



Towards shoppable health

for people with pre-diabetes

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Executive summary

Preventing or decreasing chronic health conditions by healthy eating is increasingly seen as a shared responsibility. Defining what is healthy is person-specific, depending amongst others on a person's health and responses to food. Supermarkets, which are considered highly influential in shaping the diet of customers, are starting to serve customers based on their health needs. This thesis explores how the Dutch supermarket chain Jumbo can tailor their service provision to the health-driven dietary needs of their customers and what implications and strategic advices are connected to this.

The thesis focuses on customers with pre-diabetes. In pre-diabetes, blood glucose levels are elevated. People with elevated blood glucose levels have a high risk to develop diabetes type 2, which causes them to live in suboptimal health and simultaneously puts pressure on the care system. Although food is part of the cause to develop pre-diabetes, this thesis emphasizes the role food can play in the solution, namely: a healthy diet can prevent, delay, improve and reverse diet-related diseases (as highlighted in Image 1).

However, adopting a healthy diet is seen as complicated. Through a service design study, which involved participants who adopted a carbohydrate-restricted diet to manage their blood glucose levels, thoughts and emotions during the process of dietary change were translated into a customer journey that reveals multiple opportunities for service delivery to support healthy eating. In co-creation and co-reflection with participants, these opportunities led to the construction of a portfolio of concepts. Based on the insights of literature research, fieldwork and these co-creation activities, the work outlines several strategic advices and considerations for businesses that support healthy eating to establish services related to precision nutrition. The work concludes by emphasising the view of food-as-a-solution and describing how personalized services, by means of precision nutrition, are suggested to positively impact people, society and the business results.

Therefore, the service design approach and outcomes outlined in the thesis inspire and stimulate Jumbo, and other businesses that support healthy eating, to take social responsibility by utilizing diet-as-a-solution to reduce and prevent diet-related diseases, and thereby contribute to the health of society, via group-based and personalized services.



Preface

This master thesis sparks the discussion on how commercial businesses, such as supermarkets, can truly care for their customers and their health. Embracing the view of ‘food-as-solution’ and the potential of precision nutrition, I proudly present a portfolio of concepts and associated advices to facilitate and support ‘shoppable health’ for customers with pre-diabetes. Yes: a healthy diet can prevent and delay development of chronic health conditions and thereby positively impact people and society.

While attempting to fight the pandemic of diabetes, the COVID19 pandemic hit all of us in our face. This unforeseen circumstance has influenced this work, as is further detailed in the section below. At the same time, I hope that COVID19 created momentum: momentum to start truly caring for each other and taking social responsibility for good health and well-being. Together we can! Enjoy reading, and feel free to contact me to exchange thoughts.

COVID19

At the midst of my work, the world was confronted with COVID19. Besides the enormous impact as a human tragedy, the outbreak also shed a different light on this work and impacted some of the core values in my design heart, such as engaging users and going out into the field. This section informs the reader about the consequences of this circumstance on this work, enabling the reader to interpret and evaluate the work with this in mind.

The main consequence was the limitation in user contact. I consider myself lucky that the timing allowed me to perform various fieldwork activities (see Section 3.1) and a first co-creation session with students in the pre-COVID19 timeframe. However, the virus withheld me to engage in face-to-face co-creation sessions to collaboratively design new services. As is elaborated upon in the discussion, COVID19 posed difficulties and limitations in finding people from the target group to participate in co-creation activities and the circumstance complicated the co-creation activity itself. I had to use online medium, such as phone and Skype, for contact. This online approach urged to use different design vocabulary and practice flexibility and problem-solving. For example, it was challenging to establish a creative atmosphere without physical presence and hands-on interaction. How I dealt with this? Due to this given condition, I developed concepts on my own, grounded in the insights from literature and fieldwork, parallel to the online co-creation sessions. These ‘self-developed’ concepts were later co-reflected upon via online interviews.

This limitation is visible in the outcomes of this work. The portfolio of concepts presented in Chapter 5 did not result from the intended face-to-face, group-based, co-creative sessions. Instead, the concepts are primarily a combination of online co-created concepts with individuals and concepts that have been developed by myself and have afterwards been co-reflected upon with participants. Consequently, due to the limited quantity and quality of user involvement, it is possible that the concepts are more shallow and lack a certain level of richness and depth.

Words of appreciation

It was rewarding to work on the topic of customized dietary support as it holds great potential for people's health and is in the midst of becoming more widely available to society. I feel glad that I had the opportunity to delve into this topic in collaboration with supermarket chain Jumbo, who gave me all the trust and support to contextualize my work and challenged me to aim for implementable solutions.

First and foremost, I am grateful for all wisdom and dedicated support from my supervisors from TU Delft: Marina Bos-de Vos and Dirk Snelders. Innovation is a roller-coaster; and you challenged and encouraged me to take a new, exciting ride. At all times, you supported me during this ride to transfer the energy from going down the hill to reach new heights. I celebrate that we contently arrived at the finish together and can look back at a beautiful ride!

Marina, I appreciate your engagement, enthusiasm and detailed, quick and workable feedback. It was a pleasure to not only learn, but also actually create ‘shared value’: thank you for the opportunity to collaboratively write a paper on the basis of this graduation. Dirk, I want to thank you for all your ‘brainwaves’, triggering me to critically reflect on the topic and decisions from a wide array of perspectives. I feel privileged to work with both of you during my academic journey. I grew to become a confident designer, looking forward to a next challenge, while also a bit sad to end my academic journey, at least for now ;)

I want to thank Robert Jan Koens, Director Corporate Strategy and manager Foodcoach at Jumbo, for the engaging discussions we had and the opportunity to explore this topic for Jumbo. I remember the comparison you made to the tale of ‘The Goose That Laid the Golden Eggs’. This reference was spot on; and will be one of the main lessons that I gained during last months. It taught me to see the value of my work and of the innovation process; keeping me away from desperately searching for the single golden egg.

Moreover, this work would not have been possible without all the participants and stakeholders who are mentioned in Section 3.3; thank you all!

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Reading guidelines

This thesis consists out of seven chapters (as shown in Image 2). The **FIRST CHAPTER** provides an introduction to the topic, aim and relevance of this master graduation thesis. The **SECOND CHAPTER** contains a literature study about diet and how unhealthy consumption behaviour can lead to the development of (pre-)diabetes. The chapter continues by describing how food can also be the solution to prevent, delay, reduce and reverse chronic health conditions, such as (pre-)diabetes. Chapter two concludes by discussing the process and possible interventions techniques to achieve dietary change. The **THIRD CHAPTER** describes fieldwork activities and resulting insights from user research, discussions with experts and stakeholders and an analysis of Jumbo and the care and retail market. **CHAPTER FOUR** provides several graphical representations summarizing the insights from the literature study and fieldwork. The purpose of the synthesis is threefold: to map the complexity of the topic, to show my interpretation and to form a starting point for ideation. The main outcome is a customer journey depicting the thoughts and emotions people may experience during the process of dietary change and outlines five windows of opportunities. **CHAPTER FIVE** starts by sharing a new perspective on Jumbo's vision by integrating social responsibility to care for customers' health. Afterwards, it describes the design process of co-creation and co-reflection with potential users that led to the development of a portfolio of concepts. These concepts include small-but-mighty changes to existing services of Jumbo and a collection of stand-alone service concepts. **CHAPTER SIX** outlines several strategic advices and considerations for Jumbo, or other businesses that support healthy eating, that emerged from the insights from literature, fieldwork and ideation. This chapter also provides a tentative advice related to the service concept outcomes and Jumbo's roadmap. Finally, before emphasizing the main message, **CHAPTER SEVEN** discusses the contribution of this work and critically reflects on the intention, process and outcome.

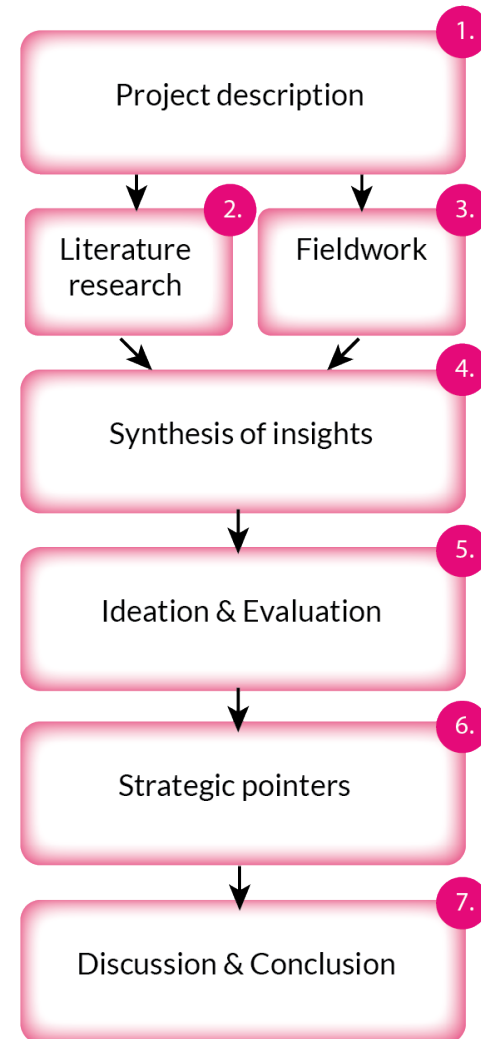


Image 2. The design process that characterizes this thesis and also reflects the structure of this report.



Nice-to-know

Throughout the thesis you find several of these boxes. They contain additional information.

“Healthy eating and healthy living should not be seen as punishment. Rather they should be viewed as a vehicle to wellbeing.”

~Paul Blokhuis, state secretary, 2020

Chapter 1 |

PROJECT INTRODUCTION

This chapter provides an introduction to this master thesis. It starts with presenting the project partners, project goal and the target group. Afterwards, it shares the design approach that characterized this work. The fifth section discusses the relevance of the thesis. The chapter is concluded with a list of take-aways.

In this chapter:

- 1.1 Collaboration partners
- 1.2 Context
- 1.3 Target group: pre-diabetes
- 1.4 Design goal, Approach & Deliverable
- 1.5 Relevance
- 1.6 Take-away

1.1 | Collaboration partners

This master thesis is in collaboration with two parties, being: the Dutch supermarket chain Jumbo (from here: Jumbo) and the faculty of Industrial Design Engineering, Delft University of Technology (from here: TU Delft). Jumbo is involved as the company client. Coaching and assessment is performed by a two-headed graduation committee from TU Delft.

AN INTRODUCTION TO JUMBO SUPERMARKETS

Jumbo, founded in 1979, is the second largest retailer in The Netherlands (Jumbo, n.d.). In 2018, Jumbo had 677 stores, 787 million euro revenue and approximately 20 percent market share. Since 2019, Jumbo also became active in the Belgian market. Jumbo has its headquarters in Veghel and is owned by the Van Eerd family.

Formula and Offer

Jumbo applies the formula 'best service + biggest assortment x lowest price' and offers their customers seven guarantees to create a positive shopping experience. These are elaborated in the company Analysis that can be retrieved in Appendix B.

Jumbo supermarkets are part of the Jumbo Group Holding, which also contains the self-service restaurant La Place and a dedicated shop for Golf sports. Strategic collaborations and acquisitions enable Jumbo to offer a unique combination of food and non-food via multiple channels: Jumbo's Foodmarkt stores provide rich-experiences (see Image 3), while the Jumbo-city stores are valued for their accessibility. Besides brick-and-mortar stores, Jumbo also facilitates online shopping. A hybrid format can be seen in Image 3, which highlights Jumbo's creativity in marketing.

Developments

Similar to other supermarkets, Jumbo pursues ambidexterity. This implies that Jumbo balances their day-to-day, exploitative activities with exploration of future opportunities to remain relevant (O'Reilly & Tushman, 2004). These future developments include the 'Foodcoach' application, which provides nutritional support to professional and recreational athletes, and the 'JumboExtra's' savings program. The latter was rolled out in February 2020, and the Foodcoach application can be expected soon. These developments are essential to remain distinctive and competitively relevant.



Image 3. Jumbo in a new guise. On top, Jumbo Foodmarkt, which makes shopping a true sensory experience. The middle and bottom images show a marketing stunt. While waiting for the bus, people scan products to create a purchase list that can be used for online shopping. Images from jumbo.nieuws.com

1.2 | Context

THE ABNORMAL AS THE NEW NORMAL

Consumption behaviour in society has changed drastically over the years. The answer to the question: 'What's for dinner today?' is influenced by the offering of global foods, processed foods and prepared meals that are convenient, cheap and palatable. This study focuses on diets rich in carbohydrates, which have a high global prevalence (Nelson et al., 2018). In fact, excessive carbohydrate intake has become the new normal.

THE DUAL FACES OF FOOD

Food and health are two primary human needs, which are interconnected. Our health starts at our plate. And this plate can have two faces. On the one hand, food is the cause of chronic health conditions. Globally, one in five deaths are due to poor diet (Afshin et al., 2019). In the Netherlands, unhealthy food consumption causes more than eight percent of the total disease burden, 129 thousand deaths and 6 milliard euro costs yearly (Rijksinstituut voor Volksgezondheid en Milieu, 2018).

At the same time, food has the potential to be the solution (Dekker, Rijnks, Strijker, & Navis, 2017). Healthy food can delay, prevent and improve chronic diseases (De Roos & Brennan, 2017; Dekker et al., 2017). The motto as already expressed by Hippocrates 2500 years ago: 'Let food be thy medicine' is still actual today. The nutrients in food are essential for living and form the basis of a healthy population (Gibney, 2002). Therefore, it is critical that we reconsider the new normal, and start using food as medicine.

CUSTOM-MADE FOR DIETARY SUCCESS

Hippocrates also coined the fundamentals of taking an individualized approach in health by mentioning: 'It's more important to know what sort of person has a disease than to know what sort of disease a person has'. This argument is evidenced by research showing that people have unique blood glucose responses to food (Zeevi et al., 2015), implying that there is no 'one-size' fits all' diet (Szakály, Fehér, & Kiss, 2019). This drives generic food recommendations to be replaced by advices tailored to specific groups and characteristics of individuals by means of 'precision nutrition' (Palmnäs et al., 2019). This line of thought is further supported by the fact that dietary change, to be effective, should match a person's context and values (Aletta Jacobs School of Public Health, 2018).

HEALTH AS SHARED RESPONSIBILITY

Achieving successful dietary change is increasingly seen as a shared responsibility (Prijs, 2018). Action is required from multiple stakeholders, calling for change in individuals, society and actors in ecosystems such as care and retail (Mozaffarian, 2016). For example, the Dutch government established the 'prevention accord' in which they see supermarkets to promote healthy consumption (Ministerie van VWS, 2018).

THE ROLE OF SUPERMARKETS

The view of health as shared responsibility demands supermarkets to change their role and take social responsibility. Yet, little is known about how supermarkets can successfully facilitate and support their customers in adopting and maintaining a healthy diet. Context analysis shows that businesses are increasingly integrating health services in their value proposition (see Appendix C). For supermarkets, who compete in an industry with high levels of saturation and competition, precision nutrition provides an opportunity for differentiation (Rabobank, 2019). As this service approach to serve customers based on their health needs is new this thesis delves into this specific area of investigation and aims to answer the following research question: How can supermarkets tailor their service provision to the health-driven dietary needs of their customers? Simultaneously, the study explores what implications and strategic advices are connected to this.



The dual faces of food related to (pre-)diabetes

Consuming an abundance of (processed) carbohydrates causes insulin resistance and elevates blood glucose levels (Zeevi et al., 2015). People with elevated blood glucose levels have a high risk to develop diabetes type 2, which causes them to live in suboptimal health and simultaneously puts pressure on the care system in terms of costs and manpower (Gibney, 2002). Studies have shown that reduced carbohydrate intake as a nutritional strategy has beneficial effects on blood glucose levels in both healthy people and people with diabetes type 2 (Westman et al., 2007) and can thus be used as treatment and for prevention.

"Let food be thy medicine, and let medicine be thy food."

~Hippocrates



Similar to a car, the body needs fuel to function. This fuel comes from consuming food: which contains carbohydrates, fat and protein. Likewise, just as a car needs a small amount of oil, a person needs small doses of vitamins, minerals and trace elements.

The driver has the freedom to reach every destination. To a great extent, the performance depends on the driver's skills and behaviour. Also in nutrition, a person has all freedom and is considered responsible. Yet, the driving is also impacted by the quality of the car, the road and driving circumstances. Similarly, a person's health and environment impacts food behaviour. And also the culture is of influence. For example: is driving when being drunk allowed? Is it tolerated that a person denies a cake at ones birthday?

A difference is that a car receives systemic, preventive checks, while this is rarely the case for a person. As a result, the person drives with closed eyes, through changing environments. The person risks breakage and accidents, creating danger for himself and others. Finally, the person finds his car transported to garage, or in the worst case: a dump.

Intermezzo | Analogy with the car industry

If your body was a car...

Taking care of our health can be compared with driving and maintenance of a car.

Just as the car industry combines commercial stakes with the experience stakes of a customer, also the food system should be designed to be profitable and successfully responding to the (health) needs and desires of customers. The ideal food system creates skilled drivers, and provides the best fuel, optimal driving conditions and sufficient pit stops that are tailored to each specific car. This empowers drivers to reach their destination quickly, without hassle and most importantly: in good state.

This intermezzo is inspired by the FoodTechnologyWeek (2019) and Mozafarrian (2016).

1.3 | Target group: pre-diabetes

This thesis focuses on middle-aged people who have pre-diabetes that is caused by poor diet and who are in the position to change their diet. This section motivates this choice and explains how this targetgroup has been selected.

FIVE PURPOSES OF FOOD IDENTIFIED BY JUMBO

Broadly speaking, the basis for the choice to focus on pre-diabetes is Jumbo's view on the purposes food can play for customers. Jumbo identified five purposes of food, as displayed in Image 4 (personal contact with R.J. Koens, director Corporate Strategy, December 2019). The purposes range from providing energy and pleasure to serving people in their performance and health. Each person may prioritize one of these purposes according to their values, health and context. This implies that each purpose represents a unique group of customers, with specific desires and needs. Therefore, each food purpose can be seen to represent a possible targetgroup.

FURTHER EXPLORATION OF THE PURPOSES: MY ACTIONS, REASONING AND CHOICES

Via a four-step process, taking the food purposes as a starting point, I arrived at the targetgroup of pre-diabetes. Each of these steps is briefly explained below.

1. Sub-specifying 'Performance' and 'Feeling better'
Analysis of the purposes revealed a big variability in the purposes 'performance' and 'feeling better'. Therefore, I identified two sub-groups for these purposes (see Image 4).

Performance was subdivided in sport performance, which is the focus on Jumbo's Foodcoach application, and performance for undergoing medical treatment. The latter is in line with the hospital-wide programs, such as 'Better in, Better out', which aim to improve people's health prior to surgery or treatment.

Feeling better was further specified in cardiovascular disease and diabetes. These chronic diseases are influenced by diet and have the highest prevalence in The Netherlands (Institute for Health Metrics and Evaluation, 2020). There are three main types of diabetes, being type 1, type 2 and gestational diabetes (diabetesFonds, n.d.). Type 2 diabetes is the most common type of diabetes, present in 90 per cent of the cases. Since development and management of diabetes type 2 is strongly modifiable by diet, the subgroup diabetes was narrowed down to diabetes type 2.

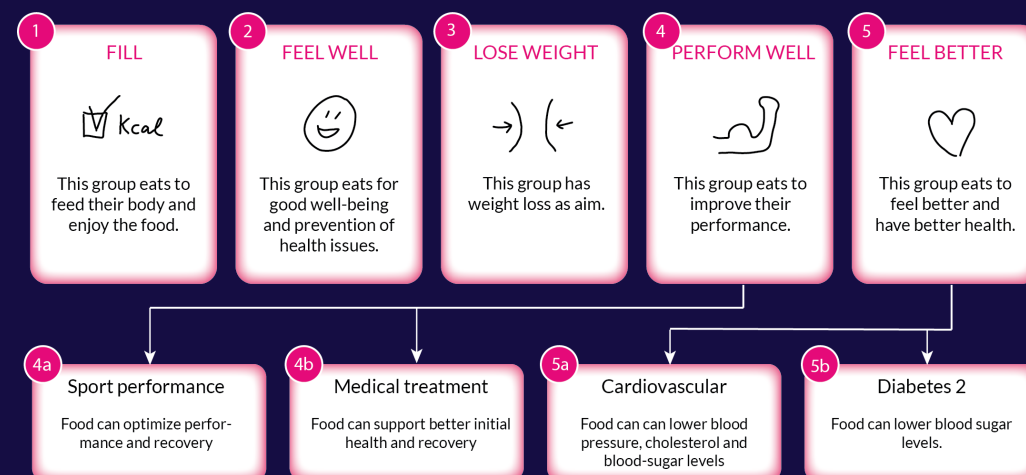


Image 4. The five purposes of food as specified by Jumbo (top) and the additionally created sub-clusters (bottom).



Image 5. A persona that gives an impression of the targetgroup.

2. Creation of persona's

Second, for each purpose specifically, I explored four aspects, namely: the size of the group of people that belong to the group, what food qualities are important for them, the availability of supportive tools and lastly, I estimated their degree of motivation to eat healthy. This information has been captured in a model that is shown in Appendix E. Based on these insights, a persona was created for each of the different purposes (also see Appendix E) with the aim of creating empathy and understanding of possible needs and desires.

3. Evaluation resulting in focus on diabetes type 2

Third, I evaluated the aforementioned health purposes on a matrix assessing: 1) the degree that food plays a leading role in achieving the purpose and 2) the value that Jumbo can add to customers' lives (by assessing the already available support). This mapping showed highest potential to focus on people with diabetes type 2, because their disease is highly modifiable by diet and, to date, there is limited support available to use food as medication to lower their blood glucose levels. The matrix and further argumentation of this choice can be retrieved in Appendix E.

4. Narrowing down to pre-diabetes

For diabetes type 2, the Dutch national program '2diabeat' identified four subgroups that are useful to target interventions (2diabeat, 2020). These are people with: 1) elevated risk of developing diabetes type 2, 2) pre-diabetes, 3) diabetes type 2 that is reversible and 4) irreversible diabetes type 2.

Through discussion with professionals during region sessions of the 2diabeat program (see Section 3.3), I decided to focus on the group of people with pre-diabetes. In this group, the blood glucose level is elevated, but does not yet reach the levels to be diagnosed with diabetes. Professionals framed this group as a 'window of opportunity' for the following reasons. The group, expected to represent 1.13 million people in The Netherlands, is often unaware of having elevated blood glucose levels. Therefore, they cannot take action. At the same time, there is no support, nor medical guidelines available. Simply put: people are waiting to develop actual diabetes type 2 and then treat symptoms and complications with medication. Research mentions that empowerment of these people is essential to tackle the root cause via dietary and lifestyle improvements (Subramaniam, Dhillon, Ahmad, Leong, & Teoh, 2018).

Within the group of people with pre-diabetes, three subgroups have been specified (Hardie, Critchley, & Moore, 2015). These are 1) persons with high risk due to genetics and lifestyle, but who lack a supportive environment and have low self-efficacy and motivation to change, 2) women with a healthy diet and inadequate physical activity and 3) middle-aged persons, mainly men, with a poor diet and who have adequate motivation and support to change their behaviour.

This thesis focuses on sub-group three because of the possible health gain by dietary change and their receptiveness and ability to change. Image 5 shows an persona for this latter subgroup. This target group can be seen as first-movers, which may eventually act as role model to convince sub-group one to change.

1.4 | Design goal, Approach & Deliverable

To deal with the epidemic of chronic diseases, it is necessary to take a more holistic view on the future of food and medicine. I embrace the view of 'food-as-solution'. Food is a solution to keep people healthy and alive. At the same time, services at the intersection of food and care can be an opportunity for supermarkets to sustain competitive relevance.

DESIGN GOAL

This thesis explores how Jumbo, as supermarket chain, can tailor their service provision to facilitate and support their customers with pre-diabetes to adopt and sustain a healthy diet in the coming years. And thereby create positive impact for customers, society and Jumbo's company results.

What is meant by a 'healthy' diet is highly debated and lacks consensus. This work builds upon research suggesting that carbohydrate reduction as a nutritional strategy is beneficial for both healthy people and people with elevated blood glucose levels (Westman et al., 2007). The same message is shared in the nutritional guideline for people with diabetes (Baan et al., 2015). This strategy seeks people to only consume carbohydrates from healthy, whole foods such as vegetables and dairy. Ideally, this diet is custom-made to customers' unique responses to foods and nutritional needs by means of precision nutrition (Palmnäs et al., 2019).

DESIGN PROCESS AND APPROACH

Innovation is an iterative process that is positioned at the intersection of what customers find desirable, and what Jumbo deems viable and technically feasible (see Image 6) (IDEO, 2015). These three aspects ensure that Jumbo can sustainably deliver value to their customers that matches their needs and expectations, which presumingly leads to enhanced customer satisfaction and customer retention.

Image 7 describes the design process that characterizes this thesis and also reflects the structure of this report. It shows that the project description is used as a starting point for literature research and fieldwork. The collected data is then synthesized. The outcomes of the synthesis form the basis for ideation, which is characterised by a process including collaborative creation of service concepts (co-creation) and collaborative evaluation of these established service concepts (co-reflection). Considering all retrieved insights, the work zooms out to provide strategic advices for Jumbo, or other organisations, to implement precision nutrition services.

A service design approach was taken as both services and dietary change involve a sequence of interactions over time (Polaine et al., 2013). As supermarkets have more or less similar assortment, supermarkets increasingly distinguish themselves through the delivery of value in the form of services. Services are the delivery of non-tangible value from the supermarket to their customer. The customer does not own this service and gains value from utilizing the service (Secomandi & Snelders, 2011). For further information on service design, see the blue box on the next page.

DESIGN DELIVERABLE

The outcome of this thesis is three-fold: identified opportunities for service provision, a portfolio of service concepts created in collaboration with users and strategic advice for Jumbo, or other parties that stimulate a healthy diet, connected to the integration of precision nutrition.

Why multiple concepts?

Services are seen as a sequence of interactions over time (Polaine et al., 2013). This implies that services can be distributed over the journey of a customer, by means of several 'micro-services'. These micro-services focus on different stages and respond to different contexts. Together, this combination of micro-services contributes to the overarching service to achieve health improvement and management. Moreover, research suggests that integration of multiple intervention mechanisms is more effective than using singular interventions (Mozaffarian, 2016; Reinders, Bouwman, & Taufik, 2019).

Why engage users in co-creation and co-reflection?

In a service system, Jumbo proposes value to their customers, who in turn can accept and evaluate the value (Spohrer et al., 2008). The service can be carried by a product, the environment or be manifested in human relationships (Secomandi & Snelders, 2011). People experience and evaluate service interventions on the overall value that it creates and the interaction with the touch points from the intervention. Therefore, it is critical that Jumbo matches their service delivery to customers' needs, expectations and experiences. This can be achieved via joint value creation between Jumbo and customers (Prahalad & Ramaswamy, 2004).

The approved project brief can be retrieved in Appendix A.

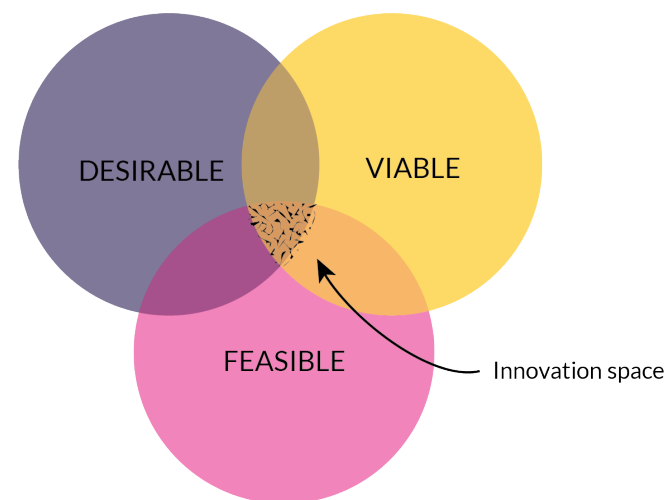


Image 6. The innovation space positioned in the intersection of desirability, feasibility and viability (IDEO, 2015).

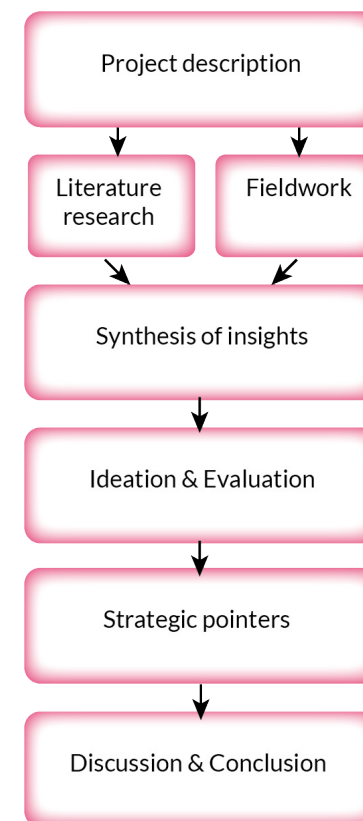


Image 7. The design process, slightly simplified, that characterizes this thesis and also reflects the structure of this report. Between these blocks, there was continuous reflection and ideation,



What is service design?

Service design is a user-centred design discipline that combines expertise from several areas of design, such as interaction design and experience design (Van Boeijen & Daalhuizen, 2013). Service design takes a long-term approach. It evaluates the value that Jumbo offers instead of sales of tangible products.

Contributions from service design are threefold, namely it: 1) develops a service concept, 2) defines the process of offering the service and 3) defines the system in which the service takes place (Secomandi & Snelders, 2011). This is an iterative process. Applied to the context of this study, the aim is to design services that offer value to the customer, and simultaneously be supported by a viable business model to create positive impact for the customers, society and the business results of Jumbo (see Image 8)



Image 8. The steps in achieving desirable systemic impact.

Service as mediator for transformations

Dietary change to control blood glucose levels is an interconnected challenge, overlapping both the food and care system. Therefore, multi-disciplinary efforts from collaboration may be necessary to provide an integrated and holistic approach (Sangiorgi, 2011). This means that stakeholders collaborate to create value to enhance their mutual benefits.

As services may trigger new collaborations, services are described as a vehicle towards a more synergistic, sustainable and inventive society (Sangiorgi, 2011). In this view, a service is not the end-deliverable. Instead, services open up opportunities to create social change and new business models. This explains why Sangiorgi (2011) describes that service design do not only impact core businesses, but can also shape culture and paradigms.

1.5 | Relevance

The relevance of this thesis is three-fold; supporting practice, society and academy. The final contribution to these three pillars is reflected upon in the discussion (see Section 7.1).

PRACTICAL

As everyone eats daily, and makes daily food choices, there are multiple possibilities for interventions to stimulate healthier behaviour. The growing interest to use food as medicine (Baan, Schoemaker, Jacobs-van der Brugge, Verkleij, & Heus, 2015) and to tackle health problems together (Prij, 2018) are push factors for Jumbo to become an actor in the (health)care market.

For Jumbo this thesis: 1) creates mindfulness of societal and market trends and customer demands, 2) provides associated advices that enabling in-time, strategic and well-prepared actions to remain relevant, and 3) provides inspiration connected to the service design approach and outcomes.

For customers, the practical implication is that they will be empowered to take in-time action to seek health maintenance and improvements, especially regarding their blood glucose levels. This thesis is relevant as it grows awareness about diet-related health conditions, introduces new approaches to (population-wide) health evaluations and provides services to empower society to provide self-care.

SOCIETAL

This thesis concerns two primary human needs, namely health and food, and thereby contributes to the UN's sustainable development goal 3: 'good health & well-being'. The societal contribution lies in the potential of diet in preventing and treating diseases by taking shared responsibility. The World Health Organization (2002) mentioned that prevention is the most cost-effective approach to reduce chronic diseases. Better health also lowers the pressure on the healthcare system. Therefore, effective and successfully implemented service interventions may support the Dutch government in realizing the prevention accord (Ministerie van VWS, 2018) and contribute to its ambition to take a leading position in local, national and global health improvement (Ocké et al., 2017). Research evidenced that even interventions that create modest health improvement through diet have the potential to substantially establish a healthier population (Mozaffarian, 2016). In turn, a healthier population can contribute more to society.

Moreover, this thesis stimulates commercial businesses to take social responsibility, of which the importance is emphasized by Prij (2018). For example, by raising societal awareness about disturbed blood glucose levels and supporting people to adopt a healthy diet and provide good self-care and care for others. This is valuable as, to date, pre-diabetes is a silent and relatively unknown disease, which limits people's ability and motivation to act adequately (Subramaniam, Dhillon, Ahmad, Leong & Teoh, 2018).

ACADEMY

The subject of the thesis, precision nutrition, is relatively new. Academic research reveals high potential, while fundamental research and applied research is still nascent. Designers can act as a bridge from objective insights to specific actions. Applied research also introduces the possibility to explore the topic from a behavioural science perspective: is it desirable and how is it used? This exploration of values is relevant to align societal and business values, which are both required to create systemic impact. Therefore, the relevance of this service study lies in: 1) field exploration of precision nutrition with possible providers and 2) exploration of services approaches to implement precision nutrition, and align its value for business and society.

Moreover, this work sheds a new light on how earlier detection of (pre-)diabetes can be facilitated and organized and how currently available healthcare data can be translated to empower people in self-care. This study may contribute to, and inspire, further research, for example by The Netherlands Organisation for Health Research and Development (ZonMW). ZonMW started a prevention program (2019- 2022; budget of 38.6 million euro), amongst others researching how prevention can be implemented in healthcare (ZonMW, n.d.).

“Lifestyle changes play a major role in preventing and treating diseases. Innovation in this field should be top priority”

~ Prof. dr. Pancras Hoogendoorn, Dean Leiden University Medical Center (LUMC)

1.6 | Take-away

This chapter 'Project introduction'...

... introduces supermarket chain Jumbo as client of this master thesis and describes their influence in shaping society's consumption behaviour.

... describes the dual faces of food. Today's diet is causing chronic diseases, while at the same time diet can also be used as a preventive tool and as medicine. This thesis advocates for viewing food as a solution.

... calls Jumbo to respond to the demand of taking social responsibility by aligning and combining their commercial stakes with health stakes of customers, thereby also creating new opportunities to distinguish themselves and bind customers.

... arguments why people with pre-diabetes, meaning that they have slightly elevated blood glucose levels, are selected as target group.

... introduces that this master thesis delves into the this topic with as goal to explore how Jumbo can tailor their services to the health-driven dietary needs of their customers with pre-diabetes in the coming years. And thereby create positive impact for customers, society and Jumbo's company results.

... describes that a service design approach will be taken, leading to opportunity identification for services, a portfolio of service concepts created in collaboration with users and associated strategic advice.

... describes that this study has academic, practical and societal relevance by: 1) highlighting how design can be used to identify service opportunities and create service concepts that can empower customers to manage their health and by 2) contributing new insights and efforts on lifestyle medicine, prevention and personalization via applied research.

Chapter 2 |

LITERATURE RESEARCH

Central in this study are two basic human needs, namely: nutrition and health. These are interconnected as nutrition plays an important role in shaping the health of individuals, and ones health influences a person's nutritional needs.

Nutrition has two faces; and can be a devil and a hero. The devil: unhealthy food contributes to the development of diet-related diseases. The hero: healthy food has the ability to function as a medicine to prevent and treat diseases.

For people with (pre-)diabetes, diet is mentioned to be a latent factor in preventing, improving and reversing the disease (Mozaffarian, 2016). However, adoption and maintenance of a healthy diet is perceived as difficult. Therefore, special assortment and diet-related services are designed to support people.

This chapter starts with an introduction of concepts related to nutrients and diet. The second section discusses the interplay between consumption of nutrients and health, with a special focus on the relationship between carbohydrates and pre-diabetes. The third section explores how diet can be used as a nutritional strategy for people with pre-diabetes to enhance their health. The fourth section provides theoretical background on dietary change and the use of interventions. The chapter concludes by sharing multiple take-aways.

In this chapter:

- 2.1 Nutrients & Diet
- 2.2 Nutritional health & (Pre-)diabetes
- 2.3 Nutrition to control blood glucose levels
- 2.4 Changing consumption behaviour
- 2.5 Take-away

2.1 | Nutrients & Diet

Diet is a complex and often-debated topic. Amongst others, this is due to conflicting information, lack of evidenced health consequences of dietary choices and interpersonal differences in food responses and needs.

This section introduces the main concepts related to nutrition and diet and shares observations of how and why generic food guidelines are increasingly replaced by personalized nutrition. The section ends by describing the drivers and possible business implications of services related to precision nutrition.

MACRO NUTRIENTS AND MICRO NUTRIENTS

People eat and drink to enable the body to function. These foods contain nutrients. Nutrients have three purposes, namely: to provide energy, support the body structure and enable essential chemical processes (Gibney, 2002). The same author describes that there are six categories of nutrients, being: carbohydrates, lipids, proteins, water, vitamins, and minerals. The amount of nutrients a person requires depends on several factors, such as age, lifestyle, health and medication. Research has shown that adequate diet can fulfil nutritional needs except for vitamin D (Maillot, Issa, Vieux, Lairon, & Darmon, 2011).

Nutrients the body requires in large amounts are called macronutrients. These include lipids, carbohydrates, and proteins. Nutrients that the body needs in lesser amounts are called micronutrients. Micronutrients contain vitamins, minerals and trace elements (Fransen, Waijers, Jansen, & Ocké, 2005). Both macro- and micronutrients and water are essential for the body to function (see Image 9).

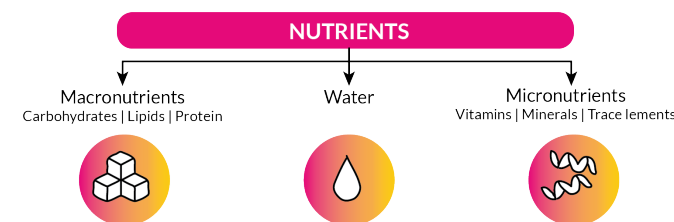


Image 9. The three types of nutrients, being: macronutrients, micronutrients and water.

FOOD GUIDELINES

Food guidelines have been established to educate society and promote their health. An example is the 'disk of five' by The Netherlands Nutrition Centre (see Image 10). The disk shows how a healthy diet contains carbohydrates, fluid, vegetables, proteins from dairy, fish and meat and lipids. These guidelines are averages, based on research on populations (Remmers, 2014). Special groups, such as pregnant women and seniors, may have different or additional food recommendations.

CRITIQUE ON GUIDELINES AND CONSEQUENCES

The food guidelines are criticized for being over-simplified in two ways. First, the guidelines view diet as an assemblage of isolated nutrients, while the interaction and synergy between these nutrients, the frequency of eating, quantity and preparation all affect the healthiness of the meal (Mozaffarian, 2016). An example related to blood glucose is that carbohydrates combined with fibre or fat cause a less steep increase in blood glucose levels compared to when carbohydrates are eaten in isolation. Second, the guidelines do not consider individuals' unique nutritional needs and responses to food (De Roos & Brennan, 2017).

These two critical aspects have driven change in the guidelines on two fronts.

The first change is that the view shifts from single, isolated nutrients to dietary patterns (Dekker et al., 2017). An advantage of this new view is that dietary patterns provide the flexibility to be tweaked via small changes, preserving the core of a dish. This is suggested to enhance the effectiveness of, and compliance to, nutritional recommendations, as the dietary pattern stays close to people's preference and remains familiar to them (Dekker et al., 2017).

Second, research has shown that there is no 'one-size-fits all' diet (Szakály et al., 2019). Like every person is unique, also the nutritional needs of people are unique and people respond differently to food (De Roos & Brennan, 2017). Therefore, an individualized approach is necessary. As a result, generic nutritional models will be replaced by personalized models. This concept is also referred to as 'personalized nutrition' and 'precision nutrition'.



Image 10. The nutritional guidelines by The Netherlands Nutrition Centre (n.d.).

PRECISION NUTRITION

Although a globally shared definition is absent, precision nutrition can be explained as the use of 'information of individual characteristics to develop targeted nutritional advice' (Ordoñas, Ferguson, Tai, & Mathers, 2018). Precision nutrition aims to prevent and treat nutrition-related diseases and thereby enhance health (Biesiekierski, Livingstone, & Moschonis, 2019).

Strategies in personalizing nutrition

There are two alternatives to generic food recommendations (Palmnäs et al., 2019). These are: 1) recommendations created for specific groups and 2) even more advanced, recommendations tailored to the characteristics of individuals (see Image 11). Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra (2008) define tailoring as a combination of segmentation and customization, referring to the establishment of groups (segmentation) and personalization to individual characteristics (customization).

Group-based recommendations are a form of targeted communication, in which specific groups receive a unique message. These groups can be based on health data, such as people's DNA, microbiome, diseases and demographics such as age and ethnicity.

Personalized nutrition is tailored to the individual's needs, lifestyle and values (Celis-morales, Gibney, Mathers, & Lovegrove, 2015). For example, the framing and delivery of the dietary recommendations is tailored to fit the needs and wishes of the person receiving the message.

The next page elaborates upon tailoring of messages.



Preference for natural foods

In general, it is advised to gain nutrients from natural foods, such as vegetables and fruits, and not rely on supplements. This has two main reasons (Van den Berg, 2019). First, the nutritional impact of natural foods is better understood than the relationship between health and artificial sources of nutrients. Second, supplementation increases the risk of excess intake, as supplements contain high doses, and may stay in the body, causing health risks.

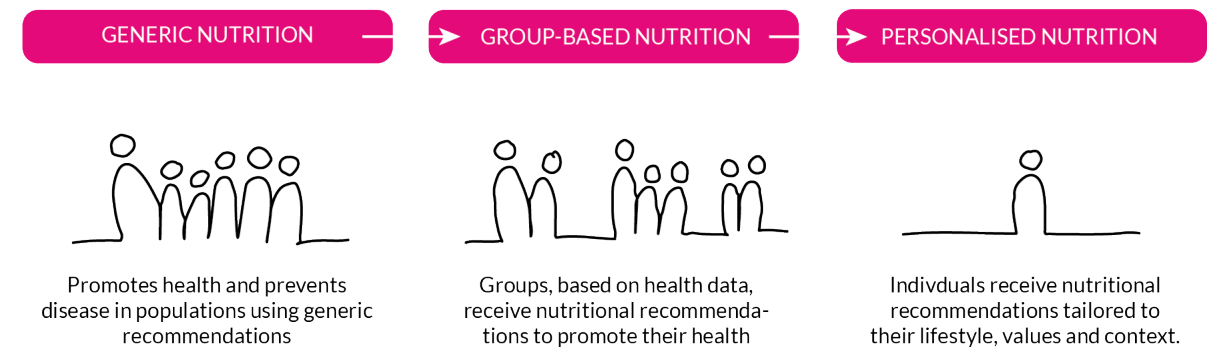


Image 11. Moving from generic nutrition to group-based interventions to personalized nutrition.



Steps in tailoring messages

Tailored messages can be achieved via three strategies, which could also be interpreted as steps. These steps are 1) personalization 2) providing feedback and 3) content matching (Hawkins et al., 2008). Each step is explained below.

1) Personalization

Examples of personalization are the use of a person's name and sending a message at the person's birthday. Personalization of messages is suggested to increase acceptance and adherence to the message or recommendation (Ordovas et al., 2018). The same study mentioned increased sense of self-efficacy as another benefit.

2) Providing feedback

There are three ways to provide feedback about the desired behaviour. The first way is to provide sec, descriptive data. A second way is to compare the person's data with social norms. Last, the feedback can contain an evaluation of the data by judging whether the behaviour is desirable.

3) Content matching

In this step, the content of the message is matched to fit the individual's skills, knowledge, expectations and desires. By means of 'right-mood, right-time, right-place feedback' a person's behaviour can be changed most effectively (Spanakis et al., 2016).

"There is no holy grail in food. What is healthy differs from person to person."

~Prof J. Seidell, VU Research Institutes, Public Health

PROCESS

To achieve personalized nutrition, interaction between the provider and receiver is essential. The receiver of personalized nutrition should be willing to share relevant personal data for the purpose of diet and health improvement (Ronteltap, Van Trijp, Berezowska, & Goossens, 2013). The provider will translate this data into meaningful services and action-possibilities.

The personalized nutrition & health cycle (see Image 12) describes this process of how people can be empowered to buy healthy products based on their food behaviour and health measurements (Van der Ent, 2018).

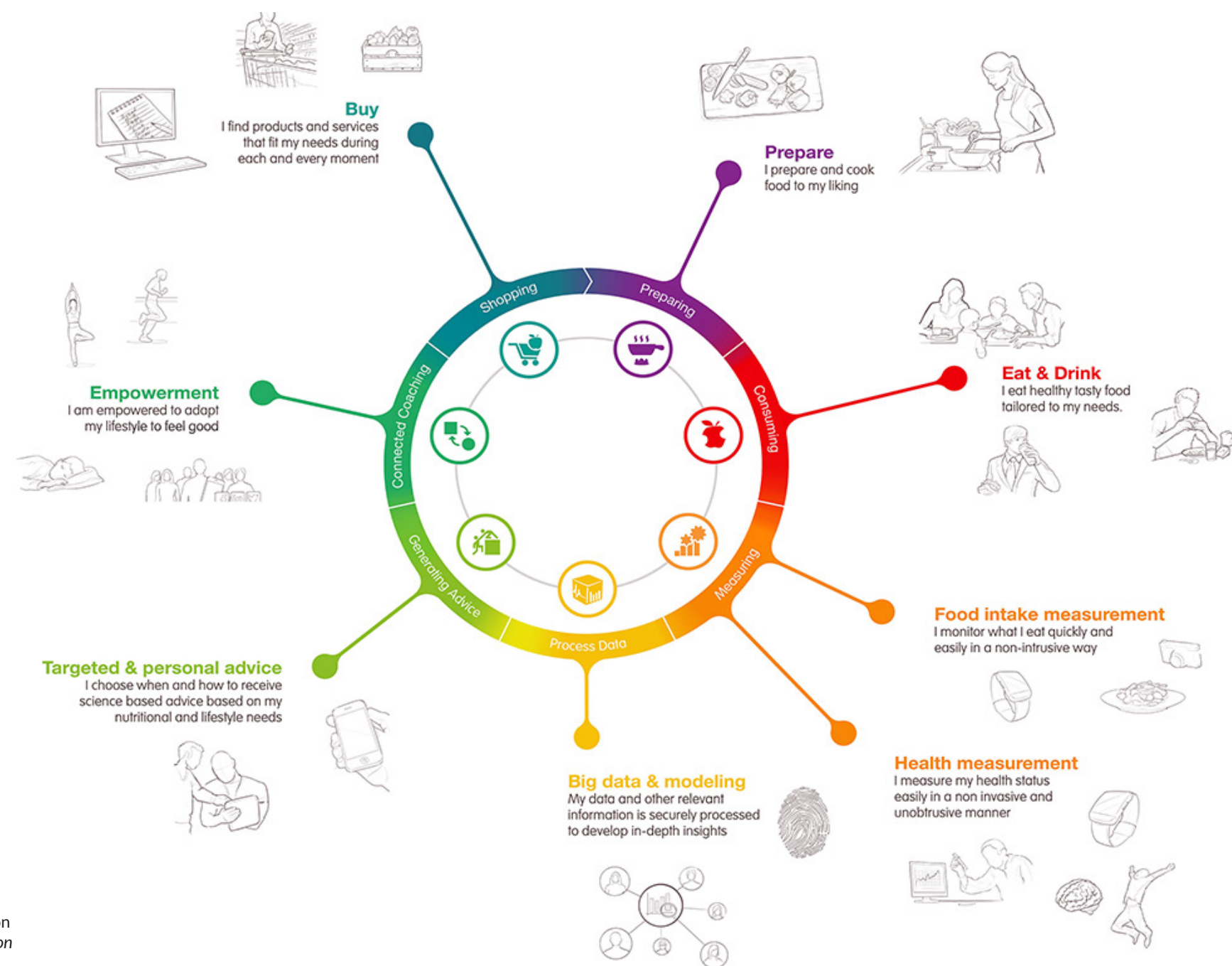


Image 12. The personalized nutrition describes the steps in providing person services (Van der Ent, 2018).

DRIVERS IN PRECISION NUTRITION

Precision nutrition is a relative new domain. It is part of the trend to personalize healthcare and centralise lifestyle. The emergence of precision nutrition is driven by four factors which are explained below.



We need to change

There is an increase in diet-related diseases, causing people to live in suboptimal health and which puts pressure on the care system (Gibney, 2002). This implies that sustainable change to a healthier lifestyle is needed (Van den Berg, 2019).



We know what needs to change

There is growing knowledge about the nutritional impact on health and interpersonal differences (Szakály et al., 2019). These discoveries shed a new light on earlier established recommendations.



We can change

New health assessments, such as point-of-care tests and DNA tests, improve the accessibility to health information (Van den Berg, 2019). A second driver is the ability to handle and mine large chunks of data to feedback society and business (Ordovas et al., 2018).



We want to change

People are increasingly health-conscious, as reflected in the expenditures on supplements, lifestyle services and gym subscriptions (Van den Berg, 2019). Bodyweight control was mentioned as key determinant to utilize a precision nutrition intervention (Stewart-Knox et al., 2019). Moreover, precision nutrition gained more attention with the growing focus on prevention (ZonMW, n.d.) and its potential to reduce healthcare costs through health improvement (Celis-morales et al., 2015).



Considerations for personalized nutrition

Various personalized nutrition services have been commercialized over the past years (see Appendix D). However, it still needs to be elucidated what measurement, or combination of measurements, holds most potential for providing valid nutritional advice (Palmnäs et al., 2019). Moreover, the degree of added benefit of personalized nutrition over group-based services is still unknown and the feasibility to apply personalized services at a population-wide level is questioned (Ordovas et al., 2018).

Besides these two fundamental concerns, there are also several ethical questions that need to be considered (Celis-morales et al., 2015). There are, amongst others:

- The degree of guesswork
When is there sufficient knowledge and personal data available to provide tailored nutritional advices?
- Preservation of food behaviour diversity and traditions
Food is a rich domain, full of flavours, traditions and beliefs. How to ensure that precision nutrition does not overshadow this richness and thus preserves the diversity and traditions?
- Possible consequences of non-compliance
If people do not comply with personalized nutrition recommendations, what consequences may this have? For example, will they remain fully insured for illness?
- Preventing sense of false security
How can we prevent that people who fully behave according to the recommendations experience a false sense of security and certainty, since health is multi-factorial, meaning that they can still get ill?
- Equality in access
Lower income classes might be at the highest risks of developing nutrition-based disorders, but may not have the financial resources, nor knowledge, beliefs or self-efficacy, to use precision nutrition services (Szakály et al., 2019).

BUSINESS MODEL IMPLICATIONS FOR JUMBO

Precision nutrition services are only effective when supported by a viable business model (Ronteltrap et al., 2013). The research by Ronteltrap et al. (2013) describes several ways how precision nutrition may impact the business model.

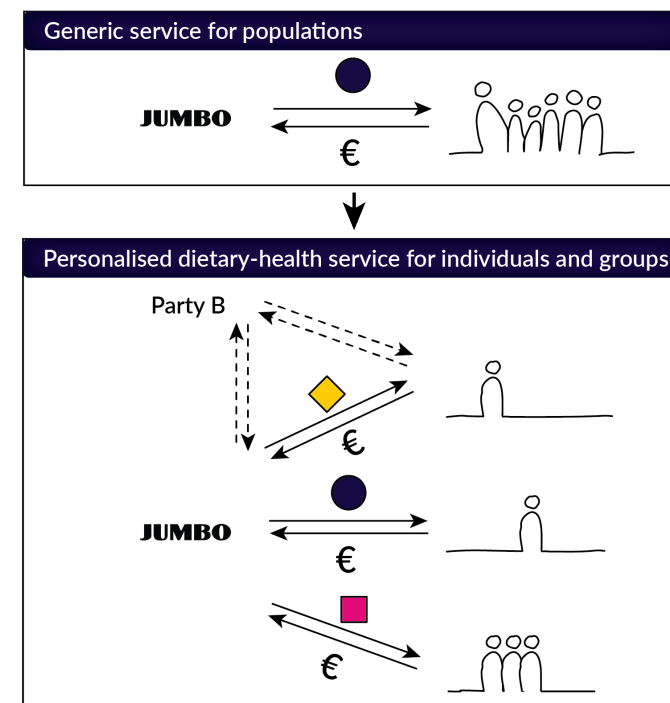
For the analysis below, I contextualised these implications for supermarkets and used Jumbo as a reference. Chapter 6 elaborates on the topics mentioned below and provides several associated strategic advices.

Customer segments and value proposition

First, with precision nutrition, Jumbo will move from generic services to group-based and personalized services. This means that Jumbo will transition from serving the population to serving individuals (see Image 13).

Diet-related health needs of customers can be used to identify new customer segments. An example of a new customer segment are customers with elevated blood glucose levels. Value propositions may target the needs of customers that belong to this group. The service can be personalized by integrating the lifestyle, dietary preferences and context of individual customers. Another option for personalized services is to use health data of individuals, such as their unique blood glucose response to specific foods.

Services that match the needs of customers are important to satisfy them and thereby enhance customer retention. Ronteltrap et al. (2013), describes that the latter is important as keeping customers is considered more cost-effective than finding new customers.



Channels, resources and core activities

Second, nutritional behaviour of customers is not limited to the moment of shopping. This means that Jumbo can also create value for customers prior to, and after, the shopping activity itself. To offer support over time, Jumbo may need new channels for communication and new resources.

A challenge for Jumbo could be to use their expertise of marketing, nudging and storytelling for the purpose of health support instead of purely deploying it for sales activities. Also the core activities of Jumbo can be impacted. For example, the core activities can start to include nutritional counselling.

Partners

Third, building upon the implication that interventions may target non-sale moments and involve health assessments, it may be necessary for supermarkets to initiate new collaborations. An example is a collaboration with local dietitians, general practitioners and health test providers. Collaborations are key to develop integrated solutions. Ronteltrap et al. (2013) mentions that collaborations can have a secondary purpose, namely to enhance the level of trust.

Cost & revenue

Fourth, a new services is expected to impact the cost-revenue structure of Jumbo. The development and operations of a new service introduces costs. At the same time, the service can increase the sales or establish new revenue streams. Collaborations may also introduce the possibility of co-funding. For example, insurance companies might be interested to co-fund if the nutritional support that Jumbo provides is proven to enhance the health of customers. Moreover, the value of data should not be overlooked. Jumbo can use this data to optimize their services and processes and contribute to research.

Customer relationship

Last, by collecting data about customers' health, this is also expected to increase the level of intimacy Jumbo has with customers. This raises the question: does Jumbo want to be a facilitator of good health, or an involved partner of customers? Related to this it can be questioned to what degree Jumbo engages customers in co-creating services. Co-creation may be especially relevant as there seems to be a fine balance between interventions being experienced as paternalistic or supporting (Prijs, 2018).

Image 13. On top: the status quo. A simplification of Jumbo's current value proposition to customers. It shows that Jumbo serves the masses, and provides them a generic service.

The bottom part shows the proposed future with precision nutrition services. Jumbo will serve individuals, or groups with similar needs with a tailored service. Jumbo provides them exactly what the person or groups needs. To achieve this, Jumbo may collaborate with an partner. As an example, this partner can be a health-test provider.

2.2 | Nutritional health & (Pre-)diabetes

The previous section explained that consumption behaviour has consequences for health. Consumption of healthy foods contributes to good health, while a diet containing unhealthy foods poses risk to develop diseases.

This section provides insights on the nutritional health of the Dutch population and how unhealthy diet contributes to the increase in chronic diseases. Afterwards, it elaborates on pre-diabetes, which is one of the diet-related diseases.

NUTRITIONAL HEALTH

Research from the Dutch government shows that the majority of the Dutch population does not meet the guidelines that were established for fruit, vegetables, legumes, nuts and salt (Van Rossum et al., 2016). As a consequence, people are at risk to have an inadequate nutritional status by being either undernourished, overnourished or malnourished (Gibney, 2002). In case of undernutrition people are in hunger. Overnutrition refers to overconsumption of food, primarily macronutrients. Malnourishment refers to a non optimal balance. The cause for malnutrition is twofold. Either the intake of people can be imbalanced, often referring to a carbohydrate-rich diet with little micronutrients (see Image 14), or a person eats healthily but has limited absorption capabilities (Bailey et al., 2015). The latter can be caused by infection and certain diseases.

HOW DO WE ASSESS NUTRITIONAL HEALTH?

Nutritional assessment relies on three approaches as there is no single tool for assessment (Gibney, 2002). The approaches and associated limitations are described below.



Tracking consumption

People record or recall their consumption, for example using food diaries (Reber, Gomes, Vasiloglou, Schuetz, & Stanga, 2019). However, this may be invalid and inaccurate, amongst others because self-evaluations are prone to bias and subjectivity.



Physical assessment

In physical assessment body size, shape, weight and composition are analysed (Gibney, 2002). A drawback is that deficiencies can be invisible and asymptomatic, introducing the risk of under-diagnosis (Li, Kiehne, Sinoway, Cameron, & Jun Huang, 2013).



Biological assessment

Biological assessment includes blood tests and analysis of urine. A drawback is that due to the high expenses of these measurements, preventive use of blood screening is not possible at the population level (Li et al., 2013). However, technical advancements open new horizons to facilitate decentralised self-testing, for example using dry-blood spot technology, test-strips and miniaturized diagnostic devices (also see the blue box on the right).

POOR DIET DRIVING CHRONIC DISEASES

According to The Institute for Health Metrics and Evaluation (2020), diseases may be caused by our behaviour, metabolism, which refers to the chemical processes in the body, and the environment in which we live. This environment seduces people to unhealthy behaviour, such as sedentary behaviour and unhealthy food choices. Therefore, today's environment is described as being obesogenic: promoting obesity.

In line with the saying 'Genetics loads the gun and environment pulls the trigger', the institution describes that unhealthy consumption behaviour, which is greatly influenced by the environment, is a latent factor in development of diseases such as cardiovascular diseases and diabetes type 2. This can be explained by the fact that metabolic consequences of unhealthy dietary behaviour are high blood glucose, high blood pressure, high body-mass index (BMI) and high LDL (bad cholesterol), which are risk factors for the development of diet-related diseases (see also the blue box on the right).

The severity of a poor diet is emphasized by the information that unhealthy food consumption causes more than eight percent of the total Dutch disease burden, 129000 deaths and 6 milliard euro healthcare costs yearly (Rijksinstituut voor Volksgezondheid en Milieu, 2018). These exclude indirect costs, such as the costs due to lack of productivity.

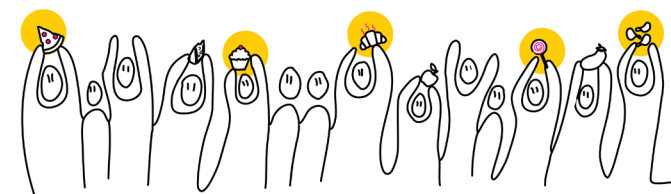


Image 14. Examples of unhealthy dietary choices that are carbohydrate-rich.



A future outlook on health checks

Health checks are suggested to become more widely available with the introduction of point-of-care tests (POCT). These tests imply that samples can be drawn and analysed at local places and do not require laboratory, which reduces the costs of trained personnel and expensive machines (Hopstaken, 2019). POCT blood glucose tests are common in general practitioners. In the future, other POCT's may emerge. Moreover, the tests are expected to be provided at other locations, such as supermarkets and people's homes.

Future health tests can therefore be provided by local care professionals, or be performed by people themselves via self-tests. Besides a finger prick (see Image 15), new tests are being developed, such as breath-based sensors to determine the quality of ingestion of certain foods by firms Respiro.life and Foodmarble respectively. Fitness tracker company Jawbone is working on a swallowable sensor, a so-called 'ingestible', to track gut-health and response to food (Van der Wel, 2015).

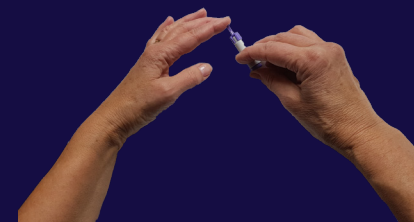


Image 15. Pricking oneself to do a self-test.

Consequences of poor diet and elevated blood glucose levels in perspective

The impact of health problems can be measured by several indicators, such as morbidity, mortality and financial costs (World Bank, 1993). The total impact of a health problem is quantitatively expressed as 'the burden of disease', also referred to as 'DALY'. DALY is the sum of years of life lost and years lived with disability due to a health issue. DALYs are expressed per 100 000 persons.

In the Netherlands, the behavioural components with a high disease burden are: tobacco use (>4000 DALY's), dietary risks (>2000 DALY's), alcohol use (>1000 DALY's), malnutrition (300 DALY's) and physical activity (260 DALY's) (Institute for Health Metrics and Evaluation, 2020).

The metabolic causes with the highest disease burden are 1) high blood glucose (2500 DALYs), 2) high blood pressure (2000 DALYs), 3) high body-mass index (BMI) (<2000 DALYs), and 4) high LDL (bad cholesterol) (<1000 DALYs).

This implies that the topics of this thesis, diet and blood glucose, are important contributors to the disease burden.

The metabolic syndrome

Having disturbed blood glucose levels is also associated with other health phenomena, as is described under the umbrella 'metabolic syndrome' (Zeevi et al., 2015). Amongst others, these include obesity, hypertension and cardiovascular disease. The health metrics of the metabolic syndrome are shown in Image 16.

A person is diagnosed with the metabolic syndrome when three or more of these health metrics are present. In the age group of 30 to 70 years, more than one third of the men, and nearly a quart of all women, has the metabolic syndrome (Blokstra, Vis-sink, Venmans, Holleman, Schouw, & Smit, 2012).

Although this thesis focuses on pre-diabetes, this information implies that people with elevated blood glucose levels can be expected to have other diet-related health needs. Mindfulness about these additional needs is required to offer integrated services.

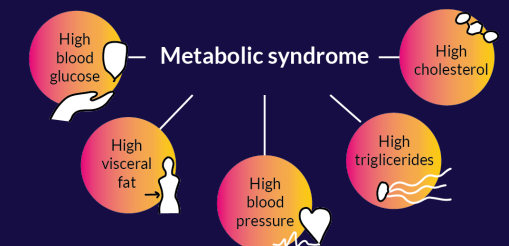


Image 16. Five health metrics that are part of the metabolic syndrome.

Risk factors for diabetes type 2

Below the main risk factors for diabetes are summed up (DiabetesFonds, n.d.):

- Having overweight
- Low physical activity
- Family history
- Ethnicity, e.g. Hispanics and American Indians
- Gestational diabetes during pregnancy
- High blood pressure
- Abnormal cholesterol and triglyceride levels
- People with a lower education and lower socio-economic status (Nielen, Poos, Ban, & Gommer, 2019)

PRE-DIABETES

A poor diet, rich in carbohydrates, disturbs blood glucose levels (WageningenX, 2020). Over a time span of five to ten years, the elevated blood glucose leads to the development of diabetes type 2. People who find themselves in the midst of this process have ‘pre-diabetes’. In pre-diabetes, blood glucose levels are raised, but have not yet reached the threshold levels to be diagnosed with diabetes. In pre-diabetes, two kind of health phenomena can be observed. In the earliest stages, people have a sharp elevation in blood glucose after consumption of a meal, also called ‘impaired glucose tolerance’. When the disease progresses, people develop ongoing elevated glucose levels, also during fasted state (WageningenX, 2020).

DIAGNOSING (PRE-) DIABETES

Symptoms of diabetes are amongst others increased thirst, frequent urination, excess hunger, fatigue and blurred vision (DiabetesFonds, n.d.). However, for diagnoses it is not possible to rely on these symptoms, as they may be absent or manifest themselves at a late stage (WageningenX, 2020).

Due to the absence of clearly observable symptoms, people need to do a blood test. In The Netherlands, to date, the most commonly used metric is (fasting) blood glucose. In this test blood glucose levels are measured in mmol per litre, either in a fasting state or after consumption of food during the last 10 hours. The standard way to assess blood glucose is via a small finger prick at the general practitioner. Table 1 shows the thresholds for test results corresponding to pre-diabetes and diabetes.

Various factors, such as the level of physical activity, influence blood glucose levels. This explains why test results may fluctuate over time. Therefore, some experts advocate to replace the (fasting) blood glucose test by HbA1C assessment, which reflects the average blood glucose level over the last three months (Hopstaken, 2019). HbA1C tests are also becoming more widely available as a point-of-care tests, similar to the (fasting) blood glucose tests.



- Two new ways to assess blood glucose levels
- Continuous measurements of blood glucose allow people to track their blood glucose levels 24/7, using a small sensor inserted underneath the skin. This test is used by people to explore their blood glucose responses to specific foods and lifestyles.
 - Also the first non-invasive blood glucose test are entering the market. For example, the ‘Glucotrack’ allows non-invasive blood glucose by clipping a sensor to the ear.

PREVALENCE

In The Netherlands, more than 1.13 million people are estimated to have pre-diabetes (2diabeat, 2020). This stands for 1 in 14 people. Research suggests that approximately half of the people aged 45 will develop pre-diabetes during their life and that 75 per cent of the people with pre-diabetes will eventually develop diabetes type 2 (Ligthart et al., 2016).



Diabetes type 2 in numbers

In the Netherlands, the number of people diagnosed with diabetes type 2 exceeds one million. The actual number is expected to be higher, as people may be unaware of their disease as the symptoms may be absent. Research from 2010 indicates that approximately 25 percent of the population with diabetes is unaware of this and has not been diagnosed (Blokstra et al., 2012).

SCREENING

As people may unknowingly have disturbed blood glucose levels, The Health Council of the Netherlands mentioned high potential of earlier detection by applying nation-wide screening. Awareness of having elevated blood glucose levels enables people to intervene at an early stage, and thereby prevent complications and even prevent or delay the establishment of diabetes type 2 (Health Council of the Netherlands, 2004).

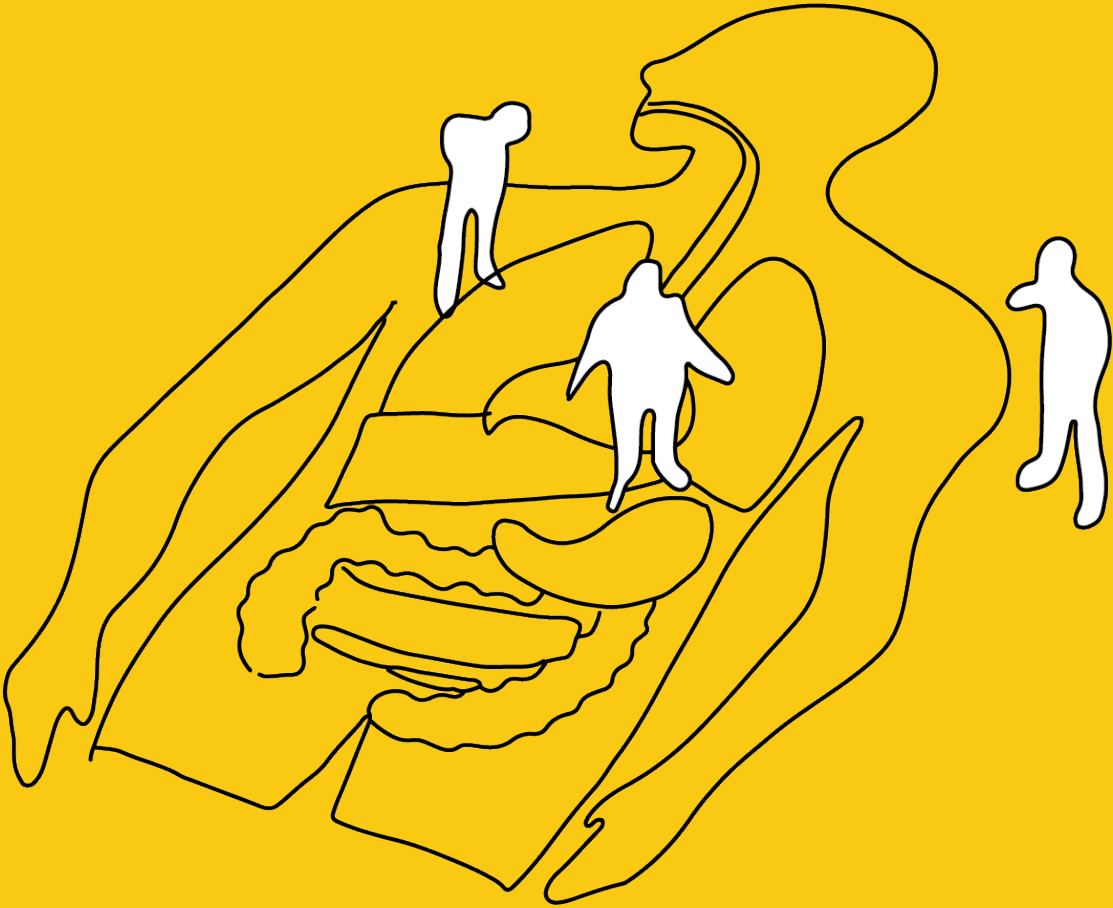
However, currently, nation-wide preventive screening is not applied despite the knowledge that healthcare costs for diabetes accounted to nearly 1.6 milliard euro in 2017, which is 1.8% of the total health care expenditure (Plasmans, Ramjiawan, Vonk, Van der Wilk, 2019). The argument is that investment costs and benefits have not been researched (Health Council of the Netherlands, 2004).

Table 1. The threshold values for diagnosing (pre-) diabetes and diabetes type 2.

TEST	PRE-DIABETES	DIABETES
Blood glucose non-fasting	> 7.8 mmol/L	> 11 mmol/L
Blood glucose fasting	> 6 mmol/L	> 7 mmol/L
Hba1C	> 42 mmol/mol	> 53 mmol/mol

“Dutch care is expensive because it is focused on disease. Disease has become leading. People are only legible for care if their doctor tells them they need it.”

~Dr. G. Stallinga, University of Groningen, Faculty of Medical Sciences, 2018



2.3 | Nutrition to control blood glucose levels

Every food choice that a person makes has effect on the blood glucose levels. Carbohydrates are the main cause for the blood glucose to rise. This explains why carbohydrates take a prominent role in a nutritional strategy to prevent and cope with elevated blood glucose levels in people with (pre-) diabetes.

This section discusses the role of carbohydrates to manage blood glucose levels. Specific attention is given to the quality and quantity of carbohydrates.

LIFESTYLE INTERVENTION FOR DIABETES TYPE 2

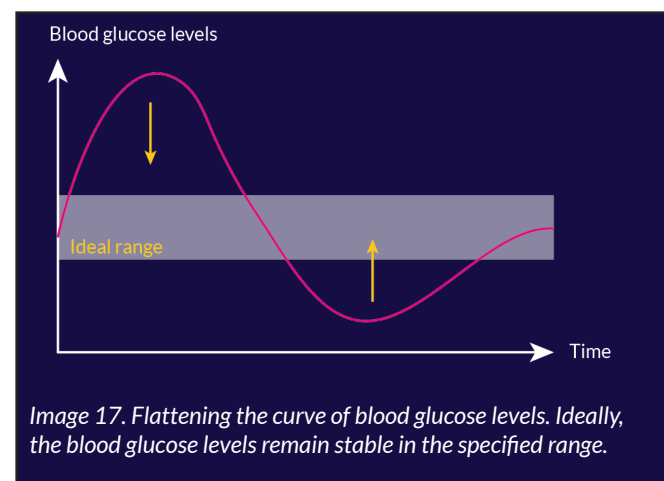
Contrary to treating symptoms of diabetes type 2 with medication, there is an increasing interest in patients and care providers to tackle the root causes through lifestyle interventions (Baan et al., 2015). This is driven by the introduction of the discipline 'lifestyle medicine' and by the knowledge that preventing diabetes type 2 is considered more effective and desirable for patients than treating the disease manifestation and complications (Shukla, Iliescu, Thomas, & Aronne, 2015).

CARBOHYDRATES AS NUTRITIONAL STRATEGY

Ideally, blood glucose levels are stable and stay within the boundaries of a healthy blood glucose. People with diabetes need to 'Flatten the curve', meaning that they need to lower the overall blood glucose levels and reduce the number of peaks (see Image 17).

To achieve stable, low blood glucose levels, it is necessary to have adequate diet, physical activity and sleep (WageningenX, 2020). Diet seems particularly important as it is mentioned to be latent factor in preventing, delaying, improving and reversing the elevated blood glucose levels (Mozaffarian, 2016).

The Dutch Food guidelines for diabetic patients suggest a Mediterranean or low-carb diet (Baan et al., 2015). In these diets the quantity of carbohydrates is reduced and the quality of carbohydrates is leading. Carbohydrates from vegetables, legumes, whole grains and fruits are preferred over consumption of carbohydrates from refined products.



CLINICAL OUTCOMES OF CARBOHYDRATE RESTRICTION

A review on carbohydrate restriction by Westman et al. (2007) suggests several health benefits of carbohydrate restriction for both healthy people and people with elevated blood glucose levels. The review mentions that carbohydrate restriction is beneficial for blood glucose levels, insulin resistance, weight loss, cholesterol and blood pressure. However, an important notice is that the long-term consequences of a carbohydrate restricted diet are unknown.

Restricting carbohydrates: what to expect?

Carbohydrate restriction causes the body's metabolism to change by gaining energy from fats and ketones (adipocentric metabolism) instead of glucose (glucentric metabolism) (Westman et al., 2007). This adaptation is suggested to take two to four weeks.

When the body changes from a glucose based metabolism to a fat driven metabolism, a person may experience symptoms such as muscle cramps, reduced strength, fatigue, skin rash and changes in stool (Westman et al., 2007). During this transition, the body disposes more fluids containing minerals and metals such as sodium and potassium. Therefore, people may be advised to increase intake of minerals. For example, people are advised to drink broth or take magnesium supplements (Dietdoctor, n.d.).

The healthiness of carbohydrates

Carbohydrates are one of the three macronutrients besides lipids and protein. What sets carbohydrates apart from lipids and protein, is that they are not required for survival (Ludwig, Hu, Tappy, & Brand-Miller, 2018). This means that we can live without consuming carbohydrates. Yet, a carbohydrate-free diet is nearly impossible as many healthy foods, such as vegetables, also contain small amounts of carbohydrates.

This is one of the reasons why the healthiness of carbohydrates is controversial and debated (Ludwig et al., 2018). Overall, the advice is to consume carbohydrates from healthy products such as vegetables and fruit. The fibre and micronutrients in these products are considered to benefit health. The excessive consumption of refined carbohydrates, such as sugar and white bread, is detrimental for one's health (Remmers, 2014). These unhealthy carbohydrates have a high Glycemic Index (GI), causing the blood glucose levels to fluctuate heavily compared to carbohydrates in healthy products that have a low GI.



You consume carbohydrates, and then....?

Image 18 describes how the body deals with carbohydrates, for both healthy people (yellow circle) and people who are resistant to insulin (pink circle). The blue circle gives special attention to the connection between diabetes type 2 and being overweight.

After consuming carbohydrates, they are broken down and converted into glucose (WageningenX, 2020). Glucose continues in the blood circulation and is absorbed by cells to offer energy. The rise of blood glucose levels causes the pancreas to secrete insulin.

Insulin is a hormone that supports cells to take up glucose. Insulin also tells the liver to stop their glucose output to the blood. As a consequence, the liver will start storing remaining carbohydrates as fat.

Obesity and diabetes type 2 go hand in hand, and reinforce each other. People with more fat have cells that are less sensitive to insulin. As a response, the pancreas secretes more and more insulin. This has two consequences. First, the liver will store more fat, causing more weight gain. At the same time, people will crave for more carbohydrates as their cells do not take up the glucose for energy, causing an excess of calorie intake leading to weight gain. Second, prolonged high demand of insulin causes the pancreas to stop working (see red arrow). At this moment, blood glucose levels remain elevated. Therefore, besides adopting a carbohydrate restricted diet, also weight loss may foster improvements in insulin resistance, and thereby have positive effects on blood glucose levels (Marshall, 2020).

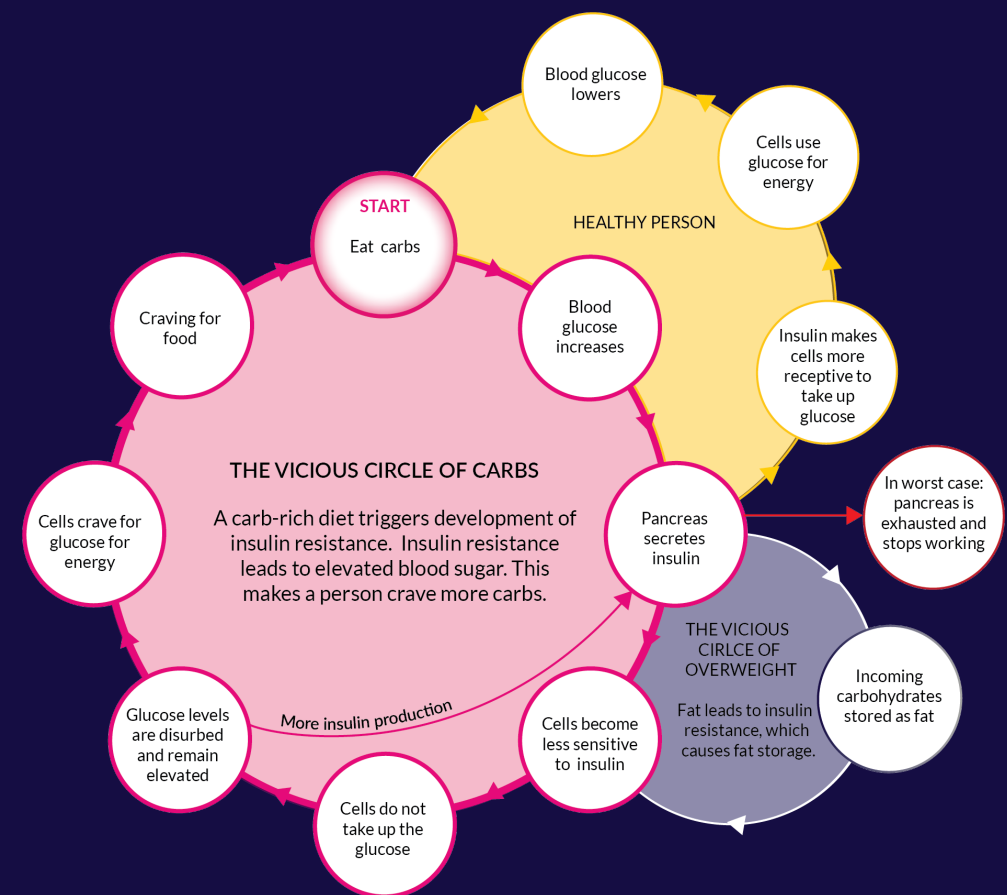


Image 18. Three circles describing bodily processes after consuming carbohydrates. The yellow circle shows the process of a healthy person. The pink circle shows the vicious circle of a person who is less sensitive to insulin. This person risks to eventually develop diabetes type 2. The blue circle shows the 'overweight - insulin resistance' conundrum. High demands of insulin production may eventually cause the pancreas to stop secreting insulin (see red arrow). This image is composed based on processes described in literature and combined according the author's interpretation.



QUALITY: THE TYPE OF CARBOHYDRATES

Carbohydrates can be categorised in three types (see Image 19) (Geleijnse, Küpers, & Mensink, 2020). A first distinction is made on whether the carbohydrate is digestible. Within the digestible carbohydrates, another distinction can be made between simple and complex carbohydrates. These three types are briefly described below.

- Digestible, simple carbohydrates are sugars. Sugars are present in natural sources, such as milk, fruit and honey, and are also added to foods and beverages. Simple carbohydrates cause a rapid increase in the blood glucose level and thereby provide instant energy. Simple carbohydrates are a risk factor for weight gain and type 2 diabetes. Therefore, the WHO suggests retrieving less than 5% of your total energy needs from simple carbohydrates.
- Digestible, complex carbohydrates are starches. Starches are present in many staple foods such as rice, grains and potatoes. In comparison to simple carbohydrates, it takes more time to digest complex carbohydrates. Therefore, they cause a lower, yet longer rise, in blood glucose levels. This means that these carbohydrates provide energy over the longer term.
- Ingestible carbohydrates are fibres. Fibres are present in plant-sources such as vegetables, fruits, grains and legumes. Fibres do not create a spike in blood glucose levels and slows down the digestion of other foods that are consumed. A slower digestion results into a less steep response in blood glucose. Moreover, fibres prevent overeating as they absorb water and thereby provide satiety. This means that by combining digestible carbohydrates with a source of fibre, blood glucose levels can be better controlled.

Quality is person-specific

Research suggests that the spikes in blood glucose levels for specific foods are unique for every individual (Zeevi et al., 2015). This research shows that even twins have a different blood glucose response to eating identical meals. Therefore, generic recommendations regarding what carbohydrates are healthy can be best used as an indication, as it may differ from person to person.

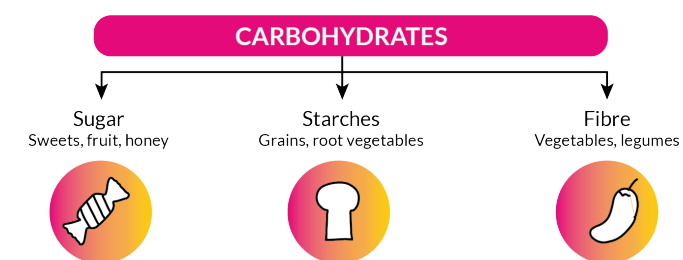


Image 19. The three types of carbohydrates.



Glycemic Index

To aid people in their food choice the Glycemic Index (GI) has been introduced. The Glycemic Index is based on the blood glucose increase after consumption of 50 grams of carbohydrates. Eating pure glucose is set as the baseline value of 100. The lower the GI value, the better (see Image 20) (Marshall, 2020).

The spike in blood glucose levels also depends on the composition of the food itself, the ripeness, how the food is combined with other foods in a meal, the preparation and one's physical activity (Kersten, 2020). In general, fibre and fat rich foods cause a lower increase in blood glucose levels compared to foods low in fibre.

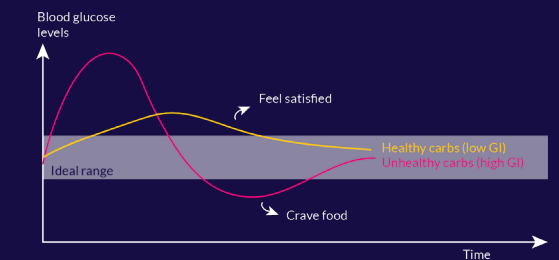


Image 20. A typical blood glucose response after consumption of good quality carbohydrates (low GI) and bad-quality carbohydrates (high GI).

QUANTITY: CARBOHYDRATE RESTRICTION

Research shows an excess in carbohydrate intake in many countries, including The Netherlands (Nelson et al., 2018). The carbohydrate intake has increased over the last years with the introduction of ultra-processed foods, which are cheap, convenient and palatable.

An average person with no specific diet consumes around 200 to 350 grams of carbohydrates each day, which accounts for 40 to 70 per cent of the person's energy needs. Particularly economically disadvantaged people have a higher incidence of diet-related diseases, because their diet contains large amounts of carbohydrate-dense foods as these are relatively cheap (Wimalawansa, 2013).

Carbohydrate restriction comes in different varieties. There is no evidence to set the ideal quantity of carbohydrate intake for both healthy people and people with elevated blood glucose levels (Gray & Threlkeld, 2000), because it depends amongst others on the person's lifestyle, unique responses to food and insulin tolerance.

Although diverse thresholds are used, a liberal low-carb diet contains between 70 and 150 grams of carbohydrates (DiabetesFonds, n.d.). A moderate low carb diet, which is most common to regulate blood glucose levels, contains between 40 to 70 grams. A strict low-carb diet, also called a 'keto' diet, contains less than 40 grams of carbohydrates. In most cases, the carbohydrates are replaced by healthy fats.

People with diabetes type 2 or hypertension are advised to make dietary change in consultation with their doctor as it may require modifications in their medication (Westman et al., 2007).

2.4 | Changing consumption behaviour

On average, a person makes around 200 food choices every day (Sobal et al., 2009). Therefore, people have many opportunities to make changes in their consumption behaviour. Various mechanisms can be used to steer people in their behaviour.

This section starts by providing an introduction to behaviour as science. Second, it describes a theory that explains the process of dietary change. Afterwards, facilitators and barriers for successful dietary change are discussed. The section ends by exploring how supermarket interventions can steer the behaviour of customers.

BEHAVIOUR AND BEHAVIOUR CHANGE

Behavioural science explores how humans behave and make decisions. 'Health behaviour' is a sub domain that particularly focuses on behaviour that is related to health maintenance, restoration and improvement (Gochman, 1997). It describes that people can either act to prevent or detect illness at an early stage, or ill people can act to improve their health (Kasl & Cobb, 1966).

Decision making

Behaviour is often the outcome of decisions that humans make. The dual system theory (Kahneman, 2011) describes that people can use two mindsets to make decisions. These are the 'reflective and slow' system and the 'automatic and fast' system (see Image 21). During reflective and slow decisions people are conscious about their decisions. During automatic and fast decisions, which is used in 95 per cent of the decisions, people are not fully aware of their decisions and rely on their intuition and habits (Zaltman, 2003), making them prone to undesirable decisions.

Persuasion

Behaviour can be changed through persuasion. Persuasion is an overarching term used to describe the attempt to influence a person's beliefs, attitudes, intentions, motivations, or behaviour without coercion (Seiter, Grass, & John, 2010). These attempts can use technology. Through technology, persuasive messages can be displayed in the right-way and at the right-time and right-place, enhancing the effectiveness (Fogg, 2003).

Nudging

Persuasive communication may be noticed by the person, or the person may be steered in their decisions without their notice. For the latter, Thaler and Sunstein (2008) coined the term 'nudges'. According to Thaler and Sunstein (2008), a nudge is 'any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives'. Nudges can assist people in making choices that are good for themselves (self-nudges), society (social nudges) and the world (for example sustainability).

Motivation, opportunity and ability

Behaviour is complex and multidimensional (Mozaffarian, 2016). In general, it is considered that the constructs 'motivation', 'opportunity' and 'ability' (MOA) are required for behaviour change (see Image 22) (Ölander & Thøgersen, 1995). This theory describes that motivation can be ex- and intrinsic. Opportunity is defined as the chance and perceived control to act in a certain environment. An important notice is that although opportunities may be present, it is possible that a person is not capable to change due to problems in his situational context, such as poor housing and limited budget (Barry, Greenhalgh, & Fahy, 2018). The construct ability depends, amongst others, on people's skills, self-efficacy and demographics.

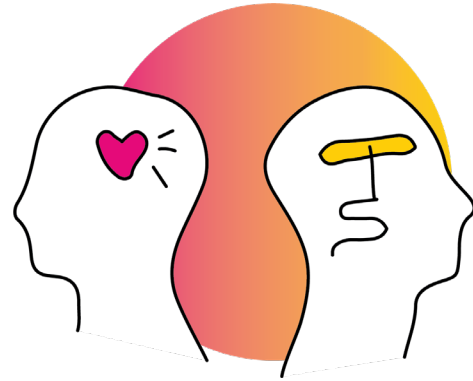


Image 21. The two mindsets to make decisions (Kahneman, 2011), being the reflective and slow system (right) and the automatic and fast system (left).



Image 22. The three components of the MOA-framework, being: motivation, opportunity and ability, which are considered to be essential for behaviour change (Ölander & Thøgersen, 1995).

75%

"... of the supermarket assortment does not meet the Dutch guidelines for healthy eating."

~ Jacqui van Kemenade, general practitioner and author of 'Leefstijl op Recept'

Self-determination theory

Connected to the constructs of the MOA-framework is the theory of 'Self determination' (Ryan & Deci, 2000). This theory describes how fulfilment of three fundamental human needs can enhance intrinsic motivation. These three human needs are autonomy, competence and relatedness (see Image 23).

- Autonomy relates to freedom and being in control. In the context of nutrition, it refers to freedom of food choices and freedom to creatively express oneself in cooking.
- Competence is explained as having control over the environment and being able to exercise skills to overcome challenges. Related to food, this refers to having and growing knowledge and skills to make healthy and palatable dishes.
- Relatedness involves having a warm and good relationship with others. People have the need for emotional support, attachment and intimacy. Food is seen as an act that binds people and serves as a gesture of care.

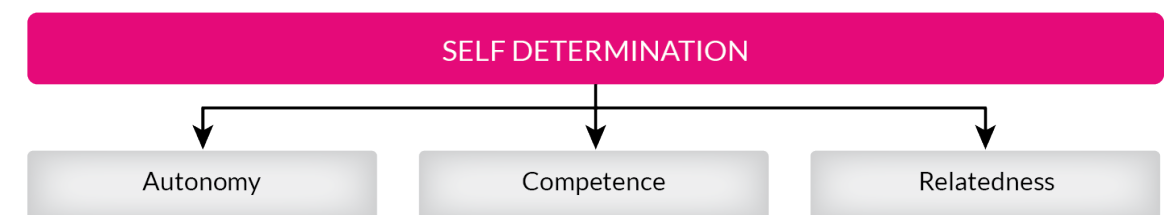


Image 23. Fulfilment of the fundamental needs autonomy, competence and relatedness lead to self-determination (Ryan & Deci, 2000).

PROCESS OF DIETARY CHANGE

Dietary change can be actively performed by a person, or can happen passively. The latter is the case when personal taste evolves, during life transitions and when common norms change (Chapman & Ogden, 2009).

This thesis explores how people take an active role in changing their dietary behaviour. Therefore, the active path of change, as described by Chapman & Ogden (2009), is taken as basis for analysis. The text preceded by a yellow line is information related to the focus of this study, being sustainable dietary change to a carbohydrate restricted diet (see Image 24).

The study by Chapman & Ogden (2009) describes how receptiveness to dietary change is achieved via two mechanisms (see Image 25). First, people need to be aware of the necessity to change their behaviour. This can be achieved via observable accumulation of evidence, such as weight gain. Second, people need a trigger to action. The trigger to action can be an internal thought or belief, or an external event. Examples or external events are alarming medical test results and a life event such as giving birth.

The diagnosis of pre-diabetes may be an external trigger to strengthen people’s internal motivation to change. Possible drivers are people’s fear for developing diabetes type 2 and anxiety to need medication (Barry et al., 2018). In this stage, people try to capture understanding of the disease, evaluate the seriousness, reflect about possible causes and have an emotional response (Eborall, Davies, Kinmonth, Griffin, & Lawton, 2007). Lack of understanding of the disease risk and threats, and their urgency, lowers people’s self-care to adopt a healthy diet (Mohebi et al., 2013). This is particularly applicable to pre-diabetes, as people are unfamiliar with this health condition, experience no symptoms and therefore perceive it as less severe (Troughton et al., 2008).

When people are receptive and motivated to change behaviour, they are suggested to set goals. Goals are mentioned to contribute to better self-regulation. Two types of goals are identified, being approach goals, e.g. to lower blood glucose levels, and avoidance goals, e.g. to stop eating refined products. These goals may differ between people. Short-term goals were mentioned to be weight loss and to receive positive feedback from others, while longer-term goals were described to relate to self image, perceived self-efficacy and self-control.

Afterwards, people define their actions to achieve the goal. According to Fogg (2009) people can be facilitated in their action through ‘facilitator sparks’. These sparks are facilitative as they may reduce the required time, money or effort and enhance the fit with social structures and routines.

Next, while trying to maintain the healthy diet, people are confronted with challenges. These challenges may be internal, describing personal circumstances that withhold the person to behave in the desired way, or external barriers imposed by the environment. When a person is repetitively unsuccessful in managing these challenges, the person may relapse in the old behaviour (Prochaska & DiClemente, 1983). To deal with these challenges, people apply strategies. An example is given below.

People who aim to restrict their carbohydrate intake can adopt the strategy to not to have any sweets stored in their home. This strategy applies the dual system theory of Kahneman (2011) in the following way: using reflective thinking people can decide not to buy sweets and thereby suppress the reflexive system when it longs for sweets.

Last, people seek to evaluate their efforts and achievement of goals. In case of dissatisfaction, people explore and define new strategies.

In a study amongst healthcare professionals, health evaluation was considered as essential for people with pre-diabetes to remain committed to the diet (Subramaniam et al., 2018).

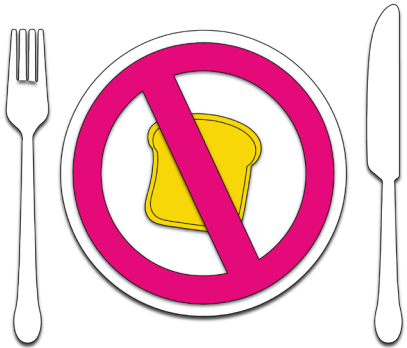


Image 24. Carbohydrate restriction as dietary change to control blood glucose levels.

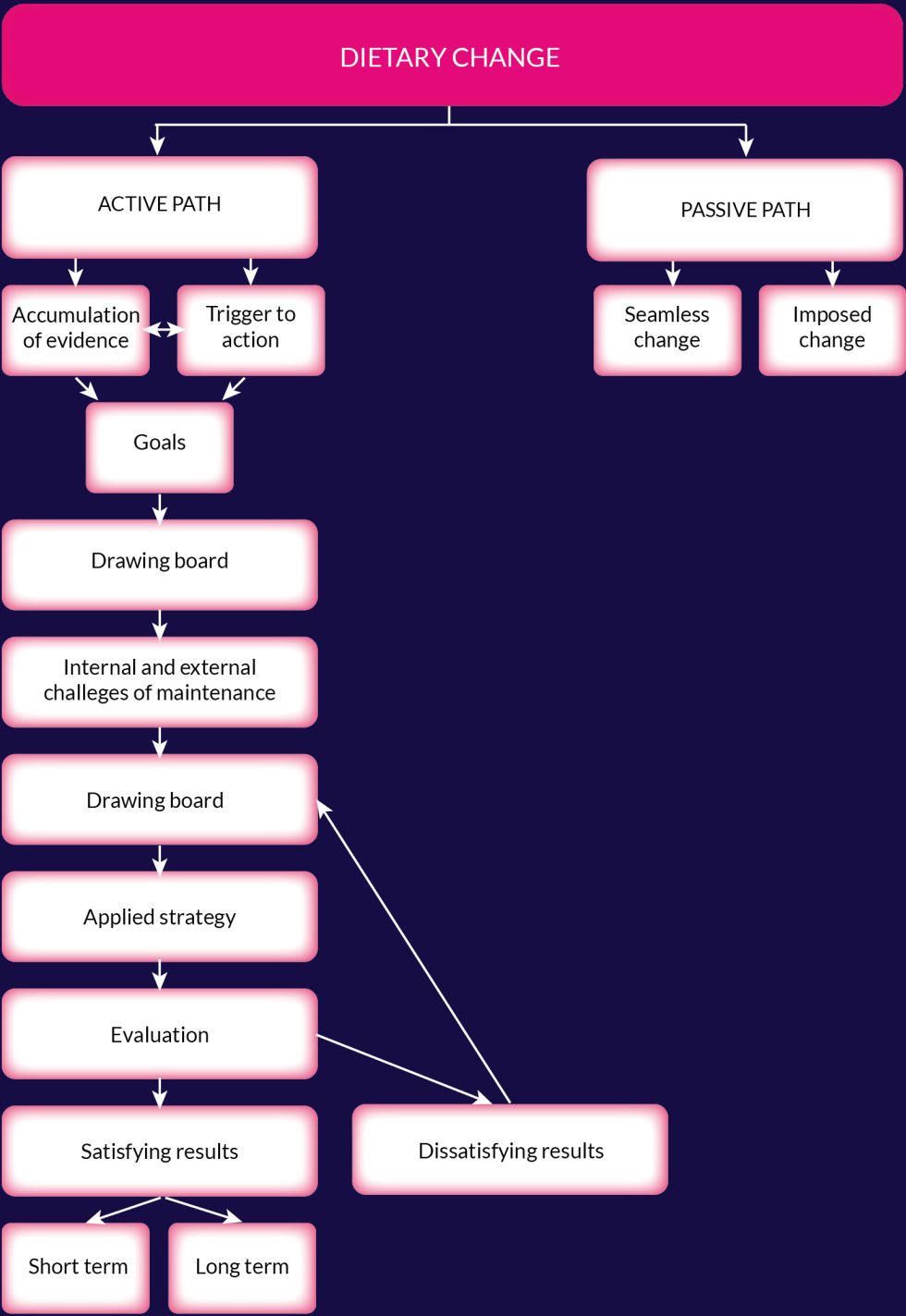


Image 25. The process of dietary change as described by Chapman & Ogden (2009).

FACILITATORS AND BARRIERS IN DIETARY CHANGE

Multiple factors impact dietary behaviour (Mozaffarian, 2016). The author describes that 'undoubtedly, taste plays a role in consumer choice, but so do availability, price, packaging, marketing, convenience, and culturally driven perceptions of norms, status, and prestige. Each of these levers is powerful and can be used to influence the selection of healthier foods'. This implies that there is a wide array of possible facilitators and barriers in dietary change.

Facilitators

A study on cardiac patients who were recommended to adopt a specific diet revealed several factors that facilitate the process of dietary change (Falk, Bisogni, & Sobal, 2000). In brief, these facilitators include being committed, enjoyability of the diet, sufficient exploration and variety, and experiencing physical and mental improvement.

Barriers

People may also be hindered in dietary change. Six barriers are summed up, and described, below.



Absent and ineffective use of health data

The majority of people is unaware of their nutritional status and personal health needs (Lee et al., 2016). This prevents them to take action. Moreover, unawareness of the disease threats and urgency causes lower commitment to change (Subramaniam et al., 2016). Furthermore, available health data is not used to its optimum, as data is hardly shared between parties due to lack of trust in data security (Spanakis et al., 2016).



Lack of consensus and certainty

A globally supported notion of what is healthy is absent (Chance, Gorlin, & Dhar, 2014). People find themselves in a world of opposing advices, alternative guidelines and new academic insights, which reduces their confidence in prior guidelines such as established by The Netherlands Nutrition Centre (Veerman, 2014).

Moreover, not all available support and tools can be trusted. A review on current applications for nutritional measurements and advice, shows that only in one third of the applications the advices is evidence-based (Chen et al., 2015).



Potential misalignment between commercial stakes of supermarkets and health stakes of customers

To date, supermarkets seduce customers to make unhealthy choices through marketing, convenience and price-incentives (Liberato, Bailie, & Brimblecombe, 2014). This contradicts with the health goals of customers by seducing people to prioritize short-term pleasure over long-term health consequences (Mozaffarian, 2016).



Changing habits

The fourth barrier in achieving healthy intentions is that doing groceries is a routinised behaviour (Hollywood et al., 2013). People are required to change long ingrained habits (Wood, Tam, & Witt, 2005), which is considered as effortful (Chapman & Ogden, 2009).



Misfit social context

A practical barrier is the difficulty to adhere to personal diets in social contexts and when eating out (Stewart-Knox et al., 2019). Another challenge is to deal with multiple individual needs within households (Van den Berg, 2019). As a consequence, people may be required to make a trade-off between satisfying personal needs and that of others (Hollywood et al., 2013).



Perception and prejudices

A sixth and last barrier may be the perception that healthy food is less tasty and more expensive, effortful and time-consuming (Hollywood et al., 2013).

These barriers may imply that people do not even consider dietary change or give up early.



Facilitator and barrier

Although social support was described as the most important factor for diabetic patients in achieving dietary change and adherence (Glasgow Wagner Kaplan, Vinicor, Smith, & Norman, 1999), research by Falk et al. (2000) describes that social relationships can be both a facilitator and a barrier in diet change. Adherence was higher if other people accommodated the diet in social events. Diet was complicated by friends who did not understand the diet, and offer products that the person is trying to avoid. This can happen unintentionally or intentionally. The latter is the case when the social environment does not understand the relevance of the diet or shares opposing views.



How people define health

Besides disagreement across experts, also ordinary people have opposing views about a healthy diet. For some, healthful shopping is about including healthy foods, whilst others see it as excluding unhealthy food (Hollywood et al., 2013). Another group of people perceive healthful eating as a balance between healthy and unhealthy food.

INTERVENTIONS FOR BEHAVIOUR CHANGE

Interventions are defined as a 'coordinated set of activities designed to change specified behaviour patterns' (Michie, Stralen, & West, 2011). Interventions are used to change current behaviour to more desirable behaviour.

Degrees of intervention

There are several degrees of intervening. The Nuffield ladder orders intervention based on the degree of freedom of choice that is provided (Nuffield Council, 2007). In this ladder the extremes are 'doing nothing' (bottom) and 'elimination choice' (top) (see Image 26). The degree of intervention are connected to the motivation, opportunity and ability that people experience. For example, restrictions reduce the opportunity and disincentives such as a 'sugar tax' are expected to lower motivation.

Stakeholders can define their intervention strategy by taking a place on this ladder. The lowest three steps aim to educate the customer, the middle steps are related to marketing and the top layers concern law and regulation.

Prij (2018) describes the fine balance between desirable interventions and interference that is perceived as paternalistic. He describes that consumption is closely connected to people's freedom of choice, which is an important liberty in a free market. A problem is that people risk being incapable of making healthy choices. As is also described by Kahneman (2011), people are prone to make irrational choices. Besides having personal consequences, unhealthy diet also impacts societies care costs and resources. Therefore, Prij (2018) argues that other parties, such as government, are allowed to intervene.

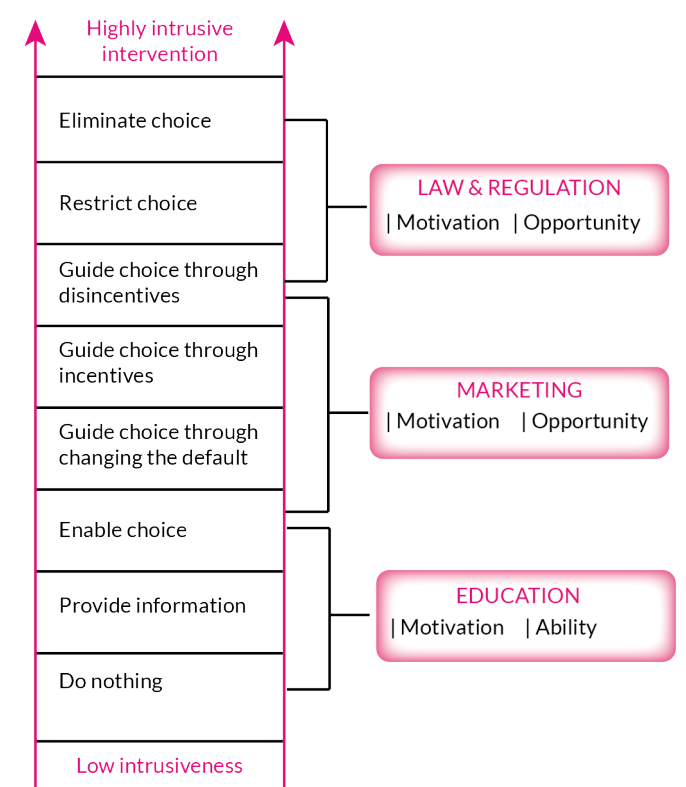


Image 26. The intervention ladder (Nuffield Council, 2007) connected to the MOA-framework (Ölander & Thøgersen, 1995).



Supermarket interventions and their effectiveness

Supermarkets are highly influential in shaping dietary behaviour by making decisions regarding product assortment, presentation, price and promotion (Rijksinstituut voor Volksgezondheid en Milieu, 2017).

Liberato, Bailie, & Brimblecombe (2014) describe that interventions indirectly influence health outcomes in the following way: interventions cause immediate changes, such as increased availability of food and intermediary outcomes, such as increased purchase of healthy food. Ultimately, this leads to an improved nutritional status (these paths of change are elaborated upon in Section 4.2).

There are various ways in which behaviour can be influenced, as is shown by the following two examples:

- Liberato et al. (2014) classified the types of interventions as: 1) economic incentives, e.g. through discounts and saving programs, 2) store environment changes, e.g. the location, availability, customer exposure and looks and 3) labelling and/or educational interventions, e.g. nutritional labels, recipes and cooking demonstrations, enhancing perceived self-efficacy. Another intervention is the ability to swap food that customers usually buy with healthier alternatives (Hartmann-Boyce et al., 2018).

- A meta-analysis from TNO, in which they researched what combinations of behaviour change techniques are effective to stimulate healthy eating, derived three other categories. These are 1) motivation enhancing, 2) planning and preparation and 3) goal striving and persistence (Dusseldorp, Van Genugten, Van Buuren, Verheijden, & Van Empelen, 2014).

A challenge is that the overall effectiveness of interventions for healthy behaviour is often not proven and effectiveness of underlying intervention mechanisms remains largely unknown (Liberato et al., 2014). However, reviews analysing these mechanisms seem to suggest that:

- Integration of multiple intervention mechanisms is more effective than using singular interventions (Mozaffarian, 2016; Reinders et al., 2019) This supports the idea to aim for a portfolio of service interventions (as described in Chapter 5).
- Price incentives, suggestions of food swaps and overall availability of healthy food are effective ways to influence behaviour (Hartmann-Boyce et al., 2018).
- Education seems to support other interventions, but as a stand-alone intervention the results are limited (Mozaffarian, 2016; Waterlander, De Boer, Schuit, Seidell, & Steenhuis, 2013).

2.6| Take-away

This chapter 'Literature research' suggests that it is time to...

- ... approach diet with nuance and not in isolation, as there is a complex and not yet fully understood interplay between nutrition and health.
- ... move from generic guidelines to customized nutritional interventions on the basis of health, responses to food, lifestyle, values and context of individuals or groups by means of precision nutrition.
- ... reconsider consumption behaviour regarding the consumption of refined carbohydrates and set a new normal.
- ... see healthy consumption as the solution: a carbohydrate restricted diet can act as medicine for people with pre-diabetes and as a tool for prevention.
- ... seek change in the behaviour of individuals, the environment and in systems: opting for shared-responsibility by all parties involved.
- ... support people throughout the process of dietary change by increasing their perceived self-determination and providing a supportive environment.

Chapter 3 |

FIELDWORK

This chapter showcases various fieldwork activities and describes the resulting insights. The first section describes various activities that were performed together with potential users. Afterwards, the insights from a company and market analysis are discussed. This is followed by sharing perspectives of several stakeholders and experts who were involved in this study. The chapter is concluded by sharing the main take-aways.

In this chapter:

- 3.1 User research
- 3.2 Jumbo & The food and care market
- 3.3 Stakeholders & Experts
- 3.4 Take-away

3.1 | User research

Five user activities have been performed. These are described in the following pages, in the chronological order of performance. During these activities various design methods and tools were used to capture a combination of verbal reports, written records and observations. This variety enabled data triangulation, which is considered to enhance the validity and richness of data (Ravitch & Mittenfeller, 2015). Moreover, this approach enabled me to explore the appropriateness and effectiveness of tools for this specific context, needs and goals.

For the written records, two generative ‘thinking tools’ were designed and used (see Sections 3.1.2 and 3.1.5). The tools functioned to sensitize the participants and support them in their thinking by becoming more mindful (Sanders & Stappers, 2012).

3.1.1 | FLY ON THE WALL IN THE SUPERMARKET

Three of Jumbo’s customers who adopted a low-carb diet have been observed during their shopping (see Image 27). The participants were recruited at the entrance of the supermarket. The underlying reasons for eating low-carb differed amongst the participants and included weight loss, solidarity to a partner and the belief that a low-carb diet is healthy.

The participants were asked to do shopping as they normally do and were not intervened during this process. Observations were made from appropriate distance and were documented via note- and photo taking. After purchasing the items, the customers participated in a short, informal interview. In this interview, I shared some of my observations and asked for elaboration and explanation.

Main insights

- The type of products bought
Most products were purchased from the vegetable, meat, fish and dairy sections and were whole, high-fat products.
- Checking unfamiliar products
Products unfamiliar to the customer, such as prepared salads and ham, were checked on their ingredients. Also products labelled as ‘low-carb’ were checked as participants mentioned to distrust the food industry. To read the nutritional label, the customer looked at the backside of the product. One customer explained to feel ashamed that he was ruining the looks of the salad by turning it upside down. He desired to see whether the product is low-carb in a single glance. He also desired to learn if he could tweak the product to reduce the amount of carbohydrates, for example by leaving out the sauce.
- Assessing the nutritional label
The customers were especially interested in the amount of carbohydrates and whether sugar was added to the product. One participant also considered the amount of fibre. These values were used for decision-making and comparison amongst products. One participant mentioned to take into account the portion sizes. He described that, for example, sauces are tolerated to have a higher carbohydrate content per 100 grams as only little is used each time.

- Dealing with seduction
Two of the participants skipped the sections with processed foods to withstand seduction. The other participant visited the sections with cookies and bread to buy products for his children, mentioning that ‘they can have some healthy carbohydrates to fulfil their energy needs and sweet tooth’. During this activity the participant was goal-oriented. He explained that he knew exactly what products to buy from prior comparisons. He chooses products with natural sweeteners, such as special fruit bars. At home, he places the products in a separate container to limit visual seduction.
- Low-carb and light assortment
Jumbo offers a special section with low-carb assortment, and assortment for health conscious customers. However, none of the participants bought products from this assortment. The participants explained that the assortment does not satisfy them for various reasons, including the type of ingredients used to replace carbohydrates, (e.g. soy and artificial sweeteners) the amount of carbohydrates still present and dissatisfaction with the taste, choice and price. One participant also mentioned that it is confusing that there is a special shelf for low-carb products whilst special low-carb products are also located throughout the shop. She preferred that the low-carb products are distributed across the ordinary assortment and be supported in finding them. For example, she likes to be notified about new low-carb assortment.

Sub-conclusion

Some of the insights are surprising and unexpected, emphasizing the importance of user involvement in service design. The insights reveal three opportunities, namely: 1) easier assessment and comparisons of products, 2) reducing seduction, and assisting people to manage seduction and 3) taking care that the low-carb assortment matches the desires and values of customers.



First stop: the vegetables. The participant prepared a purchase list on her phone. This list helped her to buy everything she needs and prevents her from doing unnecessary purchases.



Checking the ingredients of sliced ham to see if sugar or starch has been added.



Buying full-fat dairy products. She mentions that grated cheese is full of starch. Therefore, she grates her own cheese.



Searching for an olive-based salad dressing, as she tries to avoid plant-based oils.



Asking where she can find the ‘Smaakt’ cracker, which she could not find at the ordinary shelf with crackers.



Finding the desired crackers, labelled as ‘bread alternatives’, in the ‘conscious food’ section. The participant mentioned distrust if packages state to be ‘low-carb’, and always checks the nutritional labels.

Image 27. Photo impression of a ‘fly-on-the-wall’ observation.

3.1.2 | KNOWLEDGE AND ATTITUDE IN PEOPLE UNFAMILIAR TO LOW-CARB EATING AND EXPERIENCED PEOPLE

The intention of this fieldwork activity was to explore people's knowledge about, and attitude towards, a carbohydrate restricted diet. Ten people have been asked to fill out several questions on a paper tool, followed by a short interview to clarify and elaborate on answers. From the ten participants, three were following a low-carb diet.

The tool

Research suggested that people recall around 15 food choices from approximately 200 food decisions they make every day (Chance et al., 2014). Therefore, the tool aimed to support the participant in reflecting upon his consumption behaviour (see Image 28 and Appendix F). During the first activity, participants were invited to track what they consume on an ordinary day and explain their food choices. Afterwards, people were challenged to envision that they were required to eat low-carb and write down what they would eat in this situation while thinking-out-loud to identify their uncertainties and emotions. The tool concluded with questions to explore the participant's attitude towards a low-carb diet and the barriers and pains they perceive.

Main insights

- Fewer products and no replacements

The low-carb meals as described by the participants contained fewer products than their ordinary diet. All participants who did not eat low-carb indicated that their first step in carbohydrate restriction is to leave out snacks. They did not come up with healthy, low-carb replacements.

- Unawareness of carbs

One person was unaware that drinks may also contain carbohydrates and continued drinking regular coke, whilst others changed to zero-sugar drinks.

- Making personal trade-offs

People described to make trade-offs between their health and what they like and assume as superior products. One person eating low-carb described to prefer consuming one normal magnum ice cream over ten sugar-free magnums.

- Perceived barriers

Perceived barriers in low-carb eating are dealing with social and festive situations and the higher demand in time and effort to prepare meals oneself.

- Perceived pains

The pains described by the participants include: having to giving up on foods they love, the struggle to create volume in dishes and concerns about increased fat-intake.

- Willingness to eat low-carb if it is proven to be healthier

Except one person, the other participants mentioned not to consider switching to a low-carb diet if it was proven to be healthier. Reoccurring arguments why people will not change are because: they are healthy now, so there is no need (4x), they exercise a lot (2x), they don't want to diet (5x), they don't like low-carb products (3x), they think the diet is more expensive (2x) and because of low perceived self-efficacy to maintain the diet (3x).

- Diet views evolve

The participants eating low-carb all mentioned that it was easy and enjoyable. They mentioned that their view of dieting switched from seeing it as a restriction to a new way of healthy living. They mentioned that the diet is becoming easier as they develop knowledge about what foods are allowed or not and by experiencing that the diet can be tasty.

Sub-conclusion

Participants seem to be hesitant and uncomfortable with eating low-carb. Barriers include a lack of knowledge, lack of willingness to change, (as 'there is no need' and prejudices about the diet). As a consequence they may not attempt the diet. Therefore, there is an opportunity to raise knowledge and encourage a positive attitude to change. As people on the low-carb diet describe how their diet views positively changed by experience, this shows the importance of making people attempt the new diet.

3.1.3 | EXPERIENCING MYSELF

To put myself in the shoes of people who need to change their diet, I started eating low-carb myself. This approach increased my understanding of needs and problems people may encounter. During the first week, I captured some activities in photos to create a customer safari (an impression is shown in Image 29). Moreover, I noted my observations and experiences during the first month.

Main insights

- Practical advices from others

With some background knowledge on the relevance of eating low-carb, and products that are allowed to eat on a low-carb diet, I especially sought practical tips and tricks from others. For example, how to combine a low-carb diet with exercise?

- Read nutritional labels and be cautious

My first shopping experiences were time-consuming as I had to check the products I ate for their nutritional values. I learned that sugar has more than 26 different names; not an easy task!

- Increased mindfulness

Reading the nutritional values also made me more mindful about the ingredients in products I used to consume without thinking, for example related to palm oil.

- Rule of thumb

To assist myself, I wanted to adopt a rule of thumb to assess products. On the internet I found out about the maximum of 5 gram carbs per 100 gram rule and avoid processed foods except for dairy products. This rule gave me support and made judgements easier.

- New products

I placed various carb-rich products in my home out of sight, and stacked several new, low-carb products, such as coconut milk, cheeses, Greek yoghurt and seeds. The fruit basket became a vegetable basket, since I noticed that I eat more vegetables to create volume on my plate.

- Bodily responses

After a few days of eating low-carb I noticed bodily reactions. I desired reassurance that the symptoms are normal and advices on how to limit their effects. On the long-term, I noticed that full-fat products provide longer satisfaction, and therefore reduced my need to have snacks in between. This caused me to change my dietary pattern to three meals.

- Convincing others

Not all people around me understood and accepted my new diet. They were not convinced by the need or they saw it as a distrusted food hype. I felt insecure to ask people to cook low-carb for me, as I have no medical need and the diet is therefore 'optional'. I always carried some low-carb food, in case the environment does not accommodate low-carb options.

Sub-conclusion

When adopting a low-carb diet, people are confronted with a variety of needs, desires and challenges (both personal and in interaction with the environment), also depending on their personal context. This implies that service provision may contain a collection of micro-services that provide support on several fronts.



Checking the nutritional label on carbohydrates.



Roasting a mixture of seeds to add to full-fat yoghurt.



The new function of the fruit basket.



Making spaghetti from zucchini.

Image 29. Impression of the customer safari.

Image 28. An impression of the tool filled in by a participant.

3.1.4 | FORUM ANALYSIS

The Dutch patient organization for Diabetes facilitates contact with peers on the website diabetestrefpunt.nl. On this forum, people can make posts related to several topics such as food, exercise, complications, tools, medication and travelling.

The posts and answers in the topic ‘food’ have been analysed and clustered based on similarities to find needs and concerns. Image 30 provides an impression of these posts.

Main insights

- Seeking peer support

People seem to seek advices from peers and like to belong to groups. People sought advices related to how to start the diet, the (dis)acceptance of foods, how to deal with special situations such as a low-budget or eating vegan, examples of what people eat on a day and feedback on food diaries. Some people seek to be part of a community to exchange experiences and recipes and therefore exchanged contact details or invitations to Facebook groups.

- Health concerns

The posts contained several health concerns about certain foods. For example, people feel insecure about the healthiness of eggs and the amount and type of fats (saturated fat, coconut oil, ...). Moreover, there are questions related to fruit consumption: how much is allowed and is it necessary?

- Cultural change: a new normal

Some posts also discussed barriers that people experience. A social barrier was the cultural phenomena that ‘gezelligheid’ (Dutch word for having a good time together) is closely associated with food, especially food that is rewarding and tasty. People seek a change in this view. Related to this barrier, people shared advices to prioritize your own health and be less receptive to opinions of others.

- Approaches to dietary change

The posts contained conflicting advices and success stories of diet-adoption. There seem to be inter-personal preferences regarding the approach of dietary change. Some people like to make drastic change, whilst others prefer gradual change. The first group mentions to switch to an extreme low-carb diet immediately, while the second group starts with quick-wins, such as replacing bread by yoghurt for lunch or reducing the number of slices of bread.

Sub-conclusion

People seem to seek support from peers and to be part of a community to exchange knowledge, concerns, advices and experiences. The posts revealed the opportunity to enhance the information provision of dietary impact on health. Another opportunity is to create change in the food culture. Last, people seem to desire autonomy over how to shape their dietary change, and therefore demand a certain level of freedom.



Image 30. Snapshots from the forum for diabetic patients.

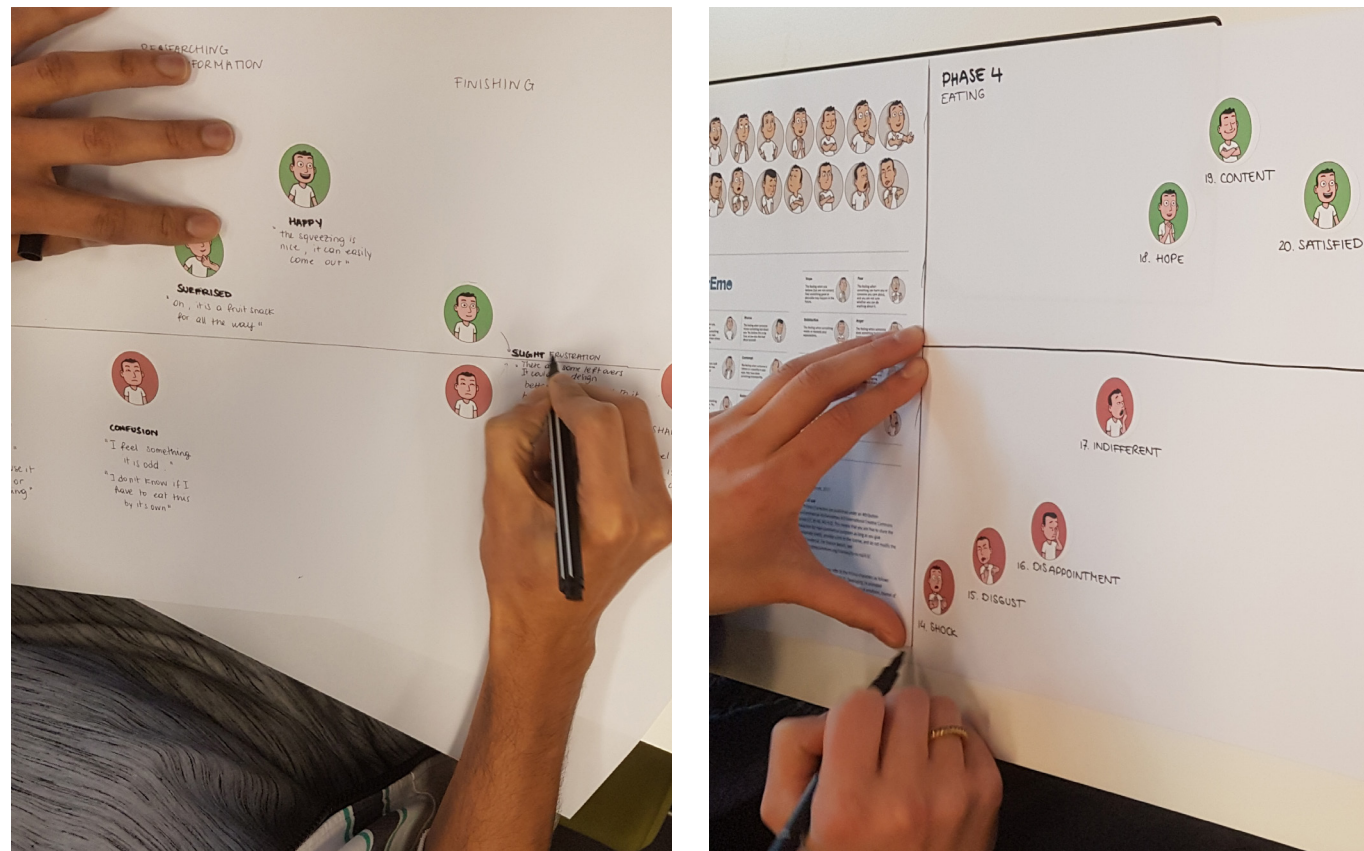


Image 31. Participants constructing the journey that describes their emotions and thoughts during the process from being diagnosed with elevated blood glucose levels to adopting a carbohydrate-restricted diet.



Image 32. The PrEmo emotion stickers by Desmet (2019), which the participants used to describe their emotions.



Journey mapping: the what and why

In essence, a journey map conveys a visual story about a person's experiences and actions over time. The journey captures the person's point of view, for example including the person's thoughts, needs, activities and used resources (Sleeswijk Visser & Snelders, 2019). Furthermore, the journey contributes to the identification of opportunities for service improvements and ideation of new services. Strengths of a journey map are fostering discussion and shared understanding.

3.1.5 | THOUGHT & EMOTION CUSTOMER JOURNEY

Five participants who adopted a carbohydrate restricted diet have been asked to recall their thoughts and emotions that they experienced during the process from being diagnosed with elevated blood glucose levels to sustainably adopting a carbohydrate-restricted diet. The participants were invited to create a customer journey map portraying these thoughts and emotions (see Image 31).

As the intention of this study is that supermarkets will facilitate customers to improve their health via nutrition, the participants are referred to as 'customers' contrary to viewing them as patients. This explains the word-choice for creating a 'customer journey'.

The participants adopted a carbohydrate restricted diet for the medical reason to lower their blood glucose levels. With the exception of one participant, all participants underwent the dietary change recently and were therefore capable of recalling their thoughts and describing vivid situations. Three participants described to keep a strict diet, two participants described to be more lenient and make exceptions occasionally.

Tool

To construct the journey, participants received two paper-based tools, namely the Product Emotion Measurement Tool (PrEmo) (Desmet 2019) and a timeline. The PrEmo tool consisted out of a collection of stickers that portrayed a fictive character with various positive and negative emotions (see Image 32). The y-axis of the timeline ranged from an intense positive emotion (top), via a neutral emotion (middle), to an intense negative emotion (bottom); and the x-axis represented the chronological order of their thoughts and emotions. The diagnosis of elevated blood glucose marked the start of the journey. The ending of the timeline was left open for the participants to describe their current state.

Process

Via a three-step process the participant's 'thoughts and emotions' were described. First, participants were invited to share the process from being diagnosed with elevated blood glucose levels to sustainably adopting a carbohydrate-restricted diet. The Product Emotion Measurement Tool (Desmet 2019) in combination with a timeline, helped participants to express the thoughts and emotions that they experienced over time. Participants were asked to map their thoughts on the timeline with a brief verbal description of the situation, and enrich each thought by picking a sticker that best reflected their emotion during that specific thought. The participants were instructed to place the sticker and explanation on the right position of the timeline.

Afterwards, the participants were asked to indicate which stages they considered as critical. A critical moment was defined as an important moment with impact on the person's next steps, either in a positive or negative way.

Finally, the participants were asked to write down the support that they used during the transition, and indicate during which moments the desired support was absent or ineffective. They were also invited to describe how they envision the ideal support.

Higher-level observations

- Participants described various phases in the transition of dietary change, being: creating awareness about diet and health, considering dietary change, preparing for the change, practicing the new diet and evaluating the diet.
- There is variability between the thoughts and emotions participants experience. Some thoughts and emotions are shared by various participants, whilst others are unique in the sense that other participants did not describe them or experienced the situation in a different way.
- A single step in the journey can trigger both positive and negative emotions, showing that there is a wide variety in how situations are experienced.
- Participants' emotional state fluctuates between positive and negative emotions, possibly explaining why participants describe their dietary experiences as a roller-coaster.
- Negative emotions and thoughts can be reinforced by other events that trigger negative responses, making a person receptive to enter a downwards spiral.

Detailed and descriptive insights

- The diagnosis triggers negative emotions like fear, sadness and shame. These motions make room for some hope when learning that they can improve their health via dietary change. However, this hope is replaced by uncertainty and dissatisfaction about having to change.
- Participants described to be scared to commit to the diet as they don't know what it entails and whether they are able to manage it.
- Participants have various concerns related to social support, such as: how to deal with dietary change in a household, how to ask friends and family to accommodate the diet, and how they will respond to this situation?
- The environment of participants can cause feelings of dissatisfaction and anger if it does not accommodate a healthy diet, or seduces them to unhealthy choices.
- What to eat today and tomorrow remains an effortful and difficult decision. Participants describe to build a repertoire of dishes they like and alternate between these dishes. Occasionally, participants try a new dish, or tweak dishes, to have new experiences.
- Participants describe two reasons why they are uncertain about their health. The first uncertainty is whether the diet has the expected beneficial effects, or whether it needs modifications. The second uncertainty is whether the person has multiple underlying health needs, such as high blood pressure and high cholesterol.

Sub-conclusion

Section 4.4 elaborates on the insights from this fieldwork activity by constructing a synthesized journey map. Using this map, five windows of opportunities have been identified, which created the starting point for ideation.

3.2 | Jumbo & The food and care market

Besides knowledge about the needs and desires of customer, it is also important to understand and anticipate on the context of the company and market. This section describes several internal and external characteristics of Jumbo and the food and care market.

3.2.1 | JUMBO COMPANY ANALYSIS

This section summarizes the findings from a company analysis (see Appendix B for the full analysis, and Section 1.1 for company numbers). The information is mainly retrieved from Jumbo's website (Jumbo, n.d.). The photos in Image 33 provide an impression of Jumbo's services, offering and channels.

Mission and brand

Jumbo believes that customer satisfaction is key. Their mission is to exceed expectations and continue where others stop. Jumbo also mentions how these expectations will be exceeded, namely: 'Every day, everywhere and for every customer. [...] The best service, the biggest and best quality assortment and the lowest price. We want to offer our customers the best in all possible ways. [...] This approach transforms Jumbo customers into real Jumbo fans'.

Formula

The aforementioned concepts are translated into Jumbo's formula: best service + biggest assortment x lowest price. With this formula, Jumbo aims to reduce and prevent possible discomfort and dissatisfaction in their clients. To achieve this, they introduced seven guarantees. These are: 1) euro's cheaper 2) service with a smile 3) for all groceries 4) fresh is really fresh 5) smooth shopping 6) not satisfied? refund and 7) customers wishes are central.

By being loyal to their customers, Jumbo expects loyalty in return. Compared to other Dutch supermarkets, such as Albert Heijn and Lidl, Jumbo creates a personal touch, for example by giving discount on cakes at customer's birthday. This is supported by an interview with Frits van Eerd, co-owner of Jumbo, which mentions the aim to establish a brand image of being a warm-hearted and luxurious fresh market (Andersen, 2020).

Jumbo also desires to be 'successful in every market that they participate in'. This statement implies that Jumbo is open-minded to non-food markets, as is also evidenced by their strategic collaboration with department store Hema.



Provision of unhealthy food?

Jumbo questions how far does their social responsibility reaches, for example regarding the sales of unhealthy products. Jumbo decided not to exclude unhealthy products as they want to have the biggest assortment and fulfil all customer needs. Meanwhile, Jumbo mentioned to promote healthy food.

Sports and Foodcoach

Jumbo established a brand-association with sports by sponsoring talented athletes and sport teams, such as racing icon Max Verstappen, Jumbo Visma's cycling group and ice-skating groups. In line with this, Jumbo's Foodcoach application supports professional athletes in healthy eating tailored to their trainings program and ambitions. In 2020, components of this service are made available to Dutch society, starting with recreational athletes.

In my view...

With the formula and seven guarantees, Jumbo has a characterising and action-based approach. However, I question whether the formula concepts 'best service' and 'biggest assortment' always reinforce each other. Does Jumbo truly care for customers if they provide them, or even worse: seduce them to, unhealthy foods? And what about possible decision fatigue? Presumably, this is connected to the liberty of a free market and Jumbo's commercial interest to sell as much as possible and satisfy all customers.

The challenge is to combine Jumbo's positioning and commercial stakes with the health stakes and desires of customers. Eating should be both healthy and enjoyable. Occasionally eating unhealthy does no harm. However, this behaviour should not become a new normal. Therefore, the aim is to have a balanced diet that centralizes healthy food.

In my view, Jumbo's standpoint to keep offering unhealthy food is acceptable. Yet, I do not agree with how unhealthy foods are incentivised and marketed today. They should not take a central position. With the possibility of governmental interventions, such as the sugar tax, I am curious to see how this will evolve the coming years.

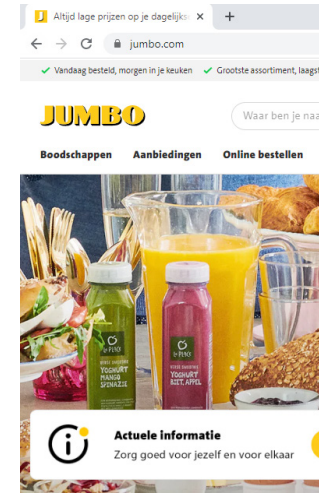
Therefore my advice it to reconsider the concept 'biggest assortment'. Can this concept be re-interpreted and made more distinctive? What if Jumbo starts tailoring their assortment to the dietary needs of individual customers. This would imply that Jumbo's assortment becomes endless and truly unique.

Sub-conclusion

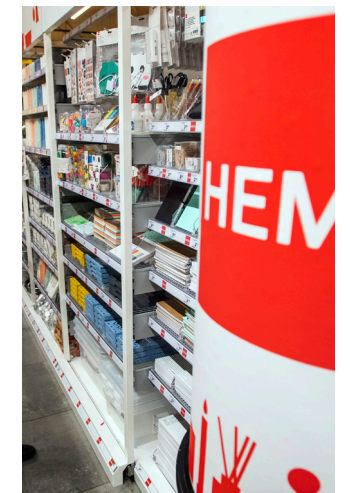
Besides being loyal and involved, Jumbo can be described as being entrepreneurial, daring to take unconventional steps and to have a winners mentality. This helps them 'be prepared for the future'. However, from my point of view I recommend Jumbo to reconsider their formula, especially related to 'the biggest assortment'. Jumbo can question how they can really distinguish themselves from competitors and align their commercial stakes with the health stakes of customers. For example, can they aim for 'endless assortment' since it is tailored to the dietary needs of individuals?



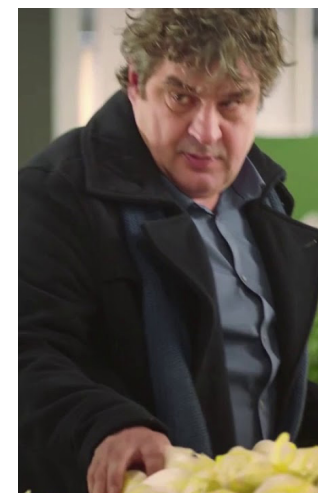
Purchases can be done via two channels: in brick-and-mortar stores (left) and via online purchases (right)



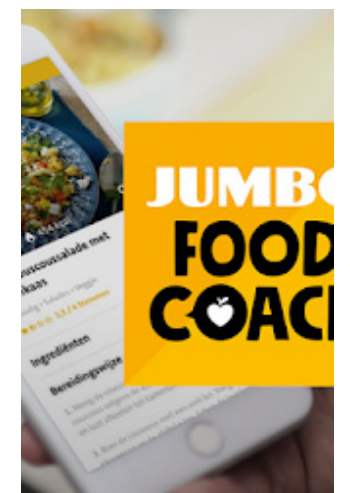
Online purchases can be collected in two ways: via personal pick-up (left) and home delivery (right)



The assortment of Jumbo contains both food and non-food. Jumbo offers own label products (left), A-brands (middle left), and products from their acquisitions LaPlace (middle right) and Hema (right).



Amongst others, Jumbo's marketing includes television commercials (left) and a magazine (right).



Jumbo has two additional phone applications: the savings program JumboExtra's (left) and Jumbo Foodcoach (right).

Image 33. Collection of images from Jumbo.

3.2.2 | MARKET ANALYSIS

This section introduces the food market, the care market and discusses what these markets have in common.

Food

Supermarkets are part of the sector food. In 2018, there were 6000 supermarkets in The Netherlands (CBS, 2018), run by around 30 different brands (Rabobank, 2019). This shows that supermarkets compete in an industry with high levels of saturation and competition. Supermarkets have competition from other parties starting to sell food, both via brick-and-mortar stores and online. Additionally, consumers use more services like eating out and foodboxes for convenience. This may reduce their need to do purchases in supermarkets. For the full competition analysis see Appendix D). Therefore, supermarkets seek new ways to distinguish themselves, attract customers and retain them.

Care

The Dutch care system is under pressure due to high costs and lack of manpower (Gibney 2002). Dr. G. Stallinga, from University of Groningen, mentioned in 2018 that ‘Dutch care is expensive because it is focused on disease. Disease has become leading. People are only legible for care if their doctor tells them they need it’. Additionally, traditional treatments centralise medication to prevent complications, instead of tackling the root cause via lifestyle intervention. The Dutch Government aims to change towards a value-driven system, by emphasising the importance of prevention and introducing lifestyle as a discipline in medicine (Ministerie van VWS, 2018). However, costs limit the use of population-wide screening (Li et al., 2013), as is also the case for diabetes (Health Council of the Netherlands, 2004). This absence hinders prevention.

Food x Care

It can be observed that companies are increasingly exploiting the business potential of the care market by integrating health services in their value proposition. An example is that Amazon collaborates with precision nutrition firm ‘Habit’ to base meal suggestions on self-reported cholesterol laboratory tests. Another example is that some Jumbo supermarkets have medicine pick-up desks. An overview of influential work related to the provision of nutritional information, health checks and personalized nutrition is shown in Appendix D.

An analysis of trends in the food and care market are discussed in Appendix C. The findings suggest that there are various trends that both markets share. Customers become more conscious about their health and that of the planet. Moreover, they seek convenience, rich-experiences, and on-demand access to personalized services. Furthermore the trends show a transition towards decentralised and networked ecosystems that are value-driven.

Sub-conclusion

Non-care related markets increasingly integrate health and lifestyle components in their value-proposition, enabling them to distinguish themselves and simultaneously increase their relevance by supporting society’s health. The principles ‘prevention’ and ‘lifestyle medicine’ are gaining in importance. Market analysis of the current service offering related to blood glucose (see blue box on the right) implies there is an opportunity to support people with pre-diabetes via dietary interventions that are accessible for all.

AVAILABLE SUPPORT FOR BLOOD GLUCOSE CONTROL

Despite the lack of interventions specifically tailored to people with pre-diabetes, analysis of the offer revealed several interventions related to blood glucose control. These interventions either target people with established diabetes, are generic population-wide programs or the services are highly exclusive for individuals. An impression of these interventions is provided below. More interventions can be retrieved in Appendix D.

Specifically for diabetes:

- Professional lifestyle intervention programs ‘Keeridabetes2om’ is a six month group-based intervention program aiming to improve and reverse elevated blood glucose levels in people with diabetes type 2. The program covers nutrition, exercise, sleep and relaxation. Besides five face-to-face sessions, participants are supervised and supported online by (medical) experts. The program costs €3850, and is paid for by insurance.

- Patient-to-patient platforms Patient-to-patient platform ‘Diabetesdoorbreken’ is a Facebook group in which patients and experts exchange advices and thoughts. Participation is free of charge. Insurance companies consider paying for each participant who successfully reverses diabetes via this platform.

- Applications for self-management Various applications, such as ‘Glucosebuddy’, ‘Mysugr’ and ‘Dediamater’ enable people with diabetes to track their blood glucose levels, activity and nutrition to find relationships. They mention to upport people in finding relationships by offering a single platform to collect and view all health data and providing the possibility to share this overview with care professionals. This implies that it still requires personal interpretation.

Population-wide programs

- Health campaigns The ‘national sugar challenge’ calls people to reduce their intake of added sugars for one month. Via daily advices, participants are informed and motivated.

- Recipes and food boxes Various websites and food bloggers are specialized in low-carb eating. Also the lifestyle program ‘FoodFirst Network’, which is bought by supermarket Albert Heijn, provides adapted recipes for people with diabetes. Shop ‘Ekoplaza’ offers a weekly foodbox low in carbohydrates.

Exclusive for individuals

- Commercialized tests Start-up ‘Clear’ (www.theclearhealthprogram.com/) provides a two-week exploratory program. In this program people wear a continuous blood glucose meter to evaluate their personal blood glucose response to foods they consume. In this way, people can tweak their meals to establish improvements.

Moreover, there are various self-tests and DNA tests available to evaluate blood glucose and personal capability to handle carbohydrates and fat.

“The public become not the passive recipients of state services, but the active agents of their own life. They are trusted to make the right choices for themselves and their families. They become doers, not the done-for.”

~David Cameron, former Prime Minister of the United Kingdom, January 2007



Image 34. An impression of the region session of the '2diabeat' program.

3.3 | Stakeholders & Experts

Various stakeholders and experts have been consulted. The purposes were twofold, namely 1) exploration of the field and opportunities and 2) evaluation of concepts. This section provides a summary of each activity. A distinction is made between workshops and interviews. In some cases a reference is made to a service concept outcome that relies on a collaboration with a specific stakeholder.

3.3.1 | WORKSHOPS

Region meetings '2diabeat'

'2diabeat' is a national program, part of the Dutch prevention accord (Ministerie van VWS, 2018), to beat diabetes type 2. The program explores, implements and scales up interventions. During the region meeting (see Image 34) I spoke to several representatives from, amongst others, the Dutch diabetes fund (DiabetesFonds), the diabetes association (DVN), behavioural researchers from Wageningen University, pharmaceutical companies, municipalities, insurance companies, dieticians and lifestyle coaches. Together we explored segmentation of diabetes patients, existing interventions and facilitators and barriers in innovations. For example, the importance of creating more awareness of early signs was discussed. The insights lead to the choice to focus on people with pre-diabetes.

Pharos

When designing interfaces, special attention should be given to people who: 1) have low literacy, being 2.5 million people in The Netherlands, 2) have low health skills, estimated to be 36 per cent of the Dutch population, 3) are from a different nationality, 4) are low-educated and 5) have low digital skills. Co-creation with this user group enhances the final accessibility and value of services.

3.3.2 | INTERVIEWS

Several interviews were performed. The interviewees are clustered in three different parties, who: 1) provide commercial health assessment, 2) provide diabetes support and 3) who are medical specialists. A semi-structured format was adopted, with custom-made questions for each of the interviews. The interviews were performed face-to-face or over phone, and took between 45 minutes and two hours. During the interviews important insights were immediately noted down.

1 | Health assessment

Test-thuis

During the 'Food Technology Week 2019', I spoke to 'Test-thuis'. This firm offers commercial vitamin and mineral self-test kits that rely on dried blood spot technology (costs between 40 and 160 euro). The founder of 'Test-thuis' mentioned potential to support people on a vegan diet and to support optimal fitness in army. The main challenge they face is that users send in inadequate blood samples.

Clear

Together with the start-up 'Clear', which facilitates people to explore their personal blood glucose responses to food (see the Section 3.2.2), we explored how data retrieved from their program can be used by a supermarket to support participants in making healthier choices. This resulted in concept 11 (see Section 5.6).

DA Pharmacy

In The Netherlands, over 300 'DA pharmacy' stores provide health checks for their customers. The five health checks are: blood glucose, cholesterol (both cost five euro) body, skin and stress (three euro each). An employee explained that they have been trained to perform the tests, interpret the results and provide advice. Advices include to use specific products of their assortment, such as creams and vitamins, or to visit a General Practitioner.

2 | Diabetes support

Jeleefstijlalsmedicijn

An interview with founder of patient-to-patient platform 'Jeleefstijlalsmedicijn' and Facebook group 'Diabetesdoorbreken' revealed the power of peer-support and practical, accessible and enjoyable health content. Moreover, we discussed patient profiles and their unique needs in relation to the journey they undergo. A possibility for collaboration is described in Section 5.4 concept 2.2.

Dutch diabetes association DVN

An ambassador of 'DVN' shared frequently voiced questions and concerns by people with diabetes. This revealed that a distinction can be made in support for recently diagnosed patients and more experienced patients.

MySugr

An employee of 'MySugr', a firm providing an application for diabetes self-management, mentioned the lack of an integrated platform. Information is spread over multiple sources, limiting people and care professionals to explore personal determinants of health. Moreover, the role of AI in photo-based carbohydrate estimations was discussed. He mentioned that AI has a 14 per cent error margin, while this is around 20 per cent for human estimations and thus carries potential for support.

3 | Medical specialists

Star shl

Together with a general practitioner and innovation specialist from knowledge institute 'Star shl', the potential of point-of-care assessment (POCT) was discussed. The main advantage of POCT is that direct test results enable on-spot decision-making and provision of advice. Moreover, POCT costs are lower as no skilled laboratory personnel is required. POCT blood glucose tests are widely implemented; POCT HbA1C tests are being introduced. The company does not exclude the opportunity to have POCT in supermarkets, which eventually turns supermarkets into health centres.

VitaMor

'VitaMor' is a website, developed by a general practitioner, guiding people to healthy eating based on their health needs. The interview revealed that the founder is sceptical about the role of supermarkets in health promotion of society. He believes that the solution lies in doctors, who should subscribe a healthy diet instead of medication. The website of VitaMor formed the basis for service concept 8.3 (see Section 5.6).

Patient organisations

Several dieticians from patient organizations, such as the 'Stomach, Liver and Bowel foundation', were consulted. Their patients are required to change their diet to improve their health. The interviews explored difficulties patients face, what support is available and how they can be better supported. In general, the organizations observed lack of knowledge about healthy eating and lack of skills in reading nutritional labels and assessment of the healthiness of one's diet. The interviews also covered the consequences of seduction, for example due to misleading packaging and food hype.

3.3.3 | INSIGHTS

The heterogeneity of involved stakeholders and experts is also reflected by the disparity in their views and approaches related to offering health support. Two main insights, and associated conflicting views, are described below.

Targetgroup inclusiveness

The stakeholders emphasized that within the target group of people with pre-diabetes there is big variety. Research by Hardie et al. (2015) already showed how to distinguish three groups based on the underlying cause of developing pre-diabetes. The stakeholders mentioned that within these sub-groups there is heterogeneity with regards to health literacy, health skills and motivation. This initiated the discussion about whether to design for the most 'complicated' target group (as promoted by Pharos; 'this group may have the biggest need, and full-proof services for them can be used by all') or to start with early adopters that require the least investment to create beneficial change and subsequently broaden to more complicated users by building upon hands-on experiences and by using the early adopters as role models. Jumbo decided to take the latter approach when designing new services as they consider it as an easier and quicker way to gains (personal contact with R.J. Koens, director Corporate Strategy, December 2019).

Increasing health consciousness and associated conflicts

Second, the stakeholders and experts mentioned the importance of increasing societies health consciousness and knowledge of one's personal health. As one stakeholder mentioned: 'It is bizarre how much is measured all around the world and how little I know about myself'. The stakeholders believe that to create behaviour change, people need to grow their health literacy and reflect on their own behaviour and understand how this impacts their health. Therefore, all the stakeholders strive to enhance health literacy and knowledge about one's personal health. However, as described below there is disparity in views and approaches on how to achieve this.

• Health tests: the solution?

First of all, there is disagreement about in which cases personal health data is relevant. The expert from Star shl mentioned: 'It is beneficial for everyone to stop eating processed foods, I don't need health data to provide this advice'. He also describes that some health assessments may be unnecessary. 'For example for vitamin D: we can almost assume that everyone has a deficiency in this. This raises the question: in what cases gives a test added value?'. Questioning the added-value of testing is necessary to control and reduce care costs. Other stakeholders mentioned that 'measuring is knowing' and that this knowledge is necessary to convince people to make lifestyle improvements. For example, the founder of Jeleefstijlalsmedicijn hosts a weekly 'measurement' session with all the patients on his platform. People share their data and he provides personal feedback by comparing it to earlier tests results and thresholds. He mentions that the measurements benefit their motivation. Associated to this is the discussion whether the solution can be sought in tests or whether bigger changes are required and should be prioritized, such as activating politics and redesign of the system to create a supportive healthy living environment. For example, the interview with Vitamor revealed opportunities to change the care system: to start seeing and offering food-as-medication. After all, a healthy base in society may reduce the necessity of testing.

• What type of test: valid?

While some stakeholders seek the solution in commercial tests, e.g. Test-thuis and Clear, experts seem to promote population-wide screening and use of existing care resources and interactions, such as point-of-care assessments (POCT) at general practitioners and dietary advice from personal dieticians. The commercial parties seem to embrace new approaches of testing, such as self-tests and wearable sensors for continuous measurements. The expert from Star shl is enthusiastic about technical advancements in diagnostics, but is hesitant in trusting commercial parties that offer these new tests. He mentioned two concerns, being 1) whether the test provides valid results and 2) whether the outcomes are interpreted in a valid way and valid associated advices are provided. For example, DNA tests are considered to be valid, but the associated dietary implications are still primarily guesswork. The expert from Star shl advocates for point-of-care assessment, which is both more accessible, convenient and cheaper than traditional laboratory testing. However, commercial parties describe these tests as not fully utilizing the potential of today's testing possibilities and lacking behind on better alternatives. Moreover, they criticize traditional testing approaches are 'only providing the test result', implying that associated services for behaviour change are often missing. They mention that the added-value of what they offer is the service of interpreting the data and connecting it to advices and actions.

• Costs of the test: accessible?

The costs for health assessments seem to vary highly. This introduces another concern, namely whether the tests are accessible to all. Commercial parties sell self-test packages and programs for - mostly speaking - more than 100 euro. On the other hand, POCT blood glucose tests cost less than six euro. Commercial parties can be suggested to abuse people's need and wish to be healthy. As a consequence, experts and public health associations mention that commercial tests grow disparity in society as only people with more financial resources can do these tests. This implies that commercial tests should not become the new common, as the commercial interests hinder access to health checks.

Sub-conclusion

Stakeholder engagement revealed two insights. The first insight is the necessity to be mindful of the diversity in the targetgroup and make well-informed choices related to this. The second insights is that, despite the fact that the aforementioned stakeholders all share the same overarching goal - namely to contribute to the health of people - they seem to have opposing views on how to achieve this and even some distrust in each other. I gained the impression that the stakeholders are working in silos, while collaboration could reinforce each other's value propositions and strengths. Moreover, by sharing more information and effort, the speed to market of meaningful and holistic initiatives can be enhanced as the parties do not have to reinvent the wheel. However, at the same time the insights show that in initiating new collaborations a critical attitude is required to assess the added-value of specific health tests, the validity and (commercial) interests.

3.4 | Take-away

Fieldwork with users, stakeholders and experts fostered understanding of needs, desires and the situational context. These insights, combined with the insights from the company and market analysis, resulted in six considerations for Jumbo.

My advice for Jumbo is to think about...

... how fitting their current value proposition is; how well do they know and act upon the needs and desires of customers?

... what relationship Jumbo seeks to have with their customers; what degree of intimacy?

... how Jumbo can respond to the variability in customers; how can Jumbo use customer data to personalize their services?

... how distinctive Jumbo's current value proposition is; how does Jumbo identify and exploit service opportunities, for example related to health, to remain competitively relevant?

... how they can combine commercial stakes with taking social responsibility; how can Jumbo facilitate and support the use of 'food-as-medicine' and become a trusted partner in people's health?

... what strategic relationships Jumbo can consider and nurture, also in sectors other than food (e.g. with start-up Clear, and Facebook group 'Diabetes-Doorbreken'); and what role technical advancements can play?

Chapter 4 |

SYNTHESIS

This chapter integrates insights from the prior chapters - literature research and field work - to generate synthesized overviews that capture my interpretations, as well as reflect the complexity and richness of the topic. For each overview the implications, sub-conclusions or resulting opportunities are mentioned. The chapter ends with an overarching take-away.

In this chapter:

- 4.1 Determinants of diet and health
- 4.2 Health outcomes of interventions
- 4.3 3 pillars, 3 messages
- 4.4 Synthesized 'thought & emotion' customer journey
- 4.5 Take-away

4.1 | Determinants of diet and health

The interplay between diet, health, lifestyle and context is complex. The health impact of specific foods is still being explored (Van den Berg, 2019). Therefore, this model develops a holistic overview of the reciprocal relationships between dietary choices and 1) our health and 2) the food system (see Image 35).

The model is based on my interpretations from literature research. The pink outlined components in the model are the focus of this study.

DESCRIPTION OF THE MODEL

The loop in the middle shows the reciprocal relationship of how diet depends on the availability and accessibility of food and vice versa. Respectively, these are the customers' demand and supply of the food system. Moreover, the model shows that four clusters of determinants influence dietary decisions and health, either directly or indirectly.

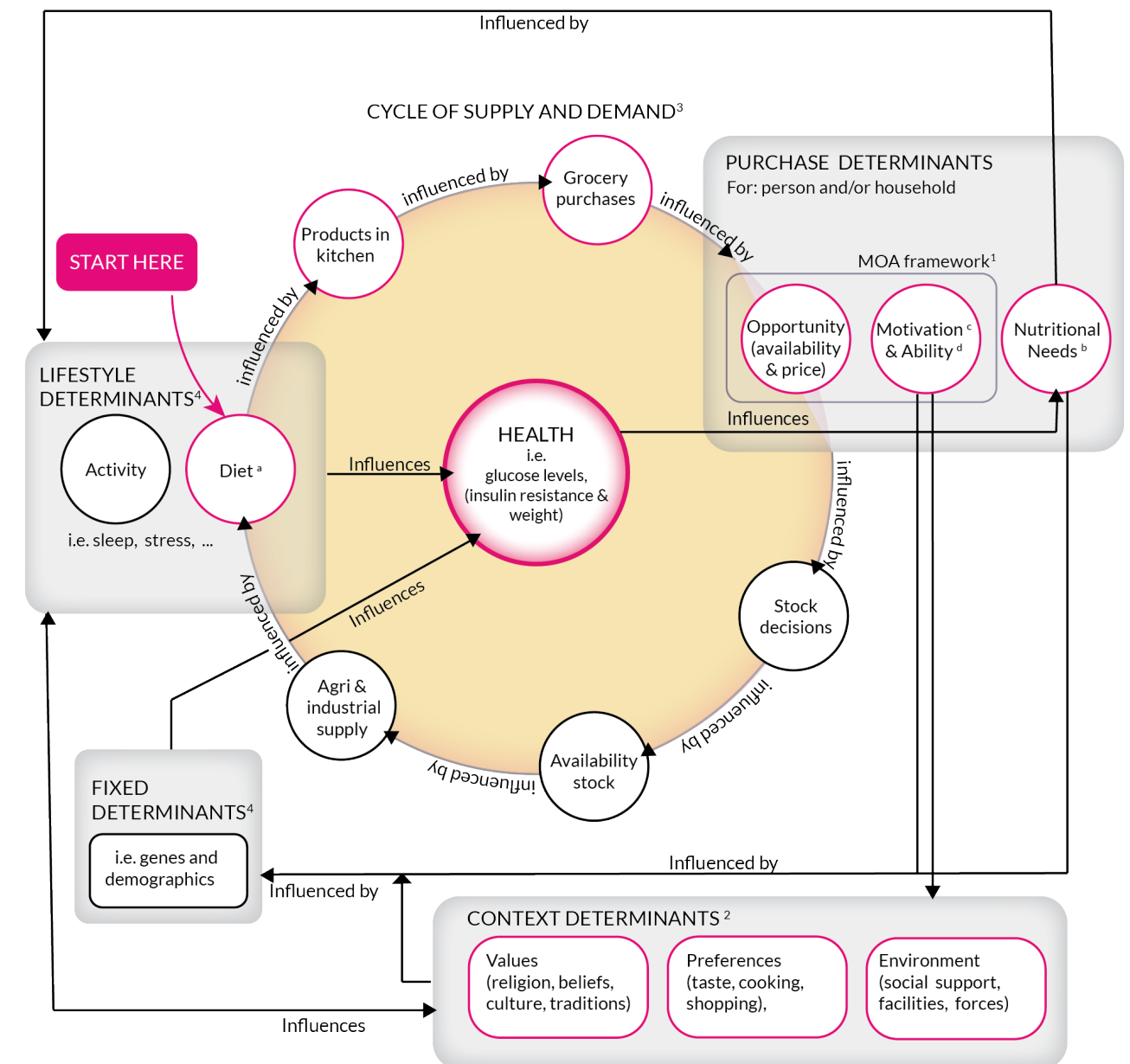
IMPLICATIONS OF THE MODEL

- The circle of demand and supply needs to be interrupted to create change. This implies that either customers need to demand more and healthier products, or farmers need to increase their production of healthy products.

When people consume more healthy food, this provides a positive stimulus for the food system to increase their supply. Similarly, increased availability and visibility of healthy food may be an incentive for customers to increase their consumption of healthy products.

- A healthy diet depends on two aspects: 1) whether people consume enough healthy products and 2) the quality and amount of nutrients in the food. This thesis focusses on the first aspect.
- What products people have in their home impacts what is consumed. What people have in their home depends on their purchases. This implies that supermarkets are highly influential in steering what people eat.
- The model shows that besides availability and price, also a person's motivation, skills and nutritional needs influence purchase behaviour. These purchase determinants are, amongst others, influenced by people's lifestyle and context.

Although the model shows possible determinants, these are person-specific. Therefore, future work may investigate what factors are salient to certain groups of people or individuals. Also the knowledge that every person has a unique response to food (Zeevi et al., 2015) supports the necessity of a nuanced, personalized approach.



Visual composed by author, containing concepts from:

¹ Ölander & Thøgersen (1995)

² Alison et al. (2014)

³ Calandro (2011)

⁴ Chatelan et al. (2019)

^a Except for vitamin D, natural food can provide all necessary nutrients (Maillot et al., 2011).

^b In the Netherlands, carbohydrates are consumed excessively (Nelson et al., 2018).

^c Motivation can be internal and external (Ölander & Thøgersen, 1995).

^d Skills involve amongst others: literacy, education, experience and self-control (Ryan & Deci, 2000).

Image 35. A synthesized model describing the reciprocal relationship between health and diet, and other determinants that influence purchase behaviour.

4.2 | Health outcomes of interventions

Interventions can impact people's health and the health system via several paths. Understanding about these paths is helpful for three reasons, being 1) for decision related to the selection of interventions, 2) managing expectations about the outcomes and 3) mapping possibilities to evaluate the effectiveness of the intervention.

DESCRIPTION OF MODEL

Liberato et al. (2014) mentioned three types of supermarket health interventions. These are 1) economic incentives, 2) labelling and/or educational interventions and 3) store environment changes. In my view, these interventions respectively match the dimensions: 'Motivation', 'Ability' and 'Opportunity' from the MOA-framework (Ölander & Thøgersen, 1995). This integration is shown in the model in Image 36.

IMPLICATIONS

- Interventions influence people's health and the health system indirectly. These intermediary steps should be integrated in the design of interventions: behaviour change can be achieved via non-behavioural changes.
- The mentioned outcomes may inspire what constructs can be used for evaluation of the effectiveness of the intervention and may convince stakeholders to support interventions based on the expected outcomes.

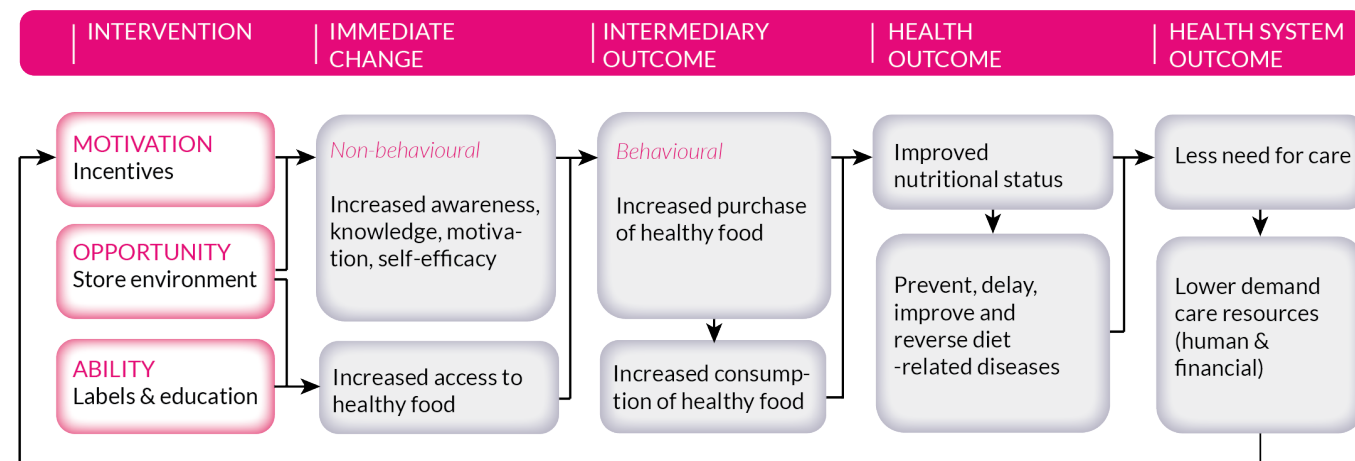


Image 36. A model describing the outcomes of interventions (inspired by Liberato et al, 2014), connected to the constructs motivation, opportunity and ability from the MOA-framework (Ölander & Thøgersen, 1995).

4.3 | 3 pillars, 3 messages

IDEO (2015) described that the sweet spot for innovation is positioned in the intersection of desirability, feasibility and viability. Literature research and fieldwork (Chapter 2 and 3 respectively) introduced several considerations for each of these three pillars. This model provides three main messages for each pillar. On the right, two examples are provided that a combination of these three pillars is essential to create effective services.

The necessity of these pillars: two examples

DNA tests and swallowable sensors to evaluate gut health and responses to food may be desirable as these tests are non-invasive and empower customers to optimize their health. However, to date, the feasibility to measure, interpret and translate the data into valid nutritional recommendations is limited. Moreover, it raises the following questions related to viability: who pays for it? Why should Jumbo offer these tests, and what do they get in return? Does Jumbo have the expertise, or should they collaborate?

Another example is related to Jumbo's standpoint regarding provision of unhealthy food. Jumbo aims to offer everything a customer may ever need or desire, meaning that they will keep offering unhealthy products. A concept to stop selling products labelled as unhealthy will therefore not be accepted by top-management. However, if customers voice this desire bottom-up, Jumbo may reconsider their mission.

Customers **DESIRE** a service that...

... truly cares for their health and well-being

... is integrated in a supportive environment that facilitates, supports and empowers them to take action

... is enjoyable and not experienced as paternalistic or stigmatizing

To be **VIABLE** for Jumbo, the service should ...

... enhance customer satisfaction, retention and/or trust

... be profitable, through increased sales, or develop new streams of value from sales or use of customer data

... provide sustainable competitive advantage via a unique value proposition that is in line with Jumbo's vision, mission and strategy

DESIRABLE

VIABLE

FEASIBLE

Service

To be **FEASIBLE** on the short-term, the service should use...

... existing resources from Jumbo, such as their touch points, infrastructure and expertise

... use available customer data (of prior purchases) to personalize services

... use available, commercialised and proven technology, products and services, such as health tests

4.4 | Synthesized ‘thought & emotion’ customer journey

This section is a continuation of the customer mapping activity that was performed during fieldwork (see Section 3.1.5). This section explains the process of creating a synthesized customer map and identification of opportunities to support customers in their journey of adopting and practising a healthy diet. Afterwards, two observations are discussed. The next pages contain a visual representation of the outcomes. Last, this section elaborates upon the five windows of opportunities that were identified.

4.1.1 | PROCESS

Creation of the synthesized journey map

The customer journeys participants constructed during fieldwork (see Section 3.1.5) served as a basis for the creation of a synthesized journey. I analysed the individual maps for overlapping thoughts, emotions and critical aspects. The resulting synthesized customer journey includes concepts that describe the main thought and emotion components of the individuals, such as sadness to give up on enjoyable foods; as well as less obvious thoughts and emotions that were considered as critical, such as the concern of eating more fat as fat was viewed as unhealthy. In case of variability in participants’ thoughts and emotions, the extremes were integrated in the journey. Side processes, such as discussion with family, were left out to maintain clarity. The synthesized map, which is shown on the next spread. It contains four phases, being: 1) Awareness and Consideration, 2) Preparation, 3) Doing and 4) Evaluating.

Opportunity identification

Two people with diabetes were engaged in opportunity finding by discussing the synthesized customer journey. Both participants (a founder of a patient-to-patient platform and an ambassador of a patient organisation) work with different types of patients with diabetes on a daily basis. They could therefore contribute valuable input from the perspectives of different patient profiles. To find windows of opportunities, participants were invited to share ideas that could support a person with elevated blood glucose levels in (stages of) the dietary change. Each idea was discussed to find the underlying need or desire, which represented the opportunity. The participants were asked to cluster the needs and desires and describe the overarching opportunities (see Table 2). I helped the participants in this process by asking questions and summarizing insights. To arrive at a final clustering, participant two also reflected upon the results of the session with participant one.

Furthermore, the discussion led to small additions to the synthesized journey and initial service ideas. For example the customer journey was enriched by including the frustration people may experience in making food judgements as they were considered as difficult and effortful.

Table 2. Fragment of the clustering that led to the fifth opportunity.

OVERARCHING OPPORTUNITY	DESIRE/NEED CLUSTER	DESIRE/NEED
Creating a supportive environment	No seduction	• No promotion of carb-rich products (e.g. discounts, recipes) • Low-carb routes or sections
	Self-initiated restriction	• Shielding carb-rich products during online purchase • Setting personal restrictions related to carb-quantity
	Stimulating healthy choices	• Incentives to buying low-carb • Rewarding good behaviour
	Social acceptance	• Low-carb party and dining assortment • National educational campaign

4.4.2 TWO OVERARCHING OBSERVATIONS

The synthesis led to two generic observations.

The first observation is that opportunities can have two purposes. An opportunity can reinforce positive emotions, and thereby enhance customers experience and motivation, or improve negative emotions. An example of reinforcing a positive emotion was to strengthen pride in people after successfully withstanding seduction. To enlighten a negative emotion, a participant suggested avoiding the word ‘diet’ as this word has a negative connotation. Instead, the participant preferred to describe the diet as a new lifestyle.

The second observation is that opportunities are present throughout the complete customer journey and do not limit themselves to existing touch points and interactions with supermarkets. This implies that services can also target pre-, and post-shopping phases.

“The challenge is to seduce people to keep to a healthy lifestyle, and at the other hand we need to take away various sources of seduction.”

~ Jaap Goudsmit, Virologist, Volkskrant May 2, 2020

4.4.3 | OUTCOME: THE SYNTHESIZED THOUGHT & EMOTION CUSTOMER JOURNEY

The outcome is a synthesized customer journey depicting customers thoughts and emotions during the process of dietary change (see Image 37). The map is enriched by showing the available resources for support. In case of variability in participants' thoughts and emotions, the extremes were integrated in the journey, which is visible by multiple bullets at the same position on the x-axis. Moreover, the journey depicts the outcomes of the opportunity finding activity with users, which resulted in five windows of service opportunities. Since all participants sustainably adopted a low-carb diet, the journey does not show the path of not attempting or quitting it.

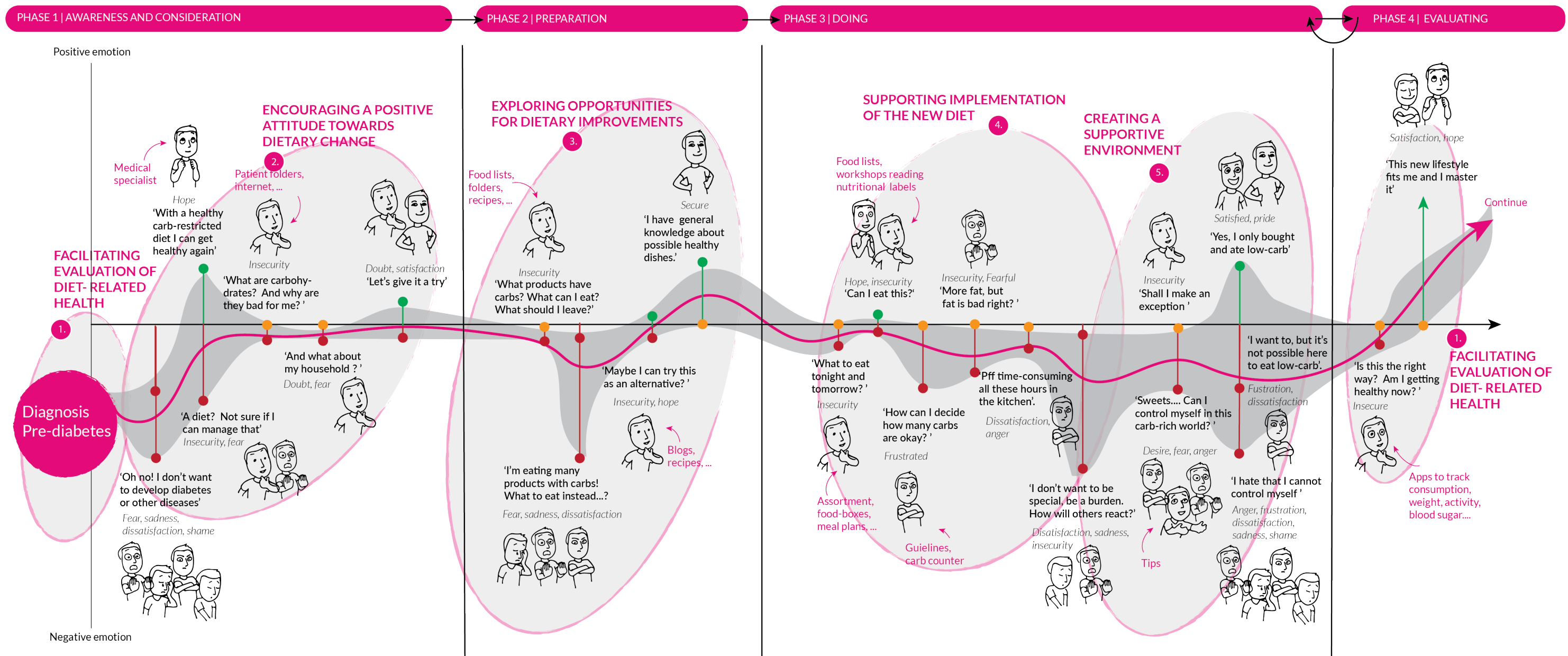


Image 37. The synthesized thought & emotion journey based on journeys created by participants.

4.4.4 | OUTCOME: WINDOWS OF OPPORTUNITIES

Five windows of opportunities were identified, being: 1) facilitating evaluation of diet-related health, 2) encouraging a positive attitude towards dietary change, 3) exploring opportunities for dietary improvements, 4) supporting implementation of the new diet, and 5) creating a supportive environment. Below, these are described in more detail.

1) Facilitating evaluation of diet-related health

The first opportunity describes the use of health check-ups, in this case assessment of blood sugar levels, to: 1) enable supermarkets to offer targeted and personalized health-driven services, 2) enhance customers' receptiveness to dietary change, and 3) establish a feedback loop.

An initial health check-up is required to identify customers with elevated blood glucose levels, and thereby enable supermarkets to offer these customers targeted services to improve their health via diet. Some participants mentioned that regret of not having tested their blood glucose at an earlier stage, as this would have enabled to intervene quicker and prevent worsening of their health. Moreover, the test outcomes create awareness and enhance customers' receptiveness to change. A participant described: 'by seeing the outcomes I realized that I really needed to change'.

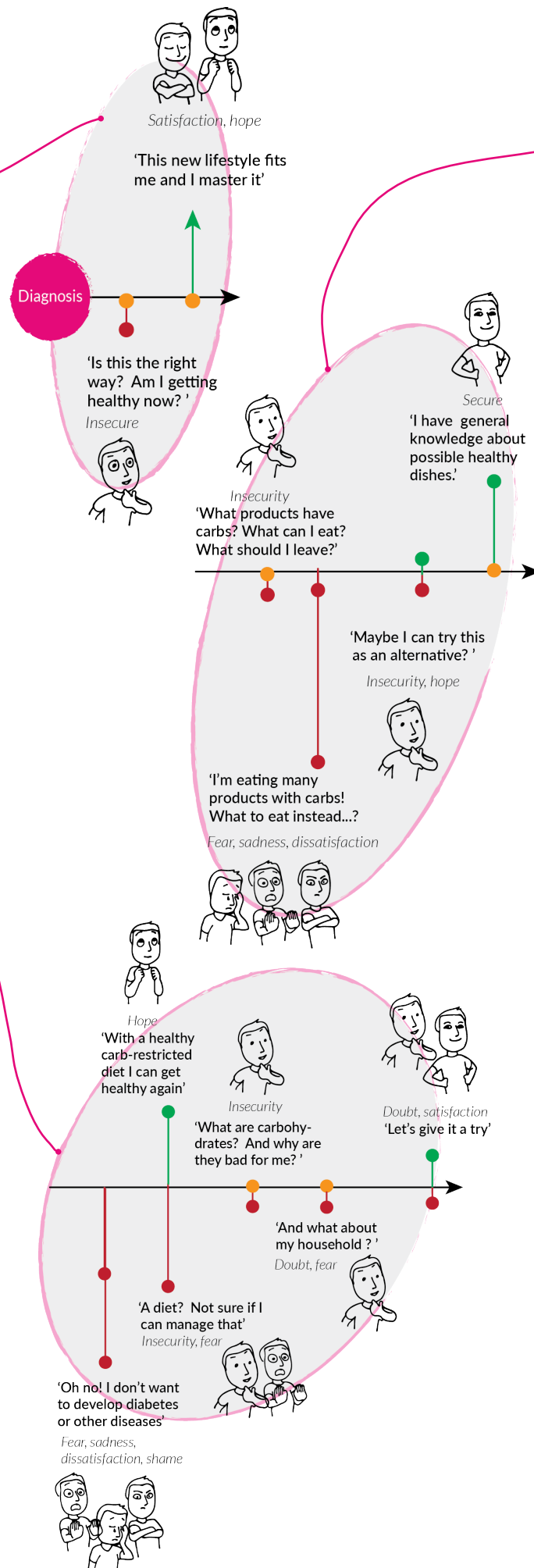
Participants also sought follow-up tests to evaluate the effectiveness of their diet and make changes if necessary, empowering them in self-management of their health. Furthermore, participants expressed the desire to evaluate other diet-related health metrics, such as cholesterol and blood pressure, as these metrics should be integrated to offer a truly personalized diet. A participant explained that he was totally surprised with the test outcome of having pre-diabetes: 'It came totally unexpected'. As a consequence the participant experiences lower trust in his body and desires to have a full body scan to be confirmed of good health.

2) Encouraging a positive attitude towards dietary change

The second opportunity is to encourage customers in developing a positive attitude towards dietary change by enhancing knowledge and skills, and facilitating them to experience the new diet as a way to combat negative prior experiences and prejudices.

Participants mentioned to be hesitant to commit to a diet. Reasons for this hesitance were negative prior experiences with dieting, having prejudices about dieting, lacking knowledge and having low perceived self-efficacy. One participant explained that he does not like to commit to unfamiliar things, as he does not know what he will commit to. These reasons imply that customers may not even consider dietary change.

Interestingly, the participants expressed that their perception of the diet changed after experiencing it and seeing positive health outcomes, such as weight loss and improved blood glucose levels. People described a transition from being insecure and hesitant to feeling convinced, satisfied, proud and in control. Despite describing their new diet as having less variety, the participants also described it as tasty, easy and healthy. This shows the importance of making people attempt the new diet.



3) Exploring opportunities for dietary improvements
Third, supermarkets can support customers to 1) structurally evaluate the healthiness of their diet and 2) provide healthier alternatives accompanied by evidence.

First, participants desire support in evaluating the healthiness of their current diet. Participants mentioned that reflection on one's diet remains important as carbohydrate-rich foods may be present in a 'hidden' form, product ingredients may change and healthier alternatives may emerge. For example, a participant described to eat shredded cheese, assuming this to be low in carbs like all cheeses, while there is starch added to the product.

Second, participants seek support in finding alternatives to the unhealthy products in their diet or the 'healthier' options. This exploration was described as an emotional roller-coaster, driven by successes and failures in finding healthy and desirable foods. Participants mentioned to experience distrust towards supermarkets and manufacturers and their dietary advices. Participants said that supermarkets should proof if, and how, their proposed alternatives are better compared to other products. Collaborations with experts and research institutes were mentioned as possible ways to enhance trust.

4) Supporting implementation of the new diet

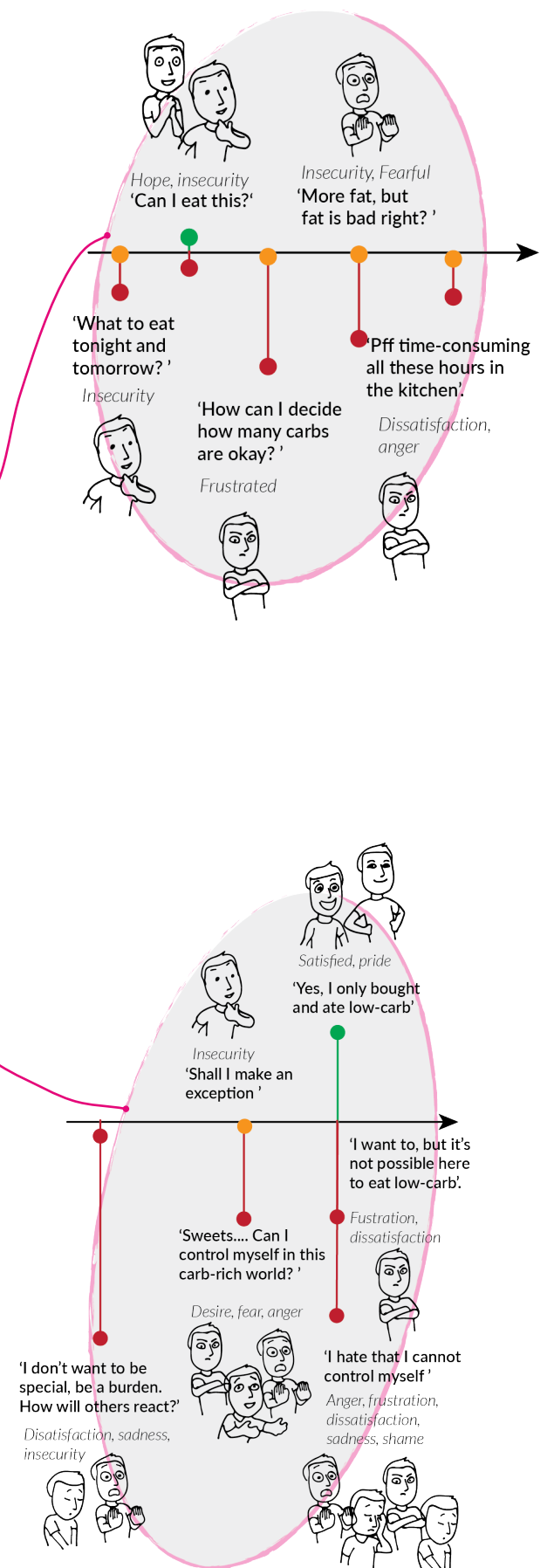
A fourth opportunity is to provide customers practical support to implement the new diet. Participants described the desire for support during day-to-day actions related to their diet. For example, they seek meal inspiration and support in reading nutrition labels as this is considered effortful and complex: 'Why is there no general symbol for products with less than 5 grams carbs per 100 gram?'. Furthermore, a participant described the inner-conflict of consuming more fat: 'I read that saturated fat is unhealthy, while this diet promotes me to eat fat: this overwhelms me, I don't know who to believe'. This person desired to be educated about fat and receive guidance in determining the right quantities. Moreover, some participants wished to reduce the time they spend in the kitchen to make low-carb foods such as seed crackers.

5) Creating a supportive environment

The fifth opportunity is to create a fully supportive environment that accommodates and stimulates a healthy diet by redesigning the food ecosystem and enhancing knowledge and acceptance in society.

Participants described to experience various negative emotions caused by their environment. The first problem occurs when the social environment does not accommodate the diet, for example during catering of events. This can also happen unintentionally as described by a participant: 'a friend who invited me for dinner failed to offer a low-carb meal due to her lack of knowledge'.

Seduction was the second problem that was voiced. Some participants perceived the sight of unhealthy foods as challenging. One participant described a strategy for self-control by only shopping in the outer ring of supermarkets; the vegetables, dairy and meat and staying away from the inner part. Another participant wished to adapt the visibility of products during online shopping. He described that: 'interventions to eat healthy make no sense if supermarkets simultaneously seduce you to buy unhealthy products'.



4.5 | Take-away

The chapter 'Synthesis' emphasizes...

... the need for shared efforts and responsibility. Diet is influenced by the interplay between personal values and behaviour and the environment, including the food culture and food ecosystem. It calls for a positive attitude and efforts in individuals and a supportive environment that accommodates and stimulates healthy eating

... that change can start bottom-up, with customers demanding healthy products, or top-down from the government and food system, including supermarkets, who can incentive healthy food and dis-promote unhealthy food.

... that small improvements in people' diet may eventually lead to mighty beneficial outcomes for the health care system.

... the need for a holistic approach. Service interventions should satisfy the desires of customers, fit the company profile and be technically feasible to have potential to be successful.

... the need for multiple personalized service interventions throughout the process of dietary change. People's experiences, needs and desires are phase-, person- and context specific. This implies that we should seek a solution in a set of personalized services each targeting specific needs throughout the process.

Last, the synthesis identifies five windows of service opportunities on the customer journey of dietary change for people who adopt a low-carb diet, and provides insights in considerations regarding desirability, feasibility and viability.

Chapter 5 |

IDEATION PORTFOLIO

This chapter presents a portfolio of fourteen service concepts, and explains the process how these concepts were developed. The first section sheds a new light on the vision for Jumbo. The second section explains the process of how participants were involved during the ideation process. Afterwards the fourteen service concepts are presented. It starts with an overview of the concepts mapped on the synthesized customer journey. The concepts have been clustered in three separate sections: section four contains concepts that relate to Jumbo's website, section five contains concepts connected to the JumboExtra's application and section six describes several stand-alone concepts. Each concept is described in the format: cause, context, concept and how the concept was co-created and/or co-reflected upon with participants. The concepts range from more generic dietary services to custom-made services for groups and individuals with pre-diabetes. The chapter concludes with several take-aways.

In this chapter:

- 5.1 Vision
- 5.2 Ideation process
- 5.3 Overview of outcomes
- 5.4 Concepts related to Jumbo's website
- 5.5 Concepts related to JumboExtra's
- 5.6 Stand-alone concepts
- 5.7 Take-away

5.1 | Vision

Ideation, both exploration of new concepts and decision-making, is guided by a vision. Therefore, this section describes a vision related to the positioning of supermarket Jumbo.

Supermarkets are increasingly expected to take social responsibility by aligning their commercial stakes with the health stakes of customers (Mozaffarian, 2016; Ministerie van VWS, 2018). Therefore, I developed a new perspective on Jumbo's existing vision. The vision is based on a model developed by Van der Loo et al. (2007). The model consists of four components, being: 1) a higher goal, 2) a daring goal, 3) core competences and 4) core values (see Image 38).

I selected the model by Van der Loo et al. (2007) as it provides the possibility to combine a sales-related goal with the aim of contributing to the health of customers. The upper half of the circle is based on Jumbo's current mission. The lower half is my contribution, in which I describe the daring goal of aiming for creating the healthiest customers.

I see Jumbo's core value as 'building loyal customers by being loyal to them', and truly understanding their dreams, needs and concerns. I envision a future-proof food- and care system that supports customers to flourish, instead of forcing them to function in an efficiency and profit driven system. Ideally, Jumbo provides customers a supportive environment, possibly custom-made, and a sense of self efficacy: 'yes we can'.

This implies that Jumbo will move outside the field of food retail and starts exploring the field of (health)care. Jumbo's customer centricity shows a caring attitude towards their customers. However, Jumbo can go one step further by truly caring for each individual customer. Jumbo can inform, engage and empower customers to optimize their diet based on their personal needs, values and context. Simply put: Jumbo can take their customers by the hand to achieve a healthy, fitting and enjoyable diet.

In my view, we cannot expect Jumbo to change their assortment and business model over one night. The coming years Jumbo will keep selling unhealthy food (personal contact with R.J. Koens, director Corporate Strategy, April 2020). However, Jumbo can start to transform. Jumbo can break the silence by including health-related messages in their marketing and offering health-related services to groups and individuals with specific health needs. Similar to the targetgroup of this thesis, Jumbo's approach is to start with customers who are intrinsically motivated to eat healthy. This targetgroup can be supported relatively easy, and can then function as role model and inspiration for customers who are less receptive to adopting a healthy diet.

“With food you’re creating a language. For this, you need vocabulary; an alphabet to construct sentences. In a low-carb diet, low-carb ingredients are the alphabet. The more letters we have, the better we can express ourselves and the more beautiful prose we can create.”

~ Inspired by the NOMA documentary 'My Perfect Storm'

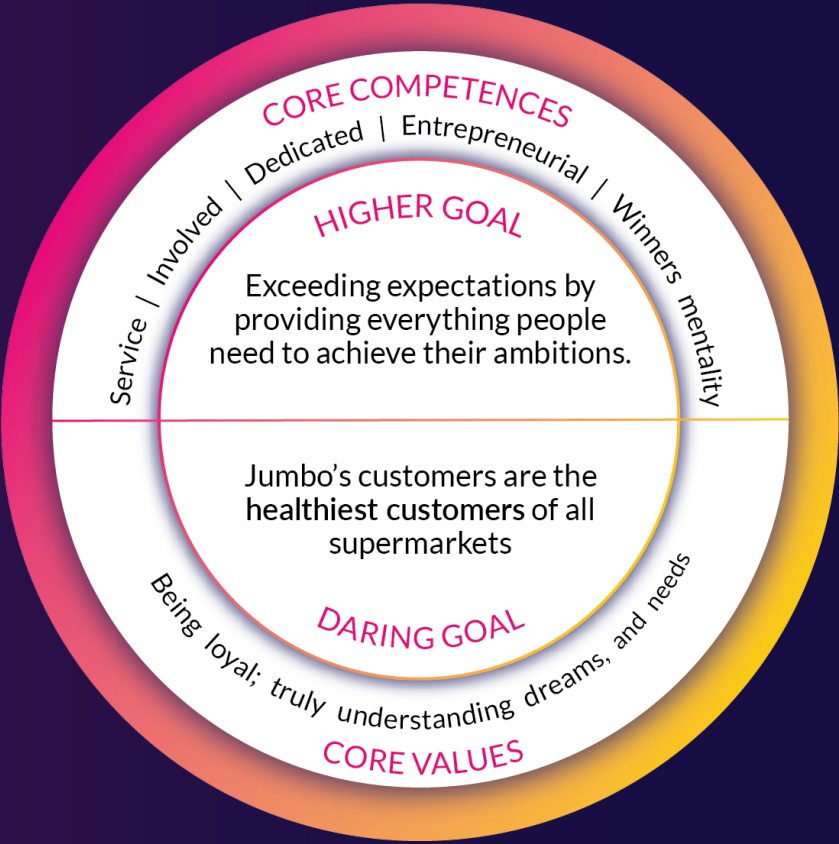


Image 38. A vision for Jumbo based on the model by Van der Loo et al. (2007).

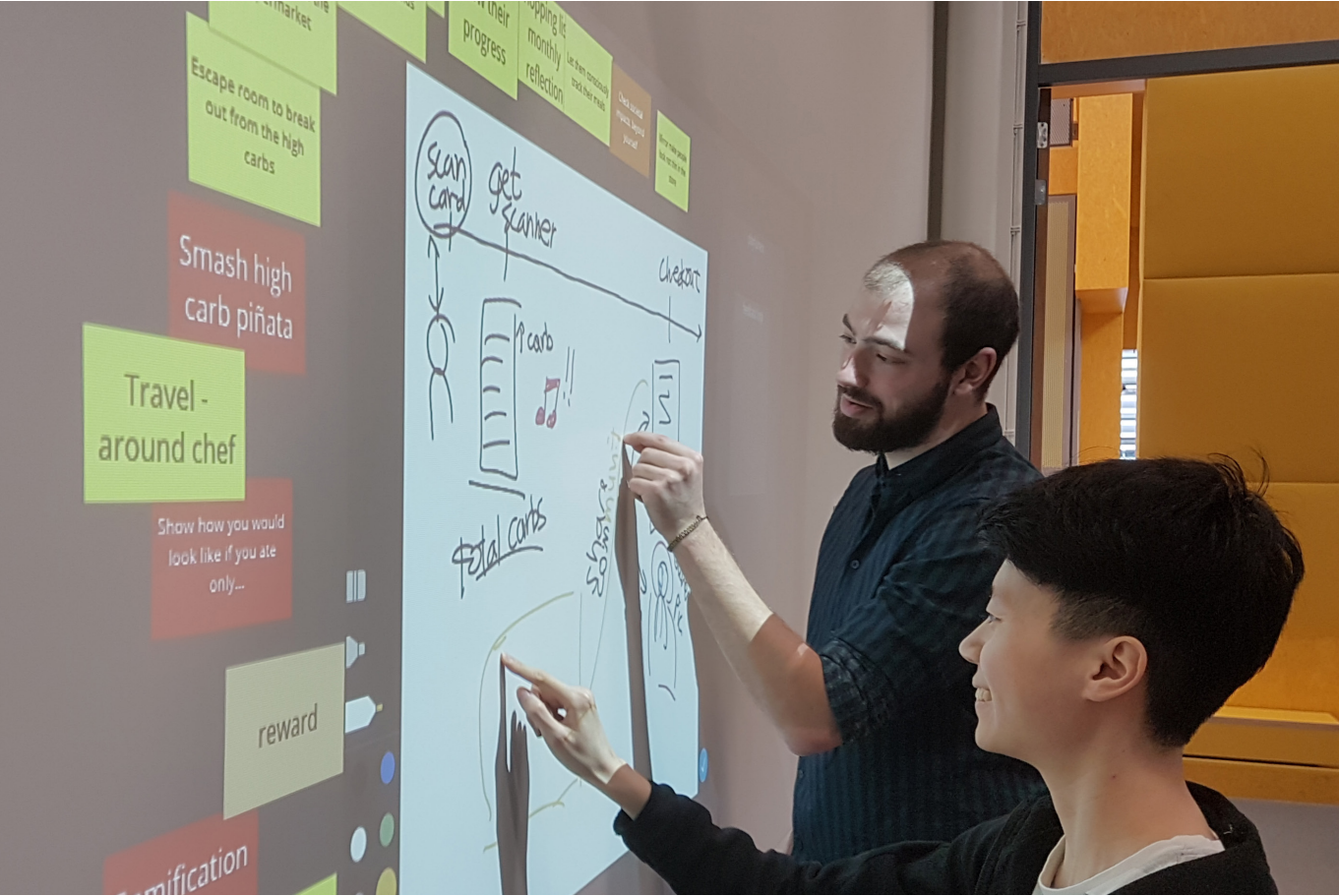
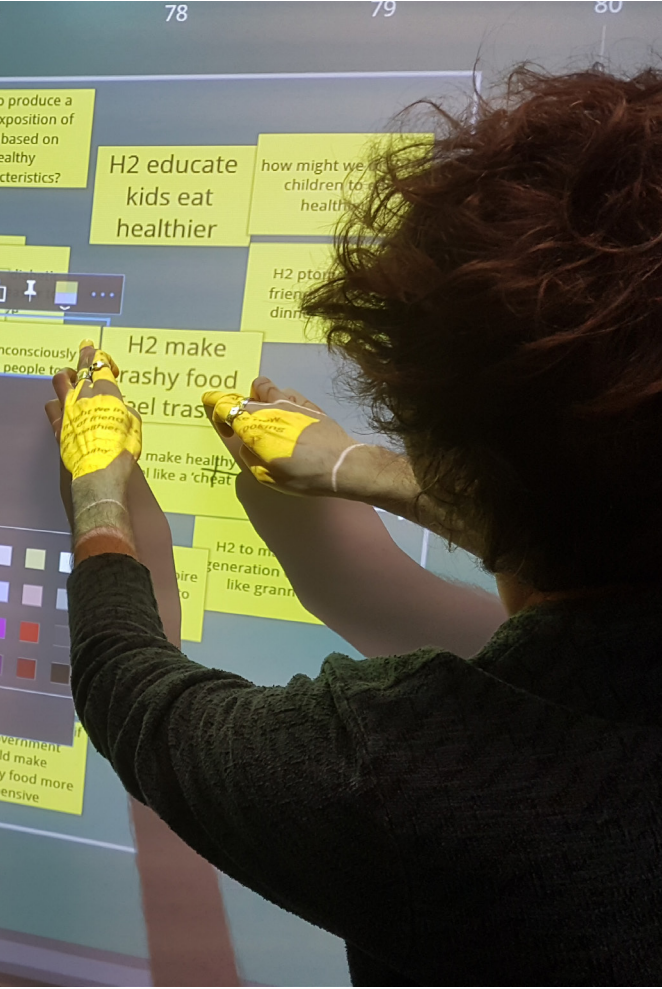


Image 39. An impression of two creative sessions with students from Industrial Design Engineering (TU Delft).

5.2 | Ideation process

Involvement of users in the design process enhances the relevance of the outcomes (Tomico, Overbeeke, & Frens, 2009). Users can be involved in various stages during the product development and also in various ways. From now I refer to these users as participants of the ideation process.

Tomico et al. (2009) propose a three-step process for a collaborative design process. The steps are: exploration, ideation and confrontation. This section describes the process that led to the development of a portfolio of concepts. During this process, participants have been involved in two ways, namely in the ideation itself and by reflecting upon concepts via confrontation. Table 3 provides insights in the participant details.

Exploration
The fieldwork described in Chapter 3 served to explore the domain. The fieldwork provided understanding of the target group and context and resulted in initial ideas and design opportunities (see Section 4.4).

Ideation
In ideation, concepts were co-created with participants (see Image 39). This co-creation process was characterised by storytelling, role playing and sketching of concepts. The synthesized customer journey (see Section 4.4) played a leading role in this phase by providing focus and structure. Together with each participant, the journey was discussed and specific concepts were developed to respond to the pre-established windows of opportunities.

Confrontation
As mentioned in the Preface, COVID19 broke out during the start of the ideation process, limiting the possibility to engage with customers. As a consequence I had to rely on insights from the fieldwork and use online medium (phone and Skype) for contact. Due to these limitations, I developed concepts on my own parallel to the planned co-creation sessions.

The concept that I developed on my own have been co-reflected upon with participants. This activity took between one and two hours. Based on the available time, and level of detail in the participant's answers, either all concepts were discussed or a selection.

To aid the reflection, the concepts were visualised and described in one-pagers. These one-pagers were shared with the participants via mail. These one-pagers eventually evolved in the concept descriptions presented in this chapter. During a phone/Skype call, the proposals were discussed. This discussion took a semi-structured format. Questions that were posed to the participants related to what they valued in the concept, what doubts they have, whether and when they would use it, and possible ways to improve the concept.

For clarity, I describe for each concept presented in the portfolio of concepts whether the concept has been co-created or co-reflected upon.

Table 3. Details of participants participating in the ideation (see top) and confrontation (see bottom).

PARTICIPANT DETAILS CO-CREATION	
3 persons with diabetes on low-carb diet	1 face-to-face 2 online
2 persons on low-carb diet with other health cause	1 face-to-face 1 online
2 student groups of Industrial Design Engineering (TU Delft)	face-to-face
1 employee firm Clear	online
PARTICIPANT DETAILS CO-REFLECTION	
2 persons with diabetes on low-carb diet	online
3 persons on low-carb diet with other health cause	online

Final reflection on concepts
Finally, together with one participant, who also took part in the co-creation, the portfolio of concepts has been evaluated to discuss associated advices for Jumbo. See Section 6.5 for more information and the outcomes.

5.3 |

Overview of concepts related to the synthesized thought & emotion customer journey

This section provides a visual overview of the concepts that are described in the next sections. Image 40 summarizes all concepts and shows to what part of the customer journey the concept corresponds to. The visual also shows how the concept has been developed, either in co-creation, via co-reflection or a combination of both.

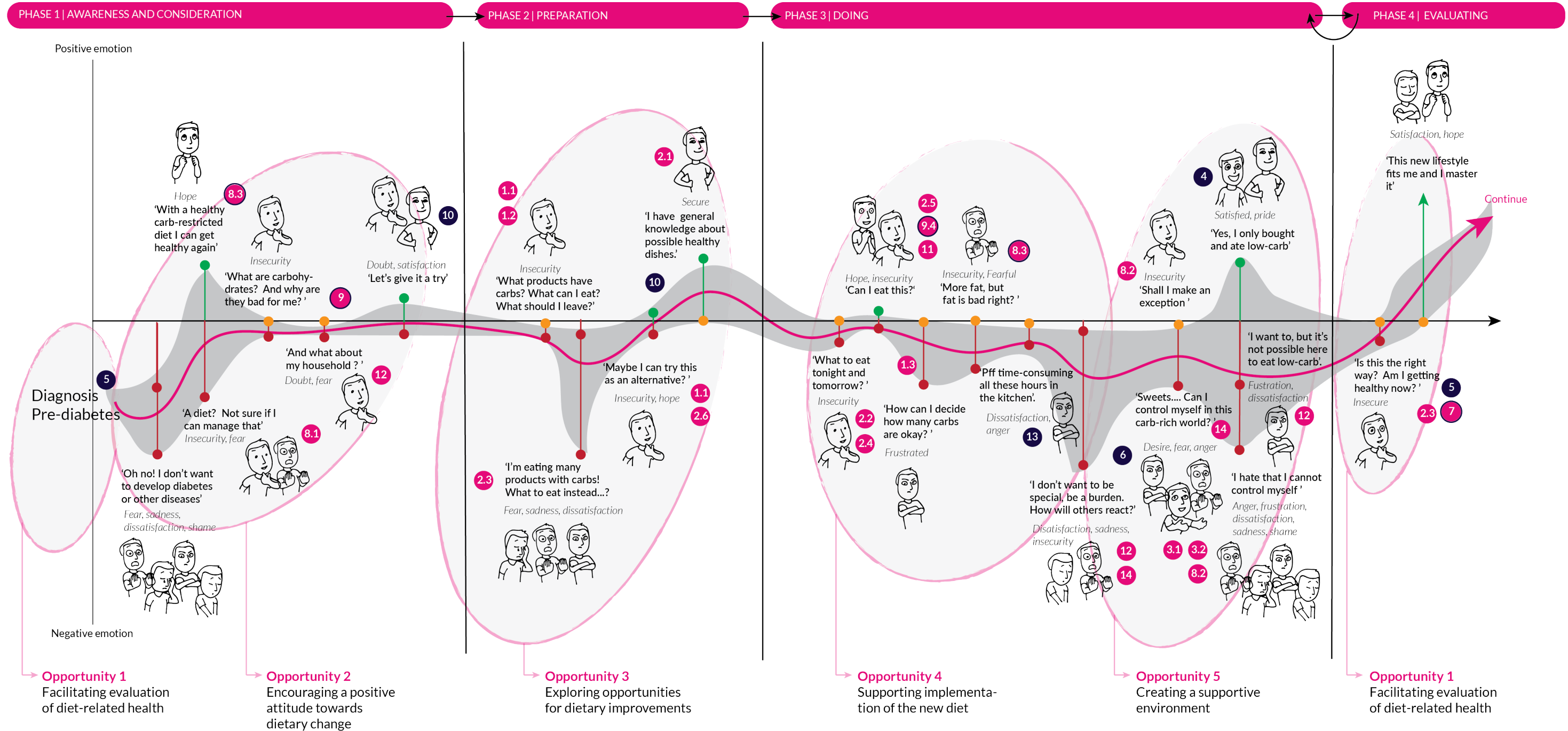


Image 40. Design concepts, which were co-created or co-reflected upon, mapped on the synthesized thought & emotion customer journey

5.4 | Concepts related to Jumbo's website

Several ideas emerged that make use of the current channels of Jumbo, such as their website and store, to better support customers in their dietary intentions. This section focusses on contributions to Jumbo's website, via three overarching concepts, being: easier comparisons, suggestions and self-control. These three concepts, and sub-concepts, are described below.

CONCEPT 1 | EASIER COMPARISONS

Cause

During fieldwork, participants described difficulties in 1) reading nutritional labels to make informed choices about what products are tolerated and in what quantity, and 2) comparing products and choosing the 'healthier' option.

Context

Generally speaking, nutritional values are shown as numerical value per 100 grams or per portion size. This requires customers to evaluate their actual portion size and do subsequent calculations, creating a first barrier. Comparing products of different categories formed a second barrier. Customers have to carry the product or remember the values by heart. Also on Jumbo's website there is no option to easily compare the nutritional values of products. A third complication is that some products, such as fruit and vegetables, do not contain nutritional values.

Co-creation

Participants were asked to describe their ideal process of evaluating and comparing products by describing a scenario. One participant described possible aids in online groceries, leading to concept 1.1 and 1.2. Another participant shared his enthusiasm about the ease and clarity of visual guides, which he had seen on a website. This led to concept 1.3.

Concept 1.1 | Comparison tool

With the comparison tool (see Image 41), customers can compare the nutritional values of products in a single glance. Customers can add the products they desire to compare and indicate on what nutritional labels they want to base the comparison on. This function was desired to explore the healthiness of products and make well-informed trade-offs; both between similar products and products from different categories such as the choice between a magnum and a handful licorice. A challenge connected to this is discussed in the blue box on the next page.

Concept 1.2| Filter

Jumbo offers various filters to search for products, such as the filters price and newness. Besides these options, customers like to sort products on their nutritional values, such as the amount of carbohydrates and fibres (see Image 43). Related to this concept, a participant expressed disappointment: 'Why is Jumbo only providing options related to these values? They have all nutritional values at hand. Why don't they offer everything and make the customer choose?'

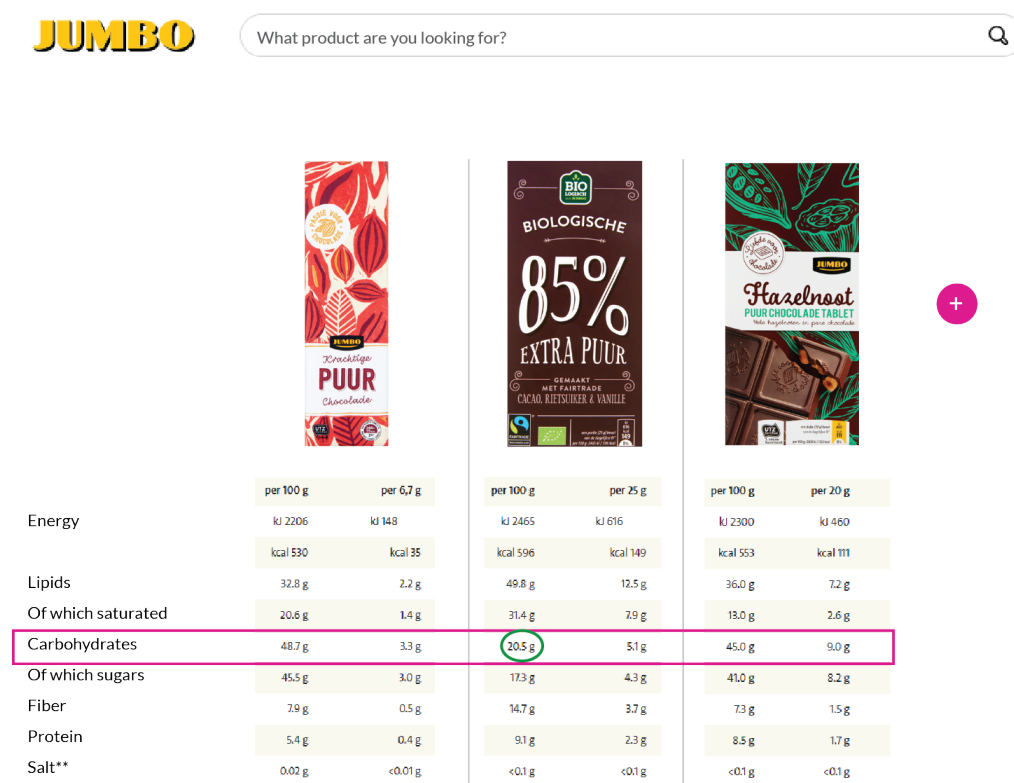


Image 41. A tool to easily compare the nutritional values of products on Jumbo's website.



Image 42. An impression of a visual guide depicting the quantity of food that corresponds with 20 grams of carbohydrates. Images from: <https://www.dietdoctor.com/low-carb/keto/20-50-how-much>.

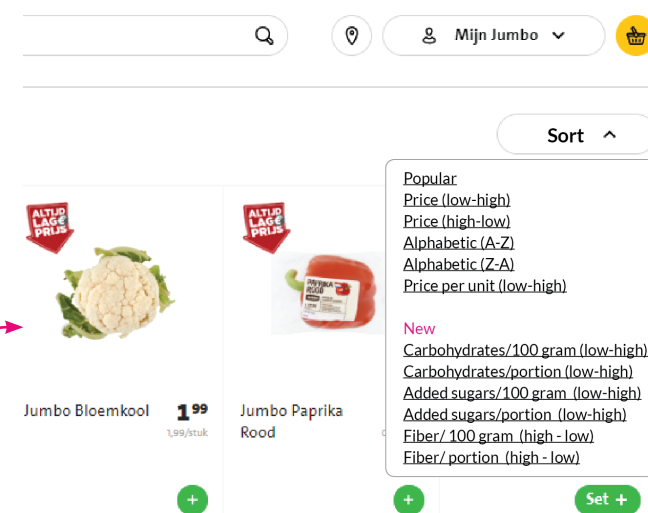


Image 43. New sorting options added to facilitate customers to compare products based on their dietary health intentions.

Concept 1.3| Visual guides

Visual guides, like shown in Image 42, provide visible impressions of the carbohydrate content of specific foods. For example, this visual guide can show how 5 grams of carbohydrates look in certain foods since this is a threshold often used by participants. Based on these images, customers are facilitated to assess whether, and in what quantity, the product fits their dietary intentions.

These visual guides may be added to the product pages on the website, be shown on hand-scanners or be added to certain products in brick-and-mortar stores. For in-store use, a selection of products should be made to avoid being overwhelmed with visuals. This concept could be implemented relatively easy, and only requires a person to calculate and assemble the amount of a specific food and take a picture. A limitation is in processed foods, such as low-sugar assortment, as these products may change over time and therefore require to be updated.

The same visual principle can be used to support customers in evaluating the amount of carbohydrates they consume per meal or per day. A customer starts with an empty plate, selects the specific food, and virtually ‘fills’ his plate to match his actual consumption. The application then predicts the quantity of carbohydrates that are on the plate.

The visuals may also be used in marketing and campaigns to raise awareness and knowledge. A possible format is an estimation game: how many carbs are in this jar (see Image 44)?



Image 44. A guessing game: a jar is filled with a certain ingredient. Can you guess how many carbs are in the jar?

CONCEPT 2 | SUGGESTIONS: INSPIRATION & FEEDBACK

Cause

Fieldwork showed that people seek inspiration and structural reflection on their diet. This is evidenced by posts on patient-to-patient platforms.

Context

The inspiration that people seek is twofold. On the one hand, people seek support for special situations, such as combining diet with sport activities and eating on festive days. On the other hand, people seek practical inspiration of what they can prepare on ordinary days. This inspiration should use ordinary ingredients and be easy and quick to make.

According to the participants, structural reflection on ones diet is important for three reasons, being that unhealthy foods may be present in a 'hidden' form, product ingredients may change and healthier alternatives may emerge. Customers appreciate a combination of generic advices and personalized feedback.

Co-creation

Participants were asked to envision how they prefer to be inspired and receive feedback. Participants described to , ideally, receive meaningful suggestions without having to ask for it. The ideas that were described led to two clusters. Cluster one relates to general dietary inspiration. Participants made a reference to pre-established purchase lists of Jumbo's website and interviews with peers or role models in Jumbo's magazine. Cluster two contains concepts for customized feedback. For customized suggestions, participants saw value in using their personal purchase list. Personalized suggestions can improve their choices during 1) the 'planning phase' by providing feedback on the purchase list, 2) the 'shopping phase', proving feedback during online shopping and when shopping with self-scanners, and 3) enable reflection in the 'post-purchase phase' based on the person's receipt. A challenge that was voiced is that a purchase list may contain products for multiple household members, who may have different dietary needs. Therefore, a challenge is to know whether the right products are consumed by the right person.

CLUSTER 1. GENERIC INSPIRATION

Concept 2.1| Categorical lists

The Jumbo website contains pre-established lists for specific situations with the aim to inspire people and simplify their process of selecting products for purchase. Examples of these lists are: 'frequently bought', 'from the air fryer' and 'guilty pleasure' (see Image 45). Participants appreciate to also have lists related to a carbohydrate restricted diet for inspiration and comparison to their own diet. Participants especially desired lists regarding special occasions or special contexts, as the food choices in these cases are less obvious. A first brainstorm revealed interest in the following lists:

Low carb & sports
Low-carb & festive days (birthday, celebrations, ...)
Low-carb on-the-go
Low-carb office lunch
Low-carb drinks
Low-carb gifts
Low-carb brunch
Low carb budget food

The participants mentioned that they probably will not initiate reading the lists themselves. Instead, they should be proposed at the right timing, when they need it. Possibly, the lists can be presented based on the shelf or online product assortment a customer is investigating. Another option is to propose a list of suitable products based on a customer's calendar. For example, if the calendar contains sports activities, low-carb sport foods are proposed. If the calendar contains drinks or parties, a person can automatically be supported in these events. Further research should explore if this is desirable and people are willing to share their calendar with Jumbo.

However, the impact of this concept on dietary improvement can be questioned. A concern voiced was that there could be an excess of lists. One participant mentioned: 'All nice, but in the end reading the lists is not enough. I need to do it'. This implies that information is not enough. Another participant expressed: 'I have never used these lists, but since they are there I also want to have a low-carb list, just to feel that Jumbo also thought about me. In case I need it, I know where to look'. This quote reveals the importance of inclusiveness and knowing that support is available and how it can be accessed.

Concept 2.2| Food stories

People seem to be curious what others eat. This is evidenced by Jumbo already sharing dishes that athletes, sponsored by Jumbo, like to eat.

In this concept, Jumbo shares purchase lists of famous and non-famous customers who follow a specific diet. These are people customers admire or feel connected to as peers.

Besides an interview and showing the purchase list, participants described the wish to learn what dishes were made with the purchased items and to have access to these recipes.

Image 46 shows an example of a food story with physician Hans van Kuijk, who also published a book on healthy carbohydrate restricted diet.

What's in it for Jumbo? New weekly content is expected to stimulate customers to re-open the application. Moreover, the content may inspire and facilitate customers to do shopping.

A feasibility concern is whether Jumbo has workforce available to provide weekly new content, as contacting, interviewing and updating the system requires time and effort.

Shopvlogs could be an alternative format. In these vlogs a customer can show what he/she buys in Jumbo and explain why. These vlogs could be co-developed and shared with patient groups, for example on Facebook groups like DiabetesDoorbreken. In this Facebook group sometimes pictures are shared of what people buy for weekly low-carb groceries to inspire others.

CLUSTER 2. CUSTOMIZED FEEDBACK

Concept 2.3| Feedback on prior purchases

With data on customer's prior purchases, Jumbo can provide a visual overview of these purchases with an indication of the amount of carbohydrates (see Image 47). This facilitates customers to judge what they can keep consuming, and what products have a high urgency to be replaced by an alternative. Ranking of products enables customers to adopt quick fixes for a selection of their 'worst' products, instead of changing their diet completely.

For example, products can be colour coded, with red standing for carbohydrate dense products and green for healthy choices on a carbohydrate restricted diet. Preferably the products are compared on the carbohydrate content calculated for portion sizes and per 100 gram.

For this concept a reoccurring challenge is the quantification, which can be potentially misleading (see blue box, concept 1).

Image 47. Prior purchases on ranked on carbohydrate quantity to inform customers about their healthiness. For the worst products, alternatives are suggested.

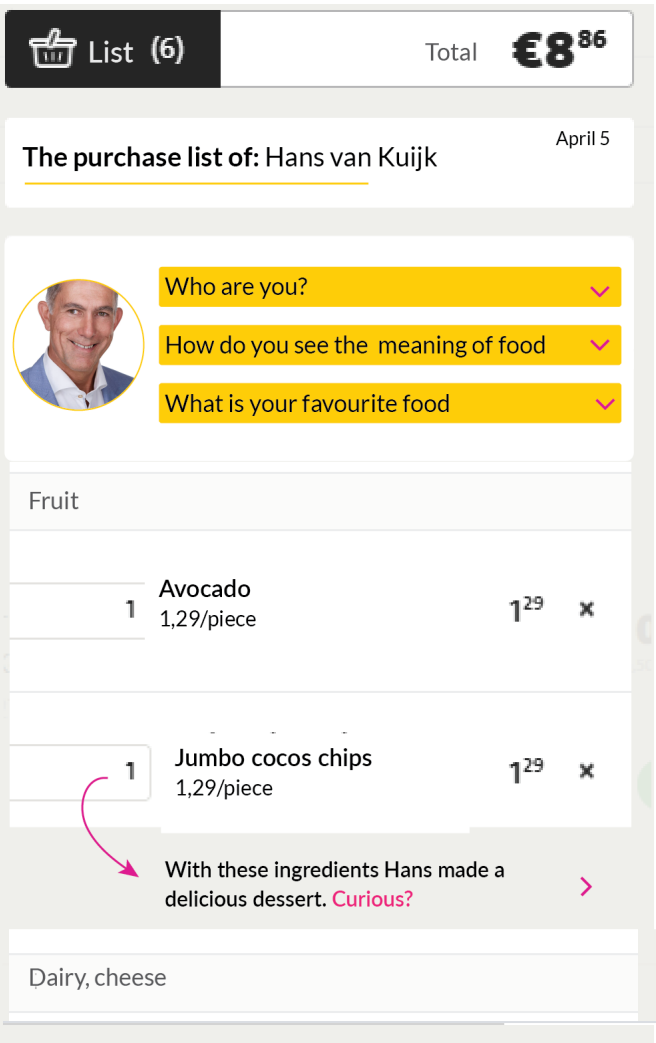
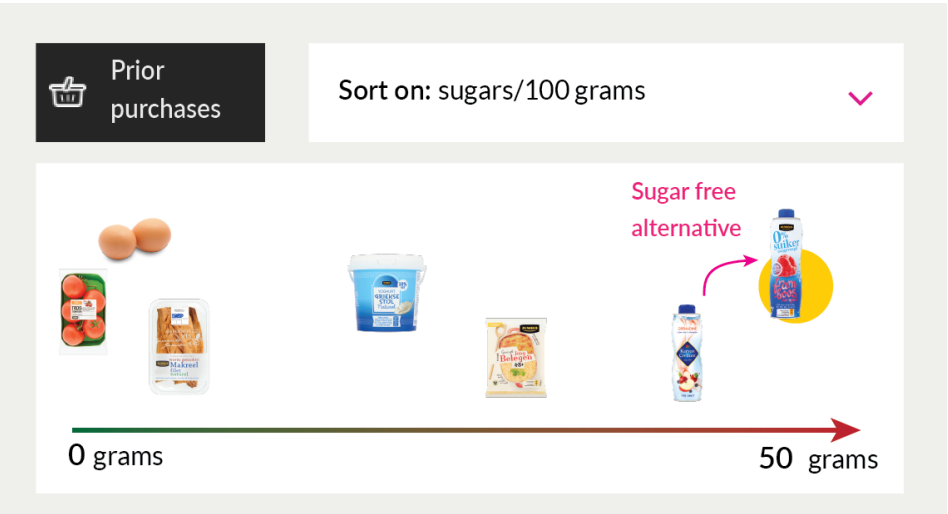


Image 46. An impression of a 'food story' that can be shared, containing an interview with someone on the low-carb diet, the purchase lists and recipes related to this list.

Jumbo lijstjes



Image 45. An impression of the lists Jumbo currently provides on their website.



Concept 2.4 | Inspiration based on purchase list

Based on the products the customer selected to buy during online groceries or in-shop with the use of a self-scanner, Jumbo provides a recipe that includes products on the shopping list and is in line with the customer's dietary intentions. Additional products that the recipe calls for are proposed and can be easily added to the list. This allows customers to grow their repertoire of healthy dishes, starting with the products they like to eat (see Image 48).

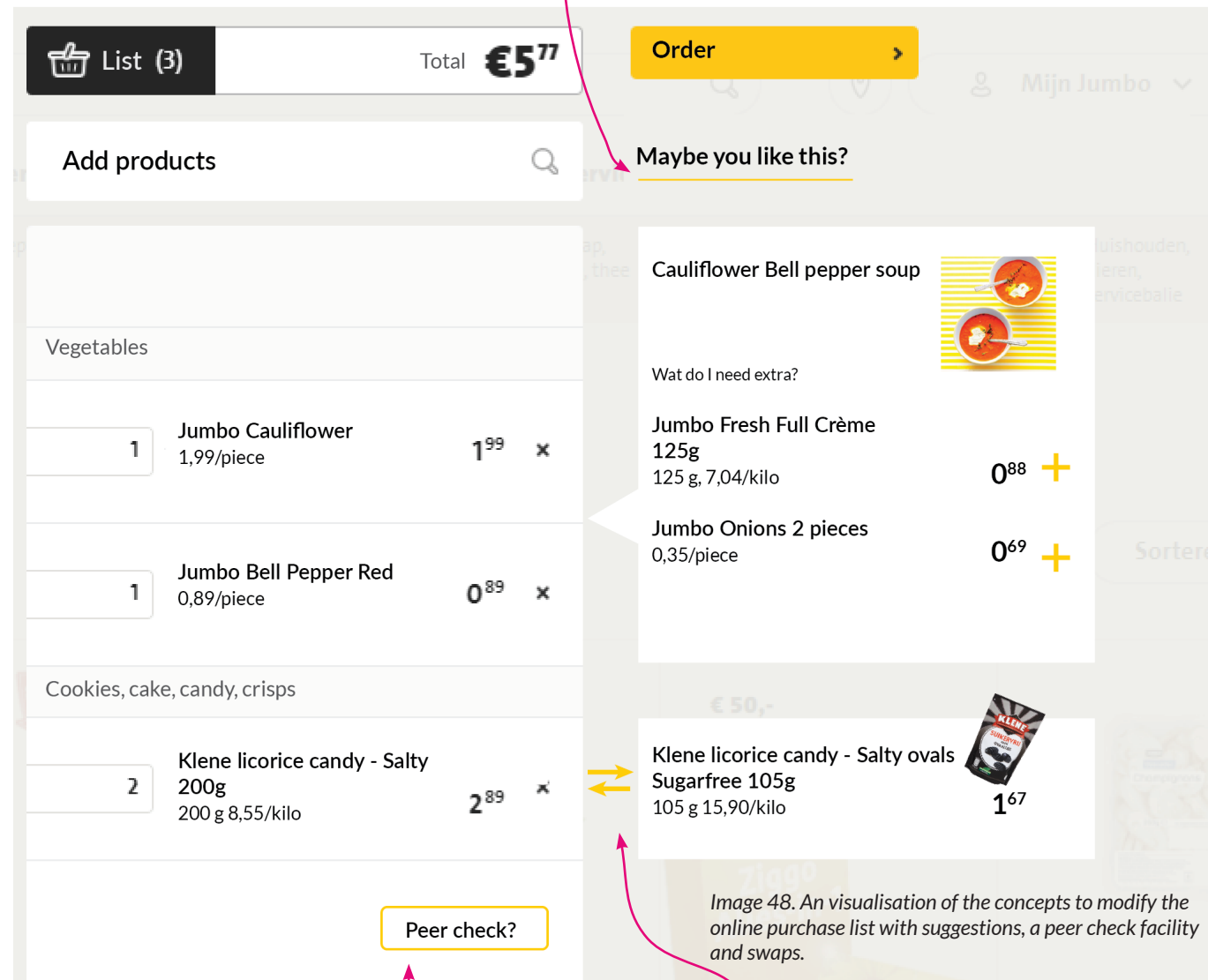


Image 48. An visualisation of the concepts to modify the online purchase list with suggestions, a peer check facility and swaps.

Concept 2.5 | Peer check

Besides professional coaching, peers are considered as a meaningful source of support (O'Connor, Stacey, & Légaré, 2008). A person may be more receptive to advice that is provided by another person who has first-hand experience. In this concept, the peer is a customer who is also eating low-carb. The peer-check allows customers to evaluate the healthiness of their purchase list by sending it to a peer. In this way, people can exchange advices and concerns.

Possibly, customers can volunteer to be a peer, as some people seem to desire to be in contact with others (insight fieldwork). Another idea is that all shops or cities have a an ambassador for the low-carb diet. This ambassador takes the role to support other local residents in the specific diet.

One participant was concerned about the quality and trustworthiness of dietary advice provided by peers. An alternative format could be to involve local dieticians and give customers yearly one 'free ticket' to ask a question to the dietician. For the dietician this may lead to new clients who desire a follow-up consult.

Concept 2.6 | Swap

Based on what a person selected to purchase, healthier alternatives are suggested by means of a swap. The customer can easily swap this product. Literature supports that suggestions of food swaps are effective in creating dietary change (Hartmann-Boyce et al., 2018).

Another format is that the purchase list can also propose healthier alternatives to products that the customer previously bought.

CONCEPT 3 | SELF-CONTROL

Cause

Literature study and fieldwork suggested that 1) supermarkets seduce customers to make unhealthy choices through marketing, convenience and price-incentives (Liberato et al., 2014), causing barriers in keeping up a healthy diet (Chance et al., 2014), and 2) people struggle with evaluating the healthiness of their diet, as they may not be mindful about food decisions, lack skills and knowledge (fieldwork) and do not see how the choices aggregate to impose health consequences (Chance et al., 2014).

Context

Research amongst Jumbo customers has revealed that one third of them experiences difficulties resisting unhealthy behaviour in places of high seduction (Motivation, 2015). Supermarkets are one of these places.

Co-creation

Participants expressed the desire to tailor their interaction with the Jumbo platform to their personal preferences. Particularly. Participants desired to remind and restrict themselves to prevent undesired behaviour. Therefore, they were asked to describe how the touch points with Jumbo can be (re-) designed to provide better self-control and prevent them from buying unhealthy products. Foremost, the participants wished that the marketing of unhealthy products stops. Moreover, they mentioned that supermarkets should reduce their assortment of unhealthy products, or make it less visible through changes in the shop- and website layout

However, participants acknowledged that this was a dream scenario and may not be realistic. Therefore, they came up with two ways to tweak the environment based on their personal desires and which does not influence other customers. Remarkably, in these concepts the participants pose self-restrictions. A note is that participants described this as an short-term intervention, mainly to create awareness. Once a healthy lifestyle is achieved, they wish to have all freedom and not be notified each time about their eating behaviour.

Concept 3.1 | 'I See That I See What You Don't See'

Participants mentioned to be seduced by seeing unhealthy products. Therefore, with this concept customers can alter the online visibility of the assortment based on their personal desires. For example, some customers may wish to restrict themselves from seeing certain products or product categories with unhealthy carbohydrates, such as the sweets assortment. Another possibility is that only the healthiest options are shown. For example, when a person searches for rice, only the brown rice with high fibre content pops up.

Concept 3.2 | Personal cues and purchase restrictions

This concept responds to the desire to set personal cues and restrictions (see Image 49). Literature suggests that cues can stimulate mindful, rational choices by making people aware of the moment of choice (Thaler & Sunstein, 2008). Participants mentioned to work with 'golden rules' to make judgements easier. Examples of golden rules are the '80/20 percent' balance in healthy and unhealthy eating and to allow products with less than 5 grams of carbohydrates per 100 grams.

Participants mentioned potential value in the following cues and self-restrictions during a first brainstorm.

Possible cues:

- A reminder about ones dietary intentions when entering the shop such as a (self-created) motivator
- A push notification when entering parts of the shop with unhealthy products, or when adding unhealthy products to the purchase lists (online or self-scan)
- Seeing what products are healthy/unhealthy on the purchase list or self-scanner
- Seeing the balance of number of unhealthy and healthy products
- Seeing the quantity of monthly consumption; e.g. the amount of sweets
- Tracking unhealthy behaviour; how often are exceptions made?
- Overall score of the healthiness of the purchase list, also visible as 'history'

Possible self-restrictions:

- Setting a maximum in carbohydrate content tolerated per purchase
- Only allowing purchase of foods with a Glycemic Index below a certain level
- Having a weekly budget for unhealthy food
- Setting the balance for healthy/unhealthy food (in terms of total costs or quantity)
- Allowing to buy a certain monthly quantity of products (e.g. 2 bags of crisps)
- Coupling the allowed purchase of unhealthy products to physical activity

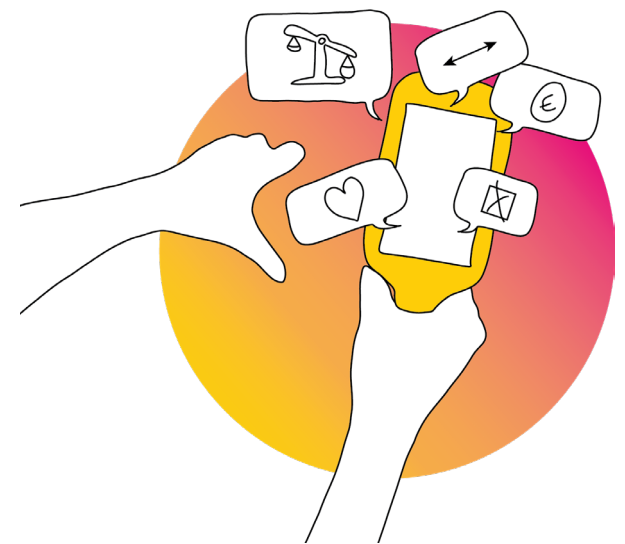


Image 49. Real-time feedback and self-imposed restrictions.

5.5 | Concepts related to JumboExtra's

This section describes three concepts that could improve and enrich the JumboExtra's application, which customers use to save points by purchasing specific products, and exchange these points to receive free or discounted products.

CAUSES

- 1) The JumboExtra's application does not support customers in their dietary intentions and health goals, and is even seducing them to unhealthy behaviour. Available health data is not integrated in Jumbo's services.
- 2) Customers may be unaware of having elevated blood glucose levels (Blokstra et al., 2012) or other health risks associated with diet (Lee et al., 2016).
- 3) Friends and families may have negative influence on dietary adherence, while they also have the potential to act as a positive stimuli (Falk et al., 2000).

CONTEXT

In the current JumboExtra's application customers are rewarded to buy certain products. As a reward they receive points, which they can use to save for a free product or discounts. In both the collection and reward system, various unhealthy products are included.

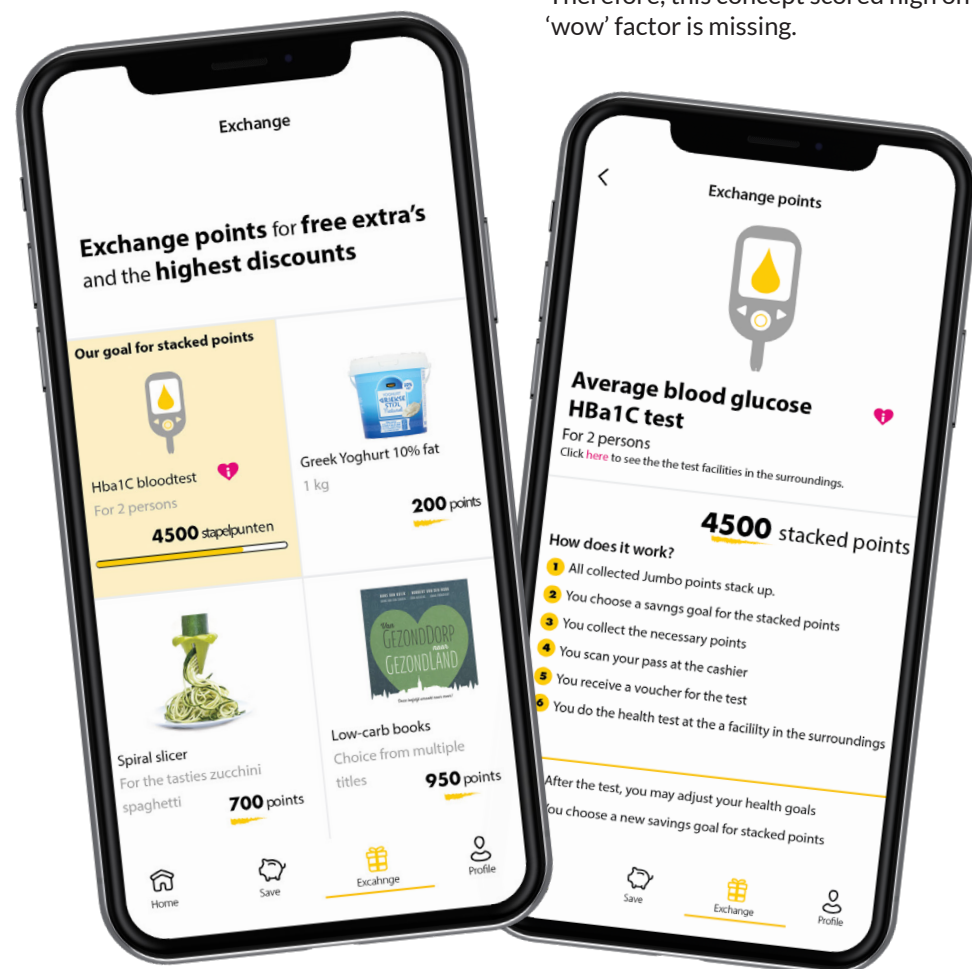


Image 50. An impression of a low-carb version of the JumboExtra's application, containing products of interest for customers on a low-carb diet (left). Customers have an overarching savings plan for a health check up (right), such as a blood glucose test.

CO-REFLECTION

Based on insights from fieldwork I developed a health promoting version of the JumboExtra's application (concept 4), which includes two new features, being saving for health check-ups (concept 5) and a gift service (concept 6). The evaluation outcomes are described for each concept separately.

CONCEPT 4 | JUMBOEXTRA'S TAILORED TO DIET

Concept

The JumboExtra's application is tailored to the dietary intentions of customers, and thereby include a low-carb version. The app stimulates customers to buy healthy products that support their diet. Similar to the current working of the application, customers save points by purchasing specified products (see Image 50). In this case, a person with pre-diabetes may be rewarded for buying healthy, low-carb products. The collected points can be exchanged for free and discounted low-carb products, or resources such as cooking tools and books empowering the customers in their diet. In the future, the application could be personalized by integrating concept 11 (my personal GI).

Co-reflection

This concept was considered as essential and should form the basis. Participants mentioned to not feel taken serious if Jumbo supports them in their health, while simultaneously also seducing them to unhealthy food. They request full support through all of Jumbo's resources and services. Therefore, this concept scored high on relevance, while the 'wow' factor is missing.

CONCEPT 5 | HEALTH CHECK

Cause

Customers may be unaware of having suboptimal health and the available health data is also used sub-optimally (Blokstra et al., 2012). To achieve dietary change, customers need evidence and a trigger to action (Chapman & Ogden, 2008; Falk et al., 2000). Moreover, customers desire to have a follow-up test to evaluate their health, efforts and goal achievements after diagnoses of a health issue (Chapman & Ogden, 2009; Troughton et al., 2008).

Concept

The concept implies that Jumbo will set up a preventive screening program for their customers and provide personalized action possibilities based on the health outcomes.

How this works? A long-term health-related savings plan is added as a new feature to the JumboExtra's application. The collected points add up to save for an overarching reward, being a health check-up (see Image 50 and 51). Examples of health check-ups are blood glucose (fasting and HbA1C), cholesterol and blood pressure. When a customer has saved enough points, the customer is invited to perform a self-test or a point-of-care blood test. The latter can be provided in collaboration with the DA pharmacy (300+ shops) or general practitioners. Both places already offer tests and have trained personnel available.

A customer with average expenditures should be able to do a health check-up three to four times a year. For blood glucose, this timing is considered adequate to detect changes (Nielsen et al, 2012).

In the future, the tests may also be expanded with vitamin, DNA and microbiome tests and health programs, such as the continuous blood glucose measurement offered by business Clear (see also Concept 11).

Optionally, to facilitate and promote social support, the health checks can be donated to someone else. For example, the test can be donated to a family member who seems to be in a less good health state. Another alternative is that by eating healthy, people can save for a common goal, such as a donation to charity or local initiatives, such as sports clubs and a low-carb village party.

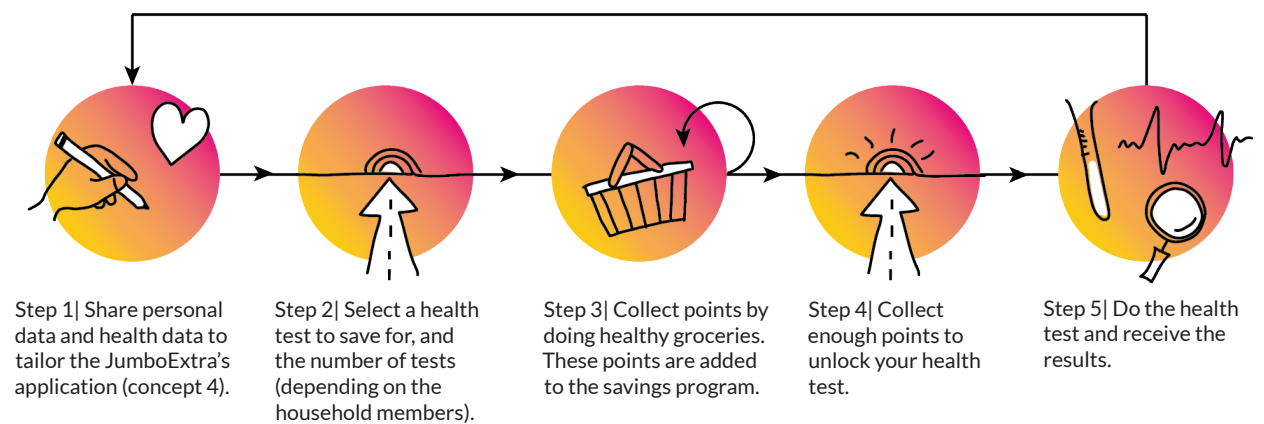


Image 51. A scenario describing the steps in saving for a health-test using the JumboExtra's application.

Co-reflection

This concept received very positive feedback. Three reasons are described below.

1) Perceived accessibility

People with pre-diabetes have no access to blood glucose tests, and therefore cannot assess whether their actions are contributing to health improvement. This causes insecurity. Participants described a high threshold to ask their general practitioner for a test as it requires initiative from their side and makes them feel like a burden. The ability to have a health test offered by Jumbo was considered as easy to integrate in one's life.

2) Enhanced receptiveness and motivation to do a check-up
A participant referred to the theory of loss aversion. This theory describes that people do not want to lose something they own. In this case, customer may be stimulated to do the health check as they do not want to lose the offer. This implies that this approach may enhance customers' receptiveness to do a health check.

3) Integrated, holistic nutritional advice

Moreover, participants mentioned that elevated blood glucose levels are often accompanied with other symptoms from the metabolic syndrome, such as high blood pressure and bad cholesterol (see also Section 2.2). Therefore, they were intrinsically motivated to have these metrics assessed too. A participant described: 'knowing about having elevated blood glucose levels also made me curious about the rest of my health'. The participant also mentioned the importance to integrate all available health data when providing dietary suggestions. For example, if a person with diabetes also has a high blood pressure, this person should be advised a cheese reduced in salt.

The participants mentioned to be willing to share their health data with Jumbo if the support they receive in return is considered meaningful. Discussion also revealed that Jumbo does not require the specific health test outcomes; knowing whether the test outcomes are 'too low', 'normal' or 'too high' is sufficient. However, this does not take away that customers demand good data security.

A concern voiced was how to deal with households. It was suggested that households can save for a health check for multiple persons.

CONCEPT 6 | SURPRISES

Cause

During fieldwork a participant described that friendly gestures are often connected to unhealthy rewards. For example, she explained to occasionally receive chocolate or wine from friends and relatives. This explains why social relationships can act as a barrier in dietary change by introducing seduction (Falk et al., 2000).

Concept

Surprise! Jumbo provides a gift service that is tailored to the customer's dietary intentions (see Image 52). Customers can surprise each other with gifts in the JumboExtra's application. The gifts are free products, which the receiver can collect during the next shopping. This uses the existing capabilities of the JumboExtra's application. When sending a gift to a person with pre-diabetes, several gifts low in carbohydrates are suggested to choose from. The sender can either buy these gifts, or use his own JumboExtra's points to send gifts for free.

Co-reflection

This concept resulted in mixed evaluations. Two participants were really positive and mentioned that this concept is really new and refreshing. They saw it as a valuable way to support others in eating healthy.

Three other participants described that this concept made them smile, but questioned whether this concept is valuable for people with pre-diabetes specifically. Possibly, the concept can support people with a big social network during the start of the diet. However the participants would not use it themselves.

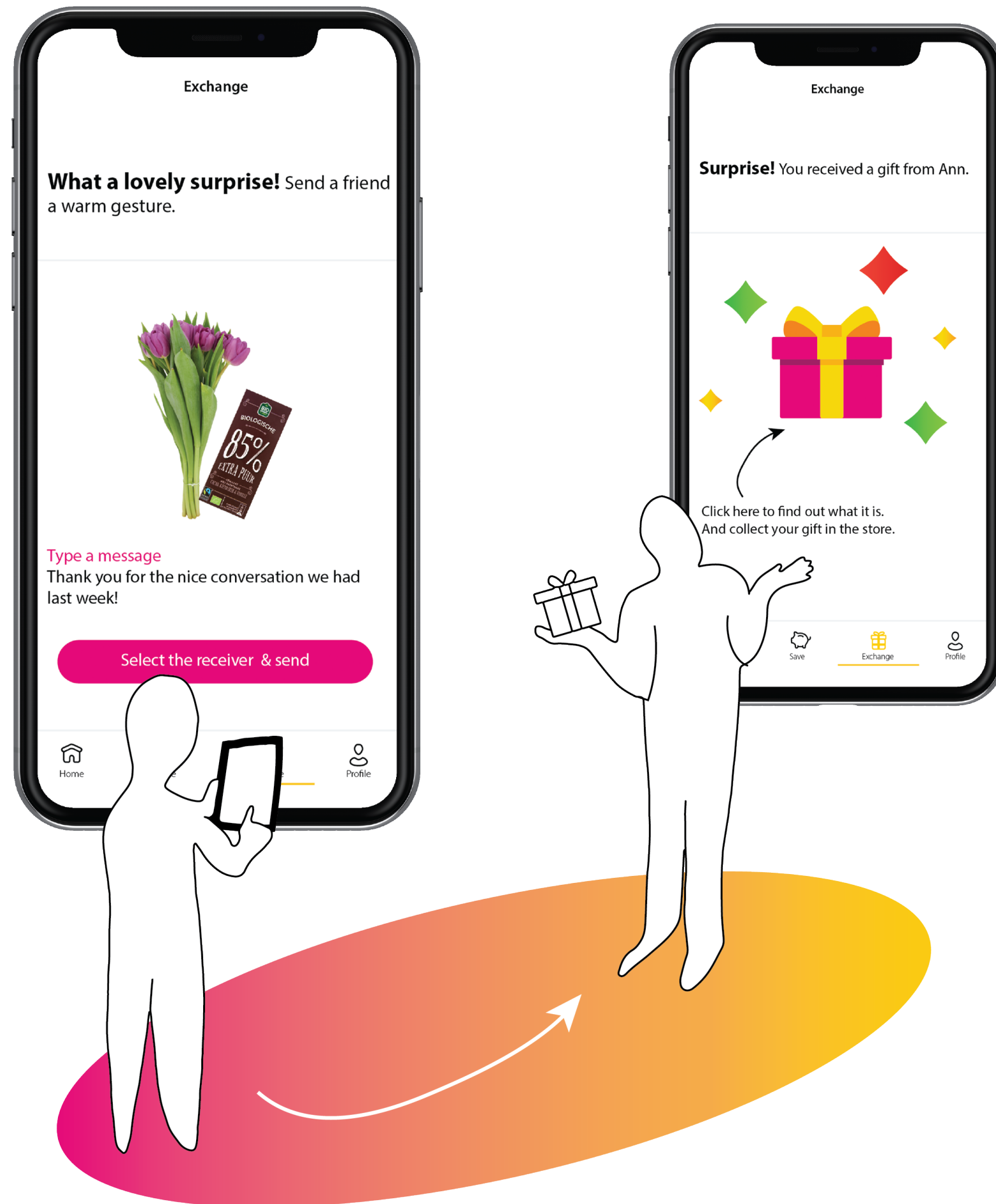
They doubted if the service would be used repetitively. 'Sending a gift for once is fun, but afterwards...?' Moreover, they question if a low-carb product could be a real surprise. A participants described: 'Receiving a piece of cheese is not as rewarding as chocolate and a bottle of wine'.

On the other hand, they mentioned that the concept itself is funny, fosters cohesion and could act as an energizer. Especially youngsters may want to surprise each other in this way. They also saw value in using it at birthdays, in combination with a digital birthday card, or to send a fruit basket and flowers if someone is ill.

People could send a gift by selecting the name of the receiver or the receiver's living address details. A feasibility concern is that the JumboExtra's application may be shared within a household. This may hinder people in surprising a specific household member. Therefore the surprises should be 'packed', comparable to a shared postbox that is used to collect letters of individuals.

To sum, this concept resulted in both positive evaluations and doubts for the use in this specific context. Therefore, further exploration of the concept is necessary to find and understand the values connected to it and evaluate what targetgroup may value this service most.

Image 52. A customer sending a low-carb gift to a friend who adopted a low-carb diet. This customer is surprised by the gift and can collect it during the next shopping.



5.6 | Stand-alone concepts

This section describes various concepts that can function independently as they do not build upon existing resources of Jumbo.

CONCEPT 7 | MY SHOPPABLE HEALTH JOURNEY

CAUSE

Fieldwork suggested that people 1) feel uncertain by experiencing bodily reactions during the start of diet: 'is this normal?' and 2) desire to track the progress during dietary change and be informed about indicators of successful adaptation.

CONTEXT

Fieldwork revealed that participants were surprised by the symptoms they experienced during the start of the diet. People questioned whether these reactions were normal and indicators of successful adaptation to a low-carb diet.

Participants appreciated to exchange these observations with others who also changed diet, for example a partner. This reassured them and enabled them overcome the struggles together. After the bodily adaptation, and the diet became a new normal, participants mentioned to be only interested to occasionally track metrics such as weight and blood test results and reflect upon their dietary adherence, as they do not want to be obsessed with their health and eating.

CO-CREATION

Participants were asked to recall the start phase of their dietary change, and sketch and describe what data they desire to track and in what way (see Image 53 for an impression of the results).

Review of these drawings and corresponding explanations revealed that:

- participants desire to record their data in an application for more privacy contrary to a tangible tool. Also the use of already available channels was mentioned, such as tracking progress in a whatsapp chat with Jumbo.
- the input of data should be simple, just in a few steps, and enjoyable.
- participants like to see an overview of their data in a single glance. Emoticons were used for clarity, ease of expression and aesthetics.
- besides guidance, the tool should provide freedom to use it in a way that is meaningful to the specific person and enables the person to truly express himself. Obligations should be avoided at all times.
- some participants described features for social support and sharing of data with family and friends on the same diet.

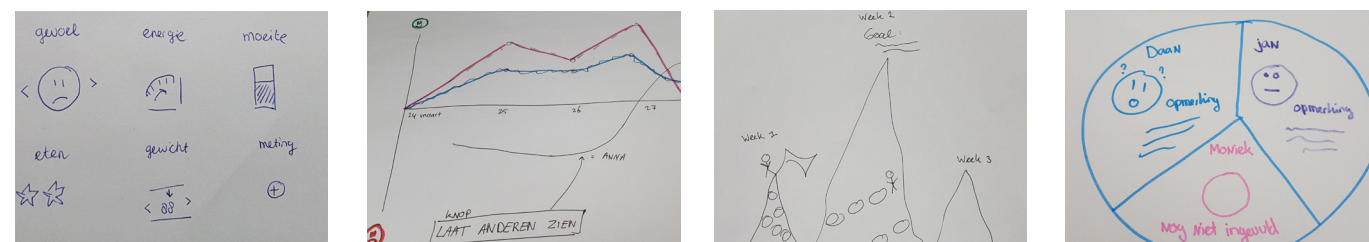


Image 53. An impression of drawings that were created during the co-creation session.

CONCEPT

Jumbo offers an online tool for customers to track (and review) their thoughts, emotions and bodily experiences, as well as specific body measurements and dietary adherence. A customer inserts data in five steps (see Image 54), in which step three to five are optional. Based on the data, an overview is created.

The steps in health tracking to create the health journey
First, the customer selects the position of the new entry on the y axis, ranging from 'doing great' (top), via neutral (middle), to 'not my best day' (bottom). The x-axis represents a timeline.

Afterwards, a screen pops up to enter details. The customer selects an emotion from a range of possible emotions, including one in which the facial expression can be drawn by the customer.

As a third and fourth step, the customer can describe what they are thinking and feeling. These questions allow the customer to express what he deems meaningful. For example, thoughts can be about well-being, concerns, dreams, experiences and reflections.

Last, a customer can choose to add body measurements, such as weight, waist circumference and test results from health check-ups, as well as their perceived dietary adherence and satisfaction.

The customer may decide to share data with friends, and view the data that is shared by friends. Only the friend's input of the current day, excluding the measurements, is shown to provide privacy. A chat function provides the opportunity to get in touch with each other.

CO-REFLECTION

Two participants mentioned that it is good to have the opportunity to track health, but that they would not use it as it requires effort and time. One participant viewed it as 'something soft, something for women'.

From this can be concluded that Jumbo can offer a package of supportive tools. Customers can decide which ones to use, based on their personal needs, interests and perceived value.

How am I doing?

A new diet introduces changes, especially during the first weeks. Use this tool to explore and share how it is going. Curious of what to expect? Take a look [here](#).

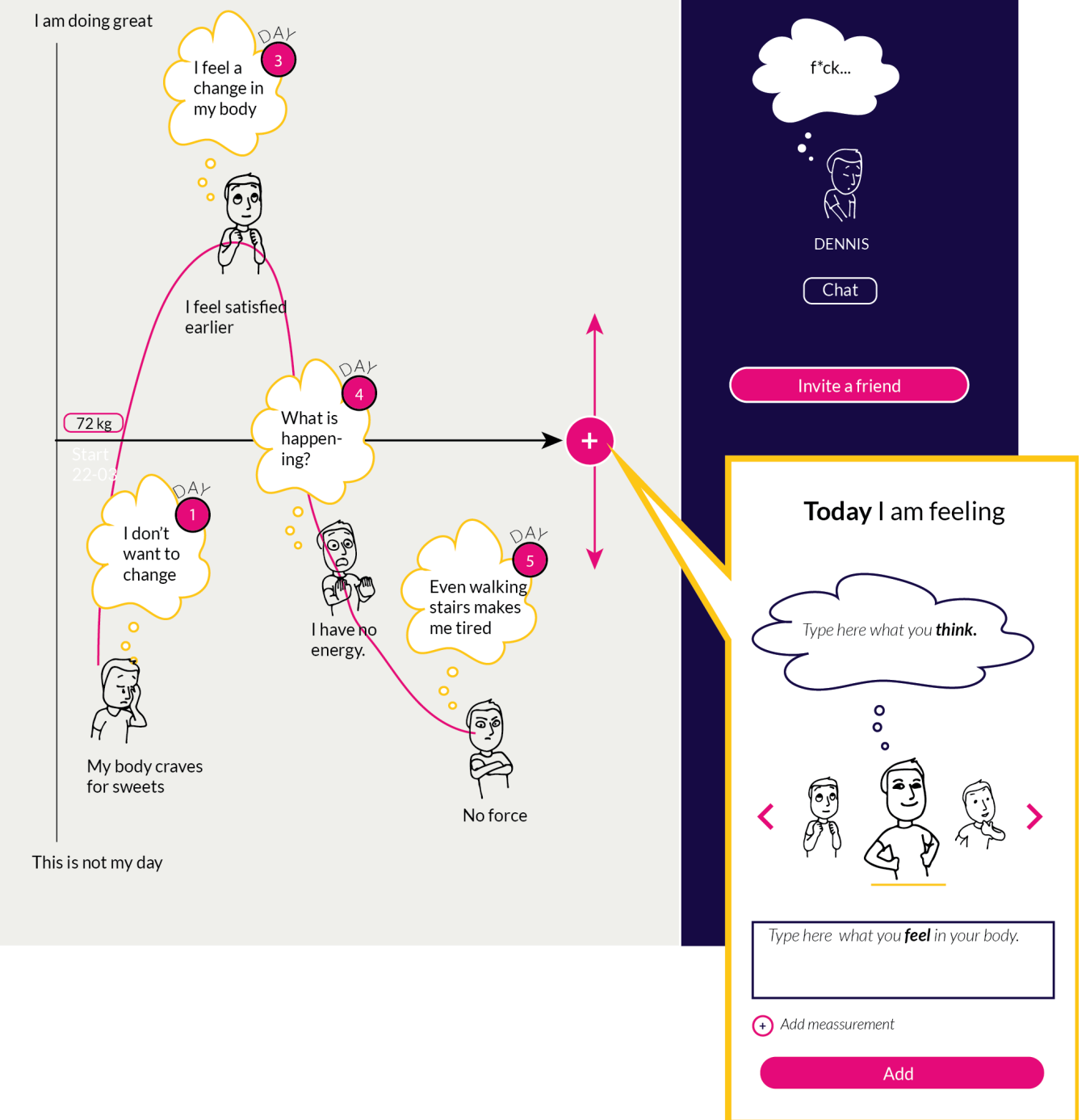


Image 54. A proposal for the service that allows customers to track their thoughts, emotions and feelings during their process of dietary change, accompanied by health- and dietary data, and share these with friends.

CONCEPT 8 | JUMBO SUPPORTS

CAUSE

Fieldwork suggested that people like to be better informed and supported before and during the adoption of a carbohydrate restricted diet. The lack of information and support causes insecurity and suboptimal performance.

CONCEPT

Jumbo offers a service for support, for example on the Jumbo website or application. Three content options that were co-created with participants are described below.

Concept 8.1| Managing expectations

Context

Fieldwork suggests that people do not know what to expect when changing to a carbohydrate restricted diet. Additionally, they felt surprised by the changes in their body during the first days and weeks. Amongst others, they experienced lack of energy and muscle strength, a change in stool and more thirst, which are in line with symptoms mentioned by Westman et al. (2007). These experiences made them feel insecure: are these feelings normal? Do they indicate successful adaptation to the diet?

To deal with this uncertainty, participants discussed with others who adopted the carbohydrate restricted diet or searched the internet for stories and information related to the symptoms. Participants described the desire to be notified about these possible symptoms beforehand.

Co-creation

Participants were asked to envision how they wished to manage their expectations before and during the dietary change. They considered expectation management to be most meaningful during the start of the diet, as this is the phase that most (bodily) changes occur and people feel new and insecure. Participants mentioned to desire an overview of all symptoms that can be expected, and the likelihood of experiencing them: 'similar to the information folder that is added to medication'. Moreover, participants described the wish to understand why these symptoms occur and how they can be prevented or reduced.

Integration of service concepts

A participant expressed the generic remark that Jumbo should prevent developing services 'in silos'. 'There is nothing worse then requiring another application for each service'. Moreover, the participant mentioned that this concept (Jumbo Supports) can be combined with Concept 7 (My shoppable health journey). While Concept 7 supports customers to evaluate the current situation and to look back, this concept can support the customer in looking forward and anticipate to whatever may come. The participant continued by describing that customers can use the time line from Concept 7 to add scheduled activities and start thinking about how to prepare for, or deal with, them. This implies that an integration with Concept 8.2 (Creating personal strategies) is valuable.

Concept

This concept 1) informs customers about what symptoms and experiences to expect during dietary change and 2) empowers them to optimize their performance during the dietary change by supporting their body with healthy food (see Image 55).

For the first part, Jumbo shows the possible symptoms a customer can expect to experience, focusing on the first three weeks. These are shown in a check-box format. The customer can select which symptoms were experienced. This data can be added to the health journey map of the customer (see Concept 7). Moreover, the data can be used to estimate the likelihood of symptoms: 'X per cent of the Jumbo customers that follow this diet have experienced this symptom'.

Second, Jumbo provides nutritional advice about how customers can optimally support their body during this adaptation phase. These advices are accompanied with purchase recommendations.

Expectation management for the first week relies most on bodily adaptation and emotions. Participants opted several topics for expectation management on the long term, such as making exceptions, dealing with seduction, dealing with setbacks and setting new personal goals.

A taster: what can I expect? And how to optimize my performance?

Hooray; by restricting the carbohydrates, your body will start burning fat. During this transition you may experience various changes in your body. On the long term, these disappear. Also, you may expect to face some challenges. Luckily Jumbo is there to help you.

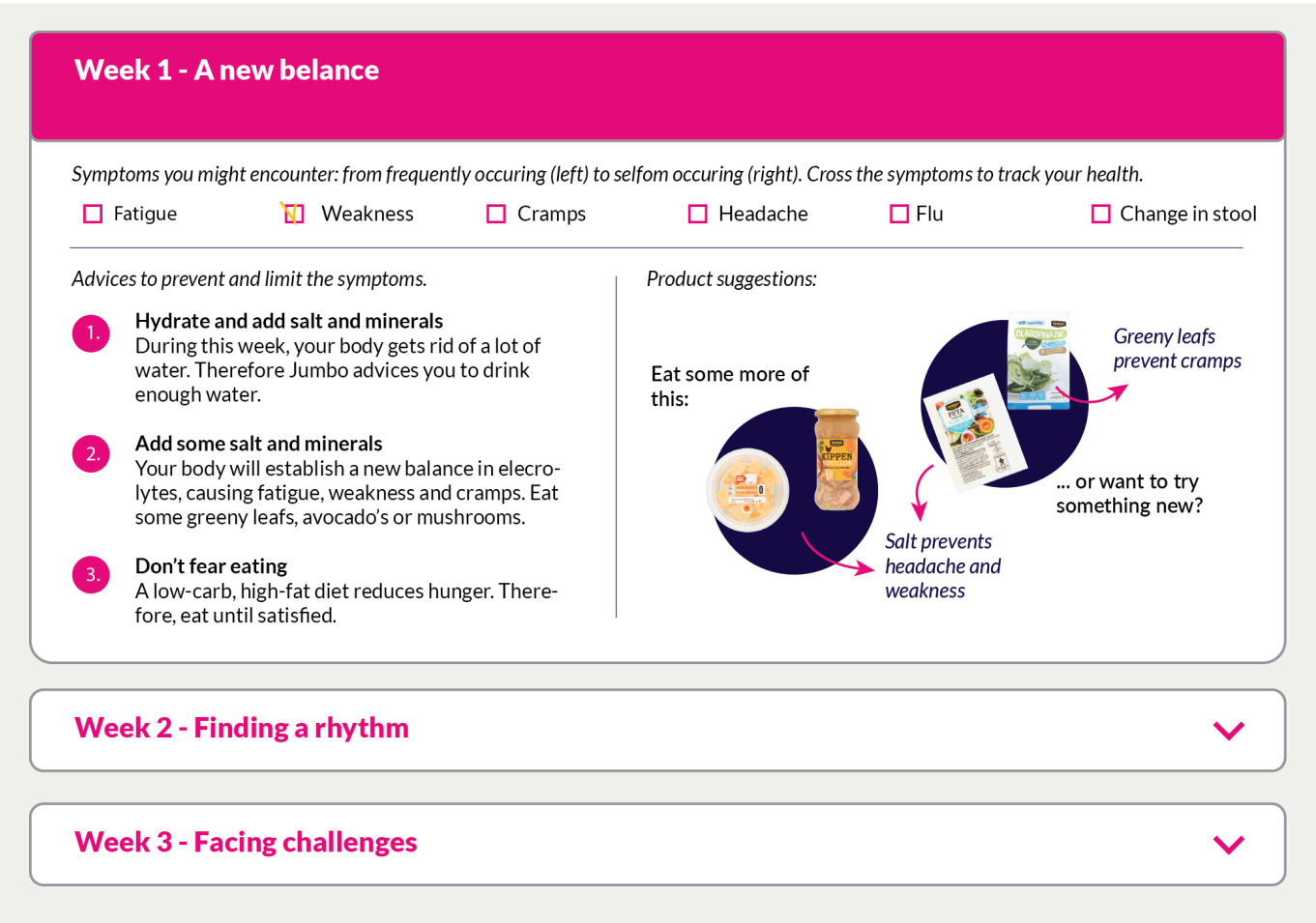


Image 55. Facilitating customers to manage their expectations and empower them to be best prepared to reduce and limit occurrence of symptoms.

Concept 8.2| Creating personal strategies

Context

The process of dietary change described by Chapman & Ogden (2009) suggests that people prepare strategies to deal with their diet. Through literature research and engagement with participants, I discovered two types of strategies. The first type is based on facts and evidence. Research suggests various pre- and post consumption strategies to reduce the impact of eating a product high in carbohydrates. ‘Self-made’ strategies to control behaviour are the second type. These self-made strategies were retrieved from engagement with participants, as described below.

Co-creation

The synthesized customer journey (see Section 4.4) contains several negative emotions associated with ones dietary behaviour. For example, a person may feel ashamed when not succeeding to withstand seduction. Participants were asked to share cases of dissatisfaction with their dietary behaviour. For these cases, they were asked how they could be empowered to transform the negatively perceived behaviour towards more desirable behaviour. Participants described the use of small, bite-sized rules and actions to influence their behaviour. Over time, these self-made strategies became micro-habits. These self-made strategies followed the format ‘Every morning/day/week, I do’, and ‘If this happens, then I will ...’. This led to the idea of drafting personal strategy statement cards.

To illustrate, one of the stories revealed that a person may enter a downwards spiral after eating carbohydrates, as dissatisfaction with the unsuccessful behaviour may lead to binge eating of even more carbohydrates. The person described to stop this behaviour by forcing himself to take a walk. When he returns, his appetite has reduced. During the co-creation session, the person identified that he is using the strategy statement: ‘If I cannot stop snacking, I will take a 10-minute walk’.

Concept

In this concept, Jumbo supports customers in controlling their behaviour and blood glucose response by 1) informing customers about the evidenced nutritional and behavioural strategies to tweak their blood glucose response and 2) enables and inspires customers to create personal strategies. Both components are elaborated upon below.

1) Nutritional and behavioural strategies

For the nutritional and behavioural strategies, Jumbo can support their customers in the planning of carbohydrate consumption and by providing ‘quick fixes’ after the consumption. Both have the goal to limit the impact of consumption on the blood glucose levels.

Advices before carbohydrate consumption:

- Combining food
Combine carbohydrates with fat, protein, and/or fibre as this will reduce the emptying of the gut and thereby result in lower peaks in blood glucose levels (Shukla et al., 2017).

- Order of consumption
Eating carbohydrates as the last part of the meal slows down absorption (Shukla et al., 2017; Shukla, Iliescu, Thomas, & Aronne, 2015). For example, eat sweets as a dessert and not before dinner.

- Exercise

Take exercise before the consumption of carbohydrates. Research has shown that exercise improves the insulin sensitivity up to 48 h after physical activity (Mul, Stanford, Hirshman, & Goodyear, 2015).

- Healthy gut

Support a healthy gut microbiota, for example by consuming fermented vegetables and yoghurt. A healthy gut microbiota is suggested to improve insulin resistance and glucose tolerance (Gurung et al., 2020).

After consumption of carbohydrates, a customer is recommended to stop eating more carbohydrates and to take exercise. With exercise, the consumed glucose will be used by the muscles immediately. Research suggests various types of activities that may be beneficial, such as walking stairs for three minutes, doing some high-interval sprints and taking a walk (Borror, Zieff, Battaglini, & Stoner, 2018).

2) Self-made strategies

‘Strategy statement cards’ facilitate customers to become mindful of their vulnerabilities and manage their behaviour by creating personal strategies. Customers can build a collection of cards, supported by a template, in a application by Jumbo (see Image 56). Jumbo can also suggest strategies that seem to work for other customers and thereby inspire customers to explore new techniques.

Examples of possible templates are:

‘Every [time indication] , I do [activity]’, and
‘In case of [situation x], I will [activity]’

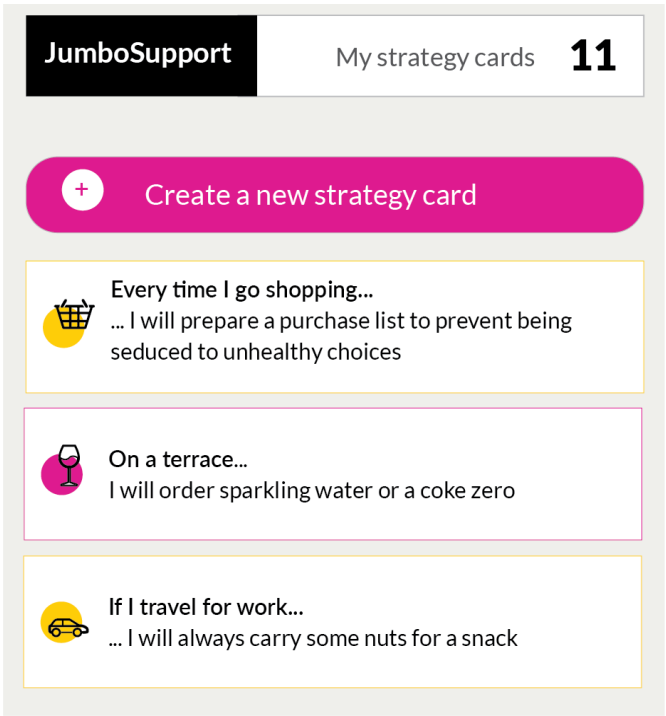


Image 56. Examples of strategy cards created and collected by a customer.

Concept 8.3| Jumbo health encyclopedia

Context

There is increasing interest in how health can be enhanced using food, both by customers and medical professionals (Baan et al., 2015). Furthermore, research suggests that understanding about the disease risk, threats and urgency increases the likelihood that people change to a healthier diet (Mohebi et al., 2013).

Co-creation

The website ‘VitaMor’ was used as a starting point for co-creation. This website shows the relationship between various health phenomena and nutrients (see Image 57 for an impression). As a first activity, the participants were asked to explore the website and share their first thoughts and opinions. They mentioned great enthusiasm about the content; ‘detailed, complete and supported by evidence’. The participants’ curiosity was triggered to further investigate dietary effects on health. The participants mentioned that the way of information delivery could be improved. They felt that the website is too text-heavy and demands a certain degree of health literacy .

Second, the participants were asked to redesign the value proposition offered by VitaMor to match their desires and connect it to a service offered by Jumbo.

Concept

Two concepts emerged. First, product pages can show the health benefits of the product in a simple and accessible way (see Image 58). Second, participants described the desire to be able to search for a health phenomena and see what foods have beneficial effects or should be avoided. A few examples: What to eat when having a headache? What to eat with high blood pressure? What to eat when having a flu? As suggested by Mohebi et al. (2013) it is advisable to support the aforementioned information with educational content about the health phenomena, such as the symptoms, risks and threats to enhance customer’s receptiveness to follow the advice and consider eating the proposed foods.

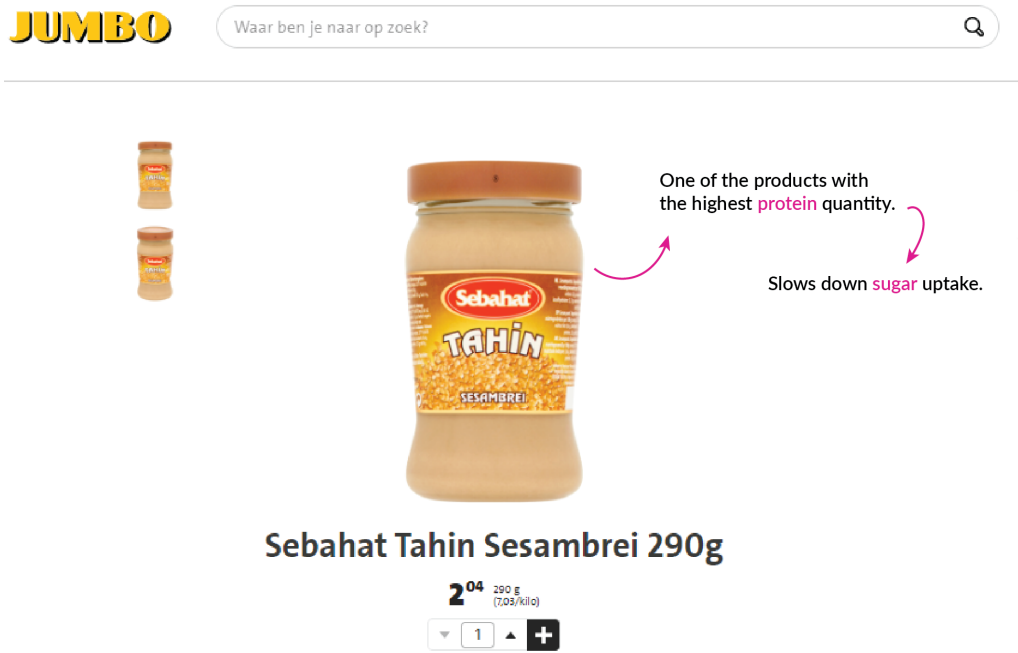


Image 58. An impression of how Jumbo can integrate information regarding the health potential of products.

Co-reflection

This concept was discussed with one participant for co-reflection. The participant was enthusiastic and saw value in better information provision related to the connection of food and health. ‘For some products we all know it is unhealthy, but for others I have no idea. I know even less about how food can be used to deal with, or prevent, certain health conditions’. He liked that the concepts emphasize the healthiness of products instead of only stating what products are unhealthy and should be avoided.

This participant also referred to today’s controversial dietary advices and views related to the healthiness of specific foods, such as high-fat products and plant-based oils. Therefore, he advised Jumbo to position themselves as a neutral party by including the different views and including scientific references to these views. This empowers customers to make up their mind by showing that advices can not be over simplified and diet requires a nuanced approach. A barrier is that as new insights emerge, product pages need to be updated to remain trustworthy.

Gezonde voeding bij bloedsuiker problemen:

- ★★★★ Dadels
- ★★★★ Broccoli
- ★★★★ Olijfolie
- ★★★★ Amandelen
- ★★★★ Soja yoghurt
- ★★★★ Hijiki
- ★★★★ Gierst
- ★★★★ Pistachenoten
- ★★★ Yoghurt
- ★★★ Granaatappel(sap)
- ★★★ Kersen
- ★★★ Tarwe zemelen

Gezonde kruiden bij bloedsuiker problemen:

.....

Image 57. A snapshot from the VitaMor website, displaying what foods are suggested for people with problems related to their blood glucose levels.

CONCEPT 9 | GAME YOURSELF HEALTHIER

CAUSE

Pre-diabetes is a silent and relatively unknown disease (Subramaniam et al., 2018). Low awareness and understanding of pre-diabetes is mentioned to have two consequences. A first consequence is reduced self-care and commitment to adopt a healthy diet (Mohebi et al., 2013; Subramaniam et al., 2016). Second, lack of understanding in one's social environment hinders accommodating the diet in social events (insight fieldwork). Fieldwork also suggests that the available support for pre-diabetes and blood glucose control is limited and not accessible to all. At the same time, games are mentioned to be a powerful tool in educating young and old (Yachin & Barak, 2019). A pilot of the game SugarVita, which is based on a diabetes simulator developed by a hospital, received positive feedback (Haak, n.d.).

CONTEXT

In the phase of considering and preparing for dietary change, participants described the dual need of informing and convincing themselves and achieving the same in others, such as their household members and friends. The informing of oneself and others was considered as difficult and unappealing, with sole support from online educational resources.

Therefore, this section explores if a game can facilitate people with pre-diabetes and their household to explore the diet - its relevance and implications - in a fun and accessible way. Above all, games fit Jumbo's brand image of joy in families and friends (Jansen, 2019). Moreover, gamification is mentioned to carry potential for positively impacting purchase behaviour (Müller-Stewens, Schlager, Häubl, & Herrmann, 2017).

CO CREATION

Four game concepts are described below. Most of these concepts were the outcome of a creative facilitation session with two student groups from Industrial Design Engineering, TU Delft. An initial brainstorm revealed two observations, being that games could target individuals or groups of people, and that games could be based in a shop or at customers' homes. For each of these quadrants, a game concept was developed (see Image 59).

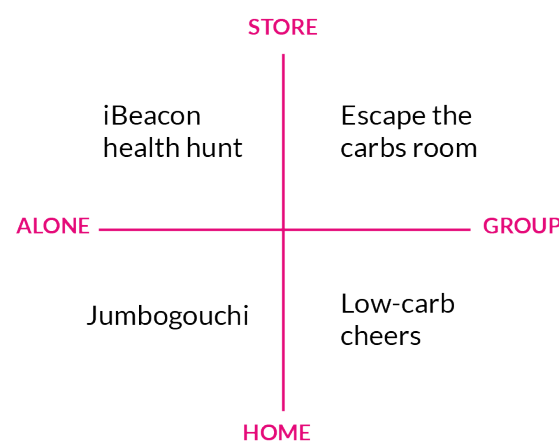


Image 59. For each quadrant a game concept has been developed.

CO-REFLECTION

The game concepts have been evaluated with participants who followed a carbohydrate-restricted diet. This led to the following insights:

- In general, the desirability and effectiveness of a game highly depends on the actual shape and content, and was considered difficult to judge from the concepts.
- Participants predict that the 'typical' pre-diabetic patient, with an age of 40 to 60, is expected to have less interest in gamification and wants a more traditional approach to feel taken serious. Instead, the games were seen as valuable and enjoyable for young people and families. Also, the games were mentioned to carry value for population-wide awareness campaigns and integration in school programs, such as biology classes.
- Participants described most interest in the concept 9.4 'Jumbogouchi'. If this concept can be proven to offer valid feedback, they wanted to be the first to use it. However, they mentioned that if the feedback is not valid for them personally, the tool holds no value. Therefore, there is a fine balance between success and failure, depending on the technical feasibility to develop an advanced simulator.
- It was questioned whether people who come for shopping have are in the right mindset to simultaneously play a game. This is supported by research suggesting that doing groceries is often task-driven and experienced as stressful (Högberg, Shams, & Wästlund, 2019). This implies that only customers with a experience-driven mindset and who intend to play a game may want to join in a shop-based game.

Concept 9.1| Escape from the carb room

Research by Tal & Miri (2019) explored the potential of escape rooms, which is one of the latest trends in games, for nutrition education. Participants had to solve various nutrition-related puzzles to escape from the room. The findings of this study suggest that the escape room improved participant's perceived self-efficacy by enhancing their knowledge and awareness. Additionally, the game triggered interest and open-mindedness to learn more about nutrition after the game ended.

In this concept, Jumbo offers nutrition-based escape rooms in their shops. These escape rooms can be first rolled out in Jumbo's Foodmarkt stores, as the games contribute to the sensory richness and experiences Jumbo wants to create.

The escape room challenges customers to find their way out of a highly seducing, carbohydrate-rich room. A possible scenario: to escape from the room, customers need to throw away the carbohydrate-rich foods, make correct food swaps, choose the healthier products, estimate the amount of carbohydrates and reflect on their assumptions regarding fat and carbs.

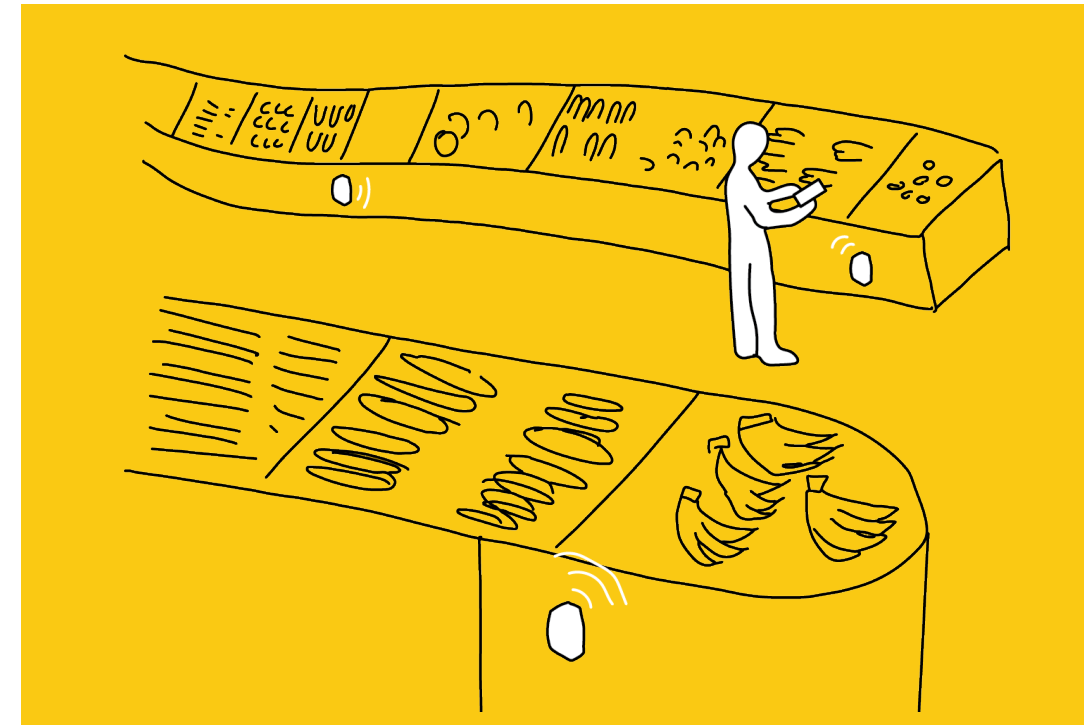


Image 60. The use of iBeacons, added to shelves, triggering interaction with the customers via pop-ups in their phones.

Concept 9.2| Hunt to health

iBeacons are small transmitters using Low Energy Bluetooth (BLE). These transmitters have the size of a coin. iBeacons can send push notifications to phones when they are near the transmitter. This technology enables supermarket to send targeted marketing content, for example based on the specific product a customer is looking at, and support a person in way finding. Another application of iBeacon technology is gamification. For example, museum and event halls use the technology to create interactive experiences, such as treasure walks.

In this concept, iBeacon technology transforms ordinary Jumbo stores in educational playgrounds. Customer participating in the game receive push-up notifications with exercises and challenges (see Image 60). For example, a quiz question or the assignment to hunt for specific places and products in the store. Correct answers may unlock discounts, for example in the form of scrap cards.

Concept 9.3| Healthful cheers

Jumbo's marketing has focused on families and conveyed the message of having a good time together (Jansen, 2019). In this view, what is a better way than to start the weekend together in a healthy, cozy way? Moreover, fieldwork pointed out that there is a desire to have specific low-carb party assortment.

In this concept, Jumbo sells low-carb snack assortment, for example in the current format: '3 cheeses for 5 euro'. At purchase of this low-carb snack, customers receive a board-game, paper-based or online, that is both fun to play together and educational. Examples of games are Party & Co, 30-seconds, Pictionary and scrabble with content related to pre-diabetes and diet.

Concept 9.4| 'Jumbogouchi'

Research investigated the use of virtual avatars in nutrition education (Hsuen, Murti, Vormawor, Bhattacharjee, & Naslund, 2013). In this research, an avatar becomes more active and slimmer when fed healthy food, while unhealthy choices make the avatar fat and slow. The avatar enables people to pre-test their choices on a fictive character and get immediate, visible feedback, empowering them to adjust decisions before applying it to themselves.

A digital twin of yourself can be created with the emergence of more health data, for example from DNA tests (Miskinis, 2018). For pre-diabetic patients, a first step is to provide a twin that predicts their blood glucose responses to food. The hospital Maxima Medisch Centrum (Eindhoven, The Netherlands) has build a simulator to predict blood glucose responses. This simulator is also integrated in the game SugarVita that is in development.

In this concept, an avatar acts as a digital twin by showing the expected personal blood glucose responses to specific foods. This allows customers to pre-test nutritional choices on their own, personalized avatar. The data of personal blood glucose responses can be retrieved in collaboration with the firm Clear (see also concept 11).

Jumbogouchi' (see Image 61) is an avatar that Jumbo can provide to their customers. The name refers to the egg-shaped digital pet 'tamagouchi'.

Another format: a generic Jumbogouchi can be used for health educations, by showing that products with a high Glycemic Index increase blood glucose levels, leading to more sugar cravings and weight gain.

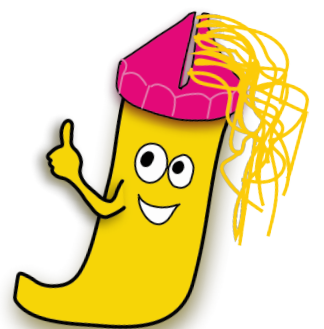


Image 61. An avatar design for low-carb diets.

CONCEPT 10 | 'OP-DE-PROEF' BOX

CAUSE

- 1) People seem to be afraid to commit to a diet (insight fieldwork). This is a pity as commitment is mentioned to be one of the facilitators in diet adherence (Falk et al., 2000).
- 2) Research has shown that the probability of sustainable dietary change depends on whether the person succeeds to match the diet to personal values and context (Aletta Jacobs School of Public Health, 2018). Exploration of enough possibilities is necessary (Falk et al., 2000).
- 3) Interventions, taking a person out of his routines, may be required to change long-ingrained dietary behaviour (Wood, Tam & Witt, 2005).
- 4) During the start of adopting a carbohydrate restricted diet, people need to support their body by ensuring enough intake of certain nutrients (Dietdoctor, n.d.).

CONTEXT

Fieldwork revealed four reasons why people fear to commit to dietary change. The four reasons are: 1) prejudices and viewing the diet as difficult and not doable, 2) unfamiliarity; not knowing what actions to take and what to expect, 3) low perceived self-efficacy, and 4) prior unsuccessful experiences with dietary change. These reasons are in line with identified barriers in dietary change by research of Falk et al. (2000).

Participants mentioned that experiencing the new diet may lead to rejection of initial prejudices and improvement in their views about the diet and self-efficacy. Therefore it is important that people attempt the new diet.

CONCEPT

The 'Op-de-Proef' box nudges customers to experience a healthy carbohydrate restricted diet in an easy, accessible and fun way (see Image 62). The box contains various ingredients and products, accompanied by recipes, practical tips and educational material. At the same time, the box contains products that support the body during the transition to a carbohydrate restricted diet. For example, the box contains broth to supplement salt and minerals.

Customers are suggested to use the box for three weeks, as this duration is suggested to be the time required for the body to adapt to a carbohydrate restricted lifestyle (Westman et al., 2007). The box is designed for two people, since fieldwork suggests that partners often join in the new diet. Each box contains products for three days, which enables customers to integrate personal explorations and make it fit their schedule.

As the box provides manufacturers of low-carb products the opportunity to stage their products to a new, receptive audience, (co-) funding of the box can be explored.



Keto-box

The keto-box offered by Ekoplaza is the best-sold box from their offering (personal contact with initiator of the keto-box, W. Tilburgs from jeleefstijlalsmedicijn.nl, march 2020). This suggests that there is interest in low-carb boxes.

CO-REFLECTION

In general, participants mentioned big interest in this concept. They describe that a convenient box lowers the threshold to try the new diet, triggers their curiosity and facilitates exploration of new products. They value that the box allows them to 'explore-by-doing' and fight initial prejudices by experiencing the diet themselves.

Co-reflection also revealed points of attention, being:

- Inclusion of processed low-carb products
Some participants are discontent about the low-carb assortment in supermarkets. They mentioned three reasons, being that the low-carb products still contains considerable amounts of carbohydrates, that they contain ingredients they do not consider healthy, such as soy and artificial sweeteners and the high costs. Therefore, not all customers are satisfied when they receive these products.

- The quantity of carbohydrates in the box
Participants mentioned big variety in the degree of carbohydrate restriction. They opted for two boxes: low-carb and keto. Another participant mentioned that true low-carb products are easy recognizable and therefore advocated for a box that shows the 'best option' regarding more complicated products, such as crackers, sauces and sweets. This argument contradicts with participants voicing the desire of having no processed foods.

- Tailoring the box to personal values and dietary needs.
Participants questioned whether an simple intake can be used to customize the box, by including allergies and intolerances, food values, taste and cooking preferences and budget.

- No stigma
People do not want to collect the 'box for diabetics'. Therefore, the box should either be delivered home, or be marketed as an enjoyable box for-all. Moreover, a 'box' may not be the most inspirational way to stimulate healthy eating.

- Proof of healthiness
Participants want to know why the products in the box are healthy or healthier than alternatives. This is driven by their distrust to supermarkets due to their commercial aims. Therefore, the box should contain explanation and proof of the healthiness of the suggested products, preferably supported by a research institute.

Different formats

Participants also mentioned alternative concepts to facilitate accessible and enjoyable low-carb experiences. These are a subscription to a weekly low-carb 'surprise me' product and the facilitation of tasting sessions. For example, a pop-up restaurant in Jumbo stores providing low-carb breakfasts or dinners. This was considered to also facilitate getting in contact with like-minded peers. Another idea that was mentioned is to offer blind tastings to truly evaluate the taste of low-carb meals. Last, participants mentioned interest in low-carb cooking classes and demonstrations offered by their local Jumbo store.



Image 62. Uncertainty in customers who aim to adopt a carbohydrate restricted nutritional strategy. A pre-assembled box lowers the threshold to try the diet, triggers curiosity and enables customers to familiarize with low-carb products.

CONCEPT 11 | MY PERSONAL GI

CAUSE

People have unique blood glucose responses to food (Zeevi et al., 2015), implying that there is no 'one-size-fits-all' diet (Szakály et al., 2019).

CONTEXT

The Dutch tech start-up 'Clear' provides a program to explore people's personal blood glucose responses to food (see: <https://www.theclearhealthprogram.com/>). During a three-week program, participants wear a chip implant that continuously measures their blood glucose levels. Participants can place this chip themselves. Meanwhile, the participants experiment with their diet and lifestyle to evaluate the effects on their blood glucose. For each consumption, the participant takes a picture and describes the ingredients. After the program, the participants receive a report (see Image 63). This report contains information about observed blood glucose levels and provides nutritional recommendations. For example, the report provides a visual ranking of the 'best' and 'worst' meals that a person consumed.

An interview with an employee of Clear revealed that during the three-week program, participants are able to optimize their breakfast (Personal contact, J. Leseman, March 2020). Each day, participants make minor adjustments to tweak their blood glucose responses. However, the time span is suggested to be too short to optimize one's dinner due to the big variety in meals. Moreover, what people consume is seasonal and may change over time. Therefore, the firm envisions a subscription model in which participants join sessions several times during the year. The current program costs 200 euro, of which 60 euro is spent on the blood glucose sensor.

CO-CREATION

Together with an employee of Clear several concepts for a service in collaboration with Jumbo were explored. One concept relates to how participants can be supported during the program. The other concepts focus on using the retrieved insights to make healthier choices after the program.

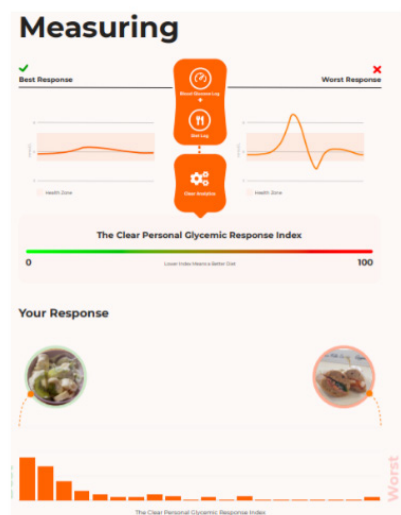


Image 63. A snapshot from the visual report participants from the Clear program receive, amongst others depicting the blood glucose responses to meals they have eaten and the meals that triggered the best responses. Image from Clear.

CONCEPTS

Concept 11.1| Challenge box

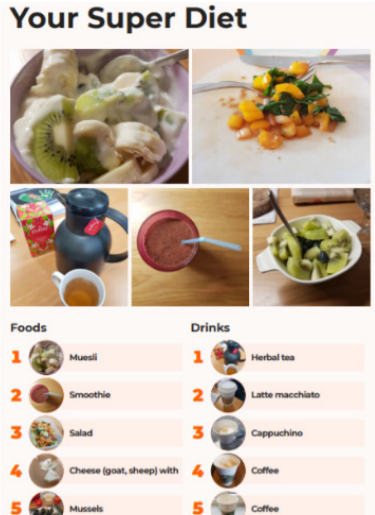
During the program of Clear, Jumbo can facilitate the exploration of new products and challenge participants to explore a wide variety of foods. For example, this could be achieved with a 'challenge box' that contains various foods that are expected to cause good and bad blood glucose responses. Clear mentioned to use group challenges, such as the banana challenge, in which participants share their blood glucose responses to certain foods for comparison. Clear mentioned that visual proof convinces the participants by acting as an eye-opener and motivator to change.

Concept 11.2| Personalized incentives and advices

The personal blood glucose outcomes of the Clear program can be used to offer personal recipes, suggestions and discounts. Technical advancements in AI will enable Clear to predict what is healthy and unhealthy based on the range of products the person tested. Jumbo can play a role by:

- Providing personal suggestions
When a person buys a certain product, such as rice, Jumbo may propose combinations, additions or alternatives that are beneficial for the specific person. For example, a person may respond better to rice when combined with chicken compared to fish.
- Stimulating mindful, rational choices
If a customer intends to buy an unhealthy product, Jumbo can confront the person with visual proof of their blood glucose response, and propose a healthier alternative.

Since concept 9.4, avatar 'Jumbogouchi', relies on the measurements of personal blood glucose responses, this concept is an additional opportunity for collaboration.



CONCEPT 12 | ACCOMMODATING DIETS

CAUSE

Social relationships risk to hinder achieving and maintaining dietary intentions, while the social environment also has the potential to be a facilitator and promoter of healthy eating (Falk et al., 2000). Fieldwork suggested internal resistance to ask the social environment to accommodate their diet and revealed possible lack of knowledge in the social environment to know how to consider dietary wishes.

CONTEXT

With the introduction of personalized food, the distinction between healthy and unhealthy food blurs and will become person-specific. These personal differences in nutritional needs complicate accommodation of a healthy diet in households and when being invited to have dinner at others.

CO-CREATION

Via a scenario, participants were sensitized about receiving guests for dinner. Participants were asked what information they need and desire in order to prepare the optimal meal for their guest. This revealed the following list: intolerances, allergies, cultural beliefs, diets (such as vegan), disliking of foods, liked cuisines and drinking preferences. Quantity of consumption was not considered important as participants mention to always cook more than needed.

CONCEPT

Customers create their personal food profile in an application offered by Jumbo. This profile includes information about their dietary health needs, such as intolerances, intentions and food values and preferences. Moreover, customers provide information about their cooking skills.

When invited for dinner, customers can easily share their profile with the cook, for example via Whatsapp. The cook can add various guests to a 'dinner party'. Besides the app shows the factual data of the nutritional needs and preferences of the guests, Jumbo proposes meals that matches satisfies all personal profiles (see Image 64). The suggestions also takes into account the cook's profile, containing his cooking skills and the desires the cook has set for the specific party, such as the number of meals, budget and preparation time.

For this concept, participants especially value the ease and inspiration. They all once had the experience to cook for a group, forgetting about the dietary needs of a guest. This made them feel ashamed. The complexity grows with the number of guests with specific dietary needs. Moreover, they also all mention to have 'that specific' friend with complicated dietary needs, such as having a nightshade foods allergy. Inviting this person is always a hassle. Participants mention to be able to rely less on the dishes in their repertoire and were thus required to try new dishes.

This concept utilizes Jumbo's existing collection of recipes and nutritional information of products. The application can connect to Jumbo's online purchase list, that simplifies the process of shopping and ensures that all necessary ingredients are purchased and in the right quantity.

JumboChefs

Total dinners you organized

7

Coming up

April 4 - Mexican dinner

3 persons

▼

April 12 - Family easter

4 persons

▼



Mathieu

Summary: gluten-free (1x), low-carb (2x), no artificial sweeteners (1x), Enjoying Asian cuisine.



Suggestion- carrot noodles with shrimps

Moderate skill, < 1hour

See recipe

Preparations

+

 Add meal to menu

+

 Create purchase list

Image 64. A suggestion how customers can accommodate dietary preferences of their guests in dinners they organize, including Jumbo's support to find recipes matching the variety of nutritional needs and preferences of the invitees.

CONCEPT 13 | CRACK MY CRACKER

CAUSE

Participants expressed dissatisfaction regarding the low-carb assortment (insights fieldwork). As a result, participants mentioned to bake their own bread and crackers. However, this was considered as labour and time consuming.

CONTEXT

Complaints regarding the low-carb assortment that were voiced included that: 1) products contain ingredients the participant did not consider as healthy, such as artificial sweeteners and soy flour, 2) suboptimal taste and texture and 3) high price.

Many recipes for low-carb crackers can be found online. The basis of these recipes are only two ingredients, namely: seeds and water. Optionally, an egg, grated vegetables and herbs and spices are added. The mixture should be spread out on a plate and baked in the oven.

CONCEPT

Jumbo can offer their customers the possibility to 'design' their own cracker, which will then be baked by Jumbo (see Image 65). People can select what seeds they like to have, the balance of the seeds in the mixture and choose to add herbs, spices and grated vegetables. Optionally, the customers can also select if they want to have thin crackers or have more bite from thicker crackers.

CO-REFLECTION

Participants wished that this service existed. They like the ability to tailor the offering of Jumbo to their personal preferences. They envision sending their recipe each week, and collecting the crackers during their groceries.

Participants emphasized that the crackers should be similar to their home-baked crackers. A concern voiced was that they expect Jumbo to bake the crackers at high temperatures to speed up the process. However, the high temperatures may adversely influence the nutritional value of the crackers. Therefore, customers may also desire to indicate the temperature of baking. Yet, from a feasibility perspective this is complicated, since an oven will contain multiple trays that all have the same temperature. Therefore, another opportunity is that low baking temperatures will be used as a pre-set for all crackers and can be used in the marketing of the product.

Research on the baking facilities of Jumbo revealed that Jumbo has a few centralized bakeries, responsible for specific regions (Hallo Jumbo magazine, May2020, number 4). To satisfy the high amount of baked assortment, the bakeries are fully automatized. Each day, fresh breads are transported to the shops where they are cut in slices and packed. Therefore, this concept requires to be explored with all stakeholders involved to assess the feasibility.

Participants also desired a similar service for two other products, being: designing their personal seed (granola) mix and by designing their own ferment by selecting the desired seeds and spices and vegetables respectively.

A personalized seed mixture may be easier to implement than the personalized crackers as it does not demand to be baked. A participant can choose whether he wants raw seeds or slightly roasted ingredients.

An associated feasibility concern is hygiene. For example, ferments needs to be created in a hygienic environment. Does Jumbo have the expertise for this? A ferment with mold that gets in the publicity can cause harm to Jumbo's brand reputation. Another question is whether Jumbo has storage space, as the natural process of fermentation takes a few days to weeks. Therefore, Jumbo is advised to explore this offer this product in cooperation with a manufacturer. To satisfy the health conscious customer, it remains important that the manufacturer keeps to the traditional production process that would be used in home-cooking. This guarantees the optimal health benefits of the product. A possibility associated to this concept is that oddly shaped vegetables and vegetable left-overs can be used, and thereby contribute to sustainability.

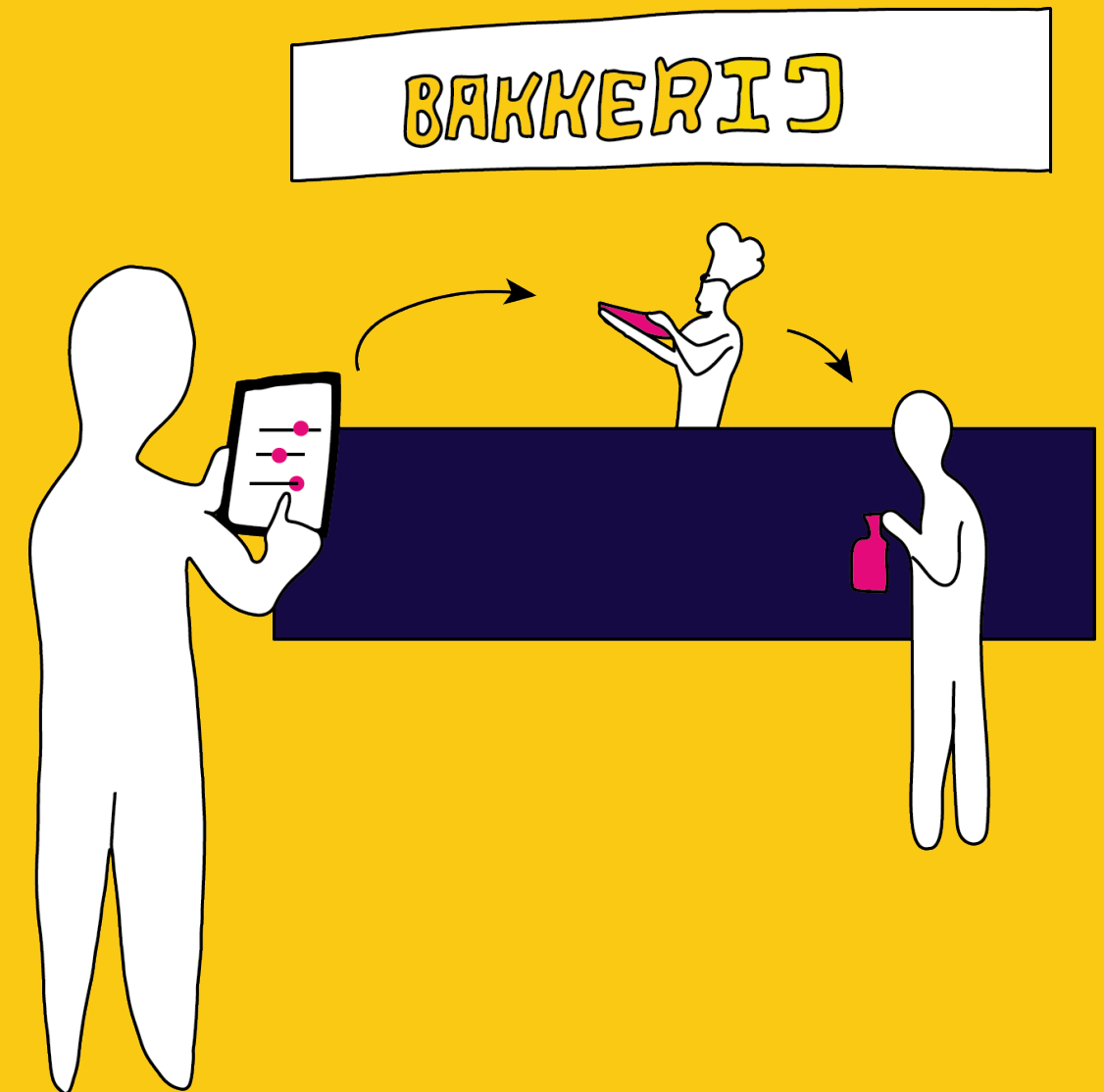


Image 65. A customer designing his desired cracker (composition of seed mixture and flavours), sending the data to Jumbo's bakery and collecting the crackers at his local store during the next shopping.

EXTRA: CONCEPT 14 | CAMPAIGNS

During the previous ideation sessions several ideas were mentioned that relate to marketing and awareness campaigns. These are combined in this additional concept 14.

CONTEXT

There is lack of population-wide understanding of pre-diabetes and the dietary implications the disease has (Subramaniam et al., 2018; insights fieldwork). As a consequence, the social environment may hinder people in following a carbohydrate restricted diet (Falk et al., 2000).

Fieldwork also suggested another barrier, namely that friendly gestures and having a good time together are associated with consumption of unhealthier foods.

Overall, this implies that unhealthy consumption has become the new cultural normal and that it is necessary to be mindful about this and consider a new normal that is palatable as well as convenient and healthy.

Concept 14.1| A new cultural normal

Participants desire a change in food culture. They aim to make 'personalized' the new normal. Jumbo can facilitate this transformation in food views via a marketing campaign that emphasizes the need and benefits of personalization. For example, Jumbo's athletes and role models can mention why nutrition fitting their personal needs is important to optimize their performance and health. The message can conclude by stating that people should support each other to achieve optimal health by considering and accommodating their dietary wishes: that is the biggest gift and gesture they can make.

Concept 14.2| Dinner talk

Inspired by the game 'chitchat jar', in which people can draw a discussion topic or challenge from a jar, the same principle can be used to facilitate and stimulate customers to discuss topics related to dietary health and carbohydrates during their dinner. Each day they are invited to discuss a question or statement in a playful way. This tool can be online, with a daily topic provided in an application, or an offline paper-based version. Participants desire to have access to background information for each topic.

For example, a statement can be: 'humans do not need to consume carbohydrates to survive'. The background information can refer to research explaining that carbohydrates are non-essential.

Concept 14.3| Koekje erbij?

'Koekje erbij?' (which translates to: have a cookie?) is a well-known quote that originated from an advertisement of the Dutch biscuit industry 'Liga'. The phrase is commonly used to make an offer to household members or visitors as an act of caring for each other. People on a low-carb diet have to refuse these offerings. Therefore, participants questioned whether Jumbo could offer an inedible activity to accompany coffee-drinking with others, or introduce a healthy, low-carb snack and party assortment. Moreover, participants appreciate if Jumbo can develop a popular, commonly known and accepted 'saying' to indicate that they eat low-carb, similar to the phrase of 'being the bob'.

Concept 14.4| #lowcarbchallenge

With this concept, Jumbo challenges customers to explore healthy low-carb products. One format is a daily #low-carbchallenge post on Jumbo's communication channels. Customers can submit their attempt. Possibly, a daily winner can be drawn. Another concept is to partner with the Dutch 'National Sugar Challenge'. For example, Jumbo can provide a sugar-free advent calendar with facts, day-challenges and discounts (see Image 66) to support people in their monthly challenge and stimulate them to explore new products and triggers their curiosity to keep up with the challenge.

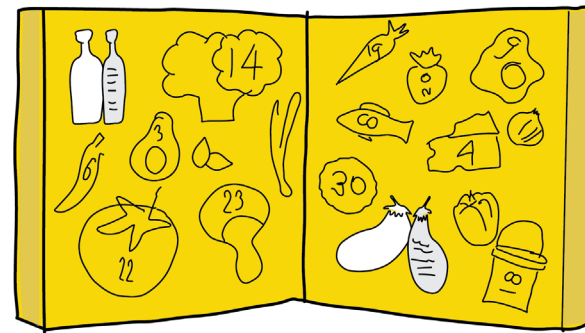


Image 66. An (online) advent calendar as a health awareness campaign and stimulate discussions.



Concept 14.5| Care professionals

Jumbo can promote the use of food as medication by targeting a nutritional health awareness campaign to care professionals. In the fieldwork activities, an expert explained his view that care professionals need to start subscribing healthy food as medicine. Therefore, Jumbo can show how diseases from various disciplines in medicine are connected to nutrition. For example, Jumbo can partner with the foundation 'studentenleefstijl' to provide master classes to medicine students about the use of food as medicine.

If care professionals are enthusiastic and convinced of the value that nutrition can offer in the health of their patients, care professionals can refer to the services Jumbo provides and possibly become a partner in co-development.

5.7| Take-away

This chapter 'Ideation portfolio'...

...sheds a new light on the vision of Jumbo by integrating the health stakes of customers.

...shows an approach to involve users via co-creation and co-reflection.

...presents a portfolio of concepts that shows how concepts can optimize and enrich existing touch points and resources from Jumbo, as well as create opportunities for new services.

...suggests that there is no ideal 'one-size-fits- all and solves-all' concept. This implies that Jumbo can offer a package of supportive tools. Customers can decide which ones to use, based on their personal needs, interests and perceived value.

... shows that the services can take a population-, group- or individual-approach based on the specific underlying cause of the intervention and the context.

... shows that concepts can involve the customer, his relationship with others and the (physical) environment.

...explains the challenge of misleading comparison due to quantification (100 grams & portion sizes) and proposes an alternative way to compare nutritional values of products.

Chapter 6 |

STRATEGIC POINTERS

This chapter discusses several strategic pointers associated with the insights and concepts from the previous chapters. The strategic pointers are underlying advices and considerations for supermarket Jumbo. Using Bronfenbenners (1979) ecological systems theory, the strategic pointers are categorised by viewing the topic from micro-, exo-, meso-, macro- and chrono- lenses. The advices were established by reflecting upon the insights from the previous chapters with one participant.

In this chapter:

- 6.1 Introduction to the process & ecological systems theory
- 6.2 Macro- lens strategies and considerations
- 6.3 Micro- & Meso- lens strategies and considerations
- 6.4 Micro- & Exo- lens strategies and considerations
- 6.5 Chrono- lens strategies and considerations
- 6.6 Take-away

6.1 |
INTRODUCTION
TO THE PROCESS &
ECOLOGICAL SYSTEMS
THEORY

The previous chapters have revealed several academic, user and creative insights. Although these insights, such as the ideation concepts presented in Chapter 5, are primarily discussed in isolation, they share various underlying messages, principles and mechanisms. These messages, principles and mechanisms have been distilled to arrive at a set of strategic advices.

These retrieved advices and considerations seemed to involve a variety of lenses. For example some focus on what Jumbo offers his customers, while others focus on Jumbo's internal organisation and mindset. These lenses correspond to Bronfenbenners (1979) ecological systems theory, which was therefore used to structure and map the strategies.

PROCESS

To arrive at the set of strategic advices, the previous chapters have been reviewed with one participant. This participant also joined in the co-creation sessions described in Chapter 5. To explore higher-level advices and considerations, the work was discussed by repetitively questioning: What does this imply for Jumbo? What can we learn from this? This two-hour activity resulted in a list of advices and considerations. To structure the outcomes, I sought inspiration in the structure of the Ecological systems theory. Although the advices are targeted to Jumbo, they may also inspire and inform other parties who aim to support a healthy diet.

BRONFENBENNERS ECOLOGICAL SYSTEMS THEORY

In short, the ecological systems theory places an individual central and describes five lenses of ecosystems that surround and impact this individual. These lenses are the micro-, exo-, meso-, macro- and chrono lens.

- The micro-lens focuses on the most direct systems around an individual person, such as his family and his living environment.
- The collection of these individual systems, and their interactions, is described by the meso-lens.
- The exo-lens includes stakeholders that are indirectly involved. The lens describes for example how organisations and media influence a person.
- The macro-lens refers to the overarching system highlighting the society and culture.
- The chrono- lens is a path that reflects how systems transition over time.

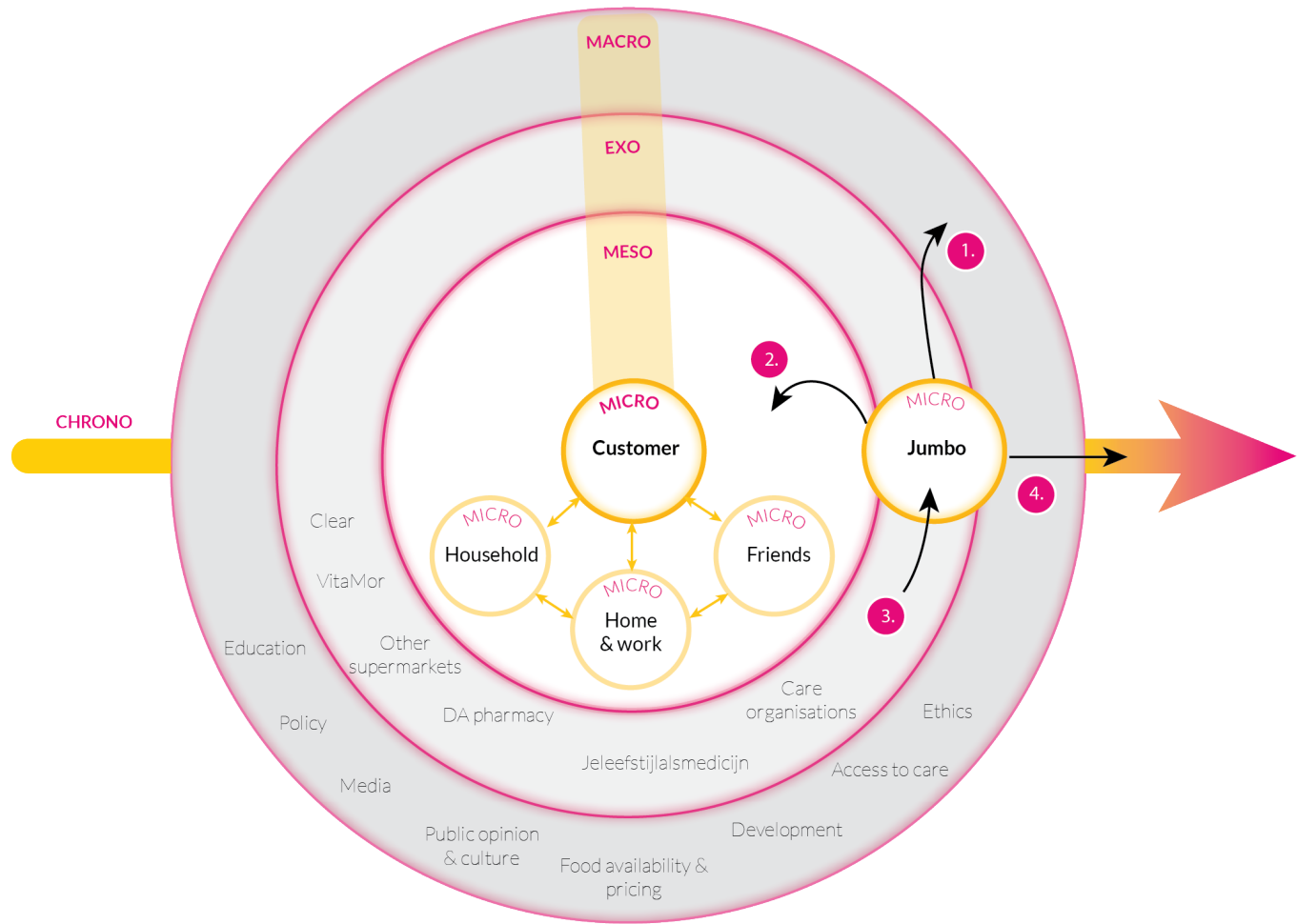
APPLICATION

The five lenses of the ecological systems theory have been contextualised to this study. Image 67 shows how these five lenses are applied, as is also briefly motivated below.

- The macro-lens is used to investigate the role of Jumbo in the food-system, society and food culture.
- For the purpose of this analysis the micro- and meso- level are combined to match what Jumbo offers customers and how Jumbo shapes the environment regarding food choices and seduction.
- Jumbo is positioned in the exo-lens as Jumbo indirectly influences customers. At the same time, Jumbo's internal organisation can be seen as a micro-system on its own. Therefore, a section called 'micro -& exo-lens' is used to provide strategies for Jumbo's internal mindset and approach.
- The chrono-lens is used to explore strategies for Jumbo's roadmap; how to move forward.

The remaining of this chapter discusses strategic pointers and considerations in four separate sections, starting with the macro-lens, followed by the micro - & meso-lens, the micro-& exo-lens and ending with the chrono-lens. Each strategy is supported with references to literature and/or fieldwork insights and references to specific concepts that resulted from ideation.

FOUR STRATEGY CLUSTERS MAPPED ON THE
ECOLOGICAL SYSTEMS THEORY



Legend| FOUR STRATEGY CLUSTERS

- | | | | |
|--|--|---|--|
| 1. MACRO- lens
Strategies on the role of Jumbo in society and ecosystems | 2. MICRO- & MESO-lens
Strategies on how Jumbo optimally supports his customers | 3. MICRO- & EXO- lens
Strategies regarding the internal organisation of Jumbo | 4. CHRONO- lens
Strategies on how Jumbo can transition |
|--|--|---|--|

Image 67. The ecological systems theory (Bronfenbenners, 1979) contextualised to this study, depicting four strategy clusters.

6.2 | MACRO-LENS STRATEGIES AND CONSIDERATIONS

The macro-lens includes strategic advices and considerations on the role of Jumbo in the food and care system, society's health and food culture.

1 | INTRODUCE JUMBO AS AN (CENTRAL) ACTOR IN THE (HEALTH)CARE LANDSCAPE

The first advice is to expand Jumbo's activities to include (health)care-related services to become an actor in the (health)care landscape. This thesis advocates using 'food-as-medicine' to optimize and maintain good health by integrating customer's health stakes in Jumbo's value propositions by means of precision nutrition. Research has evidenced that nutrition plays a latent role in preventing, delaying, and treating diet-related diseases (Palmnäs et al., 2019; Szakály et al., 2019). The strength of nutrition is that it tackles the root cause of several chronic health conditions, implying that Jumbo, who is seen to highly influence consumption behaviour (Waterlander et al., 2018), can take a critical role in society's health.

The ideation outcomes reveal multiple ways how Jumbo can enter the care market, either taking a top-down or bottom-up approach. For a top-down approach, examples are that Jumbo can: facilitate health tests (e.g. concept 5| Health check), collaborate with health-tech start-ups (e.g. concept 11| My personal GI), care professionals (e.g. concept 14.5| Care professionals), and national health initiatives (e.g. concept 14.4| #lowcarbchallenge). As an example of a bottom-up approach, Jumbo can collaborate with patient-to-patient platforms (e.g. concept 2.2| Food stories) and smaller initiatives (e.g. concept 8.3| Jumbo health encyclopaedia).

Table 4. A reflection on the role of Jumbo, and that of other stakeholders, in the identified phases and windows of opportunities.

PHASE	OPPORTUNITY	ENVISIONED ROLE JUMBO	OTHER STAKEHOLDERS
1 Awareness and Consideration	Facilitating evaluation of diet-related health	Supportive  Leading	Medical specialists, government, test providers, pharmacies, ...
	Encouraging a positive attitude towards dietary change	Supportive  Leading	Medical specialists, social surrounding, government, ...
2 Preparation	Exploring opportunities for dietary improvements	Supportive  Leading	Dieticians, ...
3 Doing	Supporting implementation of the new diet	Supportive  Leading	Dieticians, ...
	Creating a supportive environment	Supportive  Leading	Food industry, government, ...
4 Evaluating	Facilitating evaluation of diet-related health	Supportive  Leading	Medical specialists, government, test providers, pharmacies, ...

2 | INCREASE JUMBO'S PRESENCE BY TAKING A SERVICE APPROACH

The second advice is to increase Jumbo's market presence by providing a wider array of services that considers the entire time span that may be relevant for the actors involved and does not limit itself to the obvious phases of shopping and sales. The customer journey has revealed several opportunities for support prior to, and after, the actual shopping phase. Service design supports this view by seeing service as a sequence of value provisions over time (Polaine et al., 2013). From this view, adopting a service design strategy can also contribute to the establishment of holistic services, which is deemed critical by Waterlander et al. (2018). Consequently, broadened presence triggers changes in communication channels, core activities and also introduces the possibility for new collaborations (see Strategy 9).

Discussion with Jumbo about this advice revealed their interest to explore in what stages of the customer journey they can take a leading role, and during what stages they can be supportive to other parties. Therefore, Table 4 briefly describes my view on this. I believe that Jumbo can contribute most to the 'preparation' and 'doing' phase, as these phases closely connect to Jumbo's core expertise (e.g. on nutritional values) and existing resources (e.g. website and applications). Health evaluation is something that can only be established in collaboration as Jumbo lacks the knowledge, experience and resources for this. This interpretation is supported by the fact that most identified service opportunities are connected to the 'preparation' and 'doing' phase (see Section 5.3).

3 | NURTURE AND MINE JUMBO'S DATA

Another macro-level strategy is to optimally mine customers' data (both purchase data and health data (e.g. collected via concept 5| Health check and concept 11| My personal GI) for both internal and external purposes. As an example of internal use of customer data, Jumbo can use health- and consumption data of regions, cities and/or neighbourhoods to design tailored interventions. For example, can Jumbo adjust its assortment and marketing based on the health needs of local residents? Referring to the external use, Jumbo can contribute to research. For example, it may be interesting to use the combination of customers' purchase- and health data to explore consumption determinants of good health.

6.3 | MICRO-& MESO- LENS STRATEGIES AND CONSIDERATIONS

The micro- and meso-lens includes strategic considerations at the customer-level and his interactions with other micro-systems such as the customer's family, friends and environment. This section centralizes how Jumbo can support the customers and establish supportive interactions,

4 | CUSTOMIZE SERVICES AND ASSORTMENT TO ESTABLISH PRECISION NUTRITION

The fourth strategy is to customize Jumbo's services and assortment to establish precision nutrition. This is in line with earlier research, which highlighted the potential of precision nutrition to optimize health (Palmnäs et al., 2019; Szakály et al., 2019). It means that supermarkets need to transition from serving the population to serving individuals. Personalized services are important to satisfy customers and thereby enhance customer retention (Ronteltap et al., 2013).

Literature suggests Jumbo to start personalization on two levels, namely based on: 1) the customers' dietary and service preferences and 2) the customer's intended diet based on their personal health and associated health goals, and their unique responses to food (Palmnäs et al., 2019). These two levels of customization are also present in the ideation outcomes and revealed several insights as discussed below.

Related to customization to customer's dietary and service preferences, this can be initiated by Jumbo or by the customer. Jumbo can initiate customization by collecting customer data regarding their dietary preferences such as taste, food beliefs and values, and use these to personalize their assortment and suggestions (e.g. concept 2.3| Feedback on prior purchases). Customers can also customize foods to their own preferences (e.g. by designing their own seed cracker in concept 13| Crack my cracker) and shape the desired level of services provided by Jumbo (e.g. quantity of services and format, such as in concept 3.2| Personal cues and purchase restrictions). The advice to facilitate customization is grounded in insights from fieldwork suggesting dissatisfaction with the current assortment combined with lack of consensus of what makes a diet (un)healthy (e.g. related to soy, artificial sweeteners and the quantity of carbohydrates). The importance of customization is also supported by research mentioning that a diet should fit the customer's preferences and context to successfully achieve healthy eating (Aletta Jacobs School of Public Health, 2018). Additionally, within this customization, a recommendation is to focus on stimulating customers to create healthy meals, instead of stimulating them to buy healthy ingredients as research suggests switching the view from single, isolated nutrients to dietary patterns (Dekker et al., 2017).

Related to the customization to customer's intended diet and personal health and food responses, Jumbo is advised

to accommodate pre-established diets, such as the low-carb diet, throughout all their services (e.g. concept 4| JumboExtra's tailored to the diet; concept 6| Surprises) and simultaneously transition to start personalizing these diets (e.g. concept 11| My personal GI). This strategy is supported by literature indicating that healthiness of a diet is person-specific (Szakály et al., 2019). Moreover, customization may shed a new light on Jumbo's core quality of having the biggest assortment. In case of customized assortment: the assortment is endless!

5 | SIMULTANEOUSLY TARGET THE CUSTOMER, HIS SOCIAL INTERACTION AND HIS ENVIRONMENT, VIA A COMBINATION OF POPULATION, GROUP-BASED AND PERSONALIZED APPROACHES

The fifth strategy is to simultaneously target the customer, his social interaction and his environment, via a combination of population, group-based and personalized approaches. Both these three-component interventions are expected to enhance the effectiveness of stimulating healthy eating by creating a fully supportive and holistic service.

The first three-component approach is to: 1) empower an individual customer (e.g. concept 8 | Jumbo Supports) with interventions that create 2) a supportive social environment (e.g. concept 12 | Accommodating diets) and 3) a supportive physical environment and culture (e.g. concept 3.1| 'I See That I See What You Don't See' and concept 14.1| A new cultural normal respectively). This combination of interventions contributes to the creation of a fully supportive and holistic service, as supported by a participant describing that failure of his social environment to accommodate his diet overrides his own dietary knowledge and skills.

The strategy also promotes Jumbo to adopt a three-component approach in stimulating dietary health by combining 1) population-wide approaches (e.g. concept 9.1| Escape from the carb room), 2) group-based interventions (e.g. concept 10 | 'Op-de-proef' box), and 3) personalized services (e.g. concept 2.4| Inspiration based on purchase list). Chapter 5 shows that these approaches can co-exist and that the choice for a specific approach seems to depend on the specific context and intention of the intervention.

6 | FACILITATE CUSTOMERS TO SELF-MANAGE THEIR HEALTH AND DIET BY PROVIDING EDUCATION, TOOLS AND FEEDBACK

The sixth strategy, identified by the ideation outcomes, is to support customers in self-management of their health and diet by providing education, supportive tools and feedback. The concepts suggest that to facilitate self-management, customers need to be empowered in their health literacy and personal skills (e.g. concept 8.3| Jumbo health encyclopaedia; concept 8.2| Creating personal strategies), have access to tools to (e.g. concept 7 | My shoppable health journey; concept 9.4| 'Jumbogouchi') and receive feedback (e.g. concept 5 | Health check).

This strategy is supported by three aspects indicated by literature, being that 1) people should be aware of disease risks, threats, and their urgency, to provide self-care via a healthy diet (Mohebi et al., 2013), 2) that people are incapable to accurately recall their consumption behaviour (Reber et al., 2019) and 3) the necessity of health evaluations to start and maintain a healthy diet (Subramaniam et al., 2018).

6.4 | MICRO- & EXO-LENS STRATEGIES AND CONSIDERATIONS

Jumbo is positioned in the exo-layer as supermarkets indirectly influence the customer via their offering and marketing. However, Jumbo can also be seen as a micro-system on its own. Therefore, this section uses this overlap to provide organisational-level advices, primarily focussing on Jumbo's internal mindset and activities.

7 | CHALLENGE JUMBO'S STATUS QUO: VISION, CUSTOMER RELATIONSHIP, CUSTOMER SEGMENTS AND VALUE PROPOSITIONS

As described in the first strategy, there are opportunities for Jumbo to take a position in the (health)care market. This implies that changes are required in Jumbo's business model. The seventh strategy continues on this view by advising Jumbo to challenge the status quo, more specifically by re-considering Jumbo's: 1) vision, 2) relationship with customers, 3) customer segmentation and 4) value propositions, to ensure a match with the new positioning, zeitgeist and also to promote sustainable competitive relevance.

Section 5.1 sheds a new light on Jumbo's vision and role in society. It proposes the daring goal of establishing the healthiest customers, which can co-exist next to Jumbo's goal of exceeding customers expectations and providing everything they need to achieve their ambitions. While not detracting Jumbo's pride in offering the biggest assortment, Jumbo can facilitate and promote customers to make healthier choices (e.g. concept 1 | easier comparisons) and, if desired, set their own restrictions related to purchasing unhealthy food (e.g. concept 3.2 | Personal cues and purchase restrictions). Jumbo is advised to utilize the expertise in marketing to seduce customers to healthy products.



Image 69. Jumbo truly caring for, and involving, customers.

The second component of Jumbo's positioning involves their customer relationship (see Image 69). Collecting health-data of customers is expected to increase the level of intimacy with them. This demands Jumbo to explore what relationship they - and their customers - aim to pursue: being a facilitator or an involved partner? This is also connected to Jumbo's resources, such as manpower, to establish personal contact with individual customers.

All of the concepts described in Chapter 5 seem to view Jumbo as a facilitator, as real human involvement is missing. From this, the suggestion derived to start with facilitating healthy eating, and over time explores expansion of these services to include more personal involvement.

Related to customer segmentation, diet-related health needs of customers can be used to identify new customer segments. Customers with elevated blood glucose levels represent one example of such new customer segment. Services may target the needs of customers in this segment. Other ways of segmentation are based on customers' health intentions such as improving health and maintaining good health (personal contact with R.J. Koens, director Corporate Strategy, December 2019), risk profiles and their DNA and microbiome (Palmnäs et al., 2019). At the same time, Jumbo is advised to explore the future of customer segmentation as services become truly personalized, e.g. based on health, personal responses, preferences and budget: with n=1.

Last, Jumbo is advised to reconsider their current touch points and value propositions, to ensure that everything shares the same goal, is integrated and thereby reinforces each other. At all times, Jumbo should prevent conflicting services. A participant described that interventions to eat healthy make no sense if Jumbo simultaneously seduces customers to unhealthy products. Conflicting messages consequently also triggers a sense of distrust. The importance of aligned services was also mentioned during co-reflection upon concept 4 | JumboExtra's tailored to diet, which was view as obvious and essential and made participants question why it does not exist yet.

8 | INVOLVE CUSTOMERS AND NURTURE THEIR CONTRIBUTION

The eighth strategic advice is twofold, namely to involve customers via co-creation and to utilize and nurture customers' potential willingness to offer peer-support by establishing a customer-to-customer platform.

Jumbo is advised to involve customers during exploration, ideation and decision-making to identify and assess the different values that can play a role in new services, such as privacy, well-being and economic value. A suggestion is to establish customer panels with specific diet-related health needs. Examples are panels related to diabetes, cardiovascular health, obesity, inflammatory bowel disease, and separate panels for food intolerances. Together with these panels, Jumbo can reflect on how current services can be improved to better fit their needs and context, and explore ideas for new services. The tools and ideation outcomes described in this thesis may function as a starting point for engaging customers. Co-creation enables the creation of services that align to customers' desires and concerns, which is suggested to enhance customer acceptance of precision nutrition services (Szakály et al., 2019). Moreover, co-creation is especially relevant since there seems to be a fine balance between desirable interventions and interventions seen as paternalistic (Prij, 2018). Co-creation with customers can explore the sweet spot of innovation.

A second approach to unleash the power of customers is by facilitating and nurturing customer-to-customer interactions, as exemplified by concept 2.5 | Peer check. Fieldwork showed people's willingness to support peers on patient-to-patient platforms, and that peers appreciate and are receptive to this peer-support due to its low threshold of access and first-hand origin. Therefore, Jumbo can explore the creation of an 'open' customer-to-customer platform, which customers can use to pose questions and exchange support such as advices and recipes (e.g. hosting concept 2.2 | Food stories).

9 | BE OPEN TO AND ACTIVELY EXPLORE NEW COLLABORATIONS

The ninth advice is to be open to, and actively explore, new collaborations. In my contact with stakeholders (see Section 3.3) I noticed big interest to collaborate if Jumbo starts integrating health-related activities. At the same time, the stakeholders were surprised: they viewed supermarkets in their traditional role and did not consider them to be willing to contribute to customers health. Therefore, Jumbo is advised to openly and actively communicate their change in positioning as parties may still view Jumbo in the traditional format, implying that collaboration is not obvious.

Since Jumbo has limited expertise and experience in (health) care-related activities, Jumbo is suggested to explore possible partnerships with parties that have relevant expertise, experience and value propositions and for which collaboration creates mutually benefit. Examples to consider are: general practitioners and the shop DA pharmacy (concept 5 | Health check), firm Clear (concept 11 | My personal GI), website VitaMor (concept 8.3 | Jumbo health encyclopaedia) and patient-to-patient platforms (concept 2.2 | Food stories).

Another reason for collaboration is that a healthy diet is part of a healthy lifestyle (Van den Berg, 2019). Despite the fact that this thesis focuses on the dietary component, ideally future services of Jumbo are part of an integrated, holistic lifestyle facility. This means that Jumbo needs to engage with partners with value proposition for other lifestyle components, such as related to physical activity and stress management. Furthermore, collaboration with public institutes and research institutes should be considered as this may enhance customers' trust in the provided services (Ronteltap et al., 2013), which was one of the points of attention that resulted from fieldwork.

6.5 | CHRONO-LENS STRATEGIES AND CONSIDERATIONS

The chrono- lens outlines strategic pointers for how Jumbo can transition over time.

10 | MOVE FROM SMALL-BUT-MIGHTY CHANGES IN EXISTING SERVICES TO DEVELOPMENT OF NEW SERVICES

The tenth strategy is to adopt a step-by-step approach to integrate precision nutrition. Jumbo is advised to start with small-but-mighty changes to current resources. Examples of these small-but-mighty changes are provided in Section 5.4 'Concepts related to Jumbo's website' and Section 5.5 'Concepts related to JumboExtra's'. These small changes are expected to create quick health benefit with the lowest amount of investment and risk. At the same time, Jumbo can use these small-but-mighty modifications to 'learn-by-doing' and evaluate the effectiveness of the interventions to establish plans for possible future improvements and extensions. These extensions can take two shapes, which seem both important. First, Jumbo can offer more services related to a specific health condition, such as pre-diabetes, and thereby create a holistic service that was deemed important by participants and research by Waterlander et al. (2018). The second extension relates to integration of other health conditions, as is elaborated upon in strategy 11.

TENTATIVE ADVICE RELATED TO THE CONCEPTS

Together with one participant, who also took part in the co-creation, the concepts presented Chapter 5 have been discussed on their contribution to support a healthy diet and their originality. Moreover, possible constraints and uncertainties were identified related to feasibility (e.g. concept 13| crack my cracker), viability (e.g. concept 3.2| Personal cues and purchase restrictions) and actual use (e.g. concept 7| My shoppable health journey). The concepts accompanied by possible constraints and uncertainties were grouped together under the umbrella 'questionable', implying that they need further exploration. The outcome of this activity is shown in Image 70.

The concepts that belong to the 'wow' cluster, i.e. high contribution and high originality, were mapped on a spatial axis, to explore the attributes connected to the specific concepts and explore variation. This mapping was used to arrive at a final advice related to the roadmap of implementing the services. This final advice shows that Jumbo can start today with 'small-but-mighty' changes (see also Strategy 10) by introducing visual guides to inform customers about the carbohydrate quantity (concept 1.3) and by creating a low-carb version of the JumboExtra's application (concept 4). Simultaneously, Jumbo is advised to prepare for the future by considering how they can integrate health evaluations (concept 5) and personalized dietary advice based on customers' personal (blood glucose) responses to food (concept 11). These concepts score high on health contribution and originality, but seek time as they require investments and new collaborations. In between these stages, Jumbo can grow its repertoire of services by enhancing information provision (concept 8.3| Jumbo health encyclopedia) and by including original concepts that accommodate customers intended diet and at the same time foster enjoyable social interactions (concept 6| Surprises and concept 12 | Accommodating diets). Because after all: eating should be nurturing and enjoyable.

Future work is advised to evaluate the concepts with more customers and with internal employees of Jumbo to arrive at a valid representation of high-potential concepts that can be used to inspire Jumbo's roadmap.

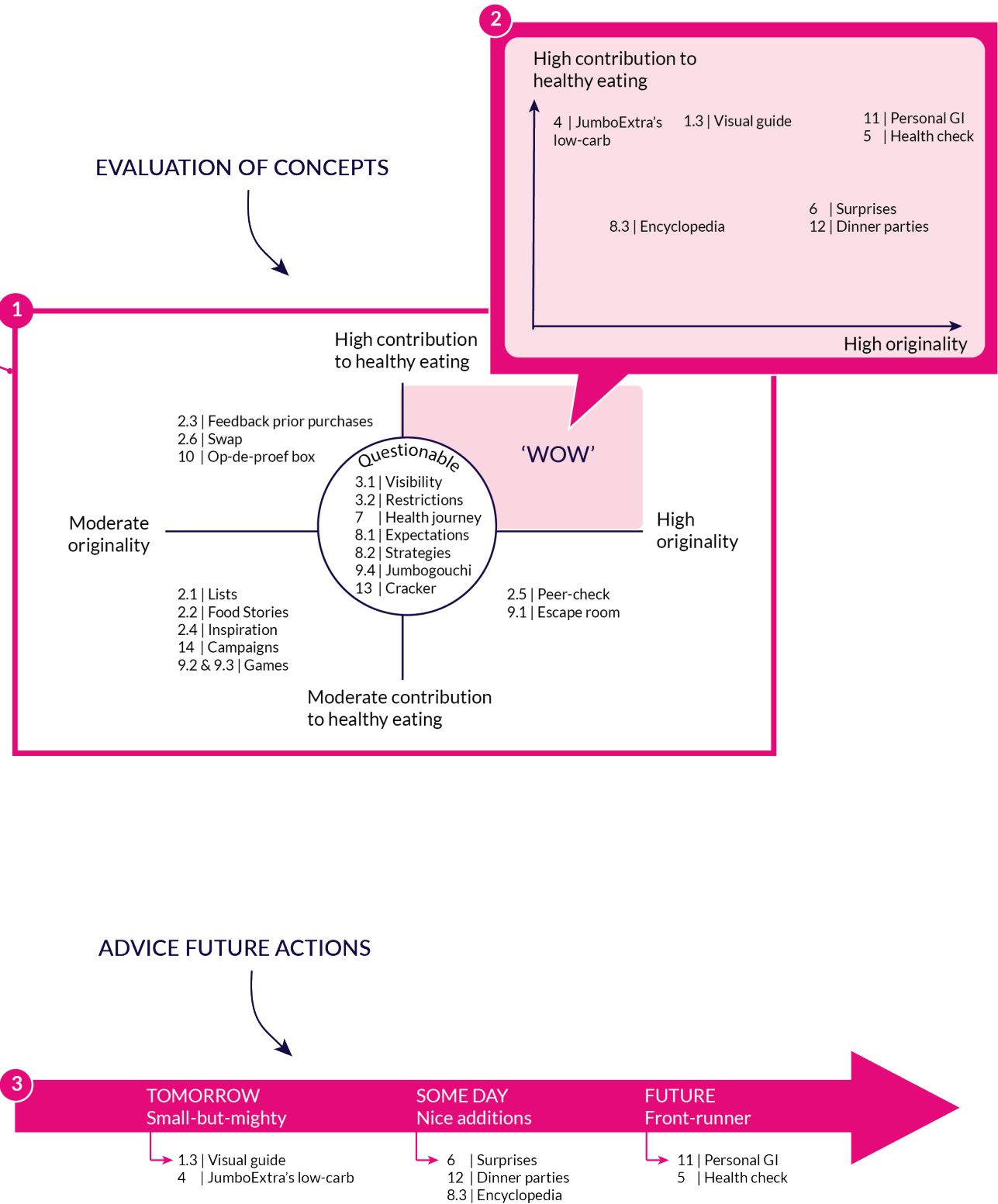


Image 70. Evaluation of the concepts by mapping them on two axes related to the contribution to healthy eating and originality (top, number 1 and 2), resulting in an advice for Jumbo's roadmap to focus on specific concepts (bottom, number 3).

11 | EXPAND JUMBO’S SERVICES TO INTEGRATE OTHER DIET-RELATED HEALTH CONDITIONS BASED ON THEIR COMPLEXITY IN MEASUREMENT, ABILITY TO MODIFY VIA DIET AND PREVALENCE.

The eleventh strategy is to expand services to integrate other diet-related health conditions based on their complexity in measurement, ability to modify via diet and prevalence. The advice is to move from easily measurable, easily modifiable and highly prevalent diet-related health conditions to more complicated assessments, health conditions to change via diet and health conditions with a lower prevalence.

This study focussed on customers with pre-diabetes for four reasons, being that: 1) the health condition is highly prevalent, 2) assessments are accessible and affordable (via self-tests and point-of-care tests), 3) the disease is highly modifiable via diet and 4) this modification is relatively easy and low-risk as it does not involve an interplay with medication, as would be required for developed diabetes type 2.

To achieve truly personalized dietary advice, multiple diet-related health metrics should be integrated. This desire was also voiced by participants (see Section 3.1.5). Jumbo is advised to start with 1) observable data, such as customer’s weight, 2) easily measurable and valid health data from wearable devices, such as physical activity, and 3) self-tests, such as cholesterol and blood pressure. This can be expanded by usage of more advanced tests such as microbiome and DNA tests when this data is proven useful for dietary advice (for a future outlook see Section 2.2). These more advanced tests are expected to come with high costs, introducing the question whether Jumbo will be able to facilitate the high-cost assessments. Another question is whether Jumbo offers the opportunity for customers to do buy the health assessment themselves and provide the opportunity to insert the data for personalized services. This implies that customers who can afford health assessments receive superior services, which leads to inequality.

Another argumentation for starting with relatively innocent observable data, is to proof that Jumbo treats the data securely and thereby gains trust of customers to share more personal details. Two questions require Jumbo’s attention. First, to what extent does Jumbo need specific quantitative test outcomes? The proposed concepts in Chapter 5 are based on the qualitative yes/no health indication of whether a person has elevated blood sugar levels. Second, how is the health data inserted - by customers themselves or by the test provider - and whether the outcomes are linked the Electronic Patient File.

To sum, Jumbo is suggested to compare the diffident options for chronic health conditions and facilitation of health tests in collaboration with experts on diet and health.

12 | BE BOLD: BE THE FRONT-RUNNER TO SET A NEW CULTURAL NORMAL

A last strategy is to act pro-actively, as a front-runner, to shape a new cultural normal, instead of being a non-responder or slow-responder to new views related to diet and health. Jumbo’s possibility to influence the dietary behaviour and views of populations is unique and can therefore play a role in national campaigns to establish a healthier population and healthier food culture (first ideas are provided in concept 14| Health campaigns).By pro-actively starting the social debate, Jumbo can show to truly care for society and show willingness to change in order to better serve customers. Presumably, the debate will also trigger and inspire new internal discussions regarding Jumbo’s positioning and value propositions. This transparency and boldness is expected to be appreciated by society. Moreover, this action provides the opportunity to enrich Jumbo’s brand image by highlighting the social responsibility they take.

6.6 | Take-away

This chapter ‘Strategic pointers’...

... reveals a set of strategic advices and considerations grounded in insights from literature research, fieldwork and ideation outcomes revealed through discussion with one participant.

... informs Jumbo to be mindful about strategies on different levels: the micro-, exo-, meso-, macro- and chrono- level.

... provides an tentative advice to implement specific concepts that: 1) are ‘small-but-mighty’, 2) empower Jumbo to prepare for the future and 3) are nice additions that both foster healthy eating and positively impact the enjoyability of food. These may inspire Jumbo in their future actions.

Chapter 7 |

DISCUSSION AND CONCLUSION

This chapter discusses and concludes the master thesis. The first section describes the contribution. This is followed by a critical reflection on the design intentions, process and outcomes. The thesis is concluded with a summary of the main contributions and take-aways.

In this chapter:

7.1 Discussion

7.2 Conclusion

7.1 | Discussion

The aim of this study was to explore how supermarket chain Jumbo can tailor service provision to the dietary needs of customers and what business and design implications this involves. With this act, Jumbo responds to the demand of taking shared social responsibility by supporting a healthy diet and thereby prevent and reduce occurrence of diet-related health conditions.

CONTRIBUTION

Similar to the description of the relevance of this study in Section 1.5, the study contributes to practice, society and academy.

For practise

The study has practical implications for Jumbo, and other (commercial) organisations that support healthy eating, and the customers.

For Jumbo, and other (commercial) organisations that support healthy eating, this thesis provides insights in precision nutrition and possible ways, and associated considerations and advices, of implementing precision nutrition via service design. Resulting from multiple activities (literature research, fieldwork, opportunity finding in the customer journey and the subsequent concepts and strategies), this thesis contributes to the development of holistic and integrated services that support healthy eating (specifically for customers with pre-diabetes) via population, group-based and personalized approaches. Thereby, the work promotes taking social responsibility, by viewing food-as-the-solution, and simultaneously explores how social responsibility may reinforce the positioning and relevance of Jumbo and other businesses. This is in line with research suggesting that precision nutrition may have beneficial business model implications (Ronteltrap et al., 2013).

Furthermore, the thesis outlines several service opportunities (see Section 4.4), a portfolio of concepts (see Chapter 5) and strategies such as: to involve customers in co-creating services, for which this thesis also describes an approach and tools, to shed a new light on customer segmentation and thereby enhance Jumbo's positioning and the thesis provides suggestions for collaborations (see Chapter 6).

For customers, the practical contribution is that establishment of precision nutrition services by supermarkets are expected facilitate and support them in managing their health, and that of others, and enhance their self-determination (see the blue box on the right).

For society

For society, this thesis suggests a food-based approach to tackle chronic health conditions at the root. As supermarkets are highly influential in shaping the diet of society, this creates potential to create health improvements in large numbers. Moreover, this thesis suggests to use the supermarket's ability to reach big populations for health campaigns to raise awareness, stimulate self-reflection and empower people to act appropriately, for example related

to the silent health condition pre-diabetes. This is in line with earlier research, which highlighted the potential of precision nutrition to optimize health (Palmnäs et al., 2019; Szakály et al., 2019) and the importance of health knowledge to provide appropriate self-care (Mohebi et al., 2013).

For academy

For academy, this thesis contributes by exploring academic insights 'in the field' by means of service design as 'applied research', which is still nascent for the topic of precision nutrition. This thesis explored the values associated to precision nutrition, for both society and business. More specifically, it explored how supermarkets can stimulate healthy eating (social value) by integrating (emerging) academic insights and use these in favour for their business, potentially resulting in enhanced customer satisfaction and sustainable competitive relevance. The work showcases how a critical reflection on ones role, values, strengths and weaknesses enables businesses to explore how they can contribute to society in a way that creates mutual benefit. For example, this thesis observed suboptimal use of health data and health tests, and explored how (health) data and tests can be used in a more meaningful way to unleash its potential. Therefore, this thesis contributes to understand how service design can transform society by supporting commercial businesses to simultaneously create business and social value with their services. This corresponds with the view from Sangiorgi (2011) that service can act as a mediator for social change.

For service designers this implies that their design goal is to seek dual value, for society and commercial parties, which can be achieved via co-capturing and co-creation of value with stakeholders. Another implication is that the strength of designers is to connect their intrinsic motivation to seek improvements and their antennae for emerging technical, social and academic developments to drive strategic (business) actions.

Moreover, the thesis seems to suggest specific new insights that contribute to achieving precision nutrition; such as the need for a holistic set of interventions that simultaneously empower the person and stimulates encouraging interactions with others and a supportive physical environment. Another insight is that these services can take a population, group-based or personalized approach, depending on the specific context and intentions.



Achieving health improvement

The main goal of this thesis is to support customers in their health, which is one of the fundamental human needs. A reflection on the proposed concepts reveals that multiple other human needs are incorporated as well, such as security, stimulation and ease. For example concepts promote that the environment accommodates the person's specific diet (security), support customers to experience the diet (stimulation) and make it easier to eat low-carb (ease).

Section 2.4 introduced the theory of self-determination, which describes the importance of fulfilling the fundamental human needs autonomy, competence and relatedness to develop intrinsic motivation (Ryan & Deci, 2000). This box describes how the proposed concepts contribute to enhance customers' self-determination (also see Image 71).

- **Autonomy**
The concepts that resulted from ideation (see Chapter 5) guarantee autonomy by providing the customers the freedom and creativity to shape their own diet. Furthermore, the facilitation of health check-ups enables customers to take ownership of their actions and health; apply self-care, instead of being a passive observant of external influences.

- **Competence**
The concepts support customers in making desirable dietary-choices, which enhances their perceived competence. This is achieved by empowering the customers with knowledge about nutrition, health and their personal behaviour. At the same time, a supportive environment is created in which customers can practise their skills.

- **Relatedness**
With the proposed service concepts, Jumbo shows to truly care for their customers by supporting them in their health and well-being. The concepts describe ways to establish a close and trusting relationship. Moreover, some concepts facilitate and stimulate social support within the customer's own social context, also positively contributing to the perceived level of relatedness.



Image 71. An argumentation summary of how the proposed concepts contribute to fulfil the human needs autonomy, competence and relatedness, and thereby enhance self-determination in customers.

CRITICAL REFLECTION ON INTENTION & CONTENT

Four critical aspects related to the intention of this thesis and findings from the literature study are discussed below, questioning the added value of personalization and increase in health tests and discussing the notion of a 'healthy' diet and whether promotion of healthy products does the trick.

Is personalized always better?

The field of precision nutrition seems to advocate replacing generic dietary recommendations by group-based and personalized services (Palmnäs et al., 2019). Although precision nutrition has several prospective benefits, it also introduces several considerations, as described in Section 2.1. One consideration I want to emphasize is the risk that personalized services, compared to population-wide services, may increase inequity (Mozaffarian, 2016; Szakály et al., 2019). What if a vulnerable population does not have the resources to use the service? As supermarkets fulfil an essential human need - namely nutrition - Jumbo should safeguard that their services remain accessible to all.

Related to this, the concepts described in this thesis are a combination of population-wide approaches, such as the awareness campaigns, group-based interventions, for example the low-carb version of the JumboExtra's application, and personalized services, such as interventions connected to customer's unique blood glucose response. Literature described that the added benefit of personalized nutrition over group-based services is still unknown (Ordovas et al., 2018). With this thesis I support this view and even go one step further by suggesting that also population-wide approaches can be meaningful, for example in changing the food culture and establishing a new normal.

Therefore, I suggest that the choice for the type of intervention - population wide/group-based/personalized - is context specific and that the solution should be sought in a combination of approaches.

Is more testing always better?

The proposed service concepts intend to contribute to the health of customers and thereby reduce the pressure on the care system (See Section 4.2). To achieve this, assessments of diet-related health, in this case blood glucose tests, are proposed. This concept implies that Jumbo becomes a facilitator of population-wide screening programs for health.

The increase in health assessments may benefit the care system by enabling early diagnostic and follow-up actions. For example, in case of blood glucose control early detection and lifestyle changes may prevent people from developing actual diabetes, reducing the need of care (Health Council of the Netherlands, 2004). Also research by Szakály et al. (2019) mentions that precision nutrition can reduce health care costs. On the other hand, positive test outcomes may induce insecurity and anxiety in customers (Barry et al., 2018). It can be expected that some of the customers will enter the medical circuit with false positive results and with a health condition that does not cause harm or does not worsen over the long-term.

Therefore, facilitating health check-ups may both reduce and increase the pressure on the healthcare system and should always be optional. A pilot of the provision of health screenings is necessary to reveal how it influences the pressure on health care.

The possibility and meaning of 'healthy' diet

This thesis promotes a healthy diet, referring to consumption of non-processed foods like vegetables. More specifically, the thesis is build upon research indicating that a carbohydrate restricted diet is beneficial for both healthy people and people with diabetes type 2 (Westman et al., 2007) and could therefore be seen as a solution to the pandemic of several diet-related chronic diseases. However, the same study mentions that the long-term health consequences of this nutritional strategy are unknown. In combination with the absence of a globally supported notion on what is healthy (Chance, Gorlin, & Dhar, 2014), this work should be interpreted with care. This also implies that it can be expected that some people do not agree with the standpoint taken in this work.

Other questions associated to facilitating a healthy diet are: Is there enough supply if we all start eating healthy? To what degree can products be labelled 'healthy', with the idea that every person has unique nutritional needs and responses? And does the healthiness of a product rely on the sole criteria of nutritional healthiness, or should it also integrate the impact on the earth and developing countries?

Therefore, it may be required for the food ecosystem to reflect on the notion of 'healthy' nutrition and together explore how they can provide this to customers. In case Jumbo, or another organisation, uses this work, it is advisable to refer to underlying research and mention the nuances.

Does promotion of healthy food do the trick?

Several service concepts in this thesis intent to support a healthy diet by promoting healthy foods, for example via price incentives (see concept 4| JumboExtra's tailored to diet). However, it can be questioned whether this does the trick. Namely, it can be argued that seeing food may prompt us to think about food and subsequently eat more. Today, we view the 20th centuries' attitude towards smoking as unacceptable. Similarly, we should think how in 2050 we look at today's assortment, marketing and consumption behaviour.

To a great extent the societies diet is influenced and manipulated by the food industry. Critical thinkers are confronted with considerate amounts of opposition when they propose a change in the system. For example, the view is changing from 'we are simply consuming too much', to 'we are consuming the wrong food'. However, the sugar industry opposes the view that sugar in unhealthy and even supports research indicating that consumption of fat is the cause to diet-related diseases. As these powerful parties in the food industry influence societies health, it can therefore be questioned whether government should interfere. A good first step is that supermarkets support healthy eating. However, ultimately it's up to the customer to behave in a healthy manner although the environment is not (yet) supportive.

CRITICAL REFLECTION ON THE PROCESS

Four process-related limitations have been identified related to user involvement, the number of iterations, focus on the desirability component and validity of customers recalling their thoughts and emotions. These are described in more detail below.

User involvement

User involvement has been complicated for two reasons, being that people with pre-diabetes are difficult to reach due to their own unawareness of having pre-diabetes (2diabeat, 2020) and by the COVID19 outbreak, which limited possibilities for user contact. These factors resulted in three limitations, namely the small number of participants, a broader sampling strategy and limitations in co-creation. These are briefly discussed below.

- Due to the low number of participants, the outcomes are expected not to embrace the diversity in customers' needs, desires and context, thereby limiting the validity of the outcomes. Each co-creation and co-reflection session revealed new insights, implying that the saturation point has not yet been reached.

- Another drawback is that a convenience sampling approach (Miles, Huberman, & Saldaña, 2014) was adopted since attempts to find people with pre-diabetes were unsuccessful. As a result, the selection criteria for participants have been broadened to include people with established diabetes and people following a carbohydrate restricted diet with other underlying health needs. Although these people are expected to undergo a similar journey as people with pre-diabetes, it cannot be guaranteed that the proposed concepts offer value for people with pre-diabetes specifically.

- Last, the restrictions in face-to-face engagements prevented me from organizing the envisioned number of face-to-face, group-based co-creation sessions. With two groups of students a creative session was performed. The engagements with the target group and other stakeholders are a combination face-to-face sessions with individuals and conversations over phone or Skype. As a consequence, the potential of interaction between participants has not been utilized. Moreover, I was challenged to facilitate ideation and reflection sessions without physical presence, complicating the establishment of a creative atmosphere and hands-on interaction.

Possibly, these aforementioned limitations have lowered the validity and quality of the proposed outcomes.

Number of iterations

Design is characterised by an iterative process (IDEO, 2015). The nature of the design deliverable of this thesis, being a portfolio of concepts, has reduced the number of iterations. Instead of multiple iterations of a single concept, the outcomes in this thesis are several concepts that have been co-created with participants or have undergone one evaluation. This implies that the concepts are on a more abstract and exploratory level, and require further exploration and evaluation.

Focus on desirability

Innovation is positioned at the intersection of what customers find desirable, what is technically feasible and what Jumbo deems viable (IDEO, 2015). This thesis centralised the desirability component, as this was considered to be most meaningful for the client. During the ideation process, feasibility was touched upon by aiming for ideas implementable on the short term and discussing possible technical constraints. Therefore, the section 'Use of this thesis' addresses recommendations for future work related to this aspect.

Validity in recalling of thoughts and emotions

The thesis combined several tools to gain insights from the user. This enabled data triangulation (Ravitch & Mittenfeller, 2015), which enhances the validity of the study.

However, the validity of participants recalling their thoughts and emotions during the creation of a customer journey (see Section 3.5) is uncertain and speculative. The participants seemed capable of recalling their thoughts as most of them underwent dietary change relatively recently. Moreover, dietary change was considered as impactful and therefore enabled them to recall vivid situations.

This implies that the outcomes should be interpreted with care. To ensure validity, future work may consider using the 'thought & emotion' customer journey with participants currently undergoing dietary change.

CRITICAL REFLECTION ON THE OUTCOME

A reflection on the outcomes revealed three insights, namely that the outcomes may also offer value to other target groups, the possibility to utilize customer data to a greater extent and to take a more holistic take on shared responsibility. These are described below.

Value for other target groups

Despite the fact that this thesis focused on pre-diabetes, several concepts may serve other diet-related health phenomena. For example, some concepts, such as tracking the journey of dietary change, are expected to also empower customers who undergo dietary change for other medical reasons such as high blood pressure and obesity. Simultaneously, other concepts, such as the awareness campaigns, are expected to contribute to population-wide prevention. The section 'Use of this thesis' addresses recommendations for future work connected to possible cross-pollination.

Utilizing customer data

Some of the proposed concepts build upon health data of the customer. The proposed concepts offer the customer a certain level of freedom in use, allowing them to tailor the concepts to their situation and preference. However, the concepts do not use the full potential of customer data that can be collected about their context, values and lifestyle to tailor the services. Integration of this data is important as research mentioned that suggestions for dietary change only have impact if they fit the context and preferences of the receiver (Aletta Jacobs School of Public Health, 2018).

This information implies that there is potential to go one step further to customize the services based on the customer's personal and situational data. Future work may also investigate questions related to customer's willingness to share data and the required data security.

A more holistic take on shared responsibility

Last, this thesis focuses on customers and supermarkets, creating an over-simplified impression by not considering the complete food and care ecosystem. Although this thesis focuses on increasing consumption of healthier products in customers, another perspective could be to ask farmers to produce more nutritious food, or to ask general practitioners and medical specialists to subscribe healthy nutrition to their patients as medicine.

Therefore, in reading this thesis it is important to be mindful that it does not embrace the full ecosystem, indicating that the proposed concepts are just the outcomes of a simplified perspective.

USE OF THE THESIS

The aforementioned reflections imply that the outcomes presented in this thesis should not be seen as 'the solution'. Rather they are steps in the right direction. This thesis can be best interpreted as a first exploration on how supermarkets can contribute to the health of customers with elevated blood glucose levels.

Future work is suggested to iterate upon the resulting service concepts, from a desirability, feasibility and viability perspective (IDEO, 2015) (see Section 4.3 for inspiration) and in collaboration with multiple stakeholders in the food and care system. For example, future work can explore how the opportunities described in this paper can be aligned to, and reinforce, the commercial stakes of supermarkets and how to (securely) utilize available customer data. Moreover, more extensive evaluation of the concepts and associated strategic advices is required, both with customers and with internal employees. After this further exploration, it is important to pilot the ideas to investigate real-context use. To examine to what extent the findings are generalizable to different customer groups, the 'thought & emotion' customer journey approach can be used with participants undergoing other types of dietary change.

7.2 | Conclusion

Although food is part of the problem, this thesis emphasizes the role food can play in the solution. The thesis advocates for viewing diet as a solution to reduce, delay and prevent diet-related diseases, focussing on pre-diabetes. Customization of food-services, by means of precision nutrition, is important to unleash the potential of food. After all, we are all unique, implying that there is no 'one-size-fits-all' diet. However, fundamental and applied research on how to establish precision nutrition is still nascent. Therefore, this service study explores how Jumbo, as supermarket chain, can facilitate and support their customers with pre-diabetes to adopt and sustain a healthier diet.

To achieve precision nutrition services, businesses that influence society's consumption behaviour, such as supermarket Jumbo, are sought to take social responsibility and customize their services by integrating the health stakes of individual customers. These group-based and personalized services seem to create positive impact for customers, society and business results as the services contribute to people's health and are suggested to enhance customer satisfaction, which leads to customer retention, and introduce opportunities to strengthen the businesses' positioning and relevance.

The outcome of this thesis is four-fold: namely it provides 1) insights on precision nutrition and associated values from literature and fieldwork, 2) a customer journey that revealed five service opportunities to support customers with pre-diabetes, 3) a portfolio of co-created concepts and 4) several associated strategic pointers and considerations for how Jumbo, or other businesses that support healthy eating, can start integrating the (dietary) health stakes of customers in their services. The introduction of precision nutrition services is expected to enhance the business' positioning and competitive relevance.

In sum, this thesis can be interpreted as an applied service study tentatively suggesting that Jumbo, or other businesses that support healthy eating, can create positive impact for customers, society and their company results by integrating customers' dietary needs in their value propositions by means of precision nutrition.

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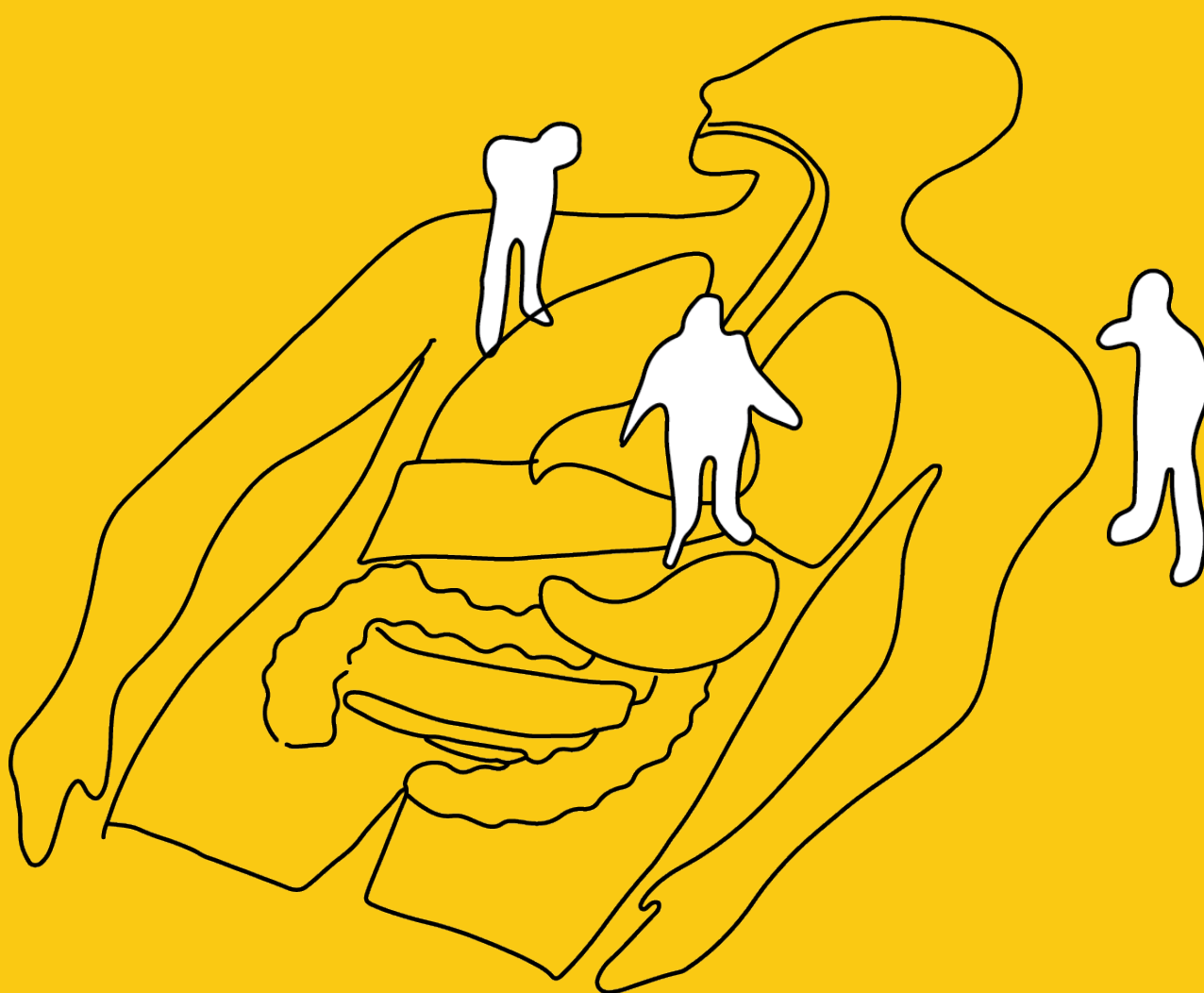
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Towards shoppable health

for people with pre-diabetes



Appendices: Towards shoppable health

Master Thesis by Veerle van Engen
May 2020

Master Strategic Product Design
Medisign specialisation

Faculty of Industrial Design Engineering
Delft University of Technology (TU Delft)
The Netherlands

Supervisory team
Dr. Ir. Bos-de Vos, M. (chair)
Prof. dr. Snelders, H.M.J.J.
Product Innovation Management
Department of Industrial Design, TU Delft

In collaboration with
Jumbo Supermarkets, Veghel
Mr. Koens, R.J
Director Corporate Strategy
Manager Foodcoach

STUDENT JUMBO CONTEXT ANALYSIS

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| Appendix A

Project Brief

DESIGN
FOR our
future



IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

! USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !



family name	<u>van Engen</u>	Your master programme (only select the options that apply to you):
initials	<u>VPM</u> given name <u>Veerle</u>	IDE master(s): ☐ IPD ☐ Dfl ☒ SPD
student number	<u>4974344</u>	2 nd non-IDE master: _____
street & no.	<u>Van den Broekweg 14</u>	individual programme: _____ (give date of approval)
zipcode & city	<u>2628 CN, Delft</u>	honours programme: ☐ Honours Programme Master
country	<u>The Netherlands</u>	specialisation / annotation: ☒ Medisign
phone	<u>+31613182300</u>	☐ Tech. in Sustainable Design
email	<u>V.P.M.vanengen@student.tudelft.nl</u>	☐ Entrepreneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair	<u>Marina Bos-De Vos</u>	dept. / section:	<u>MOD</u>
** mentor	<u>Dirk Snelders</u>	dept. / section:	<u>MOD</u>
2 nd mentor	<u>Robert Jan Koens / Eilish Hazelaar</u>		
organisation:	<u>Jumbo</u>		
city:	<u>Veghel</u>	country:	<u>The Netherlands</u>

comments (optional) Marina 'zooms out' to multi-stakeholder collaborations, while Dirk 'zooms in' to service. Marina participates in the 4TU project P&P. Dirk has design experience in health domains. Therefore, they complement each other.

! Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

! Second mentor only applies in case the assignment is hosted by an external organisation.

! Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.



Procedural Checks - IDE Master Graduation

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Marina Bos-De Vos

date

05-12-2019

signature

[Signature]

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 15 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 15 EC

List of electives obtained before the third semester without approval of the BoE

☒ YES all 1st year master courses passed

☐ NO missing 1st year master courses are:

name D. Schipper

date

13-12-19

signature

[Signature]

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks?
- Does the composition of the supervisory team comply with the regulations and fit the assignment?

Content: ☒ APPROVED ☐ NOT APPROVED

Procedure: ☒ APPROVED ☐ NOT APPROVED

- also approved for medisign

comments

name Mv Mergen

date

6-1-2020

signature

[Signature]

| Appendix B

Company analysis

Jumbo

This section describes the characteristics of the Jumbo supermarkets, including their brand, formula and past and future actions. This analysis provides an impression of the internal playing field. The information in this section is primarily derived from the Jumbo website (Jumbo, n.d.), except when otherwise noted.

INTRODUCTION

Jumbo is a Dutch supermarket that exists since 1979. Jumbo is the second largest retailer in The Netherlands. Jumbo has 677 stores, 787 million Euros revenue and approximately 20 percent market share in 2018. Since 2019 Jumbo also became active in the Belgian market. Jumbo has its headquarters in Veghel and is owned by the van Eerd family. Jumbo sells as combination of food, branded and own label (> 7000 products), and non-food. Additionally, Jumbo locally differentiates by sales of regional products. These local differences may be emphasized through franchised shops. Therefore, Jumbo may be seen as a scaled and centralized retailer, yet authentic and local. Increasingly, Jumbo is broadening their scope to prepared food (acquisition restaurant chain La Place), non-food (acquisition department store Hema) and sports and health (innovation Foodcoach).

MISSION AND BRAND

Jumbo's mission is to exceed expectations and continue where others stop. They want to be 'successful in every market that they participate in'. This shows that Jumbo is open-minded to non food-related markets.

Jumbo also mentions how these expectations will be exceeded, namely: 'Every day, everywhere and for every customer. [...] The best service, the biggest and best quality assortment and the lowest price. We want to offer our customers the best in all possible ways. [...] This approach transforms Jumbo customers into real Jumbo fans'.

'Jumbo works on being prepared for the future'. Jumbo can be described as being entrepreneurial, daring to take unconventional steps, reliable and involved. Jumbo has a winners mentality and places their customers central.

Jumbo has been famous for their television advertisements, featuring Frank Lammers. Their atmosphere-based advertisements focus on families and joy from social events. Jumbo shows interest for the younger generation and even has their own children council.

Moreover, a brand-association with sports is established via sponsoring of talented people and teams in sports, such as racing legend Max Verstappen, Jumbo Visma's cycling and ice-skating groups. Also the development of the Foodcoach application to support athletes, such as PSV, in healthy eating, shows that Jumbo is taking social responsibility, especially in relation to healthy living.

FORMULA

Three concepts fundamental to Jumbo's business are assortment, price and value. These are translated into the formula: best service + biggest assortment x lowest price.

CHARACTERISTICS

Jumbo aims to place their customers central. Through the use of seven guarantees, Jumbo aims to reduce and limit possible discomfort and dissatisfaction in their clients. By being loyal to their customers, they expect loyalty in return. The seven guarantees are: 1) Euro's cheaper 2) Service with a smile 3) For all groceries 4) Fresh is really fresh 5) smooth shopping 6) Not satisfied? Refund and 7) customers wishes are central.

Compared to other supermarkets, Jumbo creates a personal touch, by facilitating personalized cakes with edible photos and giving discount on cakes at people's birthday. Additionally, Jumbo collaborates with other parties to provide additional services in their shops. For example, in some shops people can collect their medicines or use post service.

Jumbo's pricing strategy differentiates from other supermarkets in two ways.

- Jumbo uses different pricing strategies, based on the location of the shop and presence of competition. Simultaneously they promise to offer products for the lowest price, special actions and discounts excluded.
- Jumbo offers products that are discounted for a year, or season-bound discounts for each month.
- For promotion Jumbo offers actions to save for free, or in price reduced, products – such as cooking gear – and activities, such as formula 1 racing.
- In 2020, Jumbo launched the savings program JumboExtras's. Customers collect saving points by buying selected products. With the points, customers can save for free and discounted products and events.

JUMBO'S LONG-TERM STRATEGY 2018-2022

The long-term strategy aims to achieve 1) enhancing differentiation through Jumbo formula, 2) being always available through a multi-channel approach, 3) personalizing service both digital and in-person and 4) being an entrepreneurial business. Furthermore, sustainability-related goals are mentioned, for example lower environmental-impact and living healthier.

JUMBO STORE FORMATS

Jumbo Group Holding owns besides the Jumbo supermarkets the self-service restaurant La Place and a dedicated shop for Golf.

The Jumbo supermarkets can be further classified in the ordinary supermarket format, a Foodmarkt format and the Jumbo-city concept. From 2014, Customers were able to order food online and pick-it-up at dedicated pick-up points. Jumbo started home delivery in 2016, and provides home delivery at almost every location in The Netherlands.

In 2013, the Foodmarkt format was introduced. Currently eight of Foodmarkt shops introduce customers to a big assortment of products and unique shopping experience. This experience is created through a special shop layout with kitchens, tastings, a café, activities and workshops. In 2017, Jumbo opened a first station-based shop. Jumbo aims to grow their number of smaller city shops, in which people can find a combination of normal assortment and prepared meals. Jumbo has the ambition to roll out more Foodmarkt and City formats.

La place is further classified in LaPlace restaurants, LaPlace express for take-away meals (e.g. breads, snacks, juices and fruit, and LaPlace catering. The aim is to provide good food fast. La place express are found in NS stations, squares, Schiphol and shopping centres. Last, LaPlace event catering provides catering, both stationary (e.g. in RAI) and flexible (in festivals).

STRATEGIC ACQUISITIONS

Jumbo made several acquisitions. Jumbo took over several supermarkets, such as C1000 (in 2012) and EM-TE (2018). The self-service restaurant La Place was acquired in 2015. In 2018, Jumbo expanded its recipe collection and platform by acquiring Smulweb. In 2019, Jumbo announced collaboration with Hema. Jumbo products will be available in the Hema shops, which are often conveniently located in city centres. In return, Hema products will be available in Jumbo stores.

Strategic collaborations

Jumbo has several strategic collaborations, ranging from foundations such as Krajijc, to research institutes, like TNO and Wageningen University, to government and public organizations, such as Voedingscentrum. Jumbo also has their own council of children.

DILEMMAS

Jumbo questions themselves: how far does our responsibility reach, for example regarding the sales of unhealthy products. As health is increasingly seen as a shared responsibility; what role do we take?

Jumbo decided not to exclude unhealthy products, as they want to be the supermarkets with the biggest assortment for all needs. Jumbo aims to respect the desires from the client, as they also have freedom of choice. Instead, Jumbo provides support to promote healthy behaviour.

A second challenge is how to use available data to provide value to customers and their business, yet in adherence to law, regulations and expectations.

LOOKING FORWARD

Similar to other supermarkets, Jumbo pursues ambidexterity. This implies that Jumbo balances their day-to-day activities (exploitation) with exploration of future opportunities to remain relevant (O'Reilly & Tushman, 2004). The ambidexterity also explains that Jumbo pursues quality and value improvements while simultaneously tries to optimize costs.

Future developments include the public version of the Foodcoach application that will be rolled out in 2020. Initially, this application will focus on amateur endurance athletes and will be expanded to more sports and general lifestyle. This innovation is driven by a separate team, with full commitment from top management. The innovations follow an iterative approach build, measure, learn approach through the use of pilots. Additionally, these pilots provide the opportunity to build outside-in, instead of inside-out, enhancing the fit to context and desirability of customers.

| Appendix C

Context analysis

Supermarkets are part of the sector food. Respectively, all care products and services offered by public and private organizations are part of the care-market umbrella. It can be observed that non-care related businesses are increasingly exploiting the business potential of the care market, by integrating health services in their value proposition. Examples in retail are that supermarket chain Wallmart opened a first health centre and that some Jumbo supermarkets have medicine pick-up desks. Examples from other domains are amongst others that post service PostNL started delivering medication and that Volvo equips some of their cars with AED systems.

This section starts with nine trends that influence both the retail and care industry. Afterwards, market specific numbers and trends are presented.

TRENDS SHARED BY CARE AND RETAIL

The conscious consumer – modern day consumers of the care and retail industry are increasingly concerned about their health, the capacity of the world and the impact of our behaviour on developing countries (Hanus, 2018; Waterlander et al., 2018). Transparent information and responsibility is requested.

On-demand - People want to be in full control of their needs, how these will be fulfilled and when. People want to have 24/7 access to shopping and consultations with medical specialists. People desire a seamless experience and do not want to spend time travelling and waiting (Royal HaskoningDHV, 2018). More care services are instantly provided on the point-of-care or via e-health services.

Servitization - People demand service that support them to achieve their goals in the best possible way. Supermarkets notice an increased interest in convenience foods, and simplification of choices Vandervelde, 2017). Therefore, they provide prepared meals and food boxes and smoothen the overall customer journey. For example, Albert Heijn is piloting automated payment using video-based observation of products that are purchased combined with face recognition. Also in the care market, more services are provided to improve the experience (HaskoningsDHV, 2018).

Personalisation – Services are sought to be tailored and personalized through the use of data. Wearables provide data to personalize care activities, supporting the trend towards precision medicine (Royal HaskoningDHV, 2018). For retail, purchase behaviour will be used to optimize the shopping experience and tailor purchases (Lindner, 2016).

Experience-focused - In both markets, consumer experience plays a central role. Besides the increased use and presence of technology, people seek a human, trustable experience (Royal HaskoningDHV, 2018). In retail, consumers also seek new sensory experiences (Hanus, 2018). These experiences may be provided in brick-and-mortar stores, or in virtual environments. In food, people celebrate the diversity in sensory experiences of dishes around the world (Vandervelde, 2017).

Decentralization – More care and diagnostic activities are provided at people's homes (Walg, 2014, Royal HaskoningDHV, 2018). Also, online grocery shopping and home delivery is expected to keep growing (Rabobank, 2019).

Networked – As a response to customers' high expectations of having optimized and integrated services, supermarkets and care organizations need to start collaborating with partners outside their organization (Royal HaskoningDHV, 2018). This also implies introduction of new players from other sectors in the retail and care landscape (Vandervelde, 2017)

Tech-driven – Technical innovations and robotisation will contribute to future developments in the food and care domain (Lindner, 2016). For example. 3D printing is explored to print human tissue and to print food with certain characteristics in looks and nutrition.

From profit to value – Supermarkets and care organization will no longer be driven by the quantity of sales or actions, but will be rewarded for the value that they provide. Supermarkets are challenged with the dual aim of making profit and responding to customer needs and values (VanderVelde, 2017). The care industry will become value-based, meaning that they will be rewarded for the value that they provide to the patients instead of the quantity of treatments (Tersago & Visnjic, 2011).

FOOD RETAIL INDUSTRY

Introduction to Food sector

In 2018, there were 6000 supermarkets in The Netherlands (CBS, 2018), run by around 30 different supermarket brands (Rabobank, 2019). This implies that on average 2900 inhabitants share one supermarket. Following on the latter, many people, especially in urban areas, have access to multiple supermarkets in their neighbourhood; they can choose at which supermarket brand they want to do their shopping. This shows that the food industry has high levels of saturation and competition.

Sector numbers of the Rabobank (2019) show that supermarkets have approximately 50 percent revenue share in the food sector. Nearly 75 percent of society's consumption is bought in a supermarket (Rabobank, 2019); purchases at bakeries, grocers and butchers are decreasingly visited. In 2018 the revenue of Dutch supermarkets amounted to nearly 39 milliard euro, which is a 3.5 percent annual growth. Online purchases currently represent 4 percent of market share and are expected to increase to 15 percent by 2030. Also the revenue from discounted products increased, amounting to 23,3 per cent of the total revenue (NOS, 2018).

Trends and transformations in supermarkets

The grocery retail landscape is changing rapidly as a response to changing consumer demands, technical advancements and high competition due to market saturation. Groceries need to deal with tighter regulation regarding health and sustainability. Besides making profit, supermarkets are increasingly expected to take social responsibility: customers demand transparency and responsibility in animal welfare, packaging material, Food miles, nutritional information and food waste (Rabobank, 2019). As a response, for example, supermarket chain Lidl stopped the sales of cigarettes.

Channel-specific approach- Increased number of purchases are performed online (Rabobank, 2019). Brick-and-mortar stores are visited for small purchases of immediate necessity. It can be observed that these brick-and-mortar stores are either small and located conveniently in city centres, the so-called 'to-go shops', or big and offering a full sensory experience with cooking demonstrations, wide assortment and interactive technology, such as the 'hyper stores'.

Information supply- In 2015, supermarket branch Coop created 'The supermarket of the Future' in Milano (Garfield, 2017). With an technology-driven approach, Coop aims to facilitate customers to make informed choices about what they eat. Consumers interact with huge displays to explore nutritional facts, origin, potential cross-contamination of allergens and the use of pesticides and fertilizers and other details of specific products. Prices are dynamic and influenced by supply and demand. Screens also show daily top-sellers and recipe inspiration.

Automatisation - Coop also launched a chatbot for assisting customers in their shopping (Accenture, n.d.). The chatbot, called ShoppY, is able to make purchase list, notify about discounts and provide product recommendations and recipes. In 2017, Albert Heijn launched a smart shopping list for online shopping. The list is pre-filled with an estimation of the person's needs, based on prior purchases. People can adjust this list to match their specific needs.

Shopping and (personalized) health - Chloé Rutzerveld, food futurist and designer, also expects brick-and-mortar stores to be integrated with pharmacies and health labs (Pol, 2019). She envisions that customers receive personalized advice based on stool samples that they deliver. Stuart Farrimond, writer about food science, expects to have scientifically-proven, personalized diet based on your genetic profile by 2028 (Farrimond, 2019). He also expects food to be modified to be more nutritious, healthy and sensory engaging. Rabobank research mentions that personalized nutrition will be a game-changer in the food industry (van den Berg, 2019).

Form and experience - On a food level, Chloé Rutzerveld envisions that people will daily consume supplement in the form of powder (Pol, 2019). Optionally, this powder can be integrated in a 3D printed snack, or the eating experience can be enhanced through a Virtual Reality.

Current interventions and impression supermarket

This section provides an impression of interventions currently deployed by supermarkets to promote healthy shopping behaviour. For this analysis the 4P's, presentation, price, promotion and product assortment, were explored. First generic interventions are shown, followed by supermarket-specific efforts.

Generic interventions

- Presentation: Maximize customer exposure to healthy foods e.g. by presenting vegetables at entrance and placing healthy products at eye height, make vegetables look visually attractive using lighting and green decorations. Foodboxes contain all the necessary products, also specific meal ingredients are assembled together. For example, the Dutch meal 'Hutspot', carrots, potatoes and a sausage are combined in the fridge, sometimes even accompanied with the recipe.
- Price: Products may be discounted (planned and also when the product almost expires), free food and samples are provided, customers can save for rewards and supermarkets may deploy the notification 'good deal' to inform the customer.
- Promotion & education: supermarkets provide recipes, online and in magazines, specific actions and use influential people to promote products.
- Product assortment: supermarkets offer a wide assortment of healthy foods, mention the amount of vegetables on the package.

At Jumbo

- Promotion& education – Jumbo established the 'Duurzame boodschappenroute', which is a route in the shop that makes it easier to find sustainable or healthy products (e.g. products with a special quality mark). Jumbo also sponsors a breakfast day for children in primary education. In 'De reis van 5' vegetables are placed in the spotlight, stimulating children in a playful way to create design compositions on their plate using healthy products.

Other supermarkets

- Promotion & education – AlbertHeijn provides personalised discounts based on prior purchase behaviour. Also, they provide the service 'Mijn voedingswaarde'.
- Personal ease – Predictive shopping lists are pre-composed and can be instructed by voice. AlbertHeijn pilots with automated payment, for example through face recognition.
- Product assortment –Supermarket Lidl excluded several unhealthy products from their assortment, such as cigarettes and energy drinks.

CARE INDUSTRY

Care market numbers

At the moment of writing, Dutch care costs amount to more than 97 milliard euro, and this number is increasing every year (Rabobank, n.d.). The costs are expected to rise nearly 3 percent each year, reaching 174 milliard euro in 2040 (Rijksinstituut voor Volksgezondheid en Milieu, 2018). Technology accounts for two third of these costs. Although, until now, technology has increased healthcare costs, it is also considered as a promising way to reduce costs. A new phenomena is that a special budget is allocated for prevention of diseases and promotion of healthy lifestyles.

Trends and transformations in the care market

The current Dutch health care system is disease-driven and unsustainable (Walg, 2014). Due to the ageing society, risk to unhealthy lifestyle and enhanced medical treatment the prevalence of multimorbidity increased (Rijksinstituut voor Volksgezondheid en Milieu, 2018). This puts pressure on the current care system, both the financial and human resources. The aim is to achieve optimal cost-quality (Tersago & Visnjic, 2011).

As a response, the healthcare landscape is transforming on several fronts (Walg, 2014). During the recent years, the definition of health changed from the absence of disease (World health Organisation, 2006), to the more holistic view of positive Health, which focuses on how people respond to physical, emotional and social challenges (Huber et al., 2011). This implies that healthcare is no longer restricted to diseased people. Health should be the combined responsibility of individuals and the collective. Individuals take responsibility for their health, and that of others, reducing the pressure on care (Spanakis et al., 2016). Self- management and pro-active participation should play a central role in all life stages. Like shown in Philips Health continuum, the aim is to streamline people's complete health journey through connected care and health information, which ideally prevents diseases from developing (Philips, 2018). Also the government sees value in a Preventive approach, and developed a national prevention program (Ministerie van VWS, 2018). The ambition is to integrate health in all policies (HiAP) and across all sectors to improve population health (Organization, 2014).

The increased focus on prevention, also impacts the way healthcare is structured, provided and received. Care provision will increasingly shift from the hospital to people's homes (Walg, 2014), including diagnostics with the emergence of self-tests (Royal HaskoningDHV, 2018). Only complex therapies will require hospitalization. The continuum of care is facilitated by access to data from the Personal Health Record, and the accessibility to health trackers and apps (Bonander & Gates, 2010). Additionally, this data is used to personalize and tailor the care provision to individual needs). The broadened insights about one's health stimulates personalization of care. This also implies that more collaboration between care providers is required to provide personalized, holistic care (Royal HaskoningDHV, 2018).

Royal HaskoningDHV (2018) describes a three-step process to care transformations. First, knowledge should be made transparent and shared. The accessibility and transparency in health data provides the opportunity to assess the value that the care provision creates. The second step is to transform care to be value-based, implying that care activities are financially rewarded for the value it provides instead of rewarding the quantity of delivered care. Value-based healthcare improves the quality of the care. Care activities that are tailored to the person will subsequently provide more value. In step three, the care receiver should have a fully central place in the care system.

| Appendix D
Competition and
influential work

This section explores the current competition that Jumbo as super-market faces. From this it can be derived how Jumbo differentiates themselves. Additionally, it described several influential projects in the domain of nutrition and health. These projects may eventually grow into potential partners or competitors.

COMPETITIVE LANDSCAPE

Competition is analysed by distinguishing four lenses, being the product form, product category, generic and budget.

Product form

This competition contains supermarkets that provide the same products and services, to the same customer and in the same format. In The Netherlands, approximately 30 supermarket brands exist. Supermarket Albert Heijn holds, with 971 shops, nearly 35 per cent of the market share in 2018 (Rabobank, 2019). Over the past years, this shows a decrease. Albert Heijn seems to differentiate themselves through integrating the latest technologies, such as face recognition and speech control.

Additionally, Albert Heijn take a more active role in the health of their customers by informing them about the nutritional health of their purchases via the application 'Mijnvoedingswaarden' and helping them to find fitting recipes using FoodFirst network (see next section on influential work).

Albert Heijn is followed by the increasing market share of Jumbo. In 2018, Jumbo has 626 shops and 19 per cent market share. Jumbo did several take-overs and created new strategic alliances, broadening their market presence and assortment. With the introduction of the savings program JumboExtra's, Jumbo is able to collect similar data to the bonuscard of Albert Heijn.

Discounter Lidl comes at the third place with 11 per cent market share. In total, discount supermarkets have a market share of approximately 20 percent. Therefore, discounters become an important competitor for Albert Heijn and Jumbo.

Product Category

This competition comes from non-supermarkets that offer similar products and services, yet in different ways. Increasingly, non-supermarkets are selling food. Examples are department store Hema, which even offers fresh food , and shops like Kruidvat, Ethos and Action, which are selling primarily snacks and niche products for specific diets. Another competitor in this field in online supermarket Picnic.

Generic

This competition comes from differently-formatted services that provide the same value to customers. Webshops like Bol.com and Amazon may pose competition when they expand their assortment to food. Their strength is logistics. At the moment Bol.com offers alcoholic beverages already.

Budget

Budget competitors provide other food services that compete with the same dollar that a customer can spend. The increase in eating out, home-delivered meals and food boxes reduces the need for people to visit supermarkets for their purchases. As a response, supermarkets also offer food boxes.

INFLUENTIAL WORK

A market analysis on influential projects shows what has already been done in the field to explore trends. The projects listed here are a selection of the projects with the best fit to the project. A distinction is made in work related to the provision of nutritional information, health checks, personalized nutrition and interventions related to blood sugar control.

Nutritional information

Mijn voedingswaarden – insight in nutritional values of purchases at Albert Heijn

From 2018, Albert Heijn enables customers with a bonus card to view their purchases, and explore the healthiness and possible improvements. The application shows the quantity of sugar, fiber, salt, protein, saturated, calories and carbs that were purchased. For specific unhealthy items, the app proposes a healthier alternative from the same segment.

Nutriscore – Comparison of similar products regarding nutritional values

In 2019, The Netherlands introduced the Nutriscore. Each product is labelled with a traffic light, which shows whether the product is relatively (un)healthy compared to products from the same segment. It takes into account both positive and negative attributes of the product. This approach gained critique, as a product with a green light can be the least unhealthy choice, which cannot be compared to a real healthy choice. Additionally, the score shows the nutritional value per 100 grams, while the size of consumptions should be leading in making decision.

Applications like Eetmeter and Foodschiffer – insight in nutrients in products and consumed

Scanning products to see the nutritional values, including micronutrients, and track consumption. The Foodschiffer application provides the opportunity to create an individual profile to search fitting products. The profile takes into account allergens, intolerances, specific nutrients and preferences.

Health checks

Self-tests and point-of-care tests

(online) stores offer self-tests for amongst others cholesterol, to measure ketosis and glucose levels.

DA health-check – in-store health check

(<https://www.da.nl/informatie-over/gezondheidscheck>)

Pharmacy DA provides five health checks in their shops. The tests are: cholesterol, blood pressure, skin quality, stress and body composition. For the cholesterol test, an employee performs a small finger prick. The tests cost three to five euro and results are communicated immediately. If possible, product recommendations are provided. If results fall outside the reference value, the person is advised to see the general practitioner.

Nationale Nederlanden health check – health check provided by insurance company (<https://www.nn.nl/Particulier/Zorgverzekering/Services/Gezondheidscheck.htm>)

Insurance company Nationale Nederlanden (NN) provides customers with a FIT-subscription a free health check to assess general health via a questionnaire and self-tests for cholesterol and blood sugar. People receive the health outcomes and are proposed lifestyle advices and programs.

Precision nutrition

Work in the field of precision nutrition has been clustered in work done abroad, and players in the Netherlands.

Abroad

Baze – personalized supplement pills

(<https://www.baze.com/>)

Baze offers clients personalized supplements (trial phase). With a self-test kit, users draw a blood sample and send it to a laboratory to assess their nutrients. Based on the outcomes, clients receive tailored supplements for daily intake via a monthly subscription. In this service the following nutrients are tested: Choline, Chromium, Copper, Magnesium, Omega-3, Selenium, Vitamin B12, Vitamin D, Vitamin E and Zinc. The supplement may for example contain turmeric and elderberry. Baze advises their clients to do a new test every three months to adjust the supplement composition to the client's latest needs. Via a platform, clients can track their health outcomes. Baze charges 100 \$ for a nutrient test, and 15\$ monthly for supplements.

Habit – personalized nutrition plan

(<https://habit.com/>)

Habit offers clients a personalized nutrition plan, containing food guides and personalized recipes. Clients are asked to answer some questions about their health and self-report laboratory result on cholesterol measurements. Additionally, the application can take into account Fitbit data on lifestyle. Habit integrates Amazon Fresh to facilitate clients in doing easy and healthy groceries. A yearly subscription costs \$49.

OME Health – 12-week nutritional coaching program

(<https://ome.health/>)

OME Health provides precision nutrition for the purposes of weight loss, heart health, be more energetic and to get fit. For each of these purposes, a coaching program offers nutrition support, lifestyle coaching, also regarding sleep and activity, meal plans and health tracking based on specific measurements and personal goals. These measurements may include blood tests (cholesterol, iron, vitamins D, B9, B12), gut microbiome tests, DNA test and blood pressure measurements. These are collected through faecal, saliva and blood samples. The health check ranges has costs over 100 pond. Additionally, participants are charged a monthly subscription of 10 pond.

Nestle – personalized fortified food capsules

(<https://www.nestle.com/>)

Since 2018, Japanese participants in the Nestle Wellness program receive capsules to make teas, smoothies and snacks. These capsules are fortified to match the client's personal nutritional needs using AI. These personal needs are assessed using a blood and DNA test, that is sent to the participant's home and analyzed by diagnostic companies. Based on the outcomes, the participants receive personal advice in diet, lifestyle and supplement intake. Participation costs 600\$ yearly.

Thrive&VitaMojo – personalized meals based on health

(<https://www.vitamajo.com/#/index?order-now>, <https://thriva.co/>, <https://www.dnafit.com/>)

Thrive is a UK-based lab that allows clients to do a finger-prick lab test at their home, send it in, and receive personal diet advice. VitaMojo is offers meal-delivery of meals that can be fully personalized. Clients can choose their ingredients and quantities to create meals that fit their personal needs and ambition. Thrive collaborates with VitaMojo to offer personalized meals based on the nutritional needs of the client. Besides vitamin assessment, VitaMojo also collaborates with DNAfit. DNAfit offers kits to assess topics such as salt sensitivity, lactose tolerance, carbohydrate sensitivity and caffeine response, besides nutrition. DNAfit test range from 149 pond to 200 pond.

DNA nudge- DNA based grocery advice on bracelet

(<https://www.dnanudge.com>)

November 5, 2019 DNA nudge launched a London-Based store to nudge people into healthy eating based on their DNA. Consumers are asked to send some saliva. The firm distracts DNA from this sample using a their patented device. This DNA profile, with information about diseases such as diabetes, is loaded onto a bracelet, which provides tailored advice to the user during groceries. A user can scan a barcode with the bracelet. Via colour feedback, the bracelet shows whether the scanned product is a good fit with their DNA profile. The bracelet also provides general health advices, for example by alerting the user during prolonged sedentary behaviour.

In the Netherlands

Nutriprofiel – nutrition advice for (non-) patients

(<https://nutriprofiel.nl/>)

In collaboration with Wageningen University, a few hospitals in The Netherlands offer patients personalized diet recommendations. The recommendations are based on a laboratory diagnoses of vitamins in their blood and a questionnaire. Additionally, care providers receive insight into the nutritional status and may decide to take actions on this. The test assesses folic acid and vitamin B6, B12 and D. The test and diet advice are also available for non-patients, under the condition that they have to pay and visit a specified laboratory. For non-patients, the test costs 89 euro.

Test-thuis – self-prick send to lab and health advice

(<https://www.test-thuis.nl/>)

In 2019, Test-thuis, a Dutch company, was the first to commercialize a vitamin self-test kits in collaboration with a laboratory Brightlabs in Venlo. They offer three tests to measure vitamin D, total energy and total health. A person draws blood at home via a finger rick, and sends this to the specific laboratory for analysis. The total health kit measures Vitamin D, Magnesium, Iron and Co-Enzyme Q10. The total health kit is expanded with tests on Vitamin A and E, Sodium, Potassium, Calcium, Zinc, Copper and Selenium. The tests cost 39,95 euro, 99,95 euro and 159,00 euro respectively, excluding shipping costs.

4Gold – DNA-test and sport supplements

(<https://www.4gold.be/nl/4gold-dna-analyse/>)

Cyclo-cross athlete Mathieu van der Poel provides with firm '4Gold' DNA-tests for athletes and produces tailored food supplements in the shape of sport drinks based on the DNA-test outcomes. He mentions that DNA holds the key to optimize sport performance (van Lakerveld, 2020). The

DNA test utilizes saliva and may take some week for analysis. Costs range between 220 euro and 300 euro.

Mijnlabtest – DNA tests and lab tests

(<http://mijnlabtest.nl/>)

MijnLabTest provides three DNA tests to empower people in their health.. The tests are based on self-collection of saliva. After a few weeks the DNA tests outcomes are available. DNA-test suggest to measure 1) how the body responds to food (such as carbohydrates and fats) 2) your individual needs in certain nutrients 3) your eat behaviour (e.g. response to sweets and how quickly do you feel satisfied?) 4) your metabolism (e.g. to alcohol, caffeine and lactose) 5) sports (e.g. response to endurance or high-intensity sports, risk of injuries) 6) lifestyle (sleep quality, risk to addiction to certain food) 7) cardiovascular health (e.g. cholesterol) and 8) skin quality. Based on the outcomes advices are provided in lifestyle and nutrition.

Clear – exploratory program for personal blood glucose response to optimize diet

(<https://www.theclearhealthprogram.com/>)

The Dutch tech start-up 'Clear' provides a program to explore your personal blood glucose responses to food. During a three-week program people experiment with diet and other lifestyle changes while wearing a chip implant that continuously measures blood glucose. This feedback loop empowers people to optimize their meals through small adjustments. After this exploration, clients receive nutritional advice mentioning meals that work well and less well for you. The costs of the program are 200 euro, which are distributed over the sensor (~ 60 euro), algorithm and analysis (~40 euro) and personal support.

IMEC - smart toilet and diet advice

(<https://www.imec-int.com/nl/the-netherlands/smart-toilet>)

IMEC displayed a speculative toilet design for personalized diet advice during festival Lowlands in 2019. While using the toilet, it measures heartbeat, blood pressure and assesses the urine on fluid balance. Subsequently, the user receives a tailored menu. For example, users receive the recommendation to drink more, or to select a dish high in fibers.

DNA-foodbox – Tailored food box based on DNA

(<https://dnafoodbox.com/>)

In collaboration between Bilder & De Clercq, Omnigen en DNAisyou, a food box is announced to be tailored to ones DNA. However, since the announcement in 2018, the food box is still unavailable. The service performs DNA analysis on the saliva that a person submitted. Based on the result, the food box is composed to contain a perfect mix of macronutrients that fit the DNA, and promote health and weight loss. The DNA test costs 100 euro, and the food box costs 100 euro per week.

Chocobombs – a fortified chocolate for pregnant women

(<https://www.chocobombes.nl/>)

In collaboration with Maxima Medisch Centrum, fortified chocolates are developed that support pregnant women in their nutritional needs. For each trimester a fortified chocolate is developed. This is an example of group-based nutrition.

Blood glucose

Two types of interventions for blood glucose control were found. The first type is specifically designed for people with diabetes and aims to improve and reverse their blood sugar levels. The second type focusses on raising awareness in society and individuals and is therefore accessible to people with no diagnosis. The latter group aims to improve and prevent health problems.

For people with diabetes

Keeridabetes2om – lifestyle program to reverse diabetes type 2

(<https://keeridabetesom.nl/>)

‘Keeridabetes2om’ is a six month group-based intervention program aiming to improve and reverse elevated blood sugar levels in people with diabetes type 2. The program covers nutrition, exercise, sleep and relaxation. Besides five face-to-face sessions, participants are supervised and supported online by (medical) experts. The program costs €3850, and is paid for by insurance.

Changing health – lifestyle intervention program

(<https://www.changinghealth.com/>)

Insurance Menzis adopted the UK-based program Changing Health in 2019. The program combines AI and personal coaches to provide personalized support en masse.

‘Diabetesdoorbreken’ - Patient-to-patient platform

(www.jeellefstijlalsmedicijn.nl)

Patient-to-patient platform ‘Diabetesdoorbreken’ from ‘jeellefstijlalsmedicijn.nl’ is a lively Facebook groups in which patients and experts exchange advices and thoughts. Participation is free of charge. Insurance companies are considering to pay for each participant who successfully reversed diabetes via this platform.

Sugarvita - serious game based on personal data

<https://www.sugarvita.nl/het-spel-2/>

A serious game developed in collaboration between Eindhoven Technical University and hospital Maxima Medisch Centrum. Based on a simulator of personal blood glucose response, the game creates insight in how choices in nutrition, physical activity and medication influence blood glucose levels. These insights empower both the patient, and their environment.

FoodFirst Network – Recipe and lifestyle platform

(<https://landing.foodfirstnetwork.nl/>)

Albert Heijn bought this platform for lifestyle and nutrition advice and inspiration. For various health issues, such as diabetes, and cardiovascular disease, users receive healthy meal plans.

Applications for self-management

(<https://www.glucosebuddy.com/>, <https://mysugr.com/en/blog>)

Various applications, such as ‘glucosebuddy’, ‘mysugr’ and ‘dediamater’ enable people with diabetes to track their blood sugar levels, activity, and nutrition to find relationships.

‘Cook Back to our roots’ – cooking classes in which dishes from foreign cultures are placed in the spotlight

(<https://www.salto.nl/programma/cooking-back-to-our-roots/>)

Six videos that show how role models from different cultures cook national low-carb dishes.

Nationale Diabetes Challenge – national program to promote physical activity

(<https://www.nationale diabeteschallenge.nl/>)

For four to five months people with diabetes participate in a local walking group. The walking group makes a walk 3 times a week, and is also joined by care and sport professionals. The walks are organized by the Bas van de Goor Foundation, which initiates various sport events for people with diabetes.

For individuals and society

The national sugar challenge – national program to raise awareness about sugar consumption

(<https://www.diabetesfonds.nl/minder-suiker/suiker-challenge>)

This national program calls people to reduce their intake of added sugars for one month. Via daily advices, participants are informed and motivated.

Ketobox – Foodbox for low-carb meals

(<https://www.ekomenu.nl/mijn-persoonlijk-menu>)

Shop ‘Ekoplaza’ offers a weekly foodbox low in carbohydrates.

Low-carb assortment

Supermarkets offer a range of low-carb products, such as zucchini spaghetti and low-carb bread.

ANALYSIS OF ACTORS IN THE HEALTH MARKET RELATED TO NUTRITIONAL ADVICE AND HEALTH ASSESSMENT

The analysis below shows several parties that provide:1) generic, population-wide nutritional information, 2) professional care, 3) health wearables, 4) self-care blood tests, 5) in-shop health assessments and 6) Jumbo’s Foodcoach application. For each of these parties, a future outlook of the market is described. Moreover the scheme shows what the parties measure, teach and provide action possibilities for to their users. Also a price indication is given. The analysis revealed the opportunity to provide action-possibilities related to health data that is retrieved by other parties (see pink area). Possibly, Jumbo can collaborate with these parties. This is in line with Jumbo’s strength of influencing people’s food behaviour, while they miss the expertise, resources and experience of doing health tests.

MARKET		NUTRITION-HEALTH INTERVENTION				
PROVIDER		OUTLOOK	MEASURE What does it measure	TEACH What does it teach?	ACTION Action possibilities	(€)
General	E.g.  	Replaced by personalised approaches	Population research Statistics	Nutritional facts Guidelines, advices Campaigns	Financial incentives Accessibility Promotion	Free
	Care 	For prevention, decentralised (self) diagnosis and e-health	Blood tests (e.g. nutritions, cholesterol) Physical assessment (e.g. BMI, blood-pressure) And to lesser degree: stool, urine analysis, body-scans	Test results Advice	Prescribe therapy and/or medication	Insurance Diverse > 15
Wearable	 	Tech, accessibility and desire for health measurements	Physical activity Heart rate Calories Sleep	Monitored data, trends Advice	External motivation (score board, gamification)	~40 to 200
	self-test send to lab  	Tech, validation, accessibility and competition	Blood tests (nutrients, cholesterol etc.) DNA test (saliva) Microbiome (stool) Blood pressure	Test results Advice	Amongst others: - personalised supplements - shopping list recommendations - personalised meal	~ 100 to 350
	In-shop 	Uncertain Point-of care assessments grow, but less brick-and-mortar stores	Blood tests (cholesterol) Blood pressure Physical assessment (body composition, skin)	Advices, suggestions	Buy medication Refer to medical specialist	3 to 5
Foodcoach		Expansion to recreational athletes and public fitness	No experience No knowledge No contacts	Jumbo has some experience, contacts with dieticians and a channel	Foodcoach provides direct shopping opportunity and recipes	Free
		There are various opportunities to do health measurements. Jumbo is inexperienced in this, and has not the right expertise. The provided interventions provide limited opportunities to activate users. Only a few self-tests interventions provide integrated action opportunities. As Jumbo's core strengths are in daily operations of shopping, meal planning and delivery; I suggest that Jumbo focusses on providing action possibilities for performed health measurements (as shown by the purple area). This can be supported with some nutritional advice and recommendations.				

Appendix E

Customer profiles based on food purposes

This section provides additional explanation and support for the choice of the targetgroup that is introduced in Chapter 1 of the main thesis.

THE FOOD PURPOSE AND CHARACTERISTICS WHEEL

The thesis describes the food purposes that Jumbo has established, as well as my follow-up actions. Chapter 1 refers to a model that I created to capture the food intentions and characteristics of this group (see Image 1). For each target

group the wheel shows: 1) the size of the Dutch population that is part of this target group (numbers provided by Jumbo), 2) specific food qualities that are relevant for them to reach their goal, 3) currently available tools to reach their goal and 4) an overall estimation of the motivation to eat healthy. People with chronic lifestyle related diseases are expected to have high intrinsic motivation to change their diet compared to people who see food as filling and satisfying.

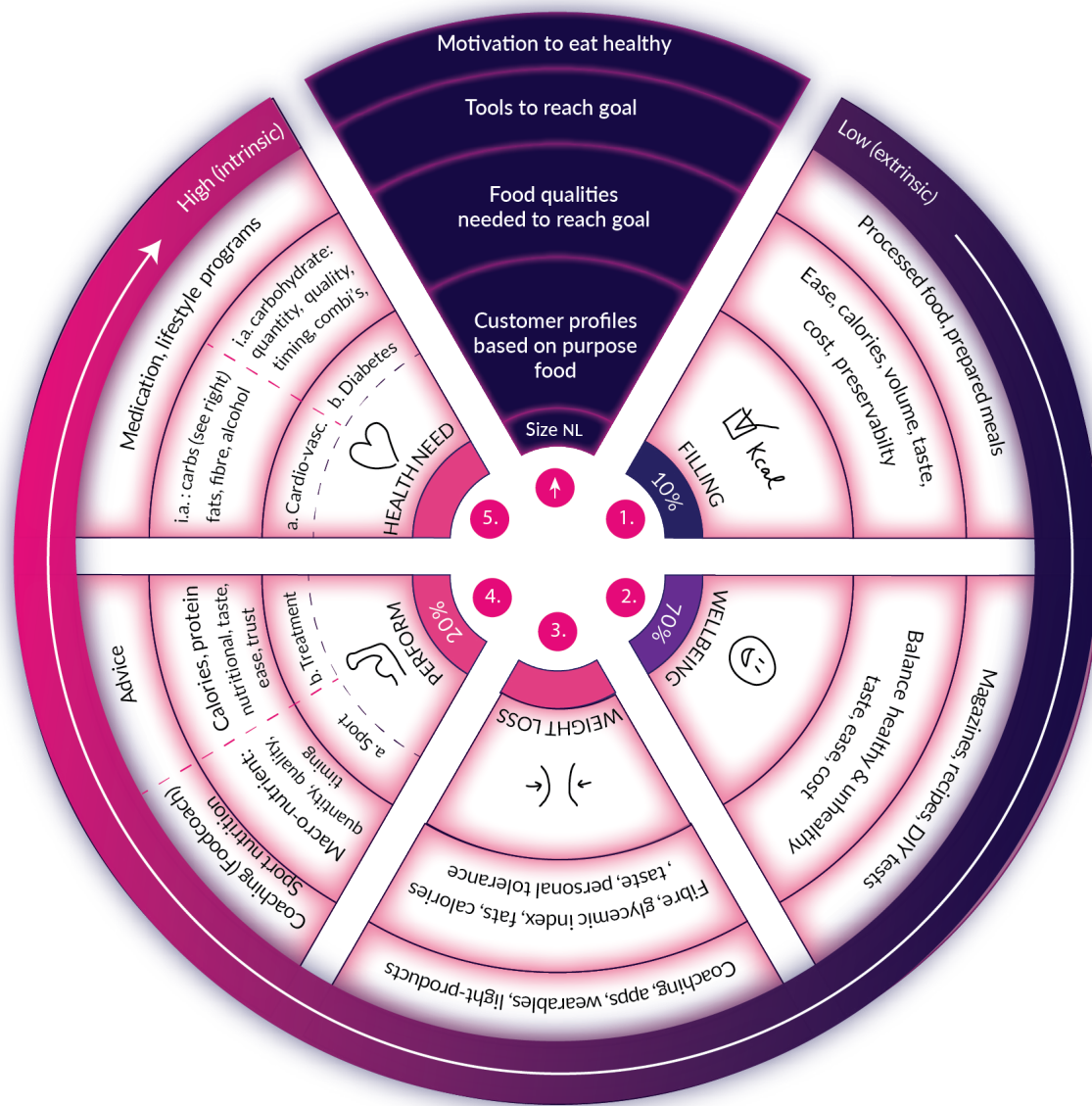


Image 1. A wheel displaying the five purposes food fulfils, a sub-specification of the purposes 'Perform' and 'Health need' and characteristics.

PERSONAS AND MATRIX

For each target group a persona was created and a possible service that may support this persona. These personas and scenarios are shown on the next pages.

Each persona has been mapped on a matrix based on information from the analysis. The x-axis of the matrix represents the role food has in achieving the goal of the persona (low/high). The y-axis represents the value Jumbo can add, for example by considering the degree of supportive facilities already available today (see Image 2).

This lead to the choice to focus on diabetes type 2. Some choices of this mapping are explained below:

- Feeling well (2), losing weight (3), performing well (4a and 4b) and feel better (5a) are scored relatively neutral on the x-axis, as they are impacted by various other lifestyle factors besides food. For example, sleep, physical activity and stress are determinants.
- For feeling well (2) and losing weight (3) various tools are already available, and therefore score lower on the value Jumbo can add.
- Jumbo Foodcoach already works on a service for athletes; therefore target group 4a can be excluded.
- Diabetes type 2 (5b) is preventable and often reversible by adequate nutrition (Hallberg et al., 2019). Diabetes type 2 is primarily influenced by Metabolic factors, being: 1) high fasting plasma glucose and to a lesser degree by high body mass (BMI) (Institute for Health Metrics and Evaluation, 2020). Both factors are closely connected to diet. Value Jumbo can add is in: 1) creating awareness of their blood sugar levels and 2) support people in using food as medication instead of treating and controlling symptoms using medication.

SUBTYPES AND MOTIVATION & SKILL

Chapter 1 describes that research created three subgroups in people with pre-diabetes (Hardie et al., 2015) and explains my choice for subgroup 3. Subtype 3 is mentioned to be 'ready' to change and benefit most from a nutritional strategy. Due to the poor diet habits, this target group is considered to score relatively low on skills (see Image 3). This means that they are receptive to, and may benefit from, support.

An addition to this is that diabetes has a higher prevalence in people from certain countries, such as Surinam and Turkey. These people may need support that matches their culture and food traditions. However, I decided not to specifically focus on these cultures as I expect many of them to do shopping at markets, discounters, and foreign supermarkets. Furthermore, I focus on the non-complicated users that have the possibilities to change. The reason for this is that research suggests that people may be unlikely to change due to their situational context, such as poor housing and limited budget (Barry et al., 2018). By creating successes in the aforementioned target group, these first-movers can act as role models for more complicated target groups.

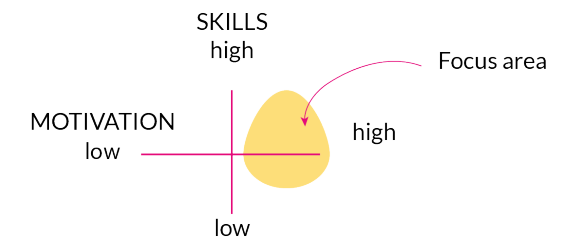


Image 3. An impression of the motivation and skills of the selected focus group.

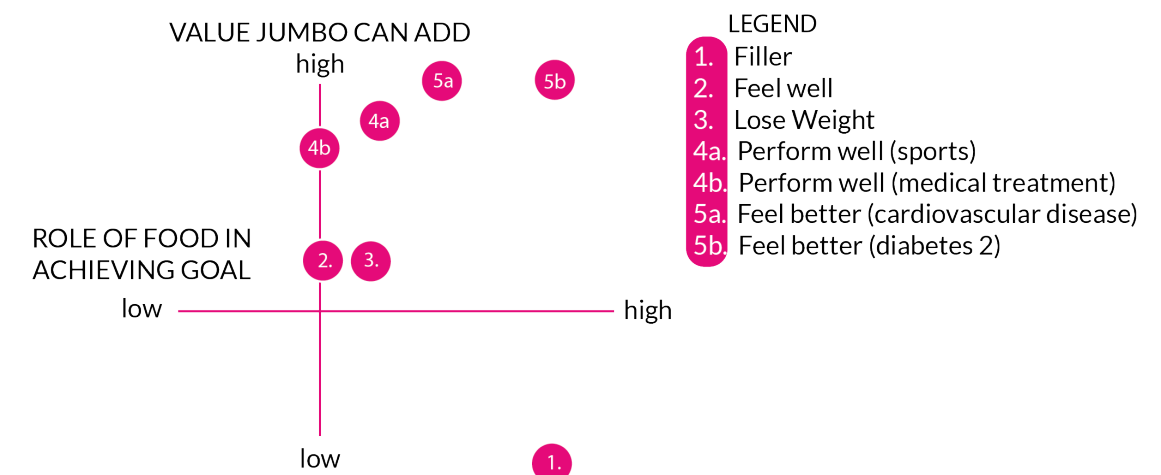


Image 2. The food purposes mapped on the matrix.

PERSONAS AND FUTURE SCENARIO'S

Food purpose: filling



GOAL
"I need quantity and energy"

MOTIVATION towards (healthy) eating
Stijn has no intrinsic motivation to eat healthy. He is driven by extrinsic factors such as ease, costs and enjoyability.

TOOLS to reach goal
Stijn does his shopping online, and picks them up when returning from work.

SKILLS to reach goal
Stijn has low skills in cooking. Therefore, he routinely stacks his house with processed, ready-to-eat food. Sometimes he also orders a pizza.

FOOD CHALLENGE
How can we provide Stijn food that 1) matches his energy demands, 2) is filling, 3) is enjoyable, 4) is convenient and 5) is economically attractive?

FOOD QUALITIES STIJN NEEDS TO CONSIDER TO ACHIEVE GOAL:
Ease, calories, degree it fills, preservability, economic attractiveness

STIJN VAN DEN BERG
Age: 25
Economic status: low

Rents a house in Rosmalen, lives on his own, often has friends over, works as a car mechanic.

Food purpose: wellbeing



GOAL
"I just want to feel well and have a balanced life"

MOTIVATION towards (healthy) eating
Sara finds healthiness only one aspect of eating. What she cooks also depends on product promotions, taste preferences of the family and the time and motivation she has to cook. She sometimes rewards herself with a snack.

TOOLS to reach goal
Sara sometimes asks her mother for advice. Also, she browses through recipes. While shopping, she sometimes looks at the nutritional values. Sara uses online shopping and home-delivery. She considers buying food-boxes.

SKILLS to reach goal
Sara knows about the general food guidelines. She learned to cook from her mother and uses many family recipes. Every day in the week stand for a certain meal category, like pasta. That creates structure.

FOOD CHALLENGE
How can we provide Sara with food that is 1) healthy, 2) enjoyable, 3) matches the desires of the household and 4) easy and 5) is economically attractive?

FOOD QUALITIES SARA NEEDS TO CONSIDER TO REACH HER GOAL:
Balance of healthy and unhealthy products, nutritional values, tastiness, convenience, economic attractiveness

SARA RUTJENS
Age: 42
Economic status: Middle

Lives in Geldrop with her husband, and two children (age 8 and 12). Works as teacher on a primary school.

FUTURE FOOD SCENARIO FOR STIJN

Design your meals: choose your ingredients, taste, shape and size. The product will be 3D printed for you



FUTURE FOOD SCENARIO FOR SARA

Discover what food fits each of you best; easily visible when doing the online shopping.



Food purpose: weight loss



JAN-PIETER DE RUIJ
Age: 49
Economic status: High

Lives in Scheveningen with his wife. Is chief officer of a tech-firm.

GOAL

"The last years I had a sedentary life with lots of stress. Now it's time to lose that excess weight"

MOTIVATION towards (healthy) eating

Jan-Pieter has intrinsic motivation to lose weight. He is not happy with his body image. His motivation fluctuates, and in times of stress he falls back in old habits. His wife supports his goal and takes care of purchasing healthy products.

TOOLS to reach goal

Jan-Pieter consults a lifestyle coach to monitor and discuss the progress. He purchased a fit-bit to track his activity. Jan-Pieter buys top-notch products, such as salmon, and follows the latest proven diets. He considers doing a DNA test to see this response to carbs and lipids.

SKILLS to reach goal

Jan-Pieter knows what caused him to gain weight, and how to reverse this with a healthy lifestyle. Yet, Jan-Pieter can not always withstand seduction and the feeling of hunger.

FOOD CHALLENGE

How can we provide Jan-Pieter with: 1) (healthy) food low in calories 2) appetite control 3) tasty food, 4) food that fits his DNA, 5) less seduction and 6) coaching?

FOOD QUALITIES JAN-PIETER NEEDS TO CONSIDER TO REACH HIS GOAL:
Fibre, (high), glycemic index (low), fats (healthy), calorie-density (low), tastiness, carb & lipid tolerance

Food purpose: performance (sports and health)



DAAN RAATJES
Age: 32
Economic status: Middle

Lives in Nijmegen, works as freelance journalist and is an enthusiasts biker.

GOAL

"I want to reach the top of the Mont Ventoux within 2 hours"

MOTIVATION towards (healthy) eating

Daan is ambitious and has a clear goal in mind. He is intrinsically motivated to adjust his lifestyle to reach his goal. From friends and family he receives full support.

TOOLS to reach goal

Daan consulted others to hear their experiences and tips. He browsed biking magazines. Also, Daan buys from the sport nutrition assortment.

SKILLS to reach goal

Daan knows how to train his biking, but has limited knowledge how food can improve his performance.

FOOD CHALLENGE

How can we provide Daan with: 1) the right food and 2) the right way of consumption (quantity and timing).

FOOD QUALITIES DAAN NEEDS TO CONSIDER TO REACH HIS GOAL:
Type of macro-nutrient, quantity of macro-nutrient, timing of consumption in relation to sport and goal.

FUTURE FOOD SCENARIO FOR JAN-PIETER

Get recommendations based on your physical activity and weight goal.





Annemijn Klaassen
Age: 62
Economic status: Low

Lives alone. Work in administration. Diagnosed with breast-cancer. On the planning: surgery and chemotherapy.

GOAL

"I want to be optimally prepared for my surgery and chemotherapy. I really want to do everything I can to survive."

MOTIVATION towards (healthy) eating

Annemijn developed intrinsic motivation to make dietary adjustments to support her health. Also, she wants to comply to the advices from medical specialists. Yet, her mind does not stand to researching how food can support her.

TOOLS to reach goal

Annemijn received some folders with dietary advice from her medical specialist.

SKILLS to reach goal

Annemijn has limited health literacy and does not know how she can best support her performance. She does not know how to interpret dietary information and integrate them in her diet.

FOOD CHALLENGE

How can we provide Annemijn with: 1) the right foods to support her treatment 2) an easy, understandable and accessible way to follow the recommendations, and 3) a supportive context.

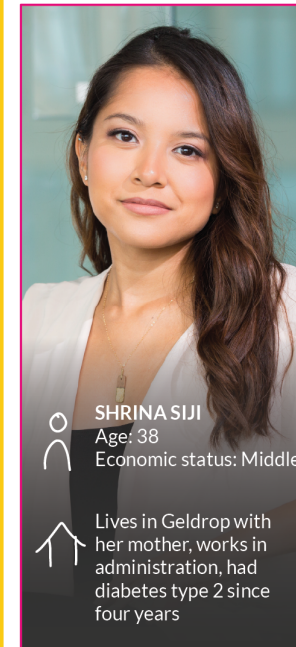
FOOD QUALITIES ANNEMIJN NEEDS TO CONSIDER TO REACH HER GOAL:
Surgery preparation and supporting chemotherapy: Calories (enough), protein (high), no deficiencies, ease, taste, and trust.

FUTURE FOOD SCENARIO FOR DAAN EN ANNEMIJN

Jumbo meals tailored to optimize your performance. Meals to support sport performance and to get people in perfect condition for hospital treatment.



Food purpose: health need (diabetes type 2 and cardiovascular disease)



SHRINA SIJI
Age: 38
Economic status: Middle

Lives in Geldrop with her mother, works in administration, had diabetes type 2 since four years

GOAL

"I want to reverse diabetes 2"



MOTIVATION towards (healthy) eating
Food has played an important cultural role in Shrina's family. She sees food as a socializing activity. Over the past years, she developed the intrinsic motivation to reverse her diabetes and stop medication.



TOOLS to reach goal
Shrina uses an application to count her carbohydrates. She considers following a 6-month program to reverse diabetes.



SKILLS to reach goal
Shrina developed basic understanding of how to control her diabetes with food. Yet, she does not know how to use food to reverse diabetes.



FOOD CHALLENGE
How can we provide Shrina with: 1) the right food to reverse diabetes, 2) foods that fit her culture, 3) advices on consumption (e.g. timing) and 4) 3) health literacy and control (to withstand seduction, make healthy decisions).

FOOD QUALITIES DSHRINA NEEDS TO CONSIDER TO REACH HER GOAL:

Carbohydrates: amount & quality (glycemic index (low), fibre (high)), right food combinations, right food timing, appetite control, taste, fit to culture



MAARTEN LOS
Age: 55
Economic status: Low

cardiovascular diseases in family, recently diagnosed with various non-optimal cardiac metrics;

GOAL

"My biggest nightmare: get a heart attack too."



MOTIVATION towards (healthy) eating
Maarten is intrinsically motivated by the fear for health problems. Yet, he looks up to change his dietary habits.



TOOLS to reach goal
Maarten received the reference to the website from the Hartstichting for dietary advice. Also, he is subscribed to take medicine and advised to quit smoking.



SKILLS to reach goal
Maarten does not know how food influences his cardiovascular health. He also does not know how to change his diet.



FOOD CHALLENGE
How can we provide Daan with: 1) the right food to support cardiac health 2) health literacy, 3) assistance in making dietary changes and grow his motivation?

FOOD QUALITIES MAARTEN NEEDS TO CONSIDER TO REACH HIS GOAL:

Blood sugar: carbohydrates: amount & , quality (glycemic index (low), fibre (high)), right food combinations, right food timing, appetite control
Blood Pressure: salt (less), licorice (low), alcohol (low), specific foods that lower blood pressure (e.g. chia seeds),
Cholesterol: fats (healthy), fibre(high),

| Appendix F

Fieldwork Tool to explore knowledge and attitude

FUTURE FOOD SCENARIO FOR SHRINA AND MAARTEN

Meal suggestions and personal discounts based on your health (metrics), such as stool, heart rate and blood sugar.



The tool shown in Image 4 was used to explore the knowledge of, and attitude towards, a low-carb diet. The tools was used by both people unfamiliar to the diet, and people who adopted a low-carb diet.

0. GETTING STARTED

1. ON A TYPICAL DAY, I EAT...

2. CHALLENGE: EAT LOW-CARBOHYDRATE

3. SOME LAST QUESTIONS

Hello!

Thank you for sharing insights about your consumption!

Filling in this template costs ~10 minutes. Your answers are fully anonymous. Please work from left to right. There are no good or bad answers.

Please introduce yourself

Age: _____

Gender: _____

Profession: _____

Do you follow a diet?

☐ Yes, namely: _____

☐ No

What do you consider when doing groceries?

Which foods do you consider as rich in carbohydrate?

What do you consider when buying and eating carbohydrate rich products?

EXAMPLE

WHAT?	WHY?
06	
07	2 slices bread, jam
08	1 milk
09	
10	1 Snicker

I like to start with something sweet.

is healthy

easy to carry & enjoy it

Please take a look at the example in the left corner.

On a typical day:

1A. When do you eat? Please circle on the timeline

1B. What do you eat? Please describe & how many portions?

1C. Why do you choose to eat this? Please describe why you choose to eat this product. Or in a meal, why did you pick these ingredients?

1A. WHAT?

1B. WHY?

06:00

07:00

08:00

09:00

10:00

11:00

12:00

13:00

14:00

15:00

16:00

17:00

18:00

19:00

20:00

21:00

22:00

23:00

24:00

You are instructed to to eat less carbohydrates. Please answer the questions below.

2A. I find eating low-carbohydrate (please circle): Really easy Easy I don't know Difficult Really difficult

Because:

2B. What would you eat when eating low-carb? & how many portions?

2C. Why do you choose to eat this? why did you choose these products and ingredients?

2D. What may hinder you eating this? Please describe these barriers

2E. What pains could you experience when eating this? Please describe the pains that you experience when you would eat this low-carb meal or snack.

2B. WHAT?

2C. WHY?

2D. BARRIERS

2E. PAINS

If research shows that eating less carbohydrates is healthy for you. Will you follow this advice? Please describe why or why not.

How would you describe the changes that you can make in your current diet to eat low-carb?

What do you dislike in low-carbohydrate meals?

If you eat low-carbohydrate, what are the top 3 difficulties that you will face?

1.

2.

3.

How could you be supported in eating low-carb?

THANK YOU! VERY MUCH :) v.p.mvanengen@student.tudelft.nl

Image 4. The tool used during a fieldwork activity.

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