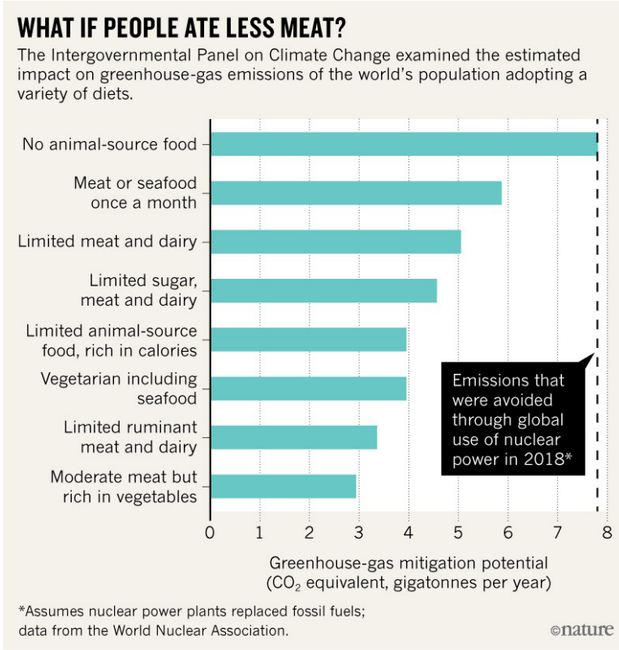


Figure 3: Illustration of the potential of dietary changes (Schiermeier, 2019)

The reduction of food waste is considered an important lever to reduce greenhouse gas emissions in the food system. The consumer role within the issue of food waste is especially crucial in developed countries, where a substantial amount of food is lost because of overconsumption and wastage. Aschemann-Witzel et al. (2015) have identified the following actions of special importance to tackle which directly concern the consumer: improving household food management and managing expectations and perceptions about food's acceptability.

2.3 The challenge of changing diet behaviour

Like many other areas of consumption, sustainable food consumption is subject to an intention-behaviour gap (Grimmer & Miles, 2016; Leire & Thidell, 2005; Vermeir & Verbeke, 2006), meaning that there is a gap between environmental awareness and real action. There are several reasons for this gap. Consumers can lack awareness of the link between their personal behaviour and the impact on the environment, the consumption of food can be strongly shaped by routine practices and habits, and cultural and social values can influence our diet behaviour to a large degree (Bhamra et al., 2011). Bhamra et al. advise to apply a "combination of techniques which solicit opinions, perceptions and beliefs with those that record actual behaviour in the context in which it occurs". In the context of sustainable food options it could be promising to combine educational techniques that raise awareness and make consumers reflect on their choices with actually experiencing and being aware of a new behaviour that is positive.

Another problem is that the consumer's perception of sustainable food often does not match what experts know to be effective, for instance, consumers underestimate the impact of meat consumption and overestimate the impact of packaging (Bosma & Zervaasen, 2020). Thus, there are people who allegedly lead a sustainable lifestyle but do not know what makes the biggest difference in environmental terms. These people are willing to change and facilitating this change to behaviours that matter might be a good opportunity for a new service offering.

2.4 Dietary change

To conceptualise behaviour change in general, Ajzen (1991) elaborated a psychological framework, the theory of planned behaviour (see figure 4). The theory implies that to reach a target behaviour, a behavioural intention has to be present. Going from intention to actual behaviour means crossing the intention-behaviour gap that was mentioned earlier. To form a behavioural intention, three factors are important: The attitude to the target behaviour, the subjective norm and the perceived control. The attitude to the target behaviour entails beliefs that the behaviour leads to certain outcomes. The subjective norm is formed by beliefs that others think the person should (not) perform the behaviour and the person's motivation to comply with these other people. The perceived control is constituted by the perceived ease or difficulty of performing the behaviour and limited by factors that may hinder the performance of the behaviour.

To go from intention to behaviour in Ajzen's (1991) model, influencing factors can occur that either promote a person to do a behaviour or that stop a person from doing a behaviour. For instance for the case of separating waste, a fine introduced by the municipality could encourage people to follow through with the behaviour. On the other hand, someone else who did it wrongly in a household could cause a person to neglect the behaviour because of the perception that the damage is already caused and that it would be too much effort to undo it. Another factor that strongly influences the likeliness of a target behaviour to be performed are habits (Ouellette & Wood, 1998). Daily activities that are performed in almost the same situations can hinder individuals from performing a new behaviour.

In the case of dietary change, new habits have to be formed to enable long-term behaviour change. Verplanken (1991) defines habits as "automatic responses to regularly occurring cues that are acquired through associative learning." According to Anderson (1982), to form new habits individuals have to go through three stages: The declarative stage in which they become aware of their old habits and consider a change in their behaviour, the knowledge compilation stage in which

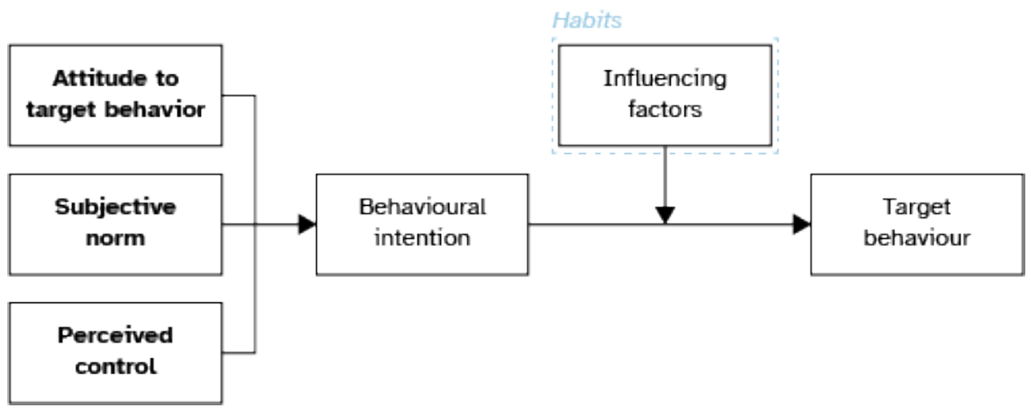


Figure 4: The theory of planned behaviour (Ajzen, 1991)

they try out the new behaviour, and the procedural stage in which they repeat the new behaviour (see figure 5). When the new behaviour is repeated often enough a new habit is formed. To arrive at durable, new habits, new behaviour should be easy to follow, repeatable and regularly reinforced (Roundtable, S. C., 2006). These three aspects should be key when designing a product-service system that helps people to change to a more sustainable diet.

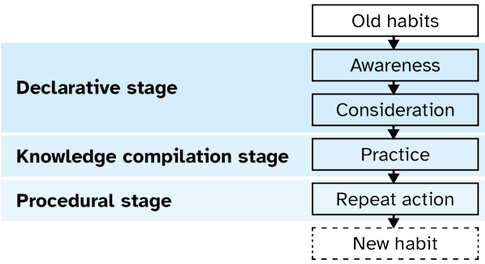


Figure 5: Stages in the formation of new habits (Anderson, 1982)

In a paper on promoting sustainable behaviour of consumers, Verplanken (2018) discusses three fundamental drivers of behaviour that have been established in behaviour change theory: motivation, opportunity and habit. Motivation can be represented by the central construct of Ajzen's (1991) theory of planned behaviour: behavioural intention, which is determined by attitudes, social norms and perceived behavioural control. Opportunity is defined by barriers and facilitating factors that influence the practice of sustainable behaviour. Examples are the presence or absence of sustainably produced food, financial constraints, and personal skills and knowledge. The aforementioned habits are the third key driver of behaviour. Verplanken used these three drivers to build a generic segmentation model of sustainable behaviour that highlights how different intervention techniques might be effective for different population segments (see chapter 2.5).

Dietary change in particular requires policy makers, entrepreneurs and designers to pay attention to certain topics that are relevant for food-related behaviours. To develop an effective solution for dietary change that counteracts the global trend of rising meat, refined sugar, and refined fat consumption, multiple factors must be taken into account. Dietary choices "are influenced by culture, nutritional knowledge, price, availability, taste and convenience" (Tilman & Clark, 2019). While global meat consumption is rising, we currently see a cultural shift in Europe. A growing number of people are shifting to a plant-based diet (Vou, 2019). This trend could be accelerated with the right measures.

With multiple different factors that play a role in dietary change it is useful to know where to start when developing interventions. In a study that links a behavioural diet shift model to an integrated assessment model, Eker et al. (2019) tried to identify the main drivers of global diet change. Their findings suggest that "diet change behaviour is most sensitive to social norms and self-efficacy, whereas the factors related to health and climate risk perception are relatively less influential." According to these results, the social norm effect (for example, the extent of vegetarianism in the population that drives a further switch to a vegetarian diet) and self-efficacy (the perceived control over a behaviour) deserve special attention when promoting large-scale diet shifts. Interventions that drive a social norm effect or that increase the self-efficacy of consumers should be developed. The results also imply that education about health benefits and climate risk is less impactful and should therefore not be the main part of an intervention.

In the theory of planned behaviour (Ajzen, 1991), social norms and self-efficacy manifest themselves as the elements of subjective norms and perceived control. In the hierarchy of the framework, these two elements are a requirement for a behavioural intention. In chapter 2.3 it was mentioned that the main challenge in changing diets is the closure of the intention-behaviour gap. If this were the case, individuals would already possess an intention and therefore might have already been positively influenced by subjective norms and perceived control. However, Eker et al. (2019) identify social norms and self-efficacy as the main drivers when it comes to dietary change to eco-friendlier diets.

Thus, it seems reasonable to not only focus on the gap between intention and behaviour but to also consolidate the behavioural intention. Moreover, Ajzen (1991) assumes a direct link between perceived control and behaviour and gives two reasons for this hypothesis. First, he suggests that if intention is held constant, the effort expended to bring a course of behavior to a successful conclusion is likely to increase with perceived behavioral control. Second, he suggests that perceived behavioral control can often be used as a substitute for a measure of actual control. Therefore, not only the intention-behaviour gap, but also the prerequisites of behavioural intention, especially social norms and self-efficacy deserve close attention.

2.5 Behaviour change interventions for dietary change

Segmentation of consumers for sustainable behaviour interventions

Verplanken's (2018) segmentation model of sustainable behaviour interventions highlights how different intervention techniques may be effective for different population segments (see figure 6). Consumers are allocated to four different segments (A, B, C, and D). The vertical axis of the diagram stands for the opportunity to act. A high opportunity is associated with high financial resources and a high availability of sustainable behaviour options, and a low opportunity with the opposite. The vertical axis stands for the motivation to act, also varying from low to high. Consumers that fall into segment C have low potential and motivation to act sustainably ('low potential, unwilling'). These consumers are considered very hard to convince to change to more sustainable behaviour. Verplanken suggests top-down approaches like changes in legislation and infrastructure to provoke this group to change. For this project, consumers who have motivation but often do not act sustainably are most interesting, because for them the potential to be influenced by empowering and supportive interventions is the largest. With a food box and accompanying services it could be possible to support and empower the consumer. Therefore the two quarters on the right side deserve close attention.

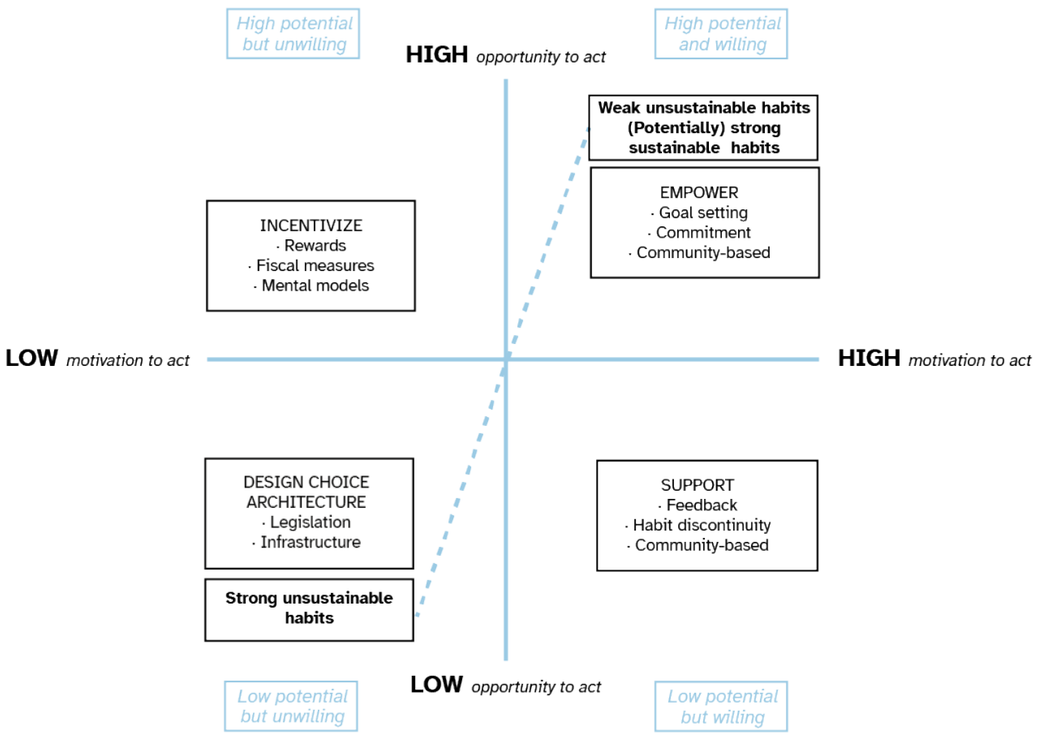


Figure 6: A segmentation model of sustainable behaviour interventions (Verplanken, 2018)

For segment D ('low potential, willing'), Verplanken (2018) suggests to apply interventions that support, lower barriers or reveal opportunities" in order to capitalise on their motivation. Furthermore, "easier access to sustainable products and services" can be provided. For people like this, who are stuck in their habits of eating unsustainably but would be willing to change, an easy to use food service that is attractively priced could be a promising opportunity.

Consumers in segment B ('high potential, willing') might not seem an obvious target for an intervention as this segment already contains the individuals who have already adopted sustainable lifestyles. However, there are still a lot of people in this group who have not managed to cross the intention-behaviour gap, especially when it comes to diet behaviour. These people might be easiest to persuade to switch to sustainable diet behaviour and are therefore also very interesting from an entrepreneurial point of view. Moreover, people who do already eat sustainably may be encouraged in continuing this behaviour, for example by inspiring them to try new sustainable food options. Promising interventions for this segment might be empowering ones, for example by helping them to set goals for themselves and to commit to their aspirations.

Furthermore, Verplanken (2018) recommends community-based interventions for both segment B and D, for instance support groups in which consumers can exchange ideas. Here, it is notable that segment B individuals might be better suited to take leading roles in such interventions, "for instance as activists who recruit, organize and roll out activities," and segment D individuals might rather be taking part as participants.

In the following, behaviour change interventions that were regarded as promising for segment B and segment D individuals are presented. While different techniques were reviewed, the research outcomes of Eker et al. (2019), which consider social norms and self-efficacy most influential when changing people's diet behaviours to more eco-friendly ones, were kept in mind.

Interventions

In the following, intervention techniques that were considered relevant for the case of a sustainable food box and sustainable behaviour change are described in detail. The intervention methods were chosen from research that gives an overview over behaviour change intervention techniques (e.g., Michie et al., 2011) and in what case to use them (e.g., Vermeir et al., 2020; White et al., 2019), and from the 'Design with Intent toolkit' by Lockton et al. (2019), a toolkit for influencing behaviour.

Challenges and goals

One way that can help to change behaviour is by challenging oneself, possibly through setting some goals that are attempted to achieve (Michie et al., 2011; Lockton, 2019). According to Verplanken (2018), this is one of the interventions that can empower consumers to change their behaviour, especially people who are willing to change and have a high potential to do so. This is a method to make behaviour change more exciting and fun by introducing game

elements (Lockton, 2019). Examples are the challenge of not smoking for a month or setting one's weight loss goal in the WW app. In the case of sustainable diet change, challenging people to eat more of the foods that have a small ecological footprint, like seasonal vegetables, and challenging people to eat less foods with a big footprint, like red meat, could be options to facilitate behaviour change.

Self-monitoring
Self-monitoring is defined by Michie and colleagues (2011) as keeping a record of a specified behavior as a method for changing behavior. It is linked to challenges and goals as the behaviour that is monitored is often part of a challenge or related to targets. Self-monitoring could take the form of a diary or a food log, like in the case of the WW programme. In this way, individuals realise to what extent they perform unwanted behaviour and can better counteract it. This technique might be useful for tracking food consumption to check if unsustainable options are eaten regularly and to celebrate periods of time in which only foods with a low environmental impact were consumed.

Provide feedback on performance
Next to self-monitoring, participants can be provided with feedback about their recorded behaviour. Moreover, their attention can be drawn to discrepancies between behavioural performance and a set goal (which involves the technique of challenges and goals) or a discrepancy between one's own performance in relation to others' (Michie et al., 2011) (which is related to providing social proof, as can be seen below). Giving feedback is one of the supportive methods that Verplanken (2018) considers most promising for people who are willing to change but have a low potential in doing so.

Plan social support
Next to controlling yourself with self-monitoring it is also possible to get feedback and support from others to help achieve a target behaviour (Michie et al., 2011). As stated by Verplanken (2018), social support might be most promising for people who are willing to change but have a low potential to act. Social support can be provided during interventions for example by setting up a 'buddy' system or a support group. It can also be provided by people close to the subject, like a partner, family or friends. Connecting individuals who want to change to a more sustainable diet could help them to follow through their dietary change by inspiring each other, sharing tips and recipes, or giving feedback.

Provide social proof
Social proof is related to and often a part of social support. It concerns making people aware that their target behaviour is performed and approved of by other people. According to the conformity bias, people are more likely to do what other people are doing (Ölander & Thogersen, 2014). For instance, positive ratings of a product on a webshop act as social proof for the potential buyer. This method could be interesting in the context of sustainable diet change as for many people unsustainable diet choices (for example eating meat daily) are still their perceived social norm. Making consumers aware that their peers eat in a sustainable manner could be a promising way to convince them that a sustainable diet is worth trying out for them as well. As mentioned before, Eker et al. (2019) identified social norms as one of the main drivers influencing consumers to change to more sustainable diets. Providing social proof can therefore be considered an important method to promote sustainable dietary change.

Cues
Cues can be used to make people aware, help them to remember important actions or convince people to perform desired behaviour (or perform an alternative behaviour in the case of behaviours to be reduced) (Michie et al., 2011). Push notifications that remind users to practice a language in the Duolingo language learning app are an example for cues. This technique could also be used in conjunction with challenges and targets, and in the context of sustainable dietary change. Giving cues can be considered a supportive technique that helps individuals to discontinue habits, fitting most for consumers with a high motivation but low potential to change (Verplanken, 2018).

3. Environmentally sustainable eating behaviour of lead users

Content:

3.1 Lead user research set-up
3.2 Lead user research results

3.1 Lead user research set-up

There are already consumers who maintain a diet that can be considered environmentally sustainable. To find out how one can change to a more sustainable diet and how to maintain it, interviews were conducted with eleven people who fall into the category of environmentally conscious consumers, for example flexitarians, vegetarians and vegans. These consumers are considered lead users in the field of sustainable diets. According to von Hippel (1986), lead users are defined as members of a user group who (1) anticipate receiving relatively high benefits from obtaining a solution to their needs and so may innovate and (2) are at the leading edge of important trends in a marketplace under study and so are presently experiencing needs that will later be experienced by a multitude of users in that marketplace. For this project, the first point is deemed especially interesting as the lead users might have found ways to facilitate the switch to a more sustainable diet that can help others to change.

Research from Hjalager et al. (2015) has shown that the lead user method can be successfully applied in product development in a food industry context. In this research, lead users were approached to develop new recipes, production processes and narratives for mussels in a specific regional context. The considerable combinatory knowledge and creativity of the lead users was found to be valuable in addressing issues of wider regional branding significance and in developing catching narratives.

Data collection

Through criterion-based sampling (Palinkas et al., 2015), eleven people were recruited for the interviews (see table 1). The criterion was an environmentally

Participant	Sex	Age	Diet	Occupation
P1	female	23	vegan	student
P2	female	52	vegetarian	teacher
P3	male	26	vegetarian	student
P4	female	25	vegan	student
P5	male	28	vegetarian	researcher
P6	female	22	mostly vegan	student
P7	male	24	mostly vegetarian	student
P8	female	24	mostly vegetarian	student
P9	female	25	mostly vegan	student
P10	male	34	vegan	software developer
P11	male	27	mostly vegan	student
P12	female	24	vegetarian	student

Table 1: Participants of the lead user interviews

sustainable diet. The participants were found via the researcher's personal network and Facebook groups focused on a sustainable lifestyle. With each participant, an online interview of around 45 minutes was planned. With the consent of the participants, these interviews were recorded. During the semi-structured interviews, the following research questions were central: How do consumers change to an environmentally sustainable diet? How do they maintain it? Where do they feel challenges? Main topics of the interviews were 'diet history', 'diet maintenance' and 'challenges' (see appendix 1).

Data analysis
The method of qualitative content analysis was used to identify patterns in the data (Gläser & Laudel, 2013). The analysis was performed on a digital whiteboard. After listening back to the interviews, relevant quotes were extracted and processed separately (see example in figure 7). In the first step, extracted quotes were tagged with a category. In the second step, quotes were clustered in the categories. Categories dealing with the same topic were integrated. A complete overview of all the clusters can be found in appendix 2. The results section elaborates on the insights drawn from these clusters that are important for changing people's diet behaviours. To enrich the insights, quotes and additional desk research are used.

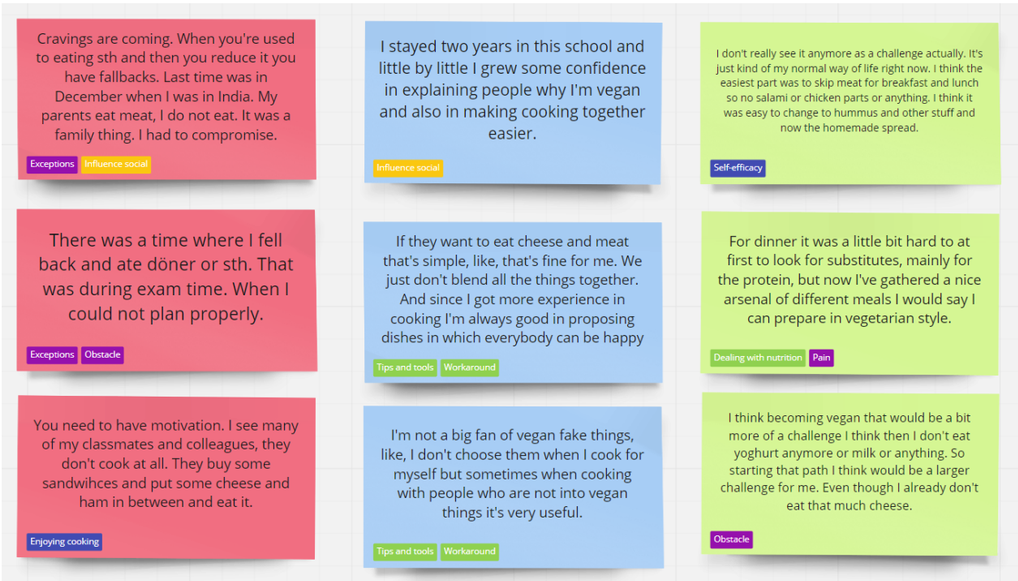


Figure 7: Extracted interview quotes with tags

3.2 Lead user research results

The environmentally sustainable eating behaviour of lead users was central in the interviews. Different kinds of *motivators* were found that encouraged the interview participants to eat in an eco-friendly way. External influences on the lead users' diets (*influences on diet*) were mainly the influence from other people like friends or family (*social influence*) and *education*, but also others like the media and the food environment (*other influences*). Next to being influenced, the participants reported that they had also influenced other individuals when it comes to diet (*influencing others*). Moreover, the interviewees reported about how they changed their diet to a more sustainable one and what effects it had on them (*changing the diet and its effects*). Different kinds of *difficulties maintaining the diet* were mentioned and *user strategies* that are used to deal with those difficulties. As user strategies, workarounds, tips and tools, dealing with nutrition, experimentation, and exceptions were identified. Another theme that was uncovered was the *individual self*, influencing the eating behaviour of the lead users internally. The latter includes *self-identification*, *enjoying cooking* and *self-efficacy*.

Motivators

Some motivation is necessary to change your diet and to reduce or stop eating foods that you have liked to eat before. The lead users mentioned different kinds of motivators. For most participants, multiple motivators were present at the same time. Sustainability was mentioned most. Especially drastically reducing or completely avoiding meat were a consequence of their insights into sustainability. For some people sustainability was the one main reason: *"I'm really trying to eat more vegetarian because of the environment. I don't really care too much about animals"* (P7). For other participants, sustainability and animal welfare went hand in hand, for example P1 noted that she does not *"want to be contributing to the system of using animals and having a big impact on climate change."* P5 considered it ethically wrong to eat animals: *"I work in the neuroscience field. I know a bit about how human brains and animal brains work. How they process emotions and so forth. Partial reason would be ethics."*

For others, additional factors, like health played a role: *"Meanwhile the main reason is sustainability but previously it was health"* (P10). P3 started realising that eating meat is not the best for his body: *"Then I started to eat less meat. And from less meat it went to almost no meat"*. P9 emphasised the health benefits of not eating meat: *"Another reason was that eating vegan is apparently very good against autoimmune diseases. And in my family there are a lot of autoimmune diseases."* Other motivators that were mentioned were curiosity to try out new things and financial motivation because meat was considered a relatively expensive food source.

While caring for the environment was the main motivation among the lead users, these insights indicate that there is not just one reason that can motivate consumers to change to a more eco-friendly diet. For people who are environmentally conscious but who have not yet changed their diet because of it, it could be interesting to convince them with an argument beyond sustainability, for example health.

Influences on diet

Social influence

Telling from the interviews, the social aspect seems to play a major role when changing one's diet to a more sustainable one. Other people can help to facilitate the change. In many cases, people close to the interviewees influenced them to change their diet, for example partners, friends or flatmates. P10 was influenced by his partner: *"Vanessa gave a lot of input, as a result of taking part in this health coaching. I always ask myself if I would have done that in the same way alone. It is of course easier if you have someone who does it with you."* P4 made new friends who were vegetarian or vegan on an exchange semester: "Then I started to eat less animal products. Because I was with them and it seemed ok to try and also I was just curious about it but I didn't have an aim in mind." Other participants were influenced by their flatmates, like P3: "I moved together with two of my friends for the studies and they also had the feeling that they didn't have to eat meat anymore. And together we then only ate vegetarian."

While other people can be a facilitator for changing to a more eco-friendly diet, social situations might also be a barrier for maintaining such a diet. Many of the lead users reported that when they meet friends or family who do not pay attention to a sustainable diet that much it is hard to stick to your ideals and prevent fallbacks. However, one can argue that such a situation should not be considered a fallback but merely an occasional inconvenience if the person completely eats eco-friendly when on her own. P5, who had been eating vegetarian for more than a year at the time of the interview, mentioned such a situation: *"Last time was in December when I was in India. My parents eat meat, I do not eat. It was a family thing. I had to compromise."* Similar difficult situations arise when meeting friends. P1, who is vegan, brought up one of these moments: *"When being at friends' and you get a cookie or something, sometimes it's hard to refuse because it's a gesture of kindness."*

Helping consumers to initiate their diet shift together could be a good strategy to motivate them more. The social support might be more convincing than recommendations received by an organisation. Eker et al. (2019) imply that it would already be effective to make people aware of other people who eat in a sustainable way or who try to change to such a new behaviour, using the social norm effect (Ölander & Thøgersen, 2014). In terms of social obstacles to a more sustainable diet, it might be a good idea to equip consumers with strategies on how to avoid or decline food that goes against their principles in a polite way.

Education

Education seemed to be an important factor positively influencing the change to an eco-friendly diet. In some cases, education from others initiated the participants' interest in a more sustainable way of eating. P1 and P6 were inspired by school teachers. For example, P6 mentioned that during geography class she *"got to know facts about the pollution created by eating meat. So I wanted to become vegetarian."* Others mentioned that they learned about vegetarian and vegan cooking from others on social media, for instance from vegan Instagrammers or Youtubers. Furthermore, many lead users reported that they did a lot of self-learning. Gaining knowledge in the sustainability issues of food production motivated people to change and later on maintain their diet. P8 started with desk research: *"I started to get informed about data and facts and whatever and the more I knew I was like 'Damn, I have to do something about it.'"* Multiple participants mentioned books like 'Eating Animals' by Jonathan Safran Foer and documentaries like 'Cowspiracy' and 'The Gamechangers' which helped to inform them. In general, online platforms like Netflix, YouTube or Instagram were mentioned as a means to get insights about sustainable food. Many participants did not necessarily use these platforms to educate themselves, more for entertainment, but they were recommended content that dealt with sustainable food and therefore learned more about it. With the help of cookbooks and, more importantly, online recipes and cooking videos, they learned how to prepare vegetarian and vegan meals and what products to use.

While Eker et al. (2019) consider knowledge about the factors health and climate risk less influential than social norms and self-efficacy when it comes to diet change, the results from the lead user interviews suggest that education can have a strong influence on individuals, especially information on climate change. Recommending good resources to consumers, for example books, documentaries or YouTube channels, could be a way to help them educate themselves. Besides that, creating your own social media content as a startup that is educating and worth knowing for one's audience could be a good way to build trust in one's brand (Baltes, 2015) and to encourage people to execute their diet change plans. The insights also show that there can be a thin line between entertainment and education in social media content. Delivering information in a funny way, for example with short videos that stress a sustainable diet behaviour in a comedic way, could be a promising marketing activity that teaches consumers about sustainable behaviour at the same time.

Other influences

A few other factors were mentioned by the lead users that influenced them to change their diet. Some participants brought up the changing food environment in which the offer of vegetarian and vegan products is increasing in the supermarkets (P10). This increased availability helps consumers who are motivated to eat sustainably to follow through with their intentions (Verplanken, 2018). P12 mentioned a positive experience in a vegan restaurant that was considered impactful (P12). She was surprised that a vegan meal could be very satisfying and was motivated to try vegan cooking herself.

The increasing availability of vegetarian and vegan products had helped some of the lead users to eat eco-friendlier. Offering consumers a convenient opportunity to order a mix of sustainable food products might be a new way to increase availability. Different people could be reached who are stuck in their habits of eating products with a big impact on the environment. Providing an eye opening experience, like in a good vegan restaurant, could be the goal of a product-service system that promotes sustainable eating. Showing that vegetarian or vegan meals prepared with the delivered ingredients can be as tasty as meat dishes might prove to consumers that an eco-friendly diet does not have to be a sacrifice, but can be very pleasant as well.

Influencing others

Besides being influenced by others, some of the lead users have also tried to inspire other people. By many participants this is considered to be difficult: *"I've tried and I've seen how many people object to that. [...] It's impossible to force this thing on people, like, people have to choose this path"* (P8). *"It's always a bit tricky to explain because I don't want people to feel guilty or anything, of course. Or that I think that their way of eating is not good. Because that's not the case"* (P6). However, eating in an eco-friendly way and talking openly about it can be a good way to raise awareness: *"It's a way to raise awareness. because when I'm vegan and people see me eating vegan they ask me questions and I can explain"* (P6). Some of the lead users reported that they have already convinced others to eat more sustainably: *"I have a few friends and they also started eating vegetarian because I started suggesting it more often"* (P7). P9 was worried about the health of her parents who used to eat a lot of meat: *"And then I thought 'if I am the right role model now, if I'm able to eat vegan, then my parents maybe also stop eating meat, or maybe even vegan.' They haven't reached that so far but they eat, since I do that, definitely only vegetarian."*

On the one hand, consumers influencing other consumers feel the necessity to be careful not to offend anyone. On the other hand, if done in the right way, other people can be nudged to try eating more sustainably themselves if a friend tells them about it. Giving customers the tools to arouse other people's curiosity can be a driver for both customer acquisition and helping others to change their diet indirectly. Providing the opportunity to share experiences or high quality branded content with friends might be a means to empower consumers to intrigue others.

Changing the diet and its perceived relative advantages

Most participants reported that they changed their diet over a relatively long period of time instead of changing their behaviour from one moment to the other: *"It took a lot of time to change. Almost two years it took me to completely switch [to a vegetarian diet]"* (P5). *"I started realizing that it's not the best for my body. Then I started to eat less meat. And from less meat it went to almost no meat"* (P3). *"I still eat milk products, but already less. I buy mainly the organic options, for example from a cheesery close by"* (P2).

It is important to note that the diet change of the lead users has taken some time. Now they are eating in an eco-friendly way but changing to that behaviour has taken them a substantial amount of time. Therefore, to not deter consumers who so far have not paid attention to their diet, promoting a gradual shift with small steps might be better than forcing people to stop with something completely. As it seems that individuals change their eating behaviour at their individual pace, providing the opportunity to go at one's own speed could be beneficial.

Many of the participants either felt equally good as before changing their diet or they even realised positive outcomes after changing and felt thereby affirmed that their decision was good. For example P10, who had been vegan for more than two and a half years, was very comfortable with his diet and health: *"I feel good, that's the point. I feel like always. Same amount of energy, equally good."* He also registered an improvement in his work routine that he attributed to his new diet: *"The afternoon low after lunch was completely gone."* P3, usually eating in a vegetarian way, recognised benefits when trying to eat vegan: *"I have eaten vegan for two months and had the feeling that I was much more awake and more efficient."*

As mentioned before, it is not necessary for consumers to arrive at the level of the lead users. However, making clear to consumers that eating in a vegetarian or vegan way (if done in the right way) will not compromise their health and can even lead to benefits could comfort them in reducing meat consumption and even motivate them to try out a vegetarian or vegan diet. One way of doing this could be through experience reports from vegetarians or vegans or testimonials from users who used the service for some time.

Difficulties maintaining the diet

Next to the difficulties maintaining one's diet in social situations there were also other pains and obstacles mentioned by the lead users that had to be overcome. Some participants brought up that it was *"time-consuming"* (P8) to do research on sustainable food and P12 reported that it can be challenging to pick sustainable products when grocery shopping: *"The supermarket's range contains a range of products and it is a challenge to filter the more sustainable products from the shelf."* Moreover, family members were affected in some cases: *"My mother would spend half an hour more for me in the supermarket"* (P1). Some participants also mentioned occasional situations where they went back to eating meat, for instance while being busy at university: *"Maybe it was a bit of time management. I was a student and I didn't plan things properly"* (P5). Worries about nutrition were not coming up a lot in the interviews. Only P7 mentioned that he sometimes struggled to find good alternative sources of protein to support his sporty lifestyle and P9 said that she missed *"the certainty whether [she eats] in a healthy way or not"*. For the rest, worries from family members were more prominent, for example P4 mentioned that she was still doing blood tests from time to time, mainly to satisfy her family in case of concerns: *"To say 'yeah, but the blood test was good.' "*

To cope with the struggle of finding and choosing sustainable products, consumers could use some help. Delivering a selection of sustainable food to consumers could be beneficial in two ways: Firstly, they do not have to buy these products themselves and it therefore saves them time and effort. Secondly, it could show them what products are eco-friendly and by experimenting with them they would learn how to use them. This would empower them to also make more sustainable food choices besides the delivered food.

User strategies

The participants named various strategies that helped them to overcome the challenges that were mentioned before and that made changing their habits easier. They have developed workarounds to deal with difficult situations, use a palette of tips and tools that they can apply in different situations and are aware of their nutrition and know how to deal with it. Some lead users considered their initial change to

an eco-friendlier diet an experiment and some stressed the importance of allowing oneself exceptions.

Workarounds

One of the situations when participants used workarounds was when they craved meat products. In this case meat substitutes could help: *"Replacement products help a lot when you are really craving something. Here in Holland, for example, the Vivera kip krokant schnitzel tastes like a chicken burger at McDonalds, at least as far as I can remember"* (P10). Also, when eating with friends who like to eat meat these products seem to be of help: *"Sometimes when cooking with people who are not into vegan things [meat replacement products are] very useful"* (P6). When eating with others, some people liked to separate their food from the others': *"If they want to eat cheese and meat that's simple, like, that's fine for me. We just don't blend all the things together. And since I got more experience in cooking I was always good at proposing dishes in which everybody can be happy"* (P6). *"When I go with friends for a weekend I say 'Ok, you do your stuff and I will take care of my stuff. I don't want them to feel it is a problem"* (P4). Another situation that prompted some participants to find a workaround was when they tried to change their diet whilst living together with people who did not follow a sustainable diet. P3 tried to become vegan, but because he still wanted to have common meals with his flatmates he decided to not do it consistently: *"Then I focused on breakfast. I do this now with soy milk and so on."* A very pragmatic workaround was mentioned by P10: *"When you go somewhere and you don't know if there is something vegan, just eat in advance and are not hungry. That's something we do from time to time."*

For people who are used to eating a lot of meat, using meat replacement products seems to be a good way of facilitating eating less meat. Helping them to explore such products might therefore be an opportunity. Giving guidelines of how to prepare a wholesome meal that lets people decide if they want to include meat on their plate or not might be a good way to facilitate consumers to share food with people who insist on eating meat.

Tips and tools

Some tips concerned facilitating cooking enjoyable meals. P10 suggested that it is best to embrace new flavours instead of simulating flavours that you were used to before. For instance, he recommended cooking with soy sauce to create an umami flavour. P6 mentioned special products like nutritional yeast, seeds, different kinds of nut butters, and tahini to enhance her eating experience and nutrient intake. Varying in products was mentioned as a way to prevent the new diet becoming boring (P12). Some lead users also reported that they have a couple of eco-friendly dishes that they can cook regularly and when they want something different, they can look up recipes online (P9, P7). In terms of online tools, googling recipes and using a supermarket app to find recipes came up. Next to online tools, some participants said that they liked to use cooking books (P2, P9). Furthermore, P7 mentioned that at his shared flat they collected recipe printouts from Albert Heijn and put them on their fridge with magnets: *"So now we have these 12, 13 recipes on our fridge. And once I'm making dinner I'm also looking at it like 'maybe something with this, oh this is also nice' and then I make this one or something related to it."* In this way, he could overcome the obstacle of not knowing what to cook. Of the mentioned tips, many can be passed on to consumers in different ways: for example as part of online content, on an informational flyer that comes with food products, on packaging material, or as a part of a newsletter or recurring reminder message. Recurringly delivering a selection of sustainable food products could be a good way to offer variation for people trying to adopt a more sustainable diet. Along with products, printed recipes could be provided to make it easy to cook with them.

Dealing with nutrition

As most of the interviewees drastically reduced or avoided meat completely they paid attention to some nutrients that could be lacking in their bodies, particularly protein and vitamin B12. Different strategies were mentioned on how to consume enough protein: *"I know some people are super worried about the proteins that they get. I'm not super worried. But I try to eat a large variety of things and a lot of peas and beans"* (P6). *"I read that if you eat a lot of vegetables you already get enough protein from that as a woman. [...] I am trying to eat more lentils or chickpeas."* (P9). Some participants were not worried about protein at all: *"At the beginning we had the feeling that when you eat vegan you miss something, some nutrients. And [in the health coaching programme] it was completely debunked"* (P10). *"I don't do anything consciously to eat enough protein. When you eat in a balanced way you are alright"* (P3). All of the vegan participants said that they take supplements for vitamin B12 and it was considered by many as the only nutrient that has to be supplemented on a balanced vegan diet.

It is important to clarify to customers what they need to pay attention to in case they decide to radically change their diet. Eating in a balanced way should always be recommended. For people who stop to eat animal-based products supplementing vitamin B12 should be recommended.

Experimentation

Experimentation was mainly mentioned in two ways: experimenting with vegetarian food options and experimenting with oneself in the sense of challenging oneself to stop eating meat or all animal-based products as a test. When it comes to experimenting with vegetarian or vegan options, some participants liked to become creative in the kitchen: *"I would just go to the market, look for whatever was on offer, I would buy it and find new ways to cook it. So in that way I would always try something new and different"* (P8). *"I like to look at recipes online but it's for inspiration and then I always modify things. Also because I do with what I have, the ingredients that I have"* (P6). In terms of self-experimentation, a few interviewees mentioned that they had started eating in a sustainable way as a self-challenge. Together with her flatmates, P9 decided to eat vegan for two weeks as an experiment: *"It wasn't bad. Maybe because you only commit to the two weeks there is not a lot of pressure, then you simply try it and you are surprised how varied you cook suddenly because you look into it more."* When P4 started to eat vegan she used a notebook to check on herself for one month: *"I started writing down in a notebook every week what I ate during that week that was actually coming from animals. For example two eggs and cheese."* She also mentioned

that a friend of hers started being vegan with a 21-day challenge.
It could be interesting to create the perfect experimentation experience for consumers, to provide them with a few starting points in the form of sustainable products and some inspiration, and then let them experiment on their own. This 'learning by doing' might enhance their self-efficacy of eating in an eco-friendly way. Furthermore, it seems that self-challenging and self-monitoring can facilitate the switch to a new eating behaviour. This is also suggested in the literature (Michie et al., 2011).

Exceptions

While some participants reported that they were very strict about their diet, others allowed themselves exceptions to make adopting and maintaining a new diet easier, for example P12: *"I think it's important not to limit yourself too much, if you feel like something 'less sustainable', then it is okay to allow that craving and after that you can go back to the sustainable tour again."* Special occasions were considered a reason to make an exception: *"On holidays I made exceptions, so for example Christmas, or when I'm at the sea and there's a fishing village, then I want to eat a fish or something regional"* (P9). Some people reported making exceptions when they were craving a certain product that was not part of their new diet, for instance P7: *"I really love milk. So once every 2 weeks or so I still buy milk and drink it and then I enjoy it."* Furthermore, a large part of the interviewees reportedly makes small exceptions when meeting with family or friends: *"When the grandma makes a cake and forgets that eggs are not vegan then I eat it of course"* P10. *"At the moment I'm with my parents so it's a bit harder, like I cannot force everybody to follow my rules in a sense so these days it's not really a vegetarian lifestyle"* (P8). *"There are like 2 or 3 days in a week when I would eat e.g. a [non-vegan] cookie, or something my roommate has made"* (P1).

For people who are used to eating meat regularly it might be deterring to present them with an ideal image of a completely sustainable diet. Consumers should be aware that exceptions are always possible and can help to transition to eating more and more eco-friendly.

Individual self

Some characteristics became apparent that seem to be highly linked to the individual: How people see themselves as a sustainable eater (self-identity), the degree to which they enjoy cooking and the way in which they believe in their ability to change their diet (self-efficacy). Environmental self-identity, the extent to which you see yourself as a type of person who acts environmentally-friendly, was found to be related to environmental intentions and behaviours (van der Werff et al., 2013). Van der Werff et al. suggest that environmental self-identity might be an important tool for environmental campaigns. As mentioned before in the literature research chapter, self-efficacy seems to play an important role when it comes to dietary change to more sustainable diets (Eker et al., 2019).

Self-identity

Some participants clearly identified themselves as vegetarian or vegan, but others did not think that this is necessary or even desired to embrace a sustainable diet, for example P8: *"[It is important] not labelling yourself. When people say 'I'm vegetarian, I do not eat meat' I approve it but when you label yourself you're constraining yourself. [...] That's why I don't see myself as a vegetarian even though I mostly eat vegetarian."* P9 said she is *"not a 100% vegan, but 98%, so quite a lot."* A motive that was mentioned by two participants was trying one's best to reduce one's impact by doing as much as one can manage to do at a certain moment (P8, P4). Even though the manner of labelling oneself differed between the lead users, all of them identified as environmentally conscious.

It could be communicated to consumers that changing to a more sustainable diet is not about labelling oneself as a certain type of eater but about reducing food that is harmful for the environment and embracing food that is produced in a sustainable way. This way, the concept of eating sustainably could be perceived as more inviting. Giving consumers the opportunity to act according to their self-identity may help to convince them of a food service like the one Goodcase offers.

Enjoying cooking

Most of the lead users reported that they find it enjoyable to cook: *"It is fun to try new recipes"* (P9). *"It provides a lot of satisfaction because you're doing it, you're making it, it's good, it's better than everything you would ever buy"* (P8). *"I love to cook so I try to do different things every day"* (P6). *"I enjoy reproducing non-vegan meals in vegan meals"* (P4). *"When I switched, it was fun to cook creatively with food from the market"* (P2). This might have helped them to change to an eco-friendlier diet. Transferring these insights from the lead users to Goodcase's target group might be problematic as not everybody might enjoy cooking like the lead users do. While it may not be possible to instantly convert consumers to passionate cooks, it could be possible to curate a cooking experience in a way that makes them have more fun doing it.

Self-efficacy

It was interesting to hear how participants transitioned from having a low self-efficacy to a high self-efficacy. Even though some participants had expected that it would be difficult for them to switch to a new diet without meat or even without any animal-based products, they reported that it was easier then expected after trying it out, for example P9, who started with a 2-week vegan experiment: *"A few years ago I would have said 'Oh my god, how can you eat vegan, I couldn't do that', but no, it was then surprisingly easy."* P4, who started by trying to eat as much vegan as possible with the help of friends and tracking non-vegan meals in her notebook, had a similar experience: *"I was seeing how effortless it was for me. [...] Before I got all the information for me it also seemed impossible."* This suggests that a lack of know-how is a cause for low self-efficacy.

P1 stressed that it is not such a big difference not eating animal-based products, you just get your nutrients elsewhere: *"A lot of people thought it was hard for me to change but I thought I don't have any problems. When you're asking me what has changed. Because I'm just eating food. I've been experimenting with food since I was young. And I'm still eating lunch, [....] dinner, [...] cookies, [...] everything."*

However, one participant who is vegetarian mentioned becoming completely vegan would be too hard for him because he is very attached to milk products: *"Vegan is quite difficult. I don't know how they do it. It's not possible for me. [...] I can minimize [my milk] consumption but not completely. There are some things which technology has not produced. Basically milk. I'm from India, I like paneer a lot. That's like cottage cheese in India. And milk tea."* This perception of no proper substitutes being available can also be considered an obstacle for people who are initiating their switch to a more sustainable diet.

Encouraging trials could be key to help people adopt new eating behaviours. The interview participants reported that they had been more afraid of changing their diet than necessary. After trying out they realised that it was easier than expected. Likewise, Bandura (19XX) suggests that self-efficacy can be increased if a person is guided towards a new behaviour via small steps that become increasingly challenging. Starting with avoiding meat one or two days per week and then increasing it could be a way for Goodcase's target audience to gradually increase their self-efficacy.

In case a person is attached to a certain food product that might not be the most eco-friendly choice, it is always possible to enjoy such a product in moderation or to choose a variant of this product that is produced in the most sustainable way, for example milk that is sourced from cows that are grazing agricultural land that cannot be used otherwise at the time.

4. Design analogies in behaviour change

Content:

4.1 Introduction
4.2 Stopping smoking - Stoptober
4.3 Stopping alcohol consumption - Dry January
4.4 Reducing weight - Weight Watchers

4.1 Introduction to design analogies

Design students and expert designers regularly use the design-by-analogy method. Analogy entails transfer of knowledge from one known domain (source) to another domain (target) (Blanchette & Dunbar, 2000). Analogical reasoning involves utilisation of 'source' information as a means to facilitate attempts to solve the 'target' problem (Ball, Ormerod, & Morley, 2004). The importance of analogical thinking in design was confirmed by previous studies (Ball et al., 2004, Ozkan and Dogan, 2013).

In the context of acquiring more sustainable eating habits, one can derive inspiration from services and initiatives in domains in which behaviour change is the goal. The cases show how intervention techniques that were already identified in the literature research are used in practice to influence individuals to change their behaviour. In the following, the initiatives Stoptober, a collective smoking cessation attempt, Dry January, a health campaign that promotes to stop drinking alcohol, and the weight loss programme Weight Watchers will be analysed and the implications for this graduation project compiled. These initiatives were chosen because, similar to the product-service system that is developed for this project, they deal with the reduction (or a complete discontinuation) of undesirable behaviours, namely smoking, alcohol consumption and unhealthy eating.

In the case of this project, the undesirable behaviour is eating food with a high impact on the environment. One can argue that the intake of food with a high impact on the environment is not a behaviour that causes negative consequences for the individual to a degree that smoking, alcohol consumption and unhealthy eating do, because the consequences are more on an environmental level. Nevertheless, learning from the three initiatives can help to deduce promising practical applications for a product-service system dealing with sustainable eating.

4.2 Stopping smoking - Stoptober

Stoptober (https://stoptober.nl) is an initiative that originated in the United Kingdom and is organized in the Netherlands by the Ministry of Health, Welfare and Sport, the Dutch Cancer society, the Hartstichting (heart foundation), and other Dutch institutions. Its goal is to motivate people to stop smoking together for 28 days in October. In the Netherlands, it has been held every year since 2014 and more than 50,000 people participate each year (Troelstra, Harting, & Kunst, 2019).

How does it work?

The focus of Stoptober is on doing it together. Everybody takes part at the same time, both "normal" people and famous people who help to extend the reach of the campaign. In this way, the organisers focus on one of the three elements in the theory of planned behaviour that increases the behavioural intention: the subjective norm (Ajzen, 1991), which is also considered a main driver for sustainable diet change (Eker et al., 2019). By showing people that many other people are trying to stop smoking, individuals might conclude that they themselves should also stop smoking or at least try to. Moreover, through the collective attempt participants can get support from other people who want to stop as well. According to Verplanken (2018), this social approach especially attracts consumers who lack the opportunity to act but who are motivated to change. For English speakers, a special app is available through which participants receive messages and tips to keep going every day (see figure 8). More support is offered on social media channels.

The focus lies on positive messaging as opposed to directing attention to the risks of smoking, which is a common strategy in anti-smoking advertising where fear appeals (Maddux & Rogers, 1983) are used to scare smokers by showing negative consequences of the action. For instance, the campaign points out how it is better for

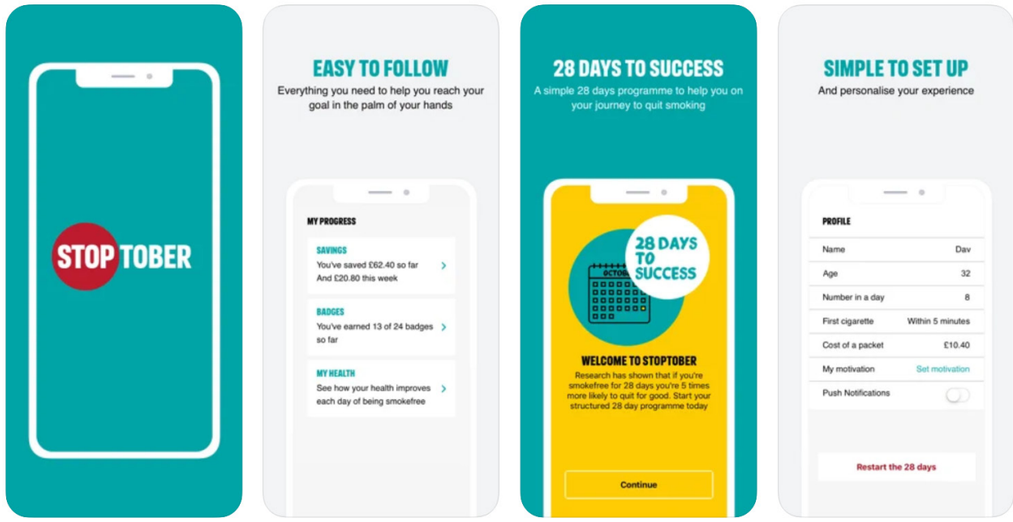


Figure 8: Functionality of the Stoptober app (Public Health England Digital, 2021)

your health and the people around you, how much money you save, and how much time for other activities you gain. According to the website, the time span of 28 days was chosen because it is just long enough to assess positive effects and it is a period that can be overviewed well.

Effectiveness

A scientific assessment of the launch of the Stoptober campaign in England in 2012 confirmed the effectiveness of the campaign (Brown et al., 2014). The researchers assessed data on quit attempts received from 31,566 past-year smokers using nationally representative household surveys conducted monthly between 2007 and 2012. Depending on the increase in national quit attempt rate in October relative to other months in 2012 vs. 2007-2011 the effectiveness of the campaign was evaluated. The study found that in 2012 there was an approximately 50% increase in quitting during October compared to other months of the same year whereas in 2007-2011 the amount of people quitting was not significantly less compared to other months of the same year.

A study in the Netherlands that assessed the short-term effects of the nation-wide campaign confirmed its short term effectiveness (Troelstra et al., 2019). Analyzing two surveys from before the start of the campaign and three months afterwards, the quitting rate was found to be 71.8%, with reduced consumption among sustained smokers. However, it has to be mentioned that the number of participants for the first survey was 6856 while the number of the second survey was only 1127. It can be expected that more people who stopped smoking participated in the second survey.

Implications

Focusing on positive messaging could be a good approach for promoting sustainable eating behaviour as well. The major difference is however, that the positive effects of not smoking are more on a personal level as opposed to the positive effects of changing to a diet lower in meat where personal health is only one part of the effect, with increased animal welfare and less greenhouse gas emissions as other positive effects. Nevertheless, positive health effects could be promoted to consumers. According to one participant in the lead user research, avoiding meat can prevent an after lunch dip during work.

The outcomes of the studies suggest that a massive and focussed quitting attempt is more fruitful than trying to quit on your own. The strength of collectiveness could also be leveraged for helping people to change to more sustainable diet behaviour.

4.3 Stopping alcohol consumption - Dry January

Just like Stoptober, Dry January (https://alcoholchange.org.uk/get-involved/campaigns/dry-january) originated in the United Kingdom. The public health campaign is organised by the charity Alcohol Change UK and urges people to abstain from alcohol for the month of January. While there are a lot of people taking the challenge on their own, taking part in the official Dry January programme means that participants get different kinds of support from Alcohol Change.

How does it work?

Participants commit to abstaining from alcohol for one month. To achieve that, they can make use of resources provided by Alcohol Change, one of these being the free Try Dry app (see figure 9). With the app, people can for example track their sober days, their alcohol intake, set goals for themselves, monitor their progress, receive coaching emails, and get a daily motivational reminder. According to Alcohol Change, people who download the app are twice as likely to have a completely alcohol-free month and drink more healthily in the longer term. Next to the app, people can get support from the Dry January Facebook group and read the Dry January blog with tips, reviews and stories from other participants. Furthermore, the book “Try Dry” is Alcohol Change’s official guide to a month alcohol-free.

Effectiveness

There is not much research done on the campaign but the research that has been performed suggests that Dry January has positive effects on participants. A study with 857 British adults participating in the Dry January challenge suggested that

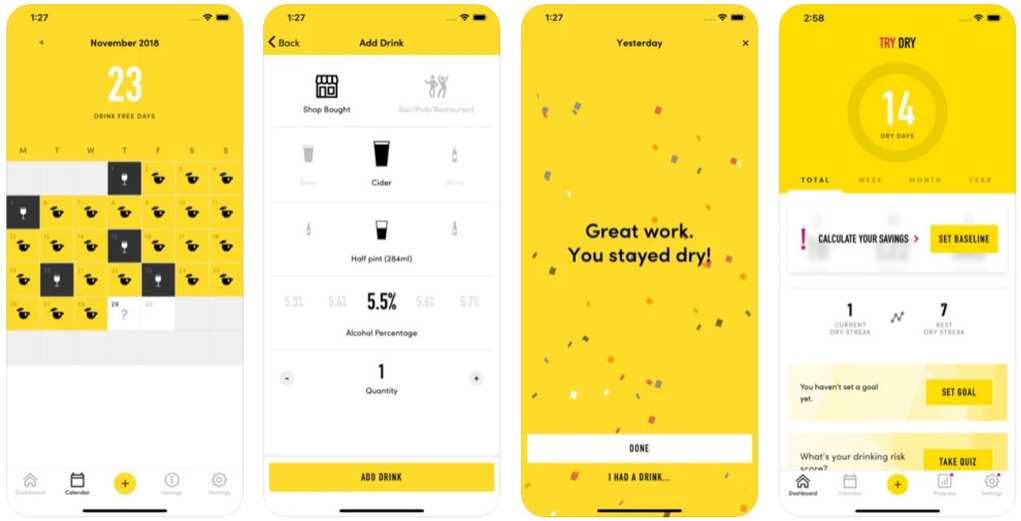


Figure 9: Functionality of the Try Dry app (Alcohol Change UK, 2021)

the programme “may be associated with changes toward healthier drinking and greater [drink refusal self-efficacy], and is unlikely to result in undesirable ‘rebound effects’: very few people reported increased alcohol consumption following a period of voluntary abstinence” (de Visser et al., 2016). The study participants completed a baseline questionnaire, a 1-month follow-up questionnaire, and a 6-month follow-up questionnaire.

According to an evaluation of the campaign in 2019 by Richard de Visser, participants mainly used support provided by the campaign organisers. The website, supportive emails and the app were most commonly used and perceived as most useful. Comparing a baseline and a 6-month follow-up questionnaire, people who completed a dry January were ”significantly more likely than those who were partially dry or those who did not try to stay dry to have increases of at least 10% in drink-refusal self-efficacy, physical health, or mental well-being. It is notable that people who registered for Dry January but were only partially dry were more likely to report improvements in drink-refusal self-efficacy and well-being than were people who were completely dry but not registered for Dry January. This indicated the value of the support provided by Dry January” (de Visser, 2019).

However, there are also researchers who doubt that Dry January can lead to behaviour change in the long term. Moreover, researchers worry that the programme might not be the right solution for people with an alcohol dependency because complete abstinence might overwhelm them due to withdrawal symptoms and failing the challenge would only discourage them (Davis, 2019; Hamilton & Gilmore, 2016). Alcohol Concern acknowledges this concern and doesn’t recommend Dry January for people who regularly drink more than the UK government’s recommended maximum of 14 units of alcohol per week (Davis, 2019).

Furthermore, there are researchers who suggest that encouraging individuals to reduce their alcohol intake, for example by abstaining for two days a week, would be much better, also because of the risk of rebound effects after a month of abstinence (Davis, 2019; Hamilton & Gilmore, 2016). The effects of the Try Dry app, which was introduced in 2019, have yet to be scientifically assessed.

Implications

A 1-month alcohol abstinence seems to have positive effects on the drinking behaviour in the following months. However, it is unclear if it is beneficial in the long term. For changing to a more sustainable diet complete abstinence of certain products, e.g. meat, might be the wrong approach as it could quickly discourage people. Meat cannot be compared to smoking in this case. Eating meat in moderation is not considered as unhealthy as smoking and is socially more accepted than smoking.

Similar to Stoptober, the collective effort of trying not to drink alcohol might play a role in the effectiveness of the campaign. A lot of people doing it at the same time gives participants the feeling of being on a common quest. Additionally, Dry January offers them a good reason for declining drinks in social situations.

With the app, self-monitoring became a central part of Dry January. It allows participants to track sober days but also the alcoholic drinks they consumed on days they were not abstinent. Therefore, it can also be used as a tool to reduce alcohol consumption, not only to stay abstinent. Furthermore, it can be used at any time of the year. Daily tracking could also be helpful in the case of changing to a more environmentally sustainable diet.

4.4 Reducing weight - Weight Watchers

WW International, formerly Weight Watchers (https://www.weightwatchers.com) is a global company that offers various products and services. It is most famous for its commercial weight loss and maintenance programme which by now also includes fitness and mindset elements. WW has different kinds of membership programmes that all come at a certain price. They all base on the use of a point system for the food you eat. Different kinds of food are assigned different amounts of points (SmartPoints). As long as members stay below a certain amount of points they can eat anything they want.

How does it work?

After a personal assessment, participants are matched with one of three food plans that guide them toward food choices geared for their preference. The three plans differentiate in the number of SmartPoints people are allowed to use and the amount of foods that are considered ZeroPoint foods, which have the SmartPoint value of zero and can be eaten as much as desired. Based on its nutrition every food and beverage is assigned a SmartPoint value. Members can only spend a certain amount of SmartPoints each day. ZeroPoint foods are healthy foods with a low risk of overeating, like non-starchy vegetables and fruits.

In the basic membership, people can track what they eat in the WW app (see figure 10), visualise their achievements in a weekly progress report and set a goal for the week ahead. Moreover, they have access to thousands of recipes, on-demand workouts, meal planning tools, members-only community support, and challenges. In the high-end subscription, like-minded members can support each other in groups, you can get support from a personal WW coach and you have access to unlimited virtual or in-person workshops. Prices for the basic plan range between €17.95 and €22.95 per month in the Netherlands, depending on the duration of the plan. The plan with unlimited workshops ranges between €32.95 and €44.95 per month.

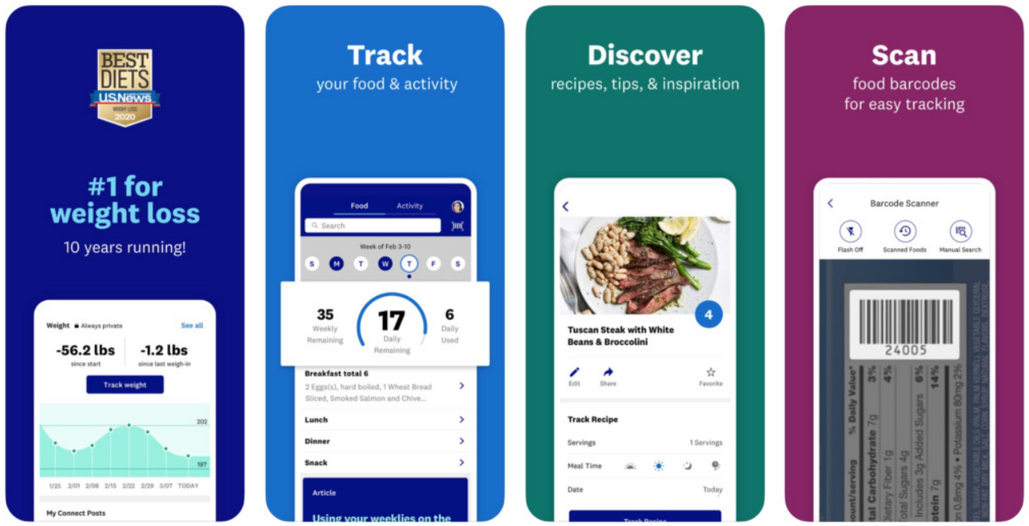


Figure 10: Functionality of the WW app (WW International, 2021)

Effectiveness

WW is one of the most researched weight loss programmes available. In a randomised controlled trial study with 772 overweight and obese adults in Australia, Germany and the UK (Jebb et al., 2011), using WW was compared to receiving standard treatment in primary care. In the 12-month assessment, participants in the WW group lost twice as much weight as did those in the standard care group, indicating that the programme "can offer a clinically useful early intervention for weight management in overweight and obese people" (Jebb et al., 2011).

In a randomised clinical trial from 2013 over 48 weeks (Pinto et al.), following the WW programme was compared to receiving professional behavioural weight loss (BWL) treatment. Researchers found WW was three times more effective for achieving at least 10 percent weight loss than those in the professionally delivered BWL programme (36.7 percent versus 13.0 percent, respectively).

Another randomised controlled trial with nearly 300 overweight and obese individuals compared following the WW programme with using self-help approach to lose weight (Johnston et al., 2013). According to the researchers, "use of the WW program yielded significantly greater weight loss than a self-help approach, suggesting it is a viable community-based provider of weight loss treatment". The researchers note that higher usage of all three resources (online, phone app, and in-person meetings), seemed to result in significantly higher weight loss.

Implications

WW shows that commercial programmes have the potential of creating behaviour change in participants and could thus also be interesting for behaviour change to more environmentally sustainable diet behaviour. However, consumers might be harder to convince to pay money for a service that helps them to eat more sustainably. It is more difficult to visualise the positive effect of their behaviour change in sustainable eating in contrast to a weight loss programme, where participants can measure their weight losses.

Similar to Dry January, self-tracking is an important part of the WW diet. It makes participants aware of what they eat and helps them to get a feeling for what is healthy for their body. As mentioned before, daily tracking could also be helpful in the case of changing to a more environmentally sustainable diet.

The community aspect of the WW diet programme could play an important part in changing people's behaviour. People who are not just using the basic membership are not on one's own, but can get support from peers and experts. This could also be beneficial for change to more sustainable behaviour.

5. Integration of insights and design brief

Content:
5.1 Integration of insights
5.2 Design brief

5.1 Integration of insights

In the three analysis chapters, that dealt with scientific literature related to sustainable diets and behaviour change, with insights from lead users, and with design analogies in different contexts, the change to new behaviour, especially dietary change, was investigated from different perspectives. In this chapter, the main insights that are considered relevant for the design challenge are gathered to serve as a baseline for the design phase. The following topics deserve special attention when developing a new product-service system for Goodcase.

Increase of self-efficacy

In the theory of planned behaviour (Ajzen, 1991), where self-efficacy is called perceived control, the concept not only plays a role in facilitating behavioural intention, but also in influencing actual behaviour. Self-efficacy was identified as one of the two main drivers for behaviour change to eco-friendlier diet behaviour by Eker et al. (2019). Verplanken (2018) considers self-efficacy a prerequisite for having motivation to act sustainably. Therefore, self-efficacy should be central when designing for ESFC behaviour change.

According to Bandura et al. (1999), the most effective way to build self-efficacy is to engage in mastery experiences (personal experiences of success). The researchers identified guided mastery as a way to help individuals increase their self-efficacy by confronting them with little challenges increasing in the level of difficulty. People who are used to eating meat but would like to eat more plant-based, could have a sense of achievement when they eat a meat alternative for the first time or cook a meal based on vegetables. Helping these individuals experience such success moments could raise their self-efficacy concerning eco-friendly diets.

In the lead user research, participants reported that they had formerly not believed that they would be able to change to a vegetarian or vegan diet. But over time they have managed to successfully change their eating behaviour. The accounts of lead users going from low self-efficacy to high self-efficacy suggest that other individuals can also make the transition if provided with the right tools. One strategy that helped the lead users to change their perceived control over their diet was self-experimentation, which will be elaborated on in the following.

Self-experimentation

In the lead user research, self-experimentation was identified as a means to try out and adopt a new behaviour. Several participants introduced themselves to more sustainable diet behaviour by considering themselves as the subject of an experiment. They would challenge themselves to perform a certain behavioural change, for example not eating animal-based food for two weeks, and use the food options that they were left with to create new dishes, often in an exploratory way. In literature, several behaviour change interventions are described that can support self-experimentation, for example cues (Michie et al., 2011), challenges and goals (Lockton, 2019) and self-monitoring (Michie et al., 2011). Verplanken (2018) considers goal setting an especially promising intervention for segment B consumers who are willing to act sustainably and have a high potential to do so.

The design analogies showed that self-experimentation is already used in practice, for instance in changing people's smoking, drinking, and eating behaviour. The individual is considered the subject in a collective experiment, in which self-challenging and self-tracking play a major role. The small challenges that consumers tackle during self-experimentation increase their belief in their capacity of adopting the new behaviour (Bandura et al., 1999).

Use of social influence

A theme that was reappearing in all three parts of the research was the social component of behaviour change. Eker et al. (2019) identify the social norm effect as the most important factor when changing diets to more sustainable ones, next to self-efficacy. Verplanken (2018) considers community-based interventions promising for consumers with high motivation to act sustainably, no matter if they already have the opportunity to act or not. In fact, communities can increase people's opportunity to act sustainably by social support. Therefore, it could be attempted to include a social aspect when designing for diet behaviour change.

There are multiple behaviour change interventions described in literature that take community into account, for example peer feedback (Lockton, 2019) and social proof (Ölander & Thogersen, 2014). Moreover, Bandura (2010) considers the experience of social evidence a source of self-efficacy. Seeing somebody, who you view as similar to yourself, succeed at something difficult can motivate you to believe that you can achieve a similar goal.

The relevance of the social component was confirmed in the lead user research. The majority of lead users were strongly influenced by other people to change their diet to a more sustainable one, be it by family, friends or flatmates. Furthermore, in all three of the analogies community played a role. In the case of Stoptober and Dry January, the intervention takes place at the same time for everyone in the country, making the effort as massive and collective as possible. In the WW app, people can exchange ideas with other members and motivate each other. These insights suggest that a social component might also be meaningful for behaviour change interventions concerning sustainable diets.

Reduction instead of abstinence

Based on the insights from the lead user research and the design analogies, different strategies are applied when it comes to undesirable behaviours. Either individuals try to stop the behavior completely, or they reduce it over time. As mentioned before, some researchers criticise the abrupt and short-term alcohol abstinence during Dry January and argue that a long-term, steady reduction of alcohol intake would be a better solution (Davis, 2019; Hamilton & Gilmore, 2016). WW applies this strategy for weight loss: Members can eat whatever they want as long as they stay under a certain amount of SmartPoints, which are assigned based on calories and macronutrients. In this way, they reduce the intake of unhealthy foods over a long period of time.

In the lead user interviews, most of the participants reported that their journey towards becoming a vegetarian or vegan took a long time, a continuous reduction of meat consumption. There were also a few people who changed abruptly to a vegan diet. In these cases, however, the individuals were already used to mostly eating vegetarian, had strong social support and it was only considered a first experiment with the option of going back to their initial diet standards. Nevertheless, this abstinence influenced them strongly and helped them on their transition to becoming (almost completely) vegan.

In the case of changing to ESFC behaviour, an effective way to lower one's ecological footprint is to avoid meat. Abstaining from meat completely might feel like a huge shift for consumers though. Moreover, even though eating a lot of meat is a health risk it is not comparable to smoking and drinking which are more dangerous for the body. Reducing meat consumption instead of abstaining from meat could therefore be the better choice for an intervention. This strategy was also proven to be successful for weight loss with WW (in this case reducing calorie intake).

Consistently supporting consumers in their quest of reducing meat consumption might be the best way to have a long-term effect. According to Verplanken (2018) habits can be disrupted by changing stable cues. Therefore, an ongoing intervention might be best, for example through recurring food deliveries and ongoing support and motivation. In terms of business model, this would speak in favor of a subscription model. The WW business model is a good analogy, which provides users with digital tools and consistent support to lose weight and live healthier for a monthly fee.

Tangible experience through curated offering

In the three analogy cases from chapter 4, behaviour change was encouraged mainly by a digital support approach. Participants are motivated, for instance, by apps, online groups and online campaigns. Even though the choices are altered in some instances (for example WW users receive a high point value in the app when they eat unhealthy food which appeals to their conscience), the actual choice has to be made by the consumer. Kelly and Barker (2016) note common misconceptions in behaviour change practice like putting all focus on the right presentation of the message or thinking that knowledge and information are sufficient to change behaviour. They argue that there is more potential in altering or taking away choices from the consumer (Kelly & Barker, 2016). Even though this research was performed on the subject of health-related behaviour, the findings can also be valuable for the change to environmentally sustainable behaviours. Altering the consumer's choice architecture through food delivery services could be especially promising, since it is easier for these services to take choices away from the consumer. In supermarkets, for example, consumers have to make most of the decisions themselves.

Positive examples for online food businesses that help consumers to make more sustainable choices are the Dutch online supermarkets Pieter Pot (www.pieter-pot.nl) and Crisp (www.crisp.nl), which offer a selection of products that are considered sustainable compared to alternatives, with Pieter Pot even delivering in reusable packaging. Other major players leave the responsibility of the sustainable choice to the consumers. This is the case for online offerings of traditional supermarkets like Jumbo or Albert Heijn and meal box companies like HelloFresh and Marley Spoon. The latter two do not offer any

incentive to choose a more sustainable option, with vegetarian boxes costing the same as boxes including meat, even though the raw material price might be substantially less. This prevents people from opting for the more sustainable choice, as one of the lead users, a flexitarian, pointed out: *"We often choose the meat box because they are all the same price. When we get the vegetarian box we think 'Oh, we can buy this really cheap from the market so why buy it from HelloFresh?' "* (P7).

In the case of Goodcase, the strength could lie in the combination of the physical and the non-physical. The delivery of a selection of sustainable food products could be accompanied with a behaviour change support service. Customers do not have to choose the food themselves but it is curated for them. In this way, consumers can explore sustainable options without having the extra effort of researching the best products and they get the help they need to make their new behaviour habitual. By receiving the food to their doorstep they are highly encouraged to try out new options and might learn from these experiences that an eco-friendly diet is easier to follow and more pleasant than expected. Providing such an offering to customers on a regular basis might cause them to form new sustainable diet habits (Anderson, 1982).

5.2 Design brief

The design brief will take the integrated insights from the research phase as starting points for the design development. With Goodcase as a client, the design needs to take limitations into account that characterise a recently founded startup before funding (limited financial resources, limited manpower). As a brand, Goodcase identifies itself as a supporter for people who want to change their diet to a more sustainable one, helping them to explore the opportunities of a sustainable diet.

For Goodcase, a new product-service system should be designed that combines the delivery of sustainable food products with a corresponding behaviour change strategy. The concept should include the selection of food products, but special focus should lie on the additional content that customers are presented with and that is supposed to support them on their journey towards eating more sustainably. The developed concept should be tested with users to evaluate its potential and to identify areas of improvement. Finally, an improved concept should be presented that can be tested with customers.

In the course of earlier pilot tests the Goodcase team was able to define a target audience for their services through interviews with pilot customers. The target customers are Dutch adults with a higher than average income who are interested in environmental sustainability and who are open to making changes to their diet for the benefit of the environment but are still eating in a way that could be substantially improved in terms of environmental impact. In Verplanken's (2018) segmentation model of sustainable behaviour they are mostly located in segment B, possessing high opportunity and motivation to act, and a great potential for developing strong sustainable habits.

They might be aware that discarding food rests is a waste but it still happens on a regular basis in their household, for instance due to bad planning. They might know that eating a lot of meat has a bad effect on the environment but they still eat it regularly, especially because it is strongly ingrained in their routines. They don't identify with a certain diet like vegetarians or vegans. Instead, they eat a broad variety and are not willing to make large sacrifices (yet). They use Goodcase's service to get inspiration about eco-friendly diets and as an aid in changing to a more sustainable diet. Currently they are mainly buying groceries in the supermarket where they struggle to make sustainable choices due to the abundance of offers and intransparent information on product packaging. Moreover, they are not aware of which food choices make the most difference in terms of sustainability and they are not very confident about their capacity to change to a diet free from meat.

Design goal:

Increase the self-efficacy of consumers trying to change to a more environmentally sustainable diet by facilitating self-experimentation with a food box.

6. Product development

Content:
6.1 Ideation
6.2 Concept design

6.1 Ideation

To start the ideation, the 'Design with Intent toolkit' from Lockton et al. (2019) was used once again. Intervention cards from the toolkit that contribute to raising self-efficacy and facilitating self-experimentation were chosen for the ideation. Based on the cards, **'how might we' questions** were posed to frame challenges into design opportunities ("How might we," n.d.). This format was used because it suggests that a solution is possible and because the questions offer you the chance to answer them in a variety of ways, leaving room for creative thinking. The cards were selected according to the design goal and themes defined in the previous chapter. The following questions were considered the most important for reaching the design goal:

How might we challenge users to perform sustainable eating behaviour?
Challenges are a good tool for getting individuals involved and engaging them for longer periods of time (Lockton et al., 2019). The right kind of challenges have to be designed to influence the behaviour of the customers in the best way.

How might we enable consumers to set goals for themselves?
Goals are a good way to motivate individuals to change their behaviour (Michie et al., 2011; Lockton, 2019). However, not every consumer starts from the same baseline in terms of diet. For example, some might eat meat each day, others four days a week. Therefore, personal goals could help to keep the challenges for consumers at an appropriate level.

How might we give users a direction but let them experiment themselves?
Confronting consumers with potentially unfamiliar food items bears the risk that they do not know how to use them in the proper manner which can lead to a bad experience. To prevent this, customers should be given some direction on how to use the products. That said, consumers should be left with enough freedom to experiment with the food themselves, as these experiences can increase their self-efficacy towards eco-friendly diets (Bandura et al., 1999).

How might we make it easy for users to cook new, eco-friendly dishes?
The Goodcase pilot tests indicated that customers tend to leave products unused for weeks if they are new to them. Therefore, it should be tried to make it as convenient as possible to use products included in the box for eco-friendly dishes.

How might we encourage users to interact with each other and support each other?
Literature (Eker et al., 2019; Ölander & Thogersen, 2014), analogies and insights from lead user research suggest that social influence plays a key role in changing behaviour. The challenge is to use this potential in the design of a product-service system that is primarily targeted at individuals.

First ideas

The concept was conceived as a product-service system, with sustainable food products as physical products and behaviour change guidance as a service. Initial ideas for the food offering and for the service part were gathered and served as a collection of opportunities that could be chosen from for the concept design (see appendix X).

6.2 Concept design

Design direction

The overall concept of the product-service system was a one week challenge for the consumers. Considering the large environmental impact of meat consumption (Steinfeld et al., 2006), the decision was made to focus on meat reduction.

Since meat reduction is not necessarily considered an eco-friendly diet behaviour by consumers (Bosma & Zervaas, 2020) and because it is among the least preferred personal options to counter climate change (Sanchez-Sabate & Sabaté, 2019), a second theme was included: The reduction of food waste, which is also considered an important lever to reduce greenhouse gas emissions in the food system, with consumers being one of the biggest contributors to food waste (Aschemann-Witzel et al., 2015). It was assumed that avoiding food waste would be the easier task, because it merely requires the adaptation of a behaviour consumers are already pursuing, while reducing meat can mean a large shift for people who like to eat meat. Therefore, the food waste challenge was supposed to give participants a feeling of accomplishment and the confidence to succeed in the harder task of reducing meat intake.

The concept was supposed to include a one week challenge of reducing meat consumption and food waste (self-experimentation component), helped by the food products in the box, and an online group for users to interact with each other (social component).

The concept

The food box was designed to take the consumers on a weeklong journey of tackling their habits when it comes to food. A special focus was put on the reduction of meat consumption and food waste. The box helped users to achieve their goals in four ways. First, the box provided food items for convenient vegetarian meals that can be easily incorporated in the customer's diet. For inspiration and to teach how the products can be dealt with, an easy recipe was included for each item. Second, it gave people the tools to set goals and track themselves. Each day they could mark if they were able to avoid food waste or meat. Third, it gave tips on how to change their behaviour in an easy way. This included tips on saving food and getting good nutrition without meat. The tips aimed to change existing habits in the way that they contribute to the set goals instead of requiring consumers to acquire new habits. As an example, people were challenged to alter meals that they are used to so they can be prepared without meat. Finally, it provided the opportunity to get in contact with other users to exchange ideas, to inspire and to support each other.

The box was not meant as a grocery service that provides all the food products you need for one week. Instead, the products were just an addition to the diet of the consumer. It was supposed to provide insight into potentially unfamiliar opportunities when it comes to sustainable eating and to inspire them to eat more of the products that they have liked. It was clarified to the customers that the basis of their healthy and sustainable diet should be foods they were probably already familiar with: Vegetables, fruits, legumes, grains, nuts, and seeds.

For the user test box, seven food products were selected. The focus was laid on products that could replace meat, but also other ingredients were included that were supposed to facilitate vegetarian or even vegan cooking. To support users in reaching their goals a physical guide was developed that could be used during the week. It was assumed that a physical booklet could have a bigger influence on people because of its tangibility. Moreover, because the consumers were sent a box anyways, giving them something physical like a booklet was not a big extra effort.

In terms of branding, the name ReduceBox was chosen for the product-service system. The name not only addresses the physical element of the concept (the food box), but also the change in behaviour that is attempted to achieve (a reduction of meat consumption and food waste). Thus, it might hint at the practical value of the service and give potential customers an idea of what they can expect. Furthermore, as it is based on English words, it could be used internationally.

Elements of the design in detail

Food products

Only packaged foods were chosen for the box because their handling is logistically more convenient. In contrast to fresh foods they can be stored longer and are less susceptible to damages during transportation. While this decision was made in part due to the prototyping limitations of this research, it can be questioned whether this choice would be the right one for Goodcase to support their mission of facilitating the switch to a more

plant-based diet. The selection of food (see figure 11) was focused on meat alternatives and products that can facilitate vegetarian or vegan cooking.

Figure 11: Selection of food products for the box (own image)

Regarding meat alternatives, two products were chosen that are supposed to replace meat one to one: vegetarian balls and vegetarian sausage. These products are most similar to meat and therefore easy to incorporate into the diet of people who are used to eating meat. Two other products were included due to their high protein content which also makes it possible to use them instead of meat in a meal: tofu and red lentils. It was assumed that the difficulty level of preparing these products would be higher than for the other meat substitutes. However, the tofu and the lentils products can be considered healthier than the heavily processed vegetarian balls and vegetarian sausage because they are treated less in production.

Soy sauce, vegan mayonnaise and pasta with a 50 percent vegetable content were included to ease vegetarian or vegan cooking. The soy sauce can be used to create various asian dishes, for example in a wok or a different kind of pan, that do not depend on meat. Moreover, as learned from one of the lead users (P10), soy sauce can add an umami flavour to dishes, which is also typical for meat dishes. The vegan mayo can be added to baked potatoes or a salad, for example, to make these dishes completely plant-based. The pasta was included to show an example of a new opportunity to eat more vegetables, in this case by eating a familiar product, but with a 50 percent vegetable content.

In terms of brands, the selection consisted of a mix between products from small Dutch food companies (vegan mayonnaise by Mr. Kitchen, vegetable pasta by Veggihap), big brands with a sustainable mission (vegetarian balls and sausage by De Vegetarische Slager, soy sauce by Fairtrade Original) and in-house brands from Dutch supermarkets (red lentils from Albert Heijn, tofu from Jumbo). The reason for this mix was that on the one hand Goodcase strives to support small Dutch food companies, but on the other hand the startup wants to offer an attractive price for consumers. The products from relatively new and small companies are usually higher priced than their alternatives from bigger brands and supermarkets. It was assumed that with this mix, Goodcase can both provide a platform for smaller brands and offer an acceptable price for consumers.

Challenge guidebook

The intention of the guidebook was to provide support in using the products from the box and in changing the dietary behaviour of the consumers by means of a physical booklet. With this graspable tool, it was assumed that the journey of changing one's diet would become more graspable for the consumer. The guidebook revolved around a one-week challenge of reducing food waste and reducing meat consumption. As you can see in figure 12, the Challenge Guidebook was divided into seven different segments. Six of them consisted of little booklets. In the following, the individual elements will be explained in detail. The complete content of the challenge guidebook can be seen in appendix X.

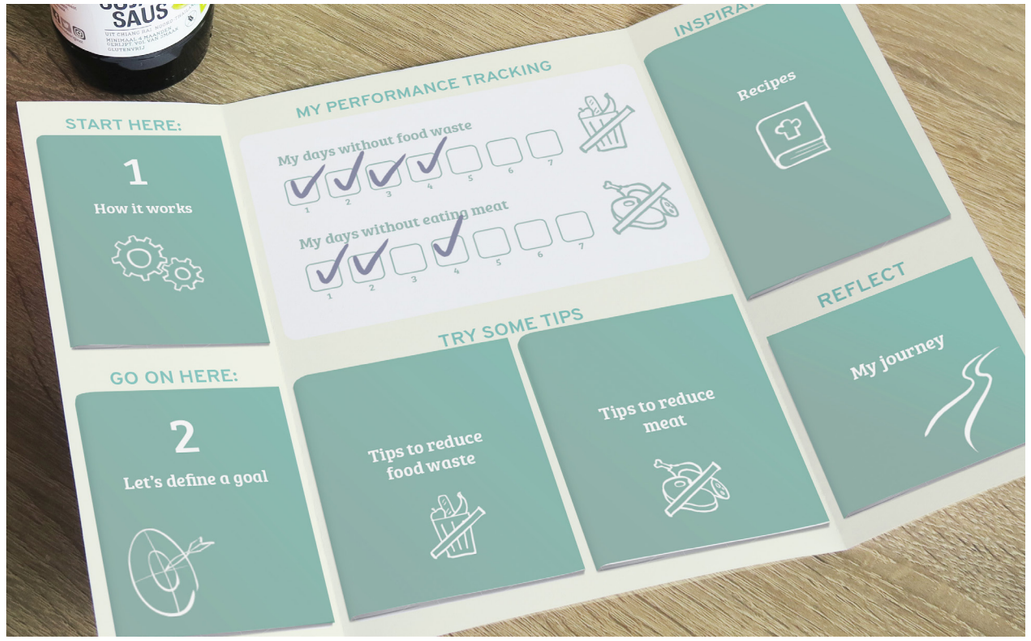
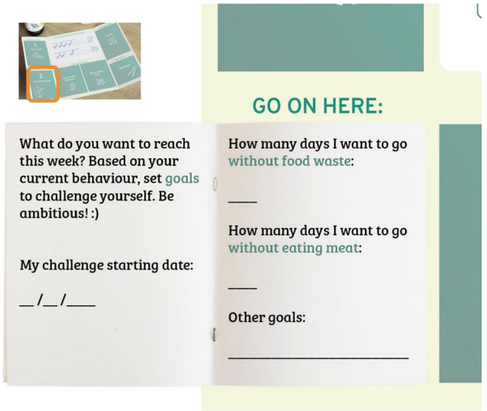
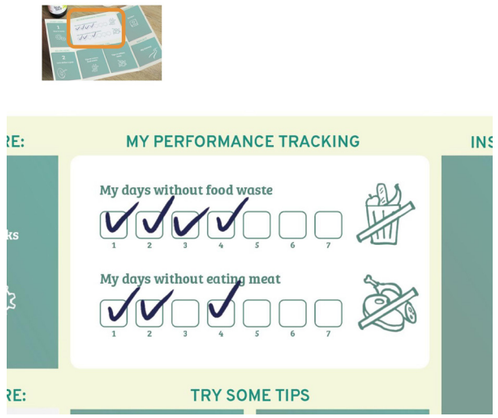


Figure 12: Challenge guidebook (own image)

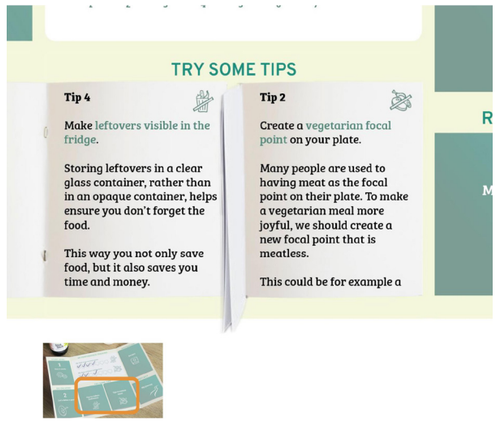
Introduction
The first booklet explained the concept of the seven day challenge and how the guidebook is supposed to be used. It clarified to the users that they could freely incorporate the products into their diet.



Goal setting
The second booklet helped the consumers to set goals for themselves, based on their current eating behaviour. Users could set a start date for their self-challenge, define the amount of days they wanted to go without wasting food and without eating meat. Additionally, they had the option to set other personal goals unrelated to the food waste and meat challenge.



Goal monitoring
In the centre of the flyer, users could track for each day whether they succeeded in not eating meat and not wasting food.



Tips
To help the users achieve their goals, a selection of seven small tips was included for both the food waste and the meat challenge. The tips for the food waste challenge included making leftovers visible in the fridge and tips on how to store food correctly. Examples for tips on reducing meat are the creation of a vegetarian focal point on one's plate and letting friends and family know about the commitment to eating less meat to raise accountability.

Recipes
The recipe booklet gave some inspiration on how to incorporate the delivered food products in simple recipes. Each food product in the box was included in at least one recipe. The recipes could be followed strictly or just serve as a rough guideline to learn in what way a product could be used.

Reflection
The last booklet was supposed to be used as a journal by consumers. Here, they could reflect on their experience to find out what worked for them personally and what didn't. For each of the seven days, they could take notes.

Online group

Within the online research community hosted by the Future of Food Institute that was used for the concept test, an online group for the ReduceBox testers was created so they had the opportunity to get in contact with each other. The group also allowed to interact with the users from the perspective of Goodcase. For example, it was possible to nudge people to report about a meal that they had prepared with food from the box. In this way, group participants could be encouraged to interact with each other so they could draw inspiration from their peers. The group worked like a forum discussion where participants can comment in text form, post photos or share links and react to the messages of other participants. The conversation was started by asking the members about their motivation to take part in the challenge and about a vegetarian dish they like (as can be seen in figure 13). From time to time, the researcher posted a question from the perspective of Goodcase to keep the interaction in the group going.

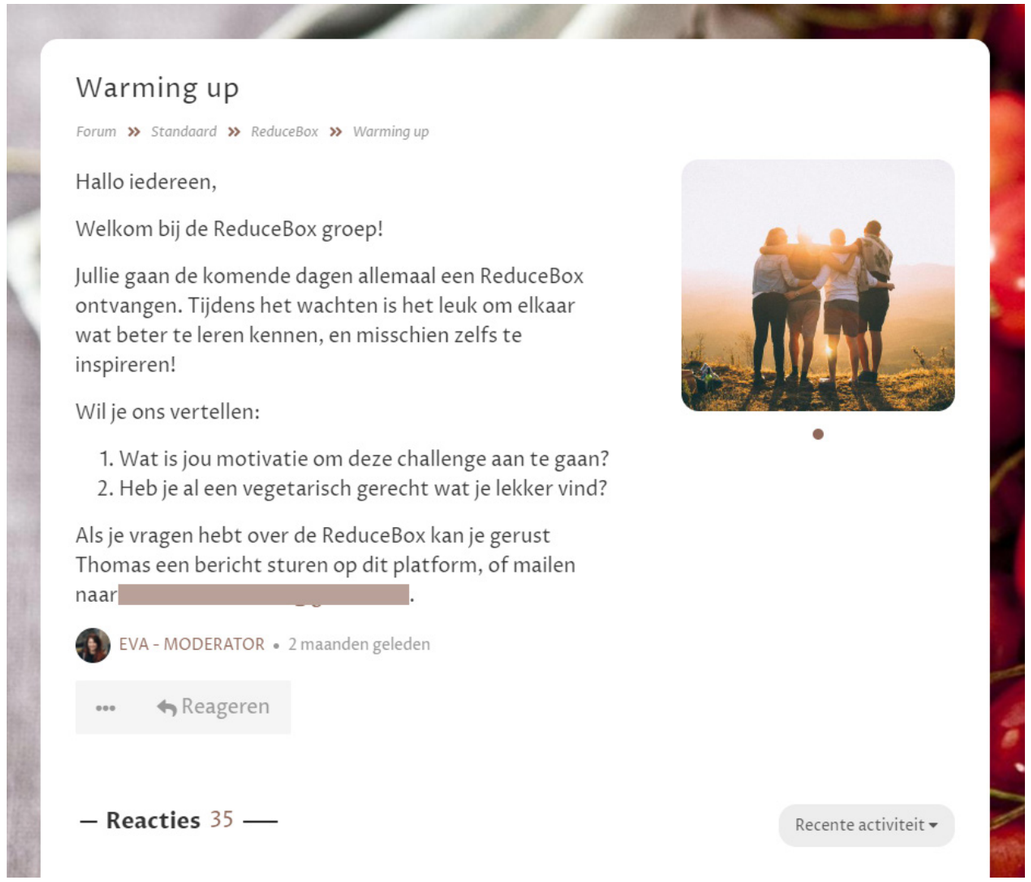


Figure 13: Inroduction post in the ReduceBox online group

Overall offering

All in all, the ReduceBox offering consisted of seven food products, the challenge guidebook, and the online group that could be used by participants (see figure 14). The whole package is supposed to inspire users to experiment with the food, to challenge themselves for one week, to have (hopefully positive) experiences with some of the food items, and to get more motivated by seeing others online taking part in the challenge as well. In the user test that will be covered below, one of the goals was to evaluate how well these different elements work together as part of the product-service system.

Figure 14: Elements of the ReduceBox offering: Food products, challenge guidebook and online group

Prototyping

The challenge guidebook and the boxes had to be physically produced and had to offer a relatively high fidelity to represent Goodcase in a good way. After sketching multiple concepts for the challenge guidebook (see sketch in fig. 15), the final design was digitally layouted and printed. The main structure was printed on thick paper that could be folded to the middle. The small booklets were printed on standard paper and were manually cut and stapled (see fig. 16). Afterwards, they were glued to the base paper of the guidebook. One of the finished guidebooks can be seen in fig. 17. For delivery, standard cardboard boxes were used. To leave the cardboard in a state that makes it easily recyclable, the box was simply stamped with a Goodcase logo to ensure attribution to the company (see fig. 18). First, all the room temperature products were put in the box and the glass products protected with cardboard pieces and paper-based filling material (see fig. 19). Before delivery, the cooled products were wrapped in isolation material together with two cool packs and added to the box (see fig. 20). Finally, an envelope with the challenge guidebook and a personal letter were added, the package sealed, franked and brought to the post office.

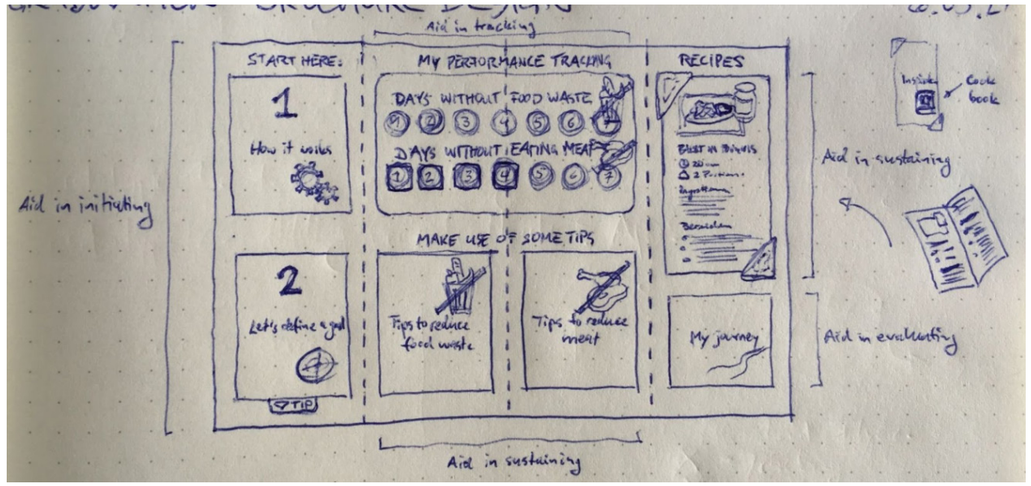


Figure 15: Concept sketch for the guide

Figure 16: Making the guide booklets

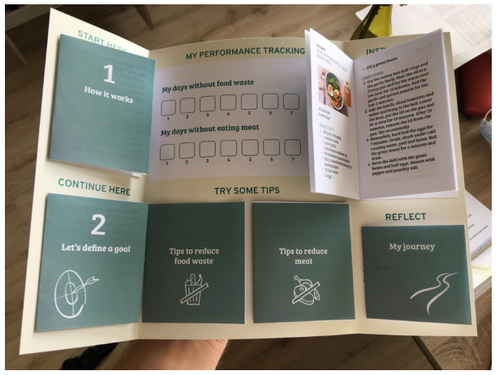


Figure 17: Finished guide

Figure 18: Stamping the Goodcase logo on the delivery boxes

Figure 19: Prepared boxes (without cooled products)

Figure 20: Filled box with cooled products in isolation material

7. User test and improved design proposal

Content:

7.1 User test set-up
7.2 User test results
7.3 Improved design proposal

7.1 User test set-up

To get a feeling for how different kinds of consumers interact with the ReduceBox a user test was organised. A food box was sent to ten people and after one week feedback was gathered. The central research questions were: How do consumers use the ReduceBox? And how does the ReduceBox help them to experiment with vegetarian food? The main goal of the product - motivating people to eat more vegetarian meals and actually help them do it - was achieved in the majority of the cases, meaning there is potential for such a product-service system to change dietary behaviour of consumers. Some features of the concept did not result in the goal behaviour however and offered opportunities to improve.

Data collection

The user test was set up in collaboration with the Future of Food Institute, a customer research company focused on sustainable food. The firm curates an online research community in which consumers can participate in research related to food. At the time of writing, the community counted 475 members, mostly based in the Netherlands. On the platform, the concept of the ReduceBox was presented with a combination of images and text. Community members could take part in a questionnaire (see appendix 3) and assess the concept and its different elements. Beyond that, demographic data were gathered through the questionnaire to be able to select a diverse group of people for the user test.
Out of the people who indicated that they would be willing to pay for such a product ten people were purposefully selected to take part. The sampling was performed criterion-based (Patton, 2015) to compare participants with different backgrounds that met key criteria. This way, a diverse group of people that differentiated in gender, age, diet, education, family situation and living situation could be interviewed (see table 2 on the following page). In terms of diet, only people who did not indicate that they were already eating in a vegetarian or vegan way were considered, because the concept of the box was meant for people at the beginning of their journey towards a more sustainable diet and a vegetarian or vegan diet can already be considered eco-friendly compared to diets with regular meat consumption.

Each participant was sent a free ReduceBox which included seven food products, the challenge guidebook and a personal letter. The box was offered for free to make sure there would be enough sign-ups and to offer a return for the participation in the research. The participants could use the content of the box however they wanted for one week. After this week, individual semi-structured interviews were conducted with seven of the participants, five of them by video call and two by phone. Video calls were preferred due to the option of leading a more natural conversation thanks to visual representation. However, two people did not have the means to conduct a video call. With the consent of the participants, these interviews were recorded. One person was only available to provide written feedback and two people did not give feedback due to personal circumstances. The interviews inquired about the following research question: How do consumers use the ReduceBox and how does the ReduceBox help them to experiment with vegetarian food? Main topics of the interviews were ‘box arrival’, ‘food products’, ‘challenge guidebook’, ‘goal setting’, ‘online support group’ and ‘price’ (see appendix 4). Because

the boxes were given away for free, we could not asses the price itself, so we used van Westendorp's (1976) price sensitivity to determine consumer price preferences.

Participant	Sex	Age	Diet	Highest education	Living situation	Type of feedback
P1	female	48	flexitarian	MBO	cohabiting / married without children living at home	interview
P2	male	40	flexitarian	MBO	with parent	interview
P3	female	52	eats everything	MAVO / first 3 years HAVO & VWO / VMBO (theoretical and mixed learning path)	with family incl. children living at home	interview
P4	female	41	eats everything	HBO / WO-bachelor or candidate	with parent	interview
P5	male	51	eats everything	MBO	by himself	interview
P6	female	43	flexitarian	MBO	with family incl. children living at home	interview
P7	female	48	flexitarian	HBO / WO-bachelor or candidate	with family incl. children living at home	interview
P8	male	46-55	flexitarian	HBO / WO-bachelor or candidate	cohabiting / married without children living at home	written
P9	female	36-45	flexitarian	MBO	with family incl. children living at home	none
P10	male	46-55	eats everything	HAVO & VWO superstructure / WO & HBO propaedeutic phase	with family incl. children living at home	none

Table 2: Participants of the user test

Data analysis

Similar to the lead user interviews, the method of qualitative content analysis was used to identify patterns in the data (Gläser & Laudel, 2013). Again, the analysis was performed on a digital whiteboard. After listening back to the interviews, relevant quotes were extracted and processed separately. In the first step, extracted quotes were tagged with a category. Figure 21 shows some examples of tagged quotes. In the second step, quotes were clustered in the categories and categories were integrated, combining similar themes into one category. The paragraph titles in the results section represent the integrated categories. In the last step, the relationships between the categories were revealed resulting in a visual map as presented in the results section (for a full clustering see appendix 5). Though not assessed quantitatively, the answers from the price sensitivity meter questions were evaluated in Excel to uncover a price range derived from the answers.

Figure 21: Extracted interview quotes with tags

7.2 User test results

Figure 22 presents the visual map that emerged from the analysis. In the middle, the diagram shows the path of the diet behaviour of the participants. Starting from their usual diet, they made new experiences by experimenting with vegetarian food which could lead to increased self-efficacy to eat less meat. The left part of the visual map shows how this process was potentially influenced by the ReduceBox. The food products in the box facilitated experimentation with vegetarian food. The guidebook, the personal goal setting which the guidebook promoted, and the online group influenced to what degree experimentation was performed by the participants. Some elements seemed to be more influential and others less. However, for different participants different elements of the concept varied in their degree of influence, for example a few people seemed to be positively influenced by the online group while others only used the group to a very limited extent and were not influenced by it much. The right side of the diagram shows the influences that were unique to each consumer.

Motivators to eat more vegetarian food were animal welfare, sustainability, health and personal preference, similar to the findings in the lead user interviews in which only one additional motivation was mentioned: a financial benefit due to high prices for meat. The theme of 'enjoying exploration' was shared by a lot of the user test participants and was a positive influence on experimentation with vegetarian food. Lastly, the interviews uncovered different obstacles that participants felt towards experimenting with vegetarian food in the context of the ReduceBox.

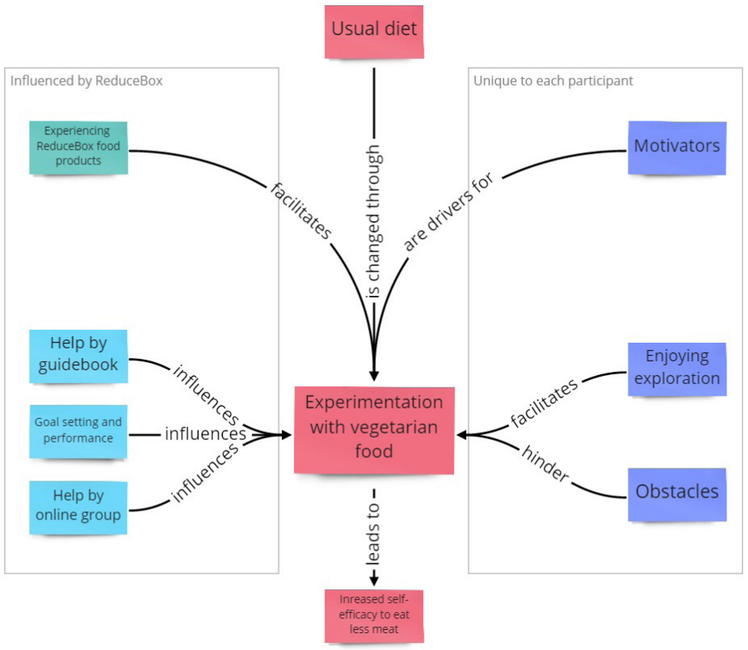


Figure 22: How experimentation with vegetarian food was influenced by thee ReduceBox and personal influences

Experimentation with vegetarian food

The goal of the box was to help people experiment with vegetarian food. Indeed, all of the participants did that to some extent. Some participants reported that the food products in the box were a major facilitator. Products they had not usedw before caused them to try out new dishes. The recipes also helped to experiment because they provided a starting point for cooking with unfamiliar ingredients. The level of independence in which people experimented with vegetarian food ranged from using recipes from the guidebook to adapting recipes from the guidebook to looking for recipes themselves online through to making up their own recipes with the ingredients that were available.

For instance, P4 stuck to a recipe from the guidebook for the tofu: *"I made tofu for the first time. I used the recipe from the booklet."* P6 used a recipe from the guidebook but adapted it to her resources: *"I tried the curry and changed it a little bit to what I had at home."* To cook the lentils, P4 looked for a recipe online: *"I made a lentil soup that I had found online with only vegetables, and it tasted very well."* Some participants experimented entirely on their own, for example P1 reported that she *"used the products in [her] own way"* and P7 said: *"I looked at the recipes for inspiration. But I made up new recipes myself."* P7 also mentioned that she involved other family members in the challenge: *"My daughter cooks once a week and she prefers meat. But this week I bought some vegetarian shawarma so she can prepare a vegetarian dinner for us."*

Based on the reports of the participants, the ReduceBox offering managed to encourage people to experiment with vegetarian food to various extent, suggesting that there is value in the overall offering for people who are open to change to a more sustainable diet. However, the user insights were only gathered over a one week period. The question arises whether this support in vegetarian or vegan eating would be in demand over a longer period of time and what elements of the product-service system would be most helpful. The attractivity of this concept as a business opportunity for Goodcase depends on the answer to this question. In the user test, different elements of the product-service system were differently successful in inducing experimentation with vegetarian food. These different elements, represented by the left half of the visual map, will be discussed below. It might be necessary to strengthen elements that seemed to be more promising in changing behavior and to put less emphasis or to discard others.

Self-efficacy to eat less meat

The assumption was that if people experiment with vegetarian food and try out new options that they are not used to, they learn that it is not difficult for them to eat meals without meat and that there are plenty of alternatives. Judging their comments, one can infer that some participants actually increased their self-efficacy when it comes to eating vegetarian meals, which is in line with the work of Bandura et al. (1999), who said that making new experiences with an unfamiliar behaviour helps people to generate more confidence in their ability to practice that behaviour. P4 for example, who made a lentil soup with an online recipe and liked it very much was positively surprised by the ingredient: *"It was very surprising because I had never tried lentil soup before."* For P6 cooking the tofu was

a lasting experience: *"The tofu was difficult to add flavour, but it was an eyeopener. I learned something new."* Moreover, she expressed that she *"learned that you can cook simple things without meat and that there is more than you think without meat."*

First of all, it has to be clarified that even though several people indicated that their self-efficacy towards eating less meat has increased it is not possible to predict if they will actually use these insights to change their behaviour in the future. To find out, a long-term study would be necessary. Nonetheless, comments from participants indicated that trying out products they had never eaten before helped them to increase their confidence in cooking vegetarian meals. Other products that were familiar to them to some extent made it easier for them to incorporate the products into their diet. Therefore, a balance has to be found of products that are new and products that are more familiar and easy to use.

Experiencing ReduceBox food products

The food products in the box appeared to be the main driver for experimentation with vegetarian food, more than the guidebook or the online group. While not every participant read or used the guidebook, every person used at least one of the products, some even used most or all of them. It was interesting to hear that people who already knew a certain product mostly started with this product. Concerning the vegetarian balls for example, P7 said that she *"had them before"* and it was the first thing she cooked from the box. Similarly, P3 had tried the vegetarian balls before and used them first, in combination with the vegetable pasta. For participants with families, sometimes the products didn't provide enough food for one meal. For P6, for instance, the vegetarian balls were not enough as a main dish for her family with three kids: *"I also made the vegetarian balls with satay sauce, fries and salad. Unfortunately it was not enough for the five of us so I had to make cheese souffles as well."*

The participants reported multiple positive experiences trying products they had never tried before, for example about the vegetable pasta: *"We didn't know the veggie pasta. I immediately cooked that with pesto, onions and mushrooms and it was very nice"* (P1). In another instance, P6 recounted a good experience with the vegetarian sausage: *"The [vegetarian sausage] was full of flavour, I wouldn't have expected that."* Even though P6 liked it, the vegetarian sausage was the only product that was explicitly disliked by more than one person. While P5 found it simply *"horrible"*, P2 explained that it *"doesn't taste at all, tastes more like flour."* P4 saw value in trying new products: *"The box helps you to try new vegan products, to know what's on the market, to keep you interested in these products."*

It appeared that the food products included in the box played an important role in initiating experimentation with vegetarian food because they offered a good starting point for preparing a vegetarian dish. In some cases, this caused participants to prepare a dish that they tried for the first time causing a memorable experience with vegetarian eating and raising their self-efficacy when it comes to eco-friendly cooking (Bandura et al., 1999). This tangible experience of trying out real food that the consumer does not have to select herself might contribute to making a behaviour change easier. (Link to integration chapter) The direct interference in the habits of the consumer by preselecting products that encourage meatless cooking seemed to exploit the potential of editing the consumer's choice architecture (Kelly & Barker, 2016), as suggested in chapter 5.1. All things considered, it can be assumed that it is valuable to include physical food products in the behaviour change concept.

Help by guidebook

The guidebook was supposed to help the participants during their week of reducing food waste and meat consumption. In the end, it was used less than expected by the researcher. However, it is important to say that at least two people had difficulties understanding the English text in the booklet. All of the participants were Dutch. Some participants had only looked at it or read it at the start but did not use it anymore throughout the week. Of the ones who used it throughout the week, only two people indicated that they used it to track their performance. The part of the guidebook that was used most was the recipe section. Many participants used it as an inspiration for cooking with the unfamiliar products, some also tried to create the recipes from the booklet. However, some of the recipes were perceived as relatively complicated. To help consumers eat less meat it would be best to suggest simple recipes with few extra ingredients to facilitate cooking with the products that they might not be familiar with.

Most people read and liked the tips section but some participants indicated that they were already familiar with the suggestions, for example P1: *"I read the tips but those are things I already knew."* Even though some of the tips were more or less obvious, there were people who appreciated them, for instance P7: *"Sometimes we don't see the leftovers in the fridge, so the tip about making leftovers more visible was a good one."* The reflection section was not used by any of the participants. It was considered too much effort. Even though some people had the intention to note something, they ended up not doing it, for example P1: *"I wanted to write something down in the reflection section but in the end I didn't."*

All in all, most participants indicated that they had read the guidebook, at least to some extent, but it was not used as thoroughly as it could have been. Whereas the researcher expected that it could potentially be too much effort for people to write down their experiences into the booklet, he hoped that more people would use it to track their behaviour. This leaves the question whether a physical booklet is necessary to help consumers reduce meat consumption. From an entrepreneur's perspective, it is advisable to try a different solution with a digital product, as the booklet printing adds to the costs of sales for the startup. A digital product could potentially make the support more convenient for users, it could be more personalised to the user's needs, it could visualise behaviour over a long period of time, and it would not require any material resources which would make the offering more sustainable. Moreover, the analogy cases in chapter 4 indicated that an app can be helpful in changing behaviour.

While it seemed that the guidebook in general was not used very much, the recipe section was quite popular. It seemed to be a good source of inspiration for consumers. It might be valuable to still offer recipes in a physical form, for example in the shape of recipe cards, as HelloFresh includes them in their meal boxes. In this form,

the recipes could be collected and easily revisited at a later time. Especially people who are less apt to use their smartphone for cooking could appreciate this feature.

Goal setting and performance

One part of the guidebook was the goal definition and another was the goal tracking for the week. Only three people used these sections as intended in the sense that they defined clear goals for themselves and tracked the days in the guidebook. P7 was one of the participants who did that. She challenged herself *"to go seven days without food waste and meat."* In the end she managed to reach six days of both not throwing away food and not eating meat. She liked about the self-challenging that it *"makes you think. You think about how many days you can reach without eating meat and what other things you can do."* Additionally to the two main challenges she set the goal of eating more vegetables for herself: *"Even if you don't eat meat you can increase your vegetable intake."*

Other participants set more vague goals for themselves and didn't register them in the guidebook, for example P3 *"tried to eat no meat for as many days as possible"*. In the end, she achieved three days without eating meat. P4 said that some days she *"wanted to eat meat and some days [...] vegan"*. She managed to avoid meat for five days. To track her days she didn't use the booklet: *"I wrote it down for myself. I thought it was easier to write it down on a separate paper."*

Defining clear goals and tracking behaviour in the guidebook lead to a greater involvement in the challenges but it was perceived as too effortful for most participants. Moreover, some participants who did not use the guidebook for goal setting and tracking still had good results compared to their normal behaviour. It seemed that the goal setting and tracking in the guidebook only served the individual needs of a few consumers, whereas others would have needed more push to do an extra activity like checking the boxes every day. A downside of the guidebook was that users could only record their behaviour over a one week period. Offering the possibility to track one's behaviour on the long term would make more sense for long-term behaviour change. This could be better overviewed with an app.

Having the second challenge of wasting food was rather confusing. The reason for adding it was to have a less difficult challenge next to reducing meat to give participants confidence, but managing not to waste food did not seem to make it substantially easier to reduce meat. Beyond that, it was considered as something that the participants were already good at. Therefore, it might be better to focus completely on the one challenge of reducing meat consumption.

Help by online group

When asked about their motivation and their favourite vegetarian meal after setting up the group, seven out of ten participants reacted. Motivations that people mentioned were eating more sustainably (often in the family to also teach the children), rediscovering vegetarian cuisine and supporting a healthier lifestyle. As their favourite vegetarian food, participants mentioned falafel sandwich, vegetarian quiche, wraps with spinach and meat replacement products like vegetarian cheese schnitzel. It became clear that some individuals were more involved in the group than others. Some people only posted a comment in the beginning and then did not take part anymore. Others commented more often, for example when they received the box, after they tried out some of the products or to react to other people's comments. After some days, the researcher suggested the members to post a picture of a meal they had made with the food from the box. However, only one participant shared a picture of a meal (see figure 23). In the further course, two people shared what they had made with the ingredients from the box in text form.

Figure 23: Screenshot of a discussion in the online group: A participant sharing a meal made with the vegetarian sausage from the box

In the interviews, the majority of people considered the online group a nice tool but noted that they did not get involved a lot: *"I posted a picture in the group when the products arrived but I didn't look at what other people were writing"* (P5) (to view the mentioned image, see figure 24). *"For me it is too much effort to participate in an online group. I only commented what my plan was for the week but I didn't look at what other people were writing."* (P7) The people who were more involved liked to read what other members were writing and valued the feeling of doing something together: *"I think that it's easier when you do it in a group, together with others to get tips and other recipe ideas without thinking about it too much. [...] I am not surrounded with a lot of people who don't eat meat so it is nice to have an online group"* (P6). Another reason that was mentioned for low involvement was the fact that there was not much interaction after the start of the group. P8 found that *"there was in the first days not much to see or do"* and P1 mentioned that *"the communication was short"*.

Figure 24: A picture shared in the online group: The food from the box after it had arrived

It can be assumed that an online group can be beneficial for users of this kind of product-service system, but it should not be expected of users to engage in the group every day if they do not want to. The interviews suggest that not all consumers value social interaction online in the same

way. However, users who participate rarely might already be influenced positively by only observing other people communicating about their experiences, according to the social norm effect (Eker et al., 2019). The set-up of the online group as part of the research platform had its downsides as people were used to visiting this website in a different context (for example filling in food research questionnaires or giving their opinion on new food innovations). This might have caused the users to perceive the group as more like a research tool than a communication group in their own interest. Therefore, a new test with a communication group as part of a stand-alone application should be conducted.

Enjoying exploration

In the interviews, the theme 'enjoying exploration' emerged. Most of the participants brought up that they enjoyed trying out new food in general and therefore also liked the experience with the ReduceBox. The following quotes are evident for that: *"Already before I got the box I liked to try new things."* (P3) *"I liked that there were products I didn't know. In the supermarket I also like to buy products that I've never tried before."* (P1) The participants also reported that opening the box was exciting because they could finally see the products that they had received. For instance, P5 mentioned that *"the surprise was nice."*

The comments from the participants imply that receiving unfamiliar sustainable food products can be an added value in the context of a sustainable food box. In case of a repeated offering, it might be advisable to always include an element of surprise in the selection of food, something that is new to the market and unlikely for consumers to have tried before. New products from small food companies suit this purpose well and by sourcing food from these companies small innovative businesses could be supported by Goodcase. However, as there is not an abundant amount of new food products that qualify for a sustainable food box it has to be assessed whether the value proposition of offering something new every time can be sustained over a long time.

Obstacles

The participants also identified obstacles that hindered them from experimenting with vegetarian food. In family settings, it was a problem if not everybody was on the same page. At the time of the interview, P6 only had the lentils left to try: *"The reason I haven't used them so far is that the children don't like it."* Similarly, P7 had identified difficulties when it comes to the family context: *"Doing it for myself is not that hard. If there are more people it becomes harder. My husband and my daughter want to eat meat sometimes. And on Sunday it's Father's Day and some more people from the family are coming. I don't know if I can fully avoid eating some of the meat then."* Other obstacles that were mentioned were the lack of the right ingredients to prepare a meal with the products from the box and considering ReduceBox products as not the right ones for a given moment.

It is clear that offering a selection of food products involves the risk of not satisfying consumers with every product. It might be worth taking this risk, however, to offer consumers the surprise experience of receiving something they did not know they would get. The issues raised by participants with families suggest that there is an opportunity to develop a separate product line that is focused on families. These boxes could include the right quantities for family dinners and child friendly products. After all, two participants mentioned that they perceived the box as a method to also teach their children about sustainable eating. To prevent the problem of not having the right additional products for included recipes at home while not creating another meal box it might be an option to communicate to customers beforehand what extra standard products they should keep in stock to be able to prepare for the arrival of the box.

Price

According to van Westendorp's (1976) **price sensitivity meter**, each participant was asked four questions to determine consumer price preferences:

1. At what price would you consider the product to be so expensive that you would not consider buying it? (**Too expensive**)

2. At what price would you consider the product to be priced so low that you would feel the quality couldn't be very good? (**Too cheap**)

3. At what price would you consider the product starting to get expensive, so that it is not out of the question, but you would have to give some thought to buying it? (**Expensive/High Side**)

4. At what price would you consider the product to be a bargain—a great buy for the money? (**Cheap/Good Value**)

Figure 25 on the following page shows the cumulative frequencies of the answers. Based on the answers from the seven participants that were interviewed, the acceptable price ranges from 7,50€ - 15,75€.

Considering a total retail value of 15,74€ of the food products alone, the acceptable price range of 7,50€ - 15,75€ was quite low. It must be mentioned though that the participants were biased by a question in the initial questionnaire that introduced the ReduceBox on the online research community. In this survey, participants were asked if they would pay 15€ for the box. This could have biased the participants. Moreover, the mere amount of seven observations is not enough to make a meaningful estimation. Nevertheless, the price range is very low. For a startup like Goodcase, the price for a box would have to be higher than 20€ to make it viable.

A reason for the low price that users are willing to pay could be that they compare it to other food boxes like HelloFresh or Marley Spoon which compete highly on price. Another version of food in a box that they could be familiar with are meal boxes in supermarkets which are also focused on offering a full meal for a cheap price. For the ReduceBox, this could mean that the concept has to be differentiated from the aforementioned offerings. More focus could be put on the aspect of supporting consumers in their quest of reducing their meat intake with the products being an added benefit. In this way, the offering would compete more with self-help programmes like Weight Watchers than with food boxes. This way of marketing the product-service system would be necessary to make it viable for Goodcase.

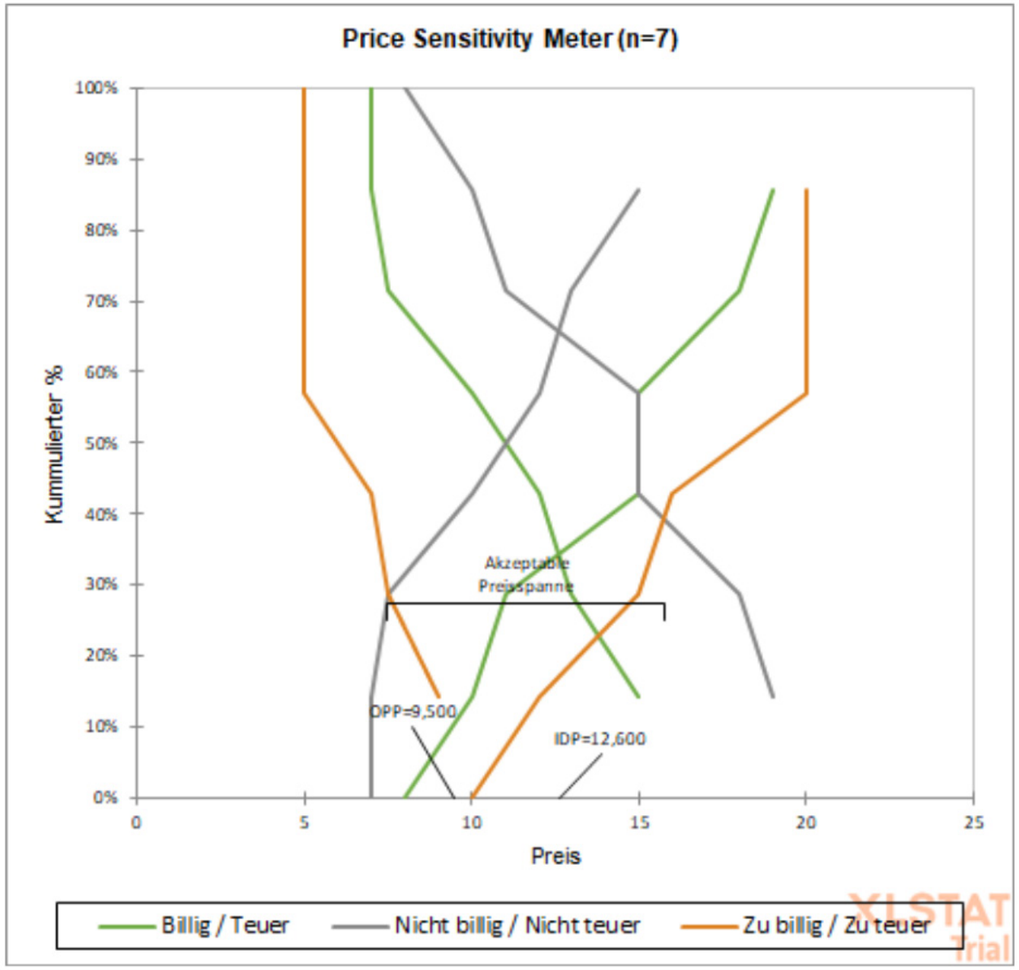


Figure 25: Plot of the price sensitivity meter based on seven user responses

7.3 Improved design proposal

Based on the results of the user test, a new design proposal with the central theme of reducing meat consumption was developed that could be tested with consumers in the future. While in the user test the ReduceBox was considered more like a one-time experience, the second iteration envisions how the ReduceBox could be offered within the frame of a long-term programme. The new proposal puts more emphasis on digital support options. This way, it is attempted to make the eating behaviour monitoring more convenient and to allow support over a long period of time. Moreover, the support would not be restricted to a physical booklet. The food products still play an important role for the concept but the service could also be used without ordering a food box. Digital behaviour change support is provided through an app (EcoEat) that bundles different functions, namely monitoring, data visualisation, social interaction, and providing helpful content like tips and recipes.

Physical offering: the EcoEat box

In the new design proposal, the food box is still filled with a selection of **sustainable food products**, accompanied by physical recipe cards. The focus should lie on healthy meat reduction. Products that come into question are meat replacement products, high protein foods like beans and lentils, and products that make vegetarian cooking easier like sauces or curry pastes. In the user test, it was pointed out that the box included a lot of soy-based products (four out of five). There will always be people who dislike a certain kind of food or who cannot eat it due to allergies. Therefore, the variety should be increased in the offering.

The recipe booklet was the most valued part of the guidebook in the user test. It seemed to be a good source for inspiration. Therefore, it was decided to include **physical recipe cards** in the EcoEat box that can be collected and easily reused. In the user test, some of the recipes were considered relatively complicated. To help consumers eat less meat it must be ensured to suggest simple recipes with few extra ingredients to facilitate cooking with products that customers might not be familiar with.

Digital support: the EcoEat app

In the user test, participants often did not use the **self-monitoring** functionality of the guidebook. The EcoEat app incorporates this feature and makes it easier to track one's behaviour daily. A short reminder is sent to the users at the end of each day to log whether meat products have been consumed. Additionally, users can also state if they have succeeded in avoiding other animal-based products like milk or cheese, in case they are even more ambitious. This way, users are reminded and can conveniently monitor their behaviour from anywhere.

Over time, consumers can observe their successes and developments in avoiding meat and other animal-based products through the app. **Data visualisation** will show users how many days per week they succeeded in the different challenges over the course of time. In this manner, they can see if they are improving over the weeks and might be more motivated to do so.

Within the app, users are assigned to small groups with other users in local proximity. In these groups, it is possible

to **socially interact** with each other, for example by exchanging recipes or sharing tips of vegetarian-friendly restaurants in the neighbourhood. Moreover, users can compare their progress with others' to get extra motivation. On an intragroup leaderboard they can see who performed best in terms of avoiding meat and animal-based products.

Lastly, the app will give access to **content** that helps users to eat more sustainably. Next to the physical recipe cards that are specifically meant for the products in the box, users have access to a broad range of vegetarian and vegan recipes in the app. Furthermore, they can resort to tips that make an eco-friendly diet easier to maintain. Moreover, users can generate their own content that is fed to the platform for other people to see, for example experience reports about a new product or personal advice on how to eat more sustainably.

Low-fidelity user interfaces in figure 26 suggest how the app could look like.

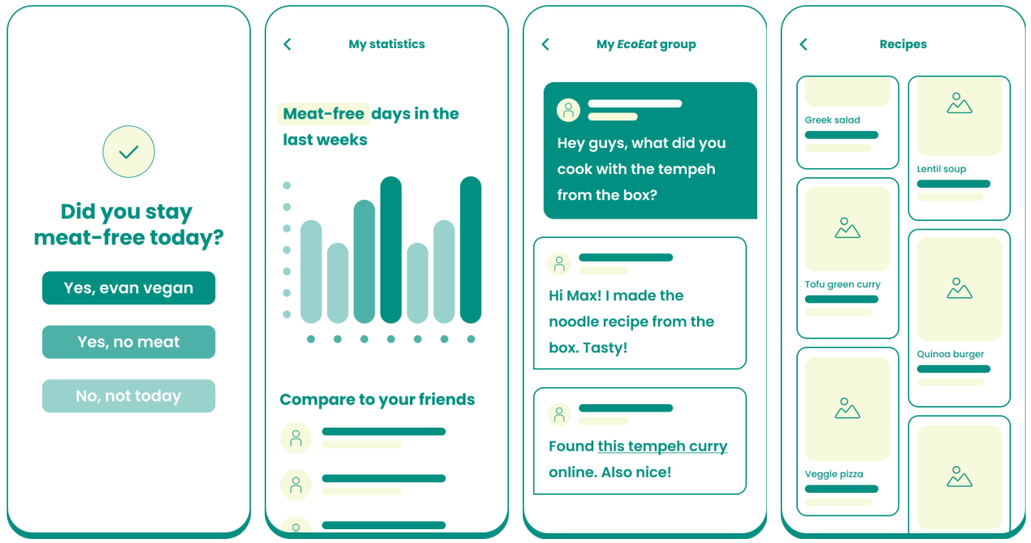


Figure 26: Mock-ups of the app user interface

Interplay between EcoEat box and app

The box and the app are connected. Ordering a food box grants access to the full functionality of the EcoEat app. The app can also be used independently from the box. However, to be able to use the full functionality without ordering food boxes, a monthly fee of around 5€ would have to be paid, employing a "freemium" business model (Kumar, 2014). The cost of the food box would be slightly higher than 20€. After ordering a food box, customers would automatically receive a new box with different products every month, in case they do not decide to discontinue with the programme. Thereby, the default effect is used to nudge people to continue their participation (Ölander & Thøgersen, 2014). By encouraging customers to continue with the programme and making it convenient to regularly try vegetarian food, durable, new habits can be formed (Anderson, 1982; Roundtable, S. C., 2006).

When customers open their first food box, a flyer encourages them to try the app to monitor their behaviour and to check additional online content. In the app, new boxes are promoted. This way, the app and the boxes complement each other and keep customers motivated to stay part of the EcoEat ecosystem.

8. Conclusion and Implications

Content:

8.1 Conclusion
8.2 Implications
8.3 Limitations
8.4 Personal reflection

8.1 Conclusion

The research aimed to facilitate environmentally sustainable food consumption behaviour with a food box. The goal was to design a service accompanying the food box which can help Goodcase customers to change their eating behaviour in the long term. The following can be concluded in relation to the main research question of this Master thesis.

Research was conducted on how individuals change to more sustainable dietary habits, what interventions can be effective to support behaviour change in the context of a food box, and how consumers deal with obstacles when changing to a more sustainable diet.

The literature research indicated that self-efficacy and social norms play the main role when it comes to changing to more eco-friendly diets (Eker et al., 2019). Some lead users reported that they had initially increased their self-efficacy to switch to a new diet by challenging themselves to perform the new behaviour for a certain time. Therefore, the design solution focused on self-experimentation through self-challenging and self-monitoring to raise self-efficacy, paired with the facilitation of social interaction with other users online, motivating each other to maintain their efforts of changing their diet. This combination is also applied in other behaviour change services, e.g. the Weight Watchers programme which helps consumers to eat healthier.

Based on these key insights, the design brief defined the following design goal: To increase the self-efficacy of consumers trying to change to a more environmentally sustainable diet by facilitating self-experimentation with a food box. Following this brief, a product-service system consisting of a food box and an online group was designed that put the focus on meat and food waste reduction. The box contained high-protein vegetarian products, other vegetarian products that can facilitate vegetarian cooking, and a challenge guidebook.

In the subsequent user test, ten participants received a box and used it for one week. Qualitative research with eight of the consumers suggested that the food products triggered experimentation with vegetarian food which helped consumers to increase their self-efficacy to eat less meat. Vegetarian eating might have been positively influenced by the meat reduction challenge. However, many users found it too inconvenient to monitor themselves daily with the guidebook.

Finally, a second iteration of the design concept was proposed that omitted the food waste topic and focused more on the reduction of meat consumption. The concept, called EcoEat, combines a food box with a supportive app which could allow users to monitor and improve their behaviour over the long term and in a more convenient way. This design proposal could be tested in the future.

The main conclusion from this project, especially based on the insights from consumers, is that providing real experiences with unfamiliar, eco-friendly food products can positively influence the consumer's attitude towards sustainable diets. It can open them up towards trying out more food of this kind and thereby helps them to switch to a more sustainable diet. More of these opportunities for trial should be provided to consumers. Food boxes are a good medium to provide these experiences

regularly. With a complementary behaviour change service the experimentation with a sustainable diet can be upheld if the users are guided in a way that does not require too much effort from them.

As the overarching intention of this project was to contribute to the mitigation of climate change by influencing consumer behaviour, the solution has to be critically assessed with regards to that goal. While Thøgersen and Crompton (2009) suggest that global environmental challenges cannot be solved through small lifestyle changes, diet is the factor that allows consumers to have the greatest impact on their ecological footprint (Poore, 2018). With a programme like EcoEat, only a relatively small number of consumers can be reached. But initiatives like this might be necessary to spread the idea of a more environmentally sustainable diet.

In this context, excessive meat consumption could be compared with smoking. Smoking also did not lose its positive reputation from one day to another. Instead, it took a long time for the practice to become socially undesirable, many decades after scientific information about the negative consequences of the practice became available (Kelly & Barker, 2016). The same might become true for excessive meat consumption if the right actions are taken.

8.2 Implications

Based on the results of this research, there are several implications for further research, designers, entrepreneurs, innovation managers, and policy makers.

Further research

In this research, the impact of the design concept was evaluated through qualitative user research over a relatively short test period of one week and with a rather small sample size of eight consumers. Therefore, the study can only give indications on the effect of the designed concept. To be able to make reliable statements about the potential of the design proposal to change diets of users sustainably, a long-term study with more participants and a control group should be conducted that assesses the impact of the design quantitatively. A longer duration of the study is proposed to determine whether the combination of a physical food box with an accompanying behaviour change support service can create new sustainable eating habits instead of merely causing a short-term behaviour change.

Designers

Based on the research, the main recommendation for designers in the sustainable food industry is to guide consumers to have more experiences with sustainable food by presenting eco-friendly offerings in a competitive way and enabling them to maintain sustainable diet behaviour. Designers should be aware that they have the power to steer users to make more eco-friendly diet choices with sophisticated designs of user interfaces and applying behaviour change techniques. This knowledge is especially relevant for designers working in the consumer food business, for example for digital grocers like Crisp or Picnic, meal box services like HelloFresh or Marley Spoon or at the online divisions of established supermarkets.

Entrepreneurs

The awareness of consumers that meat consumption is bad for the environment is not mainstream yet, but it will increase. This offers opportunities for entrepreneurs to offer new products and services that serve this trend. Innovations which inspire experimentation with vegetarian food through food boxes could help to change diets of consumers towards more sustainable ones. However, entrepreneurs should investigate whether the added value that they provide with a food box service suffices for consumers to pay a premium price which might be necessary to start a business. Based on the price preferences that were determined in the user test, consumers are expecting good value for money when a service includes the delivery of food products so the offering has to be framed in a way that convinces users of the value of the behaviour change support they receive. Apart from that, entrepreneurs in this field can draw on growing support from government grants that target sustainable businesses, sustainability-focused venture capital firms, and other organisations that support sustainable food businesses like ProVeg.

Innovation managers

The results of this research reveal opportunities for innovation managers in the online food business to promote the incorporation of behaviour change

techniques in their systems that nudge customers to make more environmentally sustainable diet choices. Digital grocers, meal box services or online divisions of supermarkets could allow users to monitor the environmental sustainability of their choices over time and thus help their customers to change their diet. This could not only cause a long-term diet shift in consumers that is beneficial for the environment, but could also strengthen the sustainable image of the companies.

Public policy makers

This research has indicated that consumers derive their motivation to eat eco-friendlier from their desire for more sustainability. Providing opportunities for consumers to try out new vegetarian food raises their belief in their ability to eat more vegetarian food in the future and less meat. With regards to global environmental goals, policy makers should encourage and incentivise consumers to try new plant based food options. It should be ensured that natural, plant-based ingredients are reasonably priced. Subsidies of the meat industry should be discontinued. Campaigns could change the social norm of daily meat consumption towards a scenario in which it is perceived normal to avoid meat, even though this might be difficult to realise due to the powerful meat industry. Moreover, policy makers could support sustainable food entrepreneurs (e.g. vegetarian or vegan restaurants and food services) with grants.

8.3 Limitations

Due to the measures of the Dutch government to reduce the spread of COVID-19, the qualitative research was conducted online or by phone. Although consumer interviews were mostly conducted via video calling, which comes close to having a face-to-face conversation, there were some limitations. Emotions of the user during interviews were not always clear. Missing these valuable cues, that could have been used for further probes, could have had an impact on the quality of the research with lead users and user test participants.

Only a limited number of consumers could be recruited for the qualitative research (twelve participants in the lead user research and eight participants in the user test). Of course, this has influenced the composition of the sample (homogeneity, degree of freedom) and limits the transferability of the results.

In the lead user research, most participants were students or young professionals with university education whereas the target group of Goodcase consists of middle-aged consumers with a good income, but from various educational backgrounds. While it is possible to learn from younger, highly educated people with the objective of conceiving a product or service that can help an older generation, it has to be mentioned that the younger generation has a different social network influencing their dietary behaviour and might regularly use tools that the older generation could be less familiar with. Therefore, transferring insights from the lead user sample to Goodcase's target audience had constraints.

For the 'ReduceBox' user test, participants were recruited from the online food research platform "aan onze keukentafel", hosted by the Future of Food Institute. Members of this community are used to evaluating food innovations and might therefore be biased in the sense that they are more familiar with other initiatives in the food sector that promote sustainable diets. The participants were only offered a free trial box after they had evaluated the concept positively and indicated that they would be willing to pay for such a product. Nevertheless, the anticipation of possibly receiving free products might have affected their willingness to take part in the test and it must thus be questioned whether the sample represented the real target audience of Goodcase well.

Another limitation of this research was that, caused by the qualitative research approach, currently no measurements support the potential decrease of meat consumption through the 'ReduceBox' concept, especially not in the long term. Although first validations of the concept indicate the potential increase of vegetarian eating compared to participants' usual diets, no quantitative data can support these statements. Therefore, it is advised to conduct a long-term quantitative experiment to generate more reliable results.

Finally, some limitations concern the new design proposal 'EcoEat'. It is a new iteration of the concept that has not been tested yet and therefore can only serve as a starting point for future experimentation. Due to time constraints, it was not possible to dive deeper into the complexity of the concept design. Currently, only guidelines for the design of the new proposal are worked out, including an app interface as a minimum viable product. Limited knowledge of application design could be applied in the design of the interface.

8.4 Reflection

When I was looking for a graduation project I considered graduating in my own startup as the ideal opportunity to contribute to our young company and to frame the project in my own personal way. Just like my two co-founders Arwin and Gijs, I followed the path of graduating at Goodcase. Choosing a project that aimed to improve the efforts that we were making towards a more environmentally sustainable food consumption was something that lay close to my heart. I had the strong feeling that we could not just send food to consumers and expect that they would change their eating behaviour in the long-term. A strategy was missing to help our customers to switch to a more sustainable diet.

After starting the project, I dove right into literature research to learn more about environmentally sustainable food consumption and, in particular, behaviour change. For me, with a bachelor in architecture and a passion for technology, it was not always easy to deal with complex social theories that were never free of doubt, did not necessarily apply to the individual, and were often quite intangible. In addition, it was difficult to accept the fact that my design could not be validated in the sense that it could actually contribute to long-term dietary change in consumers, leaving me with a rather vague proposal that would have to be tested over a very long time to prove if it really caused people to change their behaviour.

Graduating within my own startup was a challenging experience, as well, which unfortunately resulted in the end of our company. Before the start, we were warned not to consider our work for the startup and our work for the graduation as the same thing but instead keep the two separate. We were also told about another startup in which the founders graduated one after another to not affect the daily business of the company too much. Nevertheless, me and my two co-founders prioritised graduating soon and made a plan on how we would spend our time during graduation. Four days per week were assigned for graduation and one day for work on the startup. In the end, this turned out not to be enough to keep the momentum going and to produce satisfying results.

Two month before the end of our graduation, we decided to stop with the company together with our mentor Matthijs, because we had lost our passion for the startup and lost the confidence in our team which only consisted of industrial design students. On the one hand, this was a relief initially because the worries about the troubled startup were gone. On the other hand, it also felt like the reason for the existence of the project was gone which affected my motivation negatively. It took me quite some time to reconcile with the fact that my project would now be more for the general public than for a specific goal.

In hindsight, I would have changed our approach towards combining graduation and startup. I would have allowed ourselves more space for experimentation during the graduation time and would have put less focus on achieving results in terms of sales numbers. We made the mistake to switch into business mode too quickly and forgot to reiterate our approach. This was to a large extent caused by the increasing burden of the work that needed to be done on our graduation projects. Instead of sales goals we could have, for example, set ourselves goals on testing multiple minimum viable products, to learn more from consumers.

Putting aside the negative, I also learned a lot during my graduation project. I could increase my knowledge in a field I was already interested in, namely sustainability, and I could gain knowledge in a field that was new to me: behaviour change of consumers. Conducting 19 interviews, I learned a lot about talking to consumers and getting insights from them, which was one of my specific personal goals. Even though interviewing can always be further improved, I am now much better at extracting the relevant information from respondents.

Graduating within my own startup taught me a lot as well. Having full responsibility for the project, it forced me to make my own decisions and taught me to work more autonomously. Moreover, it became clear to me how important a positive attitude is when dealing with the uncertain situation of starting a company. Even though Goodcase came to an end, I now feel much more prepared for starting a new venture in the future using my strategic design skills to make it a success.

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