A personal journey that makes care enjoyable and worth it.

Design as a **product care enabler**

Increasing consumers' motivation to care more of their products.

Sebastián Acevedo Olaya

Carely

Faculty of Industrial Design Engineering

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Preface

This document is the result of my graduation project, which I am happy to share with you. It contains the journey of a design proposition that intends to support sustainable consumption, which has been one of my drivers as a designer but also has triggered my actions and purpose at a personal level. I expect that the findings of our study and the final result can be of help to support or trigger other designers to get involved in the field and increase the scale of these strategies.

Along this journey I have the opportunity to work with an inspiring group of people, first my supervisory team, which triggered my intentions and fostered my process, expanding my knowledge and giving me different perspectives and opportunities to develop further my ideas. I would like to thank you Jan for the opportunity to work with you throughout this process, I sincerely appreciate our discussions and the time that you have given me to share valuable insights, I enjoyed the way in which the project evolved allowing me to see and learn how to conduct research and use the findings to design, but also our art conversations and the spare activities, it was really inspiring to me. Laura, I would like to thank you for your precise feedback, your guidance while structuring a research project like this one, but above all for sharing with me this field of research and willingness to use design as a means to extend the impact of care.

Thanks to those who participated in the research study, in the interviews and testing. Especially to the other part of inspiring people that worked by my side supporting my process. Thank you guys I really enjoyed the process with the special stories and fun facts we shared, I am happy to have you here and sharing this project and master with you. Daavid, Sandra, Andrea, Liz for all every coffee break, walk and conversation we had along this journey. To my family that has been always supporting me and allowing me to grow and learn, Lala and Guillo I love you guys I am quite proud of you and happy to share my process with you and receive your endless feedback support and joy.

In loving memory of Margarita Olaya, I will always thank you for giving me your unique love, inspiring memories, and beautiful smile. I know that you are as happy as I am right now.

Enjoy the read,

Sebastián Acevedo Olaya

Executive summary

The relevance of persuasion for product care

Aiming at increasing users' interest in sustainable consumption, different lines of research and initiatives ranging from frameworks for design to community-based approaches, have presented routes to support a transition from a linear economy to a circular economy. These models intend to extend the performance of products through its lifetime as a means to reduce the environmental drawbacks of excessive consumption. Product care focuses on the immediate actions consumers can conduct to maintain products in sound condition. Persuasive strategies and techniques can provide product care with an additional source of motivation drivers while engaging consumers with care activities.

The project

Current research in design for product care has addressed different strategies and possibilities while promoting care behaviour, which requires consumers to be active and willing to perform maintenance and repair regularly. These strategies and methods have been useful to explore the inner drivers of consumers and undercover influential factors that make people act in a certain way. Aiming at further exploring these relations between users and products, this project addresses the influence of cultural background on care, by focusing on human behaviour to design a persuasive system to make people care more.

The research

A cross-cultural study was conducted including three different countries, Austria, The Netherlands, and Colombia, aiming at exploring the influential drivers of care. The sample consisted of 160 participants from different backgrounds who took part in a set of questionnaires and interviews to identify the specific context of product care. The findings from the research study were used to design a persuasive strategy which includes a phased-implementation. Former research has addressed cultural differences in fields such as marketing and design, but since the studies are mainly focused on marketing strategies, this research extended the scope towards persuasive strategies to influence people to act upon care.

Psychology behavioural economics and design strategies

Different lines of research have studied human behaviour as a means to tailor propositions that are relevant to the target audience, and use the factors that influence the decision-making process, to present framed content which is aligned to the individuals' interest and mindset orientation models, while convincing patients to carry on scanning procedures, or consumers to buy offers that include products which were not needed at the beginning of the consideration phase. This relates to the cognitive interest that people have concerning certain activity, product, or topic, which if high can lead them to make conscious decisions and reduce the external influence while making a choice. Behavioural economics aims at understanding the reasoning behind consumers acts, which can be shaped by the context and former experiences. The intention an individual has when setting and attaining a particular goal has been a focus of research through the time, since people say they want to commit to a certain activity such as exercising, but their actual performance falls short to reach that goal.

Persuasion in design

Regarding research in design, the interaction between people and products has been addressed identifying factors that influence users' behaviour, such as product attachment and the actual interaction with products which can lead consumers' actions in multiple manners. Understanding the intention of our propositions can be of help while designing products, services, and spaces that can make people act accordingly. A guideline for tailoring a persuasive system to convince people to care more was designed in this project.

The persuasive strategy

This project resulted in a persuasive system composed of two elements which are as follows and APP and a website are presented, together with initial lines of a service proposition which can be the result of the phased-implementation strategy. The app and the website were designed following a set of guidelines resulting from the cross-cultural study, and the current literature in the overarching fields that set the foundation of this project. The persuasive system was tested in two different iterations with designers and experts from other areas. To devise the impact of this system, it is necessary to extend the intervention in the future by introducing the means presented in a formal setting to validate the long-term impact and how the intervention can be relevant to the users.

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INTRODUCTION

This chapter illustrates the context of the project, research goal, hypotheses, and background information to manifiest the relevance of product care. It provides an overview of the project's structure.

1

In this chapter

Product care is defined as the group of activities conducted by consumers **to prolong lifetime of products.**

Ackermann, (2018)

1.1 Project **Introduction**

Current consumption dynamics are having a negative impact on the environment, the accelerated use of resources is heading the world towards an untenable lifestyle. According to the Global Footprint Network, the consumption rate of renewable resources is almost doubling the capacity in which the Earth is able to regenerate them, this implies that by the year 2050 we will need three times the environmental resources the Earth provides to supply our needs.

The current focus on a linear economy in which a wasteful mindset prevails (make, use, and dispose), is detrimental to the environment increasing pollution, material demand and shortage of resources. According to Jackson (2011), because of population growth material consumption will increase by three billion in 2030. This will have an impact on the availability of resources, the number of products disposed, and the environmental problems resulting from unmanageable waste.

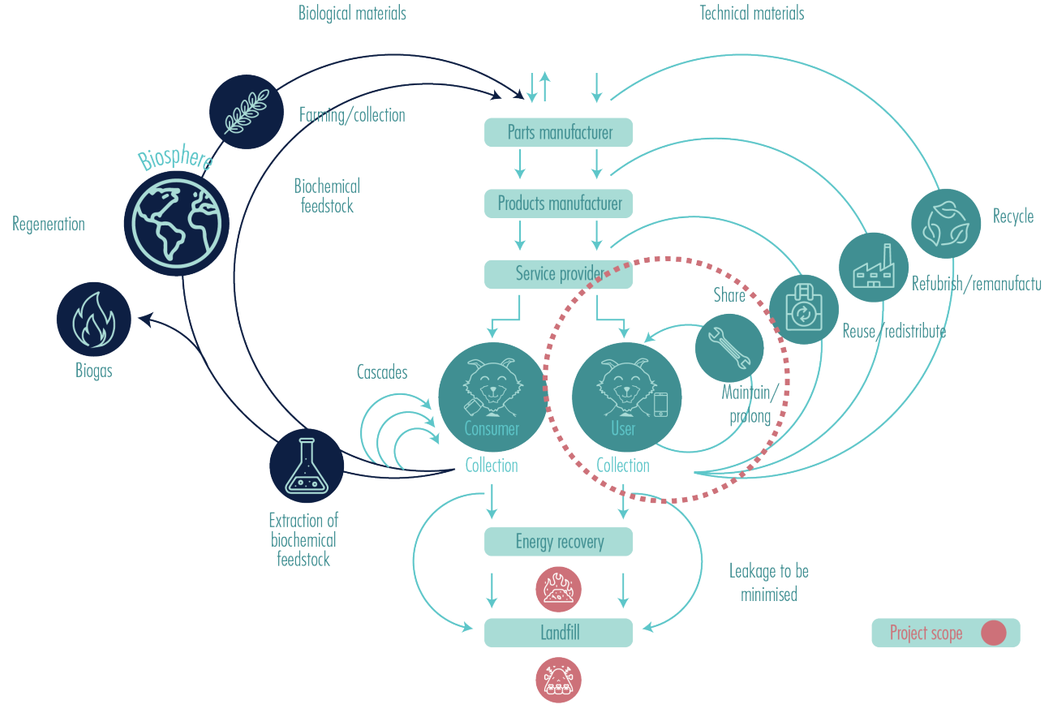
The Ellen MacArthur Foundation, stated in their Circular Economy report of 2013, that as a result of products' disposal large streams of material are burned or put on landfills, affecting multiple ecosystems which are being overloaded with waste. Replacement in early stages is reducing even more the lifespan of products, consumers are not completely aware of the long term impact this has on the environment, or the drawbacks for a circular economy that according to Jackson (2005), is a result of an inconspicuous consumption. Even though, consumers state that they are preoccupied about the impact of their behaviour, their acts do not match (are not in tune) their intentions to care (Darby, 2000; Holdsworth, 2003).

In addition, these current market dynamics are presenting models to the consumers in which old products are being rapidly discarded, and early replacement is seen as an upgrading process, disregarding its negative environmental impact. As reported by Bakker, Wang, Huisman & Den Hollander (2014), the lifetime of products has decreased considerably in recent years and counteracting strategies are required to find different was to use products as long as possible and recycle its parts in a way in which resources are used and reintegrated into the cycle.

As a result of this lifespan reduction in consumer goods such as electronics, and house appliances, consumers' mindset has changed its focus from owning a product that satisfies their needs, to owning an upgraded product which follows market trends and has the latest features and functionalities. As indicated by the German Federal Environment Agency (2016), as part of a consumers research study conducted, to assess the impact of obsolescence in product lifespan, in which, refrigerators, washing machines, and flat screens, were compared, findings show, that a third of the consumers in the sample, were motivated to replace their old appliance, based on a desire to get new functionalities, and primarily owning an upgraded appliance, regardless of whether their old machine still worked.

Sustainable consumption aims at building new strategies and routes towards having a regenerative economy in which products are reintegrated into cycles. Boulding (1966), presented this approach by comparing an open economy in which the production rate needs to be high to support the increasing consumption; With a closed economy that conversely aimed at having the resources circulating for the longest period of time decreasing the accelerated production rate.

The Ellen MacArthur Foundation, supports this sustainable behaviour by providing businesses with frameworks in which the traditional linear economy (make, use, and dispose), is replaced by a circular model which focuses on maintaining a continuous flow of technical and biological materials. The optimization of resources is essential to increase performance of products, components, and materials that are circulating through different cycles, in which these five practices are presented as routes to get the highest utility: recycle, refurbish/remanufacture, reuse/redistribute, and repair /maintenance. Unlike the other cycles, the inner circle, relates directly to the users without necessarily requiring a third party to perform the core action, which in this case refers to repair and maintenance, this circle is the most essential one since it can build awareness at early stages of the product lifetime and provides the products with an extended lifespan before considering moving on to the next cycle or disposing after a short span, because of this the inner circle should be consistently favoured, hence this project focuses on repair and maintenance.



Figure, 01. Ellen MacArthur Foundation. Routes of resources optimization-Butterfly diagram.

1.2 Design for **Sustainable Behaviour**

Sustainable design, sets its focus on the impact derived from environmental, economic and social practices along the product life cycle. According to Bhamra, Lilley & Tang (2011), Design for Sustainable Behaviour aims at reducing the environmental and social impact of the products, changing the user-product interaction to stimulate long-lasting practices.

Design can influence and support consumers to adopt more sustainable practices along everyday interactions with products. In line with Stanton & Baber (1989), "consumer behaviour is shaped by products as much as products are shaped by consumer behaviour." Increasing consumer awareness on their daily choices and the way in which they can be in control e.g. by reducing the impact of their consumption, taking care of the products they own, gaining knowledge and skills on ways to conduct tasks that can prevent product replacement and increase the interest in conducting care.

In order to have products circulating within these different loops as long as possible, understanding regarding consumption behaviour at a personal level needs to be increased to make consumers change their mindset, and start conducting care activities on a regular basis. Design for Sustainable Behaviour intends to revert the impact of consumeristic market models which are now being used and are leading consumers' decisions by presenting services or quality of the products as reasons to set aside our responsibility of taking care.

1.3 Product **Care**

Consistent with these emerging scopes, focused on promoting a sustainable consumption, research in design has been focusing on the relationship between users and products, which can be used as a means to increase interest and motivation in conducting activities that prolong the product life cycle. Design research has presented different principles as possibilities to create a strong bond between consumers and products ranging from, creating an emotional bond, improving functional benefits, and durability of goods, increasing the possibility of products' upgradeability, and promoting a caring behaviour by performing repair and maintenance tasks. In the following chapter these principles are explained.

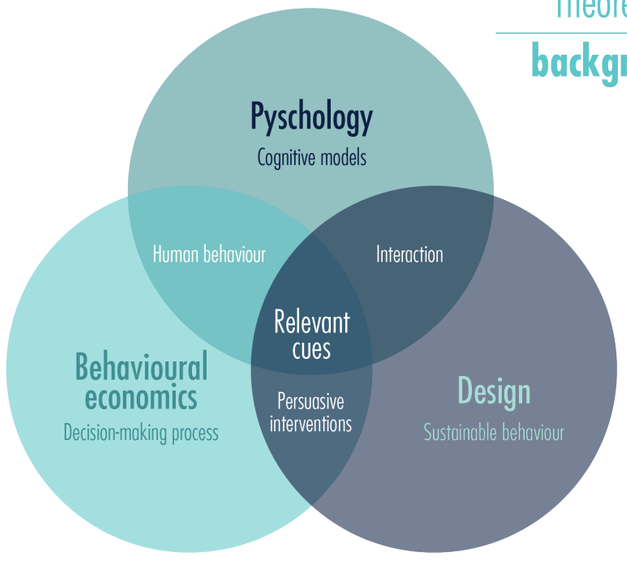
In line with this intention to promote an active role among consumers and increasing awareness, product care is illustrated by Ackermann, Mugge & Schoormans (2017), as every single activity a user can carry on to prolong lifetime of products. Which differs from the models mentioned above in the way in which an active role from the users is required and the degree in which lifetime of products is extended lies with the user. The purpose of this project is to provide support to this research by conducting studies to have an extended look at the essential drivers that motivate consumers to act.

In addition, it is important to emphasise that product care needs to be understood as a commutual relationship between the stakeholders of the circular model, in which both parties, companies and consumers need to take responsibility for acting upon improving products' lifetime by conducting repair and maintenance. It is necessary to take a step out from current consumption models which make us take unmindful decisions, while considering using a product as long as possible, counter to replacing it at early stages. In place of forming a care criterion that can guide our decisions, self-reflection is required, this project aims at showing you different routes towards including care activities in your daily basis, but more importantly portraying the value of conducting good care in a prospective manner which supports/builds a sustainable behaviour.

Once you get an idea of the way in which care can have an impact on your life and the influence/weight of small actions in the bigger picture, it is up to you to take the chance to form a mindful care. The intention is not to promote a challenge that will change your care behaviour overnight, but to make you aware of the relevance of care which if included in your current routine, can be worthwhile both on a personal level, and on a social level. Care can be easily conducted in parallel to your current activities and it does not require a great effort from you, just conducting quick care tasks your interest can increase.

This project has its foundation on current research in product care that is being conducted by Laura Ackermann as part of her PhD Ackermann (2018), which investigates different strategies to improve consumers' interest in conducting repair and maintenance. Aiming at undercovering additional factors which work as drivers for people to bridge the gap between having the intention; to conduct an action, the project investigates care behaviour taking into account cultural and individual factors.

Theoretical **background**



Figure, 02. The theoretical background that forms the basis of the project.

1.4 Main research question **and hypotheses**

Project care scope

This research project aims at increasing the involvement of consumers from different cultures in product care activities by working on motivation. Understanding the way in which designing with cultural relevance can provide product care with an additional route to change consumer behaviour, including tailored propositions which are relevant to certain group of users (Bakker, et al., 2014).

Repair and maintenance are the activities selected from which the project can work on involvement, by using motivation and ability as factors to promote a behavioral change that aims at extending the product life cycle, and making consumers aware of their actions. In addition, the project will take into account the four involvement factors for product care presented below to identify the way in which persuasion can be strengthened allowing for different user-related perspectives which weigh differently depending on the individual and therefore are expected to have different possibilities.

Involvement factors

This research study, takes into account the persuasion structure shown in the figure below as a route to design relevant solutions that support consumers along the entire care journey. (Fig. 03 . Ways to work on motivation) The factors that can increase motivation to carry on care tasks are as follows, social value, economic value, functionality and personal value that is referred to a personal interest of the user in taking part in sustainable initiatives.

Project goal

> The goal of this project is to design a persuasive system that helps consumers increase motivation to care more. The aim of this study is to see whether motivation, ability and involvement have an effect on persuading consumers to care more.

In addition, this project aims at proposing a route towards introducing product care in daily activities which can be used by designers and companies to embed a sustainable behaviour in the future.

Project hypotheses

In order to understand the effects of motivation, ability, and involvement factors the following hypotheses are presented:

> How can we design a persuasive system that encourages people to carry on more repair and maintenance?

The following Sub Hypotheses are drawn in order to understand the applicability of such a system in multiple scenarios.

> Can this system, be proposed using a standardized design to be embedded in different countries?

Considering that, conducting product care should be a relevant task worldwide, this project wants to develop a system that works in different contexts, nevertheless, users' preferences vary and we cannot disregard the fact that people are different. Thus, this project will use Hofstede's cultural dimensions to adjust/ the design to users from different countries.

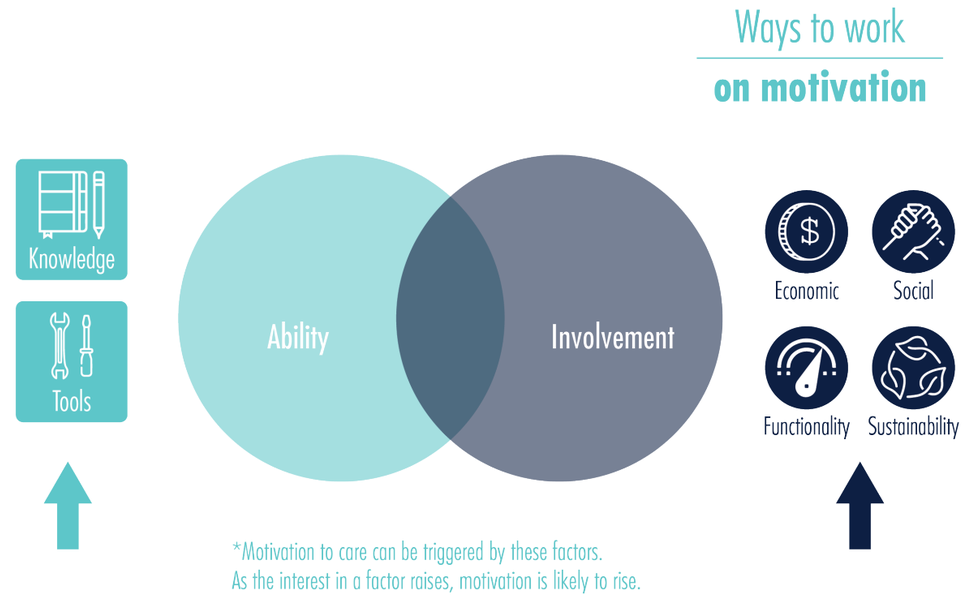
> How can cultural dimensions, be used as a means to adjust the design to match consumers interests?

> How can the design provide different routes to satisfy individual preferences regarding care activities?

We want to identify the degree to which the persuasive system needs to be designed based on each culture, aiming at finding the preferred manner to address users' drivers, controlling for individual and socio-economic factors that can have an influence on consumers' behaviour. Intending to determine whether to work on different tools pertaining to each country or an unified system.

The following sub-hypotheses are drawn in order to understand the relations between culture and product care; and design and persuasiveness.

> Long-term and short-term focus orientation, determine the degree to which users are committed to conducting product care. Short-term can be more engaging since achieving near goals is seen as immediate benefit, whereas long-term is seen as distant rewards.



Figure, 03. Ways to work on persuasion

1.5 Project **overview**

Project overview

The project uses cultural relevance to identify a set of motivation factors which can be used to support product care. The study aims at identifying the prefered route to tailor a persuasive tool to support a caring actions.

The study is divided in five stages (triple diamond creative facilitation), navigate, recognize, devise, tailor, and uphold which are connected to each other and function as an iterative process to define the best fashion in which design can be used to motivate consumers to care more.

In the first stage, an overview of the psychological models, behavioural economic theories, cultural dimensions, and design strategies that are currently used in practice is provided. The theoretical background undercovered the gap between these different disciplines as a means to define a problem statement.

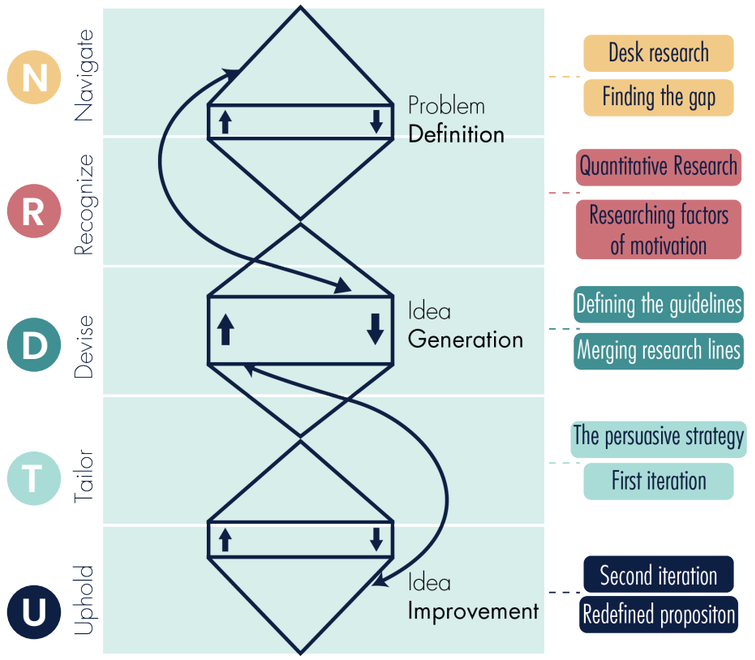
The second stage, presents the research conducted along the process. A cross-cultural study is carried out in three different countries to understand the way in which consumers are influenced by their cultural models. Subsequently, different relations between theoretical models and design strategies is mapped to understand the best manner to structure the persuasive intervention.

The third stage, elaborates on the persuasive process from a design perspective understanding the requirements that a design intervention should address in order to work have a greater impact on consumers motivation.

The fourth stage, proposes a design strategy to make people care more which is created based on the research insights and users informal iterations along the process.

The fifth stage, presents the iteration process in which the design solution was tested and improved after receiving feedback from users and analysing the interaction process users had with the proposition. Further improvements are addressed as part of the continued persuasive process users will need to have in future horizons.

The project's **framework**



Figure, 04. The framework of the project. Triple Diamond.

Reading **guidelines**

The following are the recommendations to read this report. it is composed of ten chapters, which have introduction, main body and conclusions.

Key sentences are highlighted in three colors, red is used to show takeaways through the process, blue is used for relevant elements within the chapters, such as statements, and goals last, in yellow are shown the sections in the chapters.

Takeaways

Statements, and goals

Sections A

THEORETICAL BACKGROUND

This chapter, provides an overview of the current strategies, frameworks, and research areas which have an impact on product care, aiming at attaining a behavioural change. The first section, sets the foundation of this project, drawing from psychological models, behavioural concepts, and design strategies. The second sections, explains the cross-cultural dimensions which are used to research the behavioral differences in three countries.

2

In this chapter

It is used to provide the project with an intervention route, based on the missing links between current interventions, and frameworks.

Over the years, multiple relations have been identified with regard to the influence of psychological theory, the product-user interaction, and cultural relevance on consumer behaviour. However, these relations have been focusing on the way persuasion can be used as part of marketing strategies to guide consumers' decision making process while considering to buy a product or service in multiple scenarios. Other areas of study such as, design for product care and design for sustainable behaviour, have merged psychology with design research aiming at creating a framework specific for designers to work on solutions which take into account the environmental impact of the products that are put into the market.

This chapter has several theoretical models which use terms and abbreviations along the text which are stated herewith to make the concept clear to the readers clear.
- Elaboration Likelihood Model ELM

2.1 Elements that drive **the persuasive process**

Aiming at understanding the decision making process of users, the following models are presented as routes to identify the way in which a persuasive system (persuasive intervention) needs to consider different factors that have an impact on the way people consider taking part in a particular process. These models, paved the route towards embedding care activities along the customer journey, providing researchers and designers with a guideline towards attaining a behavioral change, in which dealing with conflicting behaviours that are part of the human nature is key. *This section provides the project with a direction to structure a persuasive intervention drawing from practical examples in different areas which work as a proof of the applicability of these models.*

The persuasive factors

In order to propose a better fashion in which design can be used to steer consumer behaviour towards acquiring a caring mindset, it is important to understand the way in which people make decisions when multiple options are presented, and how cognitive processes and context factors can either foster or bias the decision-making process. For this purpose, an overview of the decision-making process is presented including multiple factors that influence the effectiveness of a persuasive mean. This overview includes three sections, that explain the way in which the decision-making process is influenced, the first section, pertains to the psychological factors related to the process, the second section, presents the behavioural elements that drive consumers' acts, and finally, the third section, draws the persuasive interventions in design. Each element, model and method, is here explained in a consecutive order, aiming at connecting models between each other, and understanding the way in which different aspects influence consumers' actions.

The following section pertains to the psychological factors which are as follows: cognitive responses, cognitive dissonance, and the elaboration likelihood model.

Cognitive responses are used to identify variation in the process of attitude change (Greenwald 1986; Cialdini, Petty & Cacioppo, 1981). After presenting a persuasive communication to a recipient, attitude and thoughts resulting from a particular interaction are assessed in order to infer differences in issue-relevant thinking or also called elaboration. The way in which an individual assesses certain information, varies when they are closely related to the topic at hand, or the particular context in which the decision is taken, which can prompt a match between the individual and the proposition.

Cognitive dissonance

Refers to a situation in which an individual, experiences conflicting attitudes, ideas and behaviours towards a decision at hand. Festinger (1957) stated that, people have an inner drive to keep attitudes and behaviours in balance avoiding dissonance. When a difference between attitudes and behaviours appears, a need to stabilize the discomfort caused by the conflict arises.

When people are led by a desire to calm a craving such as snacking before lunch, they are likely to evaluate the decision in a convenient manner; knowing that taking a sweet snack everyday might bring health problems in the future, they tend to eliminate the negative impact of snacking by prioritizing the reward a sweet snack brings which can be immediate gratification. Aiming at reducing the impact of cognitive dissonances while assessing a care activity, designers should increase the relevance of the tasks to the users by presenting easy and simple options that can function as cues to nurture motivation along the care journey.

The purpose of designing persuasive means is to increase the elaboration recipients are likely to have while assessing a particular communication. This is called, the elaboration likelihood determines the amount of effort a recipient is willing to spend assessing a presented message, which can be either done thoughtfully or non-thoughtfully. Following the model is presented to understand how can design work on persuasion by increasing elaboration.

Models of persuasion in design (ELM.)

The Elaboration Likelihood Model (ELM.), was introduced by (Petty 1977; Petty & Cacioppo 1981, 1986) as a way to understand the manner in which attitudes change as a result of different psychological processes. It presents two routes by which attitudes can be changed, one demands an effortful elaboration of the information presented and the other one a non-thoughtful elaboration.

In order to understand the way in which consumers are persuaded by the given information, motivation and ability are introduced as the factors by which elaboration guides a persuasive process. When a person posses both motivation and ability to process information the ELM predicts that a thoughtful process will mediate persuasion. On the other hand, when a person lacks motivation or ability, a non-thoughtful elaboration will mediate the persuasive process since they are likely to rely on easily accessible information such as the ones resulting from inference and associative processes.

There are two main factors that influence motivation and ability, individual differences and situational influences. Individual differences are related to the need for cognition, knowledge regarding the task at hand, and gender among other factors. The need for cognition has been extensively used to address individual differences in persuasion (Cacioppo & Petty, 1982), since it measures the inherent motivation of an individual to enjoy thoughtful consideration of information. When individuals are low in need for cognition they tend to rely upon non-thoughtful persuasion processes which are commonly guided by general notions, that reduce the effort of the process by using easily accessible information. On the other hand, situational influences are related to the specific circumstances, as reported by Beach & Mitchell (1978), there are multiple factors that can influence the decision-making process which are as follows: irreversibility, significance, accountability, and time/money.

These factors need to be taken into account while developing a persuasive mean, since they influence differently consumers' motivation to conduct a particular task, therefore, it is key to increase the interest of individuals by relating the information to their personal context. In addition, the ability to elaborate can be negatively influenced by distraction according to Petty (1976), when an individual is distracted it is likely to follow a non-thoughtful process, hence the design proposition needs to provide a clear, engaging and simple route to the users, making information available at all times to support the involvement process and increase the

ability to elaborate.

When a new attitude or an attitude change results from a thoughtful process, the persistence through the time increases (Petty & Krosnick, 1995), making more stable changes which foster the habit formation. Thus, the intention of identifying the relevance of factors, products and activities to the consumers is key to use design as a means to increase elaboration by presenting a proposition that is highly relevant to the user and that trigger them to assess the design in a conscious manner or in other words to adopt a new attitude by elaborating on the arguments presented. (Balance between easy and difficult tasks)

The decision assessment process

The way in which people process and assess a persuasive mean is related to the heuristic-systematic model coined by Shelly Chaiken (2002), that states people are able to process information in two different routes, following a heuristic route or a systematic route. Systematic processing, entails accurate deliberation of the message at hand, it values source reliability, and message content what can increase the influence of the persuasion when verified. Whereas heuristic processing, aims at simplifying the decision-making process reducing the cognitive effort, it is based on former knowledge that is stored in the memory and it is recalled when a new decision needs to be made.

Heuristic processing, is one of the shortcuts individuals tend to follow while considering a decision at hand, it leads the individual to a fast decision as a result of a reduced mental workload that relies on knowledge derived from former experiences which allows the individual to shorten the cognitive process while addressing a related issue. It is more likely to be used when the issue at hand is not directly related to them and is not personally relevant which means they have low-involvement.

Systematic processing refers to a thorough consideration of a decision at stake, whereas heuristic processing refers to fast consideration route a person is likely to follow when low involvement in certain task is present. This relates back to the ELM, having systematic processing as a result of high elaboration and heuristic processing by cause of low elaboration. Relevance or consequences of the content presented to the users is capable of steering their consideration process, when highly relevant they are more likely to invest more time and effort in certain task.

On the other hand, external factors such as context and the cultural background can also influence the persuasive process (Kitayama, Park, Sevincer, Karasawa & Uskul, 2009). Given that culture can influence the way in which individuals perceive a persuasive mean, it can be used as a variable to guide the design process by providing behavioural cues to strengthen the match between the system and the target user. In addition, considering cultural characteristics of the individuals can also work as an engagement factor which increases the relevance to the user. Designing with cultural relevance will be presented later in this chapter.

The second section, presents the processes and strategies related to the behavioural elements that drive consumers' actions being the following: Behavioural economics, the intention gap, Fogg's behaviour model, motivation variables, and involvement.

B

The following branch of research, bridged the gap between psychology, and economics, it is relevant for the project since, it provides understanding on how the decision-making process can be used to structure a particular intervention, it is key to consider the different ways in which users can react to a persuasive cue, and the way in which those cues ignite certain feelings and actions.

Behavioural Economics

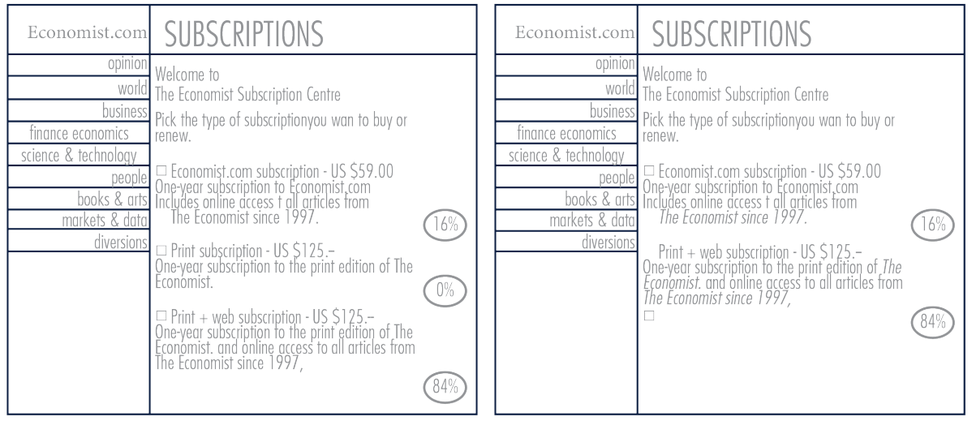
Kahneman & Tversky (1974), combined psychological theories and economic science introducing the prospect theory which explains how people decide in uncertain situations having a tendency to avoid risky situations over equivalent gains, what gave way to behavioural economics aiming at understanding the decision-making process that people and institutions experience under low certainty situations. Behavioural economics addresses the quality of the decision-making process and measures the impact of social, emotional, cultural and cognitive factors on economic decisions (Lin, Tom C, 2012).

It differs from traditional economics by taking into account the irrationality that is attached to people's' decisions as Ariely (2008) states, people are predictable and irrational in the sense that external factors such as, prices of products, free offers (the zero price effect), and special deals, among others, work as triggers to convince consumers to buy certain product or to act in a particular manner. Cues such as, comparisons between offers and prices, which present a bundled option compared to a single option, (introduced as a decoy to influence the decision) increase the likelihood to make people get additional features that they were not looking at the beginning. Ariely states that, the decision-making process is commonly led by a cost benefit analysis and the preferred route is commonly the one that has less resistance, meaning demands a minimum effort while assessing and taking the decision. Depending on the experience and knowledge with regard to the addressed topic, people are likely to have consider their decisions in amore coherent fashion, conversely, for those areas of life which are not familiar to the individuals their do not have good intuitions.

The following is an example of the example presented by Ariely, (2008), in his book Predictably Irrational, which proves that people are easily steered by information that functions as a behaviour decoy.

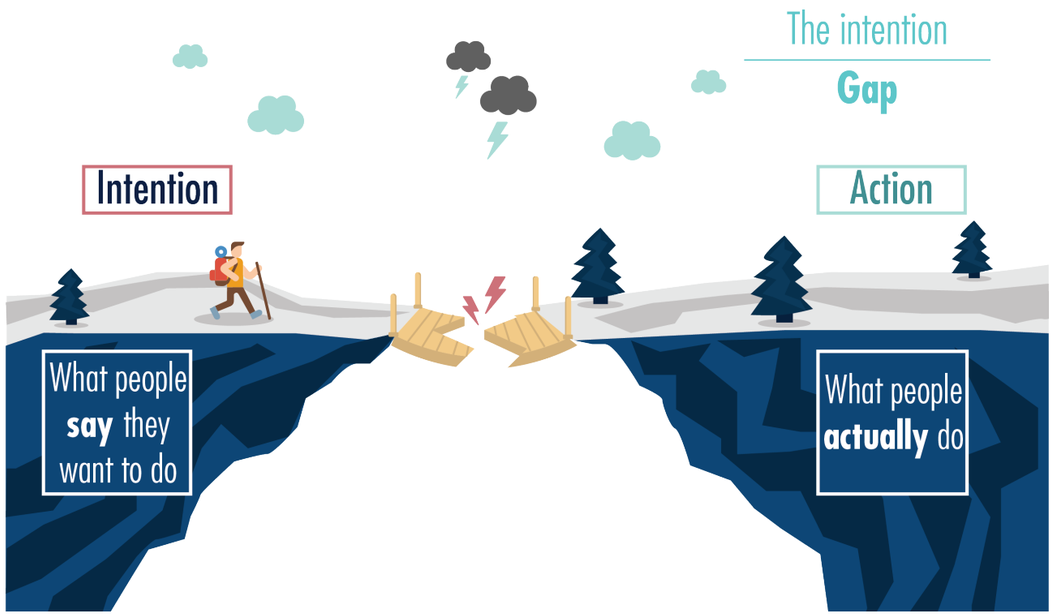
Dan Ariely

Predictably Irrational



Ariely, Dan. (2008). The Truth about Relativity. Predictably Irrational, Harper Collins.

Figure, 05. Ariely, Dan (2008) bundle offerings example. Adding a decoy.



Figure, 06. The intention gap

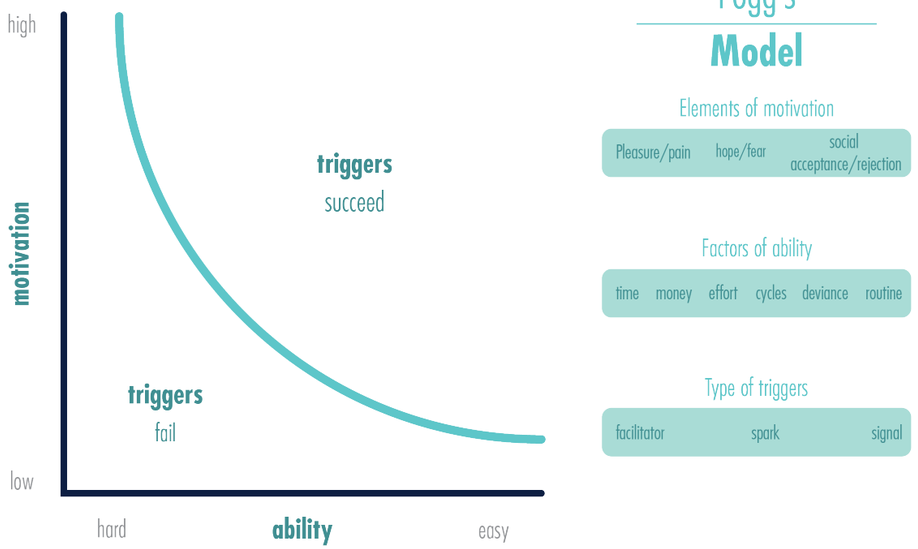
The intention gap

Sheeran, & Webb (2016), stated that the goal intentions, that people set in their lives, are part of self-instructions to attain a desired outcome, on the other hand, behaviour intentions, are those self-instructions, pertaining to carrying on certain actions required to achieve that outcome. The goals set, have an influence on the likelihood that the intentions to achieve those goals are performed. Mayor research on the effectiveness of these goals, has been conducted along the years, identifying different type of goals, which influence in a positive fashion the behaviour of people, and are more likely to foster its achievement. These goals can be more useful while persuading people to act, since they are based on, promotion-framed targets (Higgins, 1997), fostering autonomy (Ryan & Deci, 2000), extending learning (Elliot & Church, 1997), and last, concrete goals.

Baumeister & Bragh (2014), stated that, intentions formation is essential to attaining long-term goals, since this provides a clear route towards the goal. There are multiple factors that steer the formation of intentions, two of these have been identified as influential to foresee a behaviour, intentions in accordance with personal beliefs, regarding the results of the action (Sheeran & Orbell, 1999), and intentions founded on, the feelings that carrying on the behavior carries with it (Keer, Conner, Putte & Neijens,2014).

Intentions have been found as conflicting matter, Milkman, Rogers, & Bazerman, (2008), have identified discrepancy between, what individuals desire to do, and what they consider they should do. Even though, people are related to certain goal, and form the intention to achieve this goal, their actions are not consistent, and fall short to attain the behaviour, Taylor, Webb, and Sheeran (2014), found that these conflicts, lead people to find a reason to advocate a counterproductive behaviour, that weakens the intention, which relates back to the cognitive dissonances, in which an individual is more likely justify indulgence when considering conflicting decisions.

While aiming at persuading consumers to act upon product care, the following takeaways are presented as a means to strengthen the behaviour intentions, required to attaining actions to care. Positive goals, have been found by Zhang & Fischbach (2010), as effective means to engaging people while pursuing the set goals, they allow people to overcome issues along the process, and as a result, they contribute to increasing performance in a general manner. In addition, (GUIDELINE)research suggests, that behaviours which are easy to conduct, contribute positively when turning the intention into action (Sheeran, Trafimow, & Armitage, 2003).



Figure, 07. Fogg's Behaviour model

Fogg's Behaviour model

According to Fogg (2009), there are three key factors that need to be present at the same moment for an actual change to happen. Ability, motivation, and triggers are the components of an intervention that can lead consumers towards adopting or changing an intended behaviour. They provide a route for design to increase the involvement of consumers in a particular task while designing persuasive technologies. These three elements, motivation, ability and triggers, are introduced as consequent stages of a behavioural change its components are explained below. (visual behavior model)

Motivation is the driver that is capable of persuading a target behaviour. Sensation, anticipation and belonging are the three core motivators which can have either a positive or a negative influence on people's behaviour: pleasure/pain, hope/fear, acceptance/rejection.

Ability allows people to perform a target behaviour by giving them, knowledge or tools required to conduct the task at hand. Time, effort, and, brain cycles have an impact on people's ability, depending on the degree of difficulty of the given task, how demanding it is to get it done, and the way in which is presented; the behaviour can be more easily accepted by the target audience. Designers can work on ways to provide consumers the opportunity to extend their proficiency level by means of developing trainings, workshops and interactive materials; by finding better ways to provide user with the necessary tools to perform the task, or by finding ways to make the task relevant to them. (this can be related to the cultural differences between countries and the way in which they can influence ability)

Lastly, triggers or prompts are essential for the behaviour to happen they can lead people to perform harder behaviours by stimulating different events. According to Fogg (2009), it is necessary to assess the type of intervention one wants to promote in order to use the trigger that fits the particular condition. In order to do it, he presents three types of triggers which are as follows, facilitator aims at increasing ability, signal works as a reminder, and spark aims at increasing motivation.

Ackermann (2017), has developed an extension of the Fogg's behavior model to complement the way in which ability, motivation, and triggers, influence consumers interest in conducting product care. In the study, motivation was identified as an essential factor when designing for product care, which means that consumers should always have a reason for conducting product care and that designs should provide consumers with constant reminders, and cues to keep carrying on such activities.

Additionally, it presents slow design, as a principle that is capable of increasing the involvement of consumers, by presenting new values that are focused on sustainability. Grosse-Hering, Mason, Aliakseyeu & Bakker (2013), stated that Slow Design is a supportive practice that empowers customers to do things at the right time and the right speed in order to have a reflective space between the interaction and the task a product fulfils. It is introduced as part of the Slow movement in which wellbeing for individuals, society, and environment is promoted.

Drawing from the factors that have an influence on a behavioural change process, design cues that provoke actions, are required along the consumer journey in order to involve, engage and motivate consumers to conduct a care task. Design can be used to work on consumers' motivation, ability, and triggers, identifying the multiple touchpoints in which users' involvement decreases as a result of a missing factor (following the persuasive steps MODEL).

Takeaway

For this purpose, the persuasive capabilities attached to design propositions, need to be taken into account in order to identify the prefered route to increase the relevance of the design for the target users, namely, selecting the means by which the persuasive task will be introduced, and designing the elements that accompany the users along the persuasive journey such as, actions, motivation factors, cues, reinforcing messages, and so forth.

There are multiple factors that can have an influence on the decision-making process, the quality of the information, the availability, the concentration level an individual puts on a task, and the fit with the individuals' context. These factors determine the degree to which a behaviour can be successfully changed. Herewith, the factors which are influential to the persuasive mean are addressed.

Motivational variables

Extensive research in consumer behaviour (Khaniwale, 2015; Hawkins & Mothersbaugh, 2012) found that consumers are influenced by four actors; two of them are external which are as follows, cultural factors, social factors; and the other two are internal including, personal factors, and psychological factors. Being the main goal of this project, "motivate people to conduct more care tasks", the starting priority will set its focus on the internal factors which drive consumers behaviour, and within this category, on the psychological factor which is divided in four categories, motivation, perception, learning, beliefs and attitudes.

Motivation, refers to the level of interest an individual can have in certain behaviour, which in line with Maslow (1970), it is mostly influenced by basic needs, psychological needs, and self fulfillment needs. The intention of this project is to raise motivation by gradually increasing interest in conducting care, relating first the outcome of the target behaviour with the basic needs a user has and later on build upon psychological needs and self fulfillment to engage them along the care journey. Ryan & Deci (2000), identified two types of motivation: intrinsic motivation and extrinsic motivation, which are related to these factors one referring to an internal needs and the other to external needs.

Another influential factor is, learning since along the process users are likely to acquire knowledge and skills and this is the process in which a particular behaviour changes as a result of the experience which grows as them journey towards the target. Different variables such as, stimuli, cues, responses and reinforcement can influence learning, and here lies the impact of the interaction, designers tailor with their propositions. It can also foster the involvement process in care, by providing the users with opportunities to expand their ability.

Along the motivation process, involvement is seen as an overarching factor which can result from the factors presented above. Involvement has been used as a parameter to measure the degree in which an individual is willing to solve certain task following either an extensive process or a limited process (Petty & Cacioppo, 1981). Since, involvement is a motivator for the cognitive effort a person is willing to invest in carrying on a particular task, it serves here as a main driver to increase motivation of consumers in acquiring a sustainable behaviour.

As stated above motivation and learning, are the focus drivers for the intervention of this project, since they can strongly influence the way in which interest grows in a gradual manner, that can be effortlessly embedded into the current care journey.

2.2 Involvement as a **Care driver**

Involvement according to Bloch (1982); Costley (1988), involvement is conceived as a property of the relationship between a person and a product category. There are two kinds of involvement, situational involvement, and enduring involvement. Situational, is related to the temporal interest in a product category which raises from a specific circumstance. Enduring, refers to a long-term interest in a product category which becomes important to the consumers and that makes them attached to the whole category.

In order to use design to increase consumers' interest in care activities, it is crucial to increment the involvement of consumers with product categories that are related to them, to achieve this it is necessary to work on motivation from the scope of the following four factors, social value, economic value, functionality, and a personal value which is of personal interest for the user such as sustainability. Each factor influences differently consumers engagement in product care activities it is necessary to assess its influence separately to understand the way in which the design solution can guide consumers to adopt or change a specific behaviour.

The social value takes into account the cultural dynamics in which the individual takes part, the society itself has predetermined rules and models which make people act accordingly. When considering a new decision family, friends, and acquaintances have an influence on the user's motivation to conduct certain task.

Economic value refers to the financial investment the users do in order to carry on a particular activity. It refers to the different benefits tangible and intangible that come with a product or a service and it is measured based on units of a currency.

Functionality is the degree to which the object satisfies the user's expectation and basic need, it can be related to the product's performance and ability to conduct a task. Are the functional benefits that the product delivers to the customers.

Sustainability is related to a personal belief a person is willing to fulfill with the target behaviour, e.g. supporting circular alternatives which aim at closing the materials loops and reintegrating products after the end of life. This particular intention is rooted in external factors such as, trends and new customs adhered to sustainability at a social level which influences the way individuals consider their actions, after being impelled by social prompts, the user develops a personal interest in enduring these actions.

C The third section presents, persuasive methods, strategies and models, concerning persuasive interventions in design, which are as follows: Design with Intent, and the Hooked model. Once the essential factors are identified, the way to persuade users to perform a certain action can be tailored. In order to achieve this, specific persuasive models for designing relevant interactions are presented below.

2.3 Persuasion in **Design**

Willing to influence consumers along the care journey, here the current interventions within design are presented to understand the way in which the theoretical background merges with design while tailoring persuasive means. In line with, Lockton (2009) designers naturally influence consumers' actions while endowing products with certain characteristics and features that make them act in a specific fashion. Considering this influence, is here essential to make these interactions relevant and fruitful, both for the design intervention (in this case attaining a target behaviour), and for the user, using the factors presented above to increase the relevance, and fit of the persuasive system with the target users.

Different persuasive models and techniques, have been implemented while addressing persuasion in design (Lockton, 2009; Eyal, 2014) one part of it is intended to provide routes for the intervention by using a variety of scenarios and principles to foster the ideation process; the other part is focused on creating a persuasive cycle to convince users to act according to what the designer prescribes, which takes into account the structure of the behaviour model presented above, to create relevant content and identify why, how, when and where it should be added along the persuasive journey.

Design with Intent

As part of their research approach in interaction design (Lockton, Harrison & Stanton, 2009,) created a persuasive toolkit which is part of a method that can be used to guide a design intervention that aims at influencing consumers' behaviour by controlling the way people use a set of products, services, interfaces, and the elements part of a particular environment. The method addresses different scopes and scenarios to explore several manners to persuade users, by categorizing the interactions in different lenses. By means of provoking questions and portraying examples of the principles at hand, the card set motivate designers to think of different relationships between possibilities of persuasion and areas of application to get inspired. Three types of behaviours related to the users' mindsets are presented: (pinballs, shortcuts, thoughtful) which function as a way to understand the type of interaction that is preferred depending on the user's profile. By taking into account different personas during the ideation phase, designers can identify the underlying drivers of a target behaviour along with the resources that are more relevant.

According to Lockton et al. (2009), the lenses presented in the method represent a field of research in which different techniques can serve to shape users' behaviour, the intention of the toolkit is to enrich the ideation phase by giving examples and strategies, that can be fruitful to structure a persuasion process

by means of design elements which can be present within different contexts, products and interactions. The method makes designers think of different manners in which certain interaction can lead users' actions.

The lenses are explained below:

Figure, 08. Design with intent. Architectural lens.

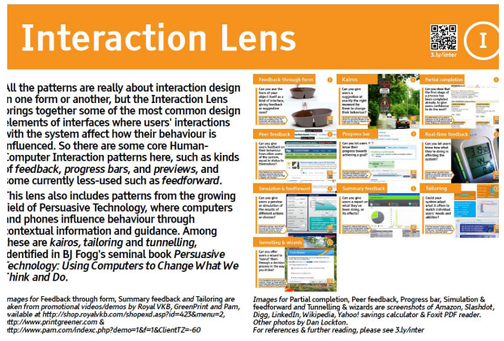
Architectural Lens

It uses urban planning, and architecture to steer users behaviours in areas such as architecture, crime prevention, traffic management. This lens, focuses on the way in which the spaces and context elements can restrain, guide, and motivate users' behaviours.

Figure, 09. Design with intent. Errorproofing lens.

Error Proofing lens

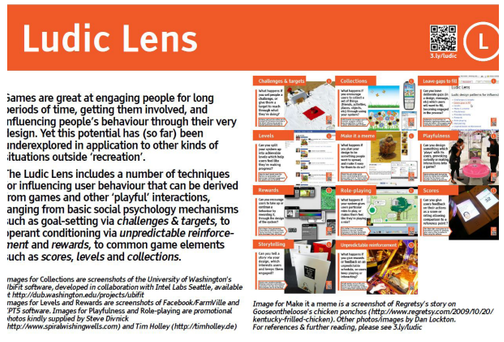
Uses fixed structures to avoid deviations from the target behaviour. Unlike the other lenses, it does not focused on attitude change as long as the target actions are achieved.



Figure, 010. Design with intent. Interaction lens.

Interaction lens

Aims to provide support to the design process of elements that are part of interfaces, in which users' interactions with certain system affect how their behaviour is influenced.



Figure, 011. Design with intent. Ludic lens.

Ludic lens

Influences behaviour by creating playful interactions, it uses different strategies such as, gamification to support the users' journey along certain process, including, psychological mechanisms.

Figure, 012. Design with intent. Perceptual lens.

Perceptual Lens

It relates to the product semantics, semiotics, ecological psychology, gestalt, to design visual and physical interactions. It focuses on, users' perceive patterns and meanings part of systems within their context.

Figure, 013. Design with intent. Cognitive lens.

Cognitive lens

It deals with the decision-making process affected by heuristics and biases. How to make the interaction fruitful to counter poor decisions of the users.

Figure, 014. Design with intent. Machiavellian lens.

Machiavellian lens

It relates to "the end justifies the means" vision, used in design patterns, that mold consumers actions by using, lock-ins which show an only route to attain a goal. It tests the ethical considerations of its consequences.

Figure, 015. Design with intent. Security lens.

Security lens

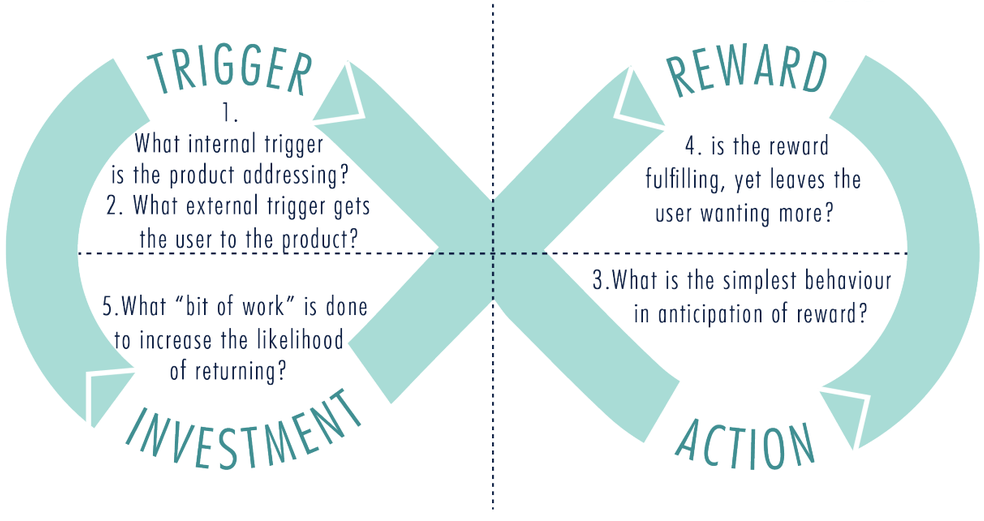
This lens takes for granted that individuals' behaviour goes against the established, and treats users as 'guilty until proven innocent'. It focuses on designing countermeasures to prevent an undesired behaviour.

Hooked model

The second stage of a persuasive intervention, aims at leading consumers to repeat the target action intending to form a habit in the future. By structuring the persuasion process in a cycle with a flow of steps that build upon the other, the action is strengthened and as a result, consumers are more likely to sustain the actions through the time.

In this regard, the Hook model is presented by Eyal (2014), as a complementary model to the Fogg's behaviour model, which is used to connect users' issues to solutions as a means to increase consumer involvement with offerings and brands, and guarantee a repurchase that at a later stage can build consumer loyalty and form a habit. The model presents four steps, which work as a structure of a persuasive process which are as follows, trigger, action, reward, and investment.

These steps, are part of a cycle that lead consumers to repeat the action after having accomplished the previous one, by doing this, consumers are supported along the journey, and interest increases in a gradual fashion.



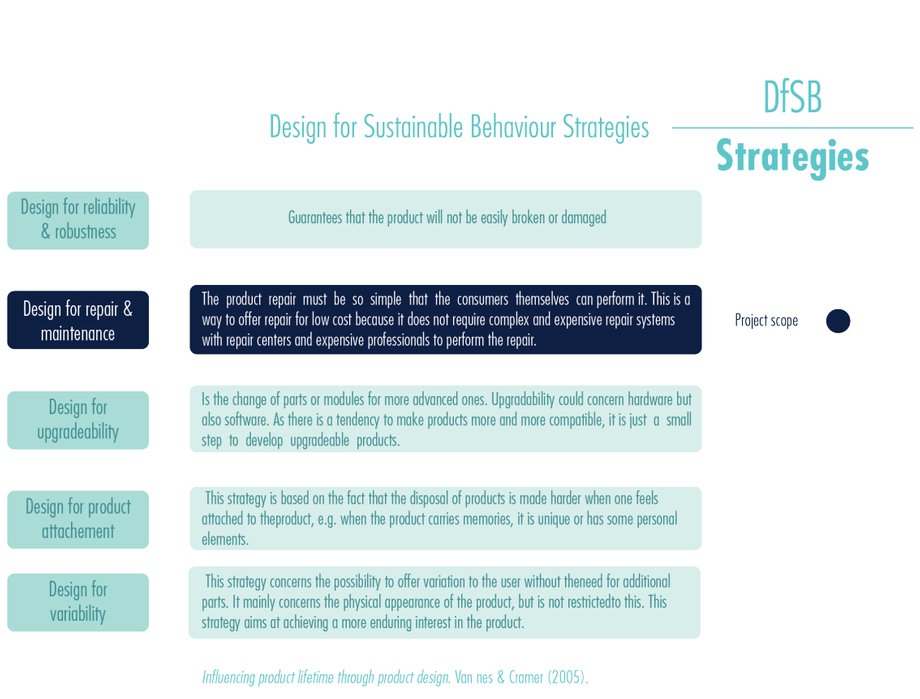
Figure, 016. Hook model. Eyal (2014)

2 **This second section of the theoretical background, relates design to persuasive initiatives, and collaborative dynamics that work to give support while attaining a care behaviour. It provides an overview of the sustainable strategies developed within the discipline, and focuses on providing and in depth look at the ones pertaining to product care, creating the link between persuasive models and product care.**

2.4 Relevance for **Product care**

Turning to the subject of Design for Sustainable Behaviour (DfSB), introduced five practices in design which can extend the product lifetime and reduce product replacement. Design for reliability and robustness; design for repair and maintenance; design for upgradeability; design for product attachment, and design for variability. These design principles take into account the way in which products are produced to withstand certain conditions; The degree of easiness in which repair tasks can be conducted by simplifying the needed parts and steps; The possibilities to renovate and improve products; the bond that consumers have with products, resulting from emotional connections which add another layer of meaning to the products. Finally, it takes the product's modification capability without incurring in additional expenses as a result of requiring extra spare parts.

As mentioned in the introduction, within scope of DfSB, this project will focus on, maintenance and repair, understood as the set of activities and practices which consumers and companies need to conduct in order to guarantee the functionality of the product through its lifetime. Maintenance is related to the tasks performed to ensure product longevity, it is occasionally mentioned as a preventive alternative that allows anticipating and identifying product failures after a period of use, performance and functionality are tested by using regular activities to keep the product functioning without downtimes. Repair focuses on, restoring the product to a former sound condition by replacing components and parts that were broken as a result of a usage period or an unexpected flaw. Knowledge and tools also called



Figure, 017. DfSB strategies. Van nes & Cramer (2005)

ability, are highly relevant for consumers to conduct both activities and can influence the willingness to care. (visual maintenance and repair) (Intention gap related to ability)

Product attachment focuses on the strength of an emotional connection that rises as a result of the product-user relationship, which grows depending on they way the product relates to the user (Schifferstein & Pelgrim, 2004). Consistent with this relationship, Mugge (2007), identified different types of connections with products, attachment can be used to understand the relationship users have with products and identify how to increase the factors that motivate care, strengthening the interaction consumers have with their products, and at the same time, embed caring practices in their daily routines which in the past were conducted by a professional offering a service and not by the owner of the product.

These regular interactions with the products we own, establish a bond between the objects and the users; nurtured by personal interest in conducting a specific task in which the object is the mean to an end; the degree to which the product satisfies our needs, fosters the interest in using the product and ignites the appearance of certain rituals which turn the object into a cherished item. Belk (1991), found that people are more likely to conduct care activities aiming at extending lifespan of products, when they become linked to the them. These rituals are presented below as part of the engagement process users have with the products along the consumer journey.

Possession rituals

Care activities can strengthen the bond between the consumer and the product, increasing the interest in preserving and using the product for a longer period of time (Ackermann, Mugge, Schoormans, 2017). Cleaning, using, discussing, comparing, and reflecting are part of the possession rituals introduced by McCracken (1986), to explain the meaning transfer process in which cultural meaning that resides in consumer goods, moves into consumer's life. Once consumers have successfully claimed a product, these rituals work as ways to transform a standard product into a personal product which is attached to them by adding a set of symbolic properties.

Mugge (2017), mentioned these rituals as part of the attachment process in which a relationship is created and nurtured during the ownership of the product. As a result, products become significant to the owner, and change through meaning from an ordinary product to an extraordinary product (Kleine & Baker, 2004). The design intervention has the possibility to strengthen the bond with the product and as a consequence, the interest in care by means of designing stimulus focused on the possession rituals which can be allocated along the consumer journey to provide support to the intention raised at the beginning of the journey.

Designers, are hence capable of persuading consumers, by endowing products with personal meaning, which can be related back to their culture, and or to their individual interests reinforcing the interaction to make consumers act upon certain task. When related to culture, the link between users and products can be further extended by means of social dynamics, which at first, function to connect users with similar interests based on the product at hand, and later, to create an additional layer of meaning attached to the product.

Takeaway

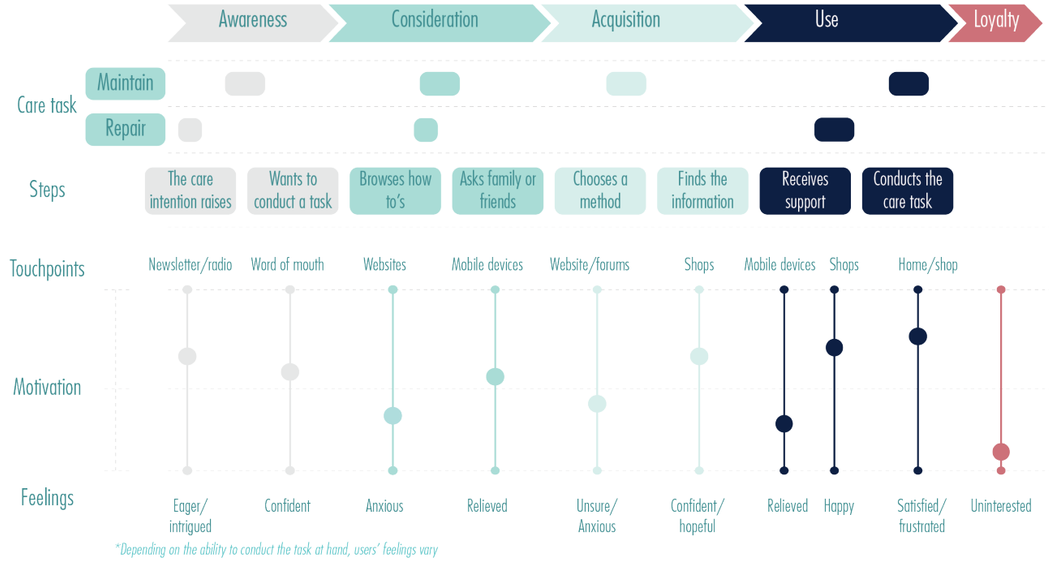
As a result, taking part in these activities, raises users' involvement in certain tasks, and can be further guided towards adopting a sustainable behaviour. The degree to which consumers are willing to care of a certain product, depends on how engaged they are with the product at hand, this process is known as involvement, and takes into account a set of factors which are relevant to the users and the specific context. (connect state in the proposition chapter)

2.5 How can design **support the care journey?**

Even though product interventions to change consumption behaviour are changing its focus from production issues to attending design challenges related to consumption (Richardson, Irwin & Sherwin, 2005), sustainable consumption models are mainly focused on purchasing and not on use (Bhamra et al., 2011). It is necessary to see consumption further than the mere purchase, Bharma et al. (2011), stressed the fact that developing routines and rituals of use and personalizing the product are also part of consumption, which relates to the meaning transfer process studied by McCracken (1986), presented above. The journey consumers experience through the product usage reflects consumption, which can be divided into different interactions between the user, the product, and a brand. These interactions are named touchpoints and as reported by Koskijoki (1997), they involve the selection process, the purchase, use, maintenance, repair, disposal, and recycling.

Takeaway

Designers can create supportive cues to raise the awareness and interest of users along the consumer journey, using triggers to help them going from a sustainable desire to conduct care activities as part of their routinary tasks.



(Figure, 018. The current customer journey map)

2.6 Collaborative dynamics **in product care**

Current research, has been focusing on understanding, and enhancing consumers' interest in conducting care activities. According to Ackermann, et al. (2017), product care is understood as any action that helps to prolong the lifetime of a product, such as maintenance and repair tasks. Product care aims at increasing consumers' interest in taking care of products as a means to engage their actions with circular models, in which the product lifetime is extended and end of life alternatives are focused on recycling. Keeping products in use for a longer period of time by engaging users with care activities which can be embedded in their routines.

Maintenance and repair, are presented by the Ellen MacArthur Foundation, as one of the paths to work on product's performance and optimization, as mentioned before, it belongs to the inner loop of the butterfly diagram, in which both users and service providers can support servicing activities for products. This section, takes into account current sharing dynamics, such as, communities of users, that make knowledge accessible during the process, which have potential to increase the involvement of users in repair and maintenance tasks that in the past were meant to be conducted only by experts.

In line with these initiatives, Cole, C., & Gnanapragasam, A. (2017), stated in their community repair report, that non-commercial repair is being supported by community-based groups in which the repair mindset is embedded as part of social dynamics. The European Commission (2016) pointed out the importance of repair in achieving resource security and sustainability as part of the change towards a circular economy. Governments are also creating plans to support this change that goes from waste production to reuse and reduce. An example of this, is the waste reduction strategy of the UK, which includes repair as an essential aspect to involve citizens in sustainable practices. Followed by, Wales and Scotland supporting actions, which aim at fostering resource efficiency and "making things last" encouraging a move towards circular economy that according to Cooper (2010a), sets product longevity as an expected goal by following a design, repair and reuse model.

Figure, 019. The Endinburgh library tool.

Figure, 020. The Endinburgh library tool.

Although these circular initiatives are gaining more attention in different groups of the society, more awareness is needed, in order to scale up the model and expand the impact on consumer behaviour. Educational programs, are required to introduce better practices connected with repair and maintenance, as well as, promoting recycling processes that ensure resource optimization. Another influential factor in consumers' involvement in product care, is the confidence required to open up, dismantle, and repair products which is key to introduce a circular model that motivates consumers to share knowledge and pass it on to others.

As it was identified in the theoretical background, current initiatives to engage consumers with product care, such as, the waste reduction strategy in the U.K, need to increase the awareness of consumers by reaching a mayor group of the society and not only a particular group which is already involved at a certain point with sustainable practices. According to Schoormans (2017), it is relevant to see design interventions from a wider scope which takes into account the most of the society and not only particular groups of people.

This current initiatives have a small scale impact, which can be extended by adding other stakeholders to provide the interventions with additional means such as, channels to share sustainable models and practices with other consumers, aiming at extending the reach of the current propositions to other spheres of the society. Education is needed to further stimulate a sustainable behaviour and increase the impact and reach of care activities from both scopes, a personal and social level, starting from increasing personal awareness in product care and extending its relevance within the individuals' community and social environment.

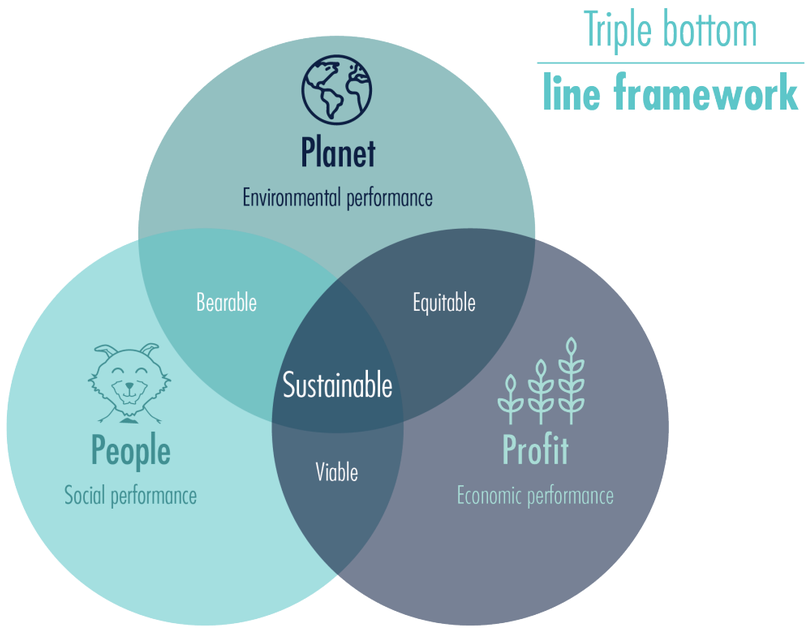
In this model, the central piece is the consumer who needs to be engaged with product care, being aware of the impact of their decisions and how they can help on all accounts of the journey, supporting activities that belong to the inner loop such as, collaborative setups that motivate the community to take an active role in gaining knowledge related to care tasks and facilitating the learning process which increases involvement as cues engage consumers with certain behaviour.

Multiple resources can be used to stimulate users to conduct care activities by including a social aspect which has been identified as an influential factor in consumer behaviour, it can work as a driver to connect users to knowledge, and enable spaces in which the experience with certain tasks can be gained in a different manner which is commonly seen as less demanding or difficult when compared to the individual care.

Repair Cafés have been introduced as a circular initiative in Western Europe which has gained recognition among communities of consumers who are interested in expanding their knowledge and skills with regard to servicing the products they own, these collaborative dynamics empower consumers by increasing their confidence to dismantle and repair products, and by fostering an active care role. In addition, this initiative extends the lifespan of products that are being replaced earlier than expected not because of a functional issue, but due to a consumption behaviour that demands purchasing the latest electronic devices (Cooper, 2004; WRAP. 2011b). *(Current initiatives in care will be addressed later in this chapter section 2.8)*

Just as communities are getting involved in product care, companies are adopting new business models which are focused on promoting a sustainable behaviour by giving consumers the possibility to return old products and recycle them to extend its lifespan. Nowadays, businesses are working work on different offerings that create new revenue streams by including services as part of products which promote circularity and make consumers active in product care. Ackermann et al. (2017), stated that business models in which consumers are aware of their responsibility on products' longevity, supported by an active involvement in care activities, can increase the interest in product care behaviour and sustainable practices which are beneficial for both parties.

According to Elkington (1997), sustainable design takes into account economic, environmental and social impacts resulting from the product life cycle. Product care can translate this impact into value creators for tailoring new circular propositions. Services attached to products are an example of how product owning changes and how knowledge can be extended to a larger number of consumers. Ifixit is one example of how product care tasks focused on repairment can empower users to replace malfunctioning parts of their mobiles in an easy fashion



Figure, 021. Triple bottom line framework.

The following section, provides an extended overview of current initiatives to promote product care.

2.7 Into action the state of the art of Product care

This is an overview of the initiatives that are currently working on product care, they are presented based on the scope of the activity, and on the way they are experienced by the user which can be either physically also called on-site or remotely. Maintenance alternatives are presented first followed by repair propositions. *This will give you an overview on the different routes designers can take to work on fostering product care.*

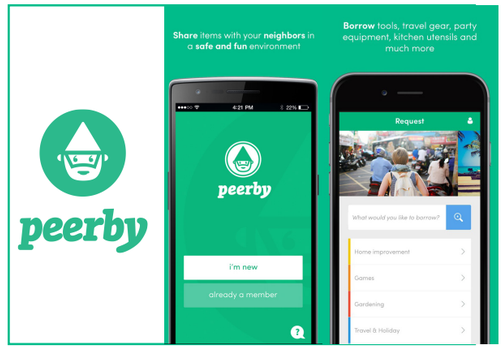
Collaborative initiatives

Repair Cafés are spaces in which people can have access to knowledge and tools when aiming at conducting a maintenance or repair task. This is a social dynamic which can empower consumers to bridge the gap between the desire and the action. The foundation of this initiative is to motivate people to repair things together from clothes, electrical appliances to toys and bicycles. Expert volunteers are available on site to offer additional help to the visitors.

Figure, 022. Repair café Delft

Shared products

Supporting a sustainable behaviour that aims at reducing the amount of non-used products, websites and apps are gaining attention as means to handle second hand products by using online communities to sell, exchange, and lend products which in the past were only accessible through the purchase but after the needs was solved these products ended up stacked in basements and storages.



Figure, 023. Peerby, app screens.

Peerby

An App which lists different belongings online allows the users to borrow products for a required period of time in order to accomplish a specific task, such as tools and spare products which are not often used more after the purchase. Users can find the closest items available near to their current location and request the loan of a product which can be free or paying a low fee. This initiative increases the access to tools while making products actively used instead of kept them stored after one-time use.

Product Service systems

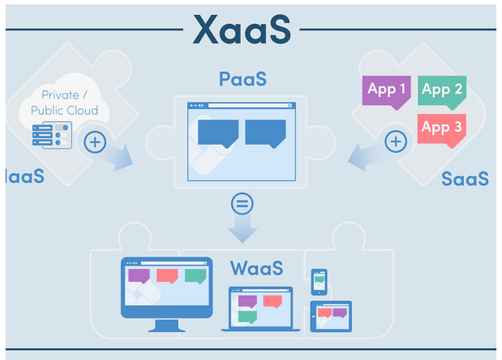
As part of the different approaches to address the environmental impact of production and consumption, different Product Service System (PSS) models have been developed in order to dematerialize the economy, changing the focus on selling products to selling a mixture of services and products tailored to satisfy consumer needs by changing the traditional ownership structure.

Tukker (2004), presented eight archetypical models which are part of three-PSS categories: product-oriented, user-oriented, result-oriented. In addition, pay per use business models (PSS) propose a new relation between products and customers to convince consumers to care more. Each of category can be

used as a means to motivate consumers along the journey by increasing the interest on each focus product-specific interest has been found as one of the mayor drivers of product care which is currently functioning as a which can be related back to the personal interest in conducting care and to the individual mindset.

Products as a service

Know as “XaaS or Anything as-a-service” this cloud computing model was introduced as a way to develop software applications as services, it allows consumers to have access to a variety of services over the web to run their business resources which in the past customers were responsible of the purchase of an specific software, management, and the installation of networks, this model offers new payment alternatives in which a product is delivered as a service. Products are not owned by the consumers and they are handled under service contracts. They are bundled as an alternative to offer different layers of the service as a source of personalization.



Figure, 024. XaaS

According to Deloitte (2018), these services are beneficial for companies since they “enable predictable, renewable revenue streams, deliver greater value to the end customer by allowing them to pay only what they consume”. This initiative supports the lifespan extension strategies by making products circulate for longer within the cycle since they ensure that products are needed at all times and traditional owning turns into a shared ownership which creates a sense of mutual belonging extending product lifetime.

Figure, 025. Swapfiets

SwapFiets

Is a bike rental service that belongs to the product service system models presented by Tukker (2004), which are user oriented. By following the product lease model SwapFiets allows users to use a bicycle for an indefinite period of time by paying monthly fees which include repair and maintenance along the rental period. The service contract is the agreement between the customer and the provider which determines the way in which the need will be satisfied.

Brand initiatives

New business models are offering services attached to their products as the key differentiator and added value that changes the way the relationship behaves going from getting more one-time sales to increasing the touchpoints along the customer journey, nurturing a bond between consumers and brands that fosters a relationship that motivates consumers to stay in touch with the brand.

Figure, 026. NudieJeans

NudieJeans

It is a Swedish brand which has a lifetime repair model that allows consumers to return and replace their torn jeans in exchange of an updated pair. The repair centres collect, repair and update the old jeans for free. The quality of the garments is one of the features which is highlighted in the value proposition and motivates consumers to buy long lasting products which are easily repairable and updated.

Figure, 027. Fairphone

Fairphone

Aims at building phones that are responsible produced bearing in mind the environmental impact along the entire product life cycle and empowering communities to demand fair products. It uses durable materials and design which makes the phone easily upgradeable so they can be repaired instead of replaced. It combines a strategic vision which supports recycling initiatives in countries affected by the electronic waste and using materials which are easy to recycle aiming at reducing waste.

It takes into account the different stakeholders involved in the electronic waste challenge offering long lasting products that can be freely adjusted, collaborating with sustainable partners while increasing awareness of the electronic waste. By using materials that are recyclable this initiative reduces the impact of traditional mobile production which disposes spare parts that have several materials which are not being recycled.

Consumer empowerment, increasing ability

The sustainable mindset is introduced by increasing the ability of consumers to take care of their products using a community-based set up that connects people that share an interest in the way products are being used and what kind of initiatives can reduce the impact on the environment. This mindset is extended along the network increasing awareness of current consumption behaviours.

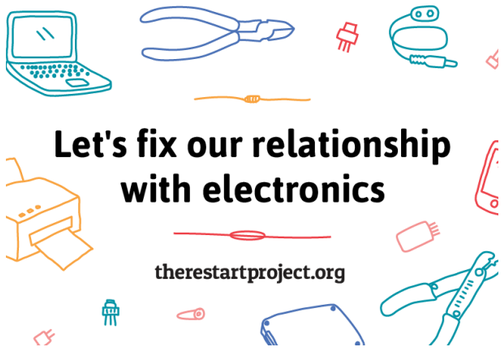
Knowledge and motivation are extended with this initiative since it aims at providing the customers with the necessary tools and knowledge to repair a particular product. Making the repair and maintenance tasks simple these business models ensure that consumers’ willingness to conduct a repairment activity is sustained and fostered. Additional guidance is provided by using digital means such as video tutorials that present a step by step process

On-site community based approach

The restart project

It is a social initiative that aims at changing the relationship of people with electronics by providing users with the necessary knowledge to repair a particular product. The project started as a

proposition to change the throwaway mindset of current consumption behaviour by connecting people and sharing better ways to repair and use products for a longer period of time.



Figure, 028. The restart project.

It works with communities and schools creating programs in which the fixer mindset introduced as part of the education program since early stages and organizing different events to provide communities the opportunity to repair electronic devices. It intends to change consumer behaviour by creating group-dynamics which make easier the process of knowing how to and conducting a repair and maintenance task.

Figure, 029. The restart project. Restart party.

Pop-up-repair events were created as a result of the Restart consumer research which pointed out a lack of ability to conduct repair tasks even in cases in which tools and spare parts were available. According to the survey results, only an 8% of the respondents were confident undertaking repairs at home and 48% were not confident. This results allowed the project to focus on increasing consumers confidence by working on ability to conduct a repair task.

It was created as an initiative to support the product care process of consumers which identified three barriers while repairing an specific product, lack knowledge and skills, confidence and fear and motivation. Product circularity enables communities to have access to more tools and knowledge that participants have on different areas of intervention. Learning from others makes the process more engaging since consumers trust in a repairer or manufacturer is no longer an issue.

Figure, 030. The Edinburgh Remakery

Edinburgh Remakery

A community-based project that aims at reducing the generation of e-waste by making repair education accessible to people. It provides people with a skill-based program in which different workshops are held to involve people with a sustainable mindset increasing awareness of the environmental impact electronics have. In line with the repair and maintenance loop presented above, this project extends the lifetime of product by refurbishing old devices and offering them at accessible fees to the people that needs them the most.

Figure, 031. The Edinburgh Remakery. Michelle Lile.

Zero Waste Leith

As part of the Edinburgh Remakery aims at empowering people to take action on a sustainable mindset by conducting repair tasks, gaining knowledge and joining a community which increases the saving waste awareness. By offering free “repair surgeries” for three product categories such as textiles, IT equipment and furniture, along with repair demos, consumer behaviour is triggered and supported as Fogg model explains Motivation, ability and triggers need to happen simultaneously to successfully change a behaviour.

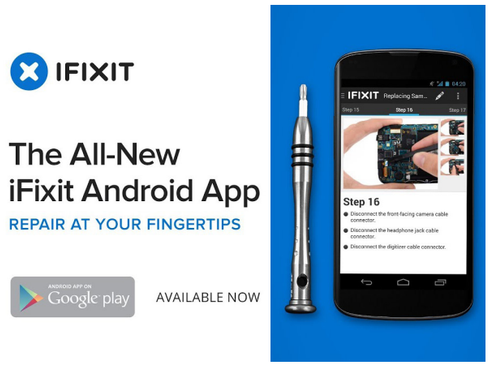
Figure, 032. Zero waste Leith.

Creating multiple channels, spaces and offerings to collect, repair, recycle and reuse products, has been useful to this initiative since it increases the touchpoints that are needed to engage communities with a sustainable mindset. Therefore, it can be an example for design propositions that provide continued support along the care journey aiming at changing a consumption behaviour.

Takeaway

The design intervention resulting from this research, needs to engage consumers with the task at hand but also create the space for the behaviour to happen.

Do it yourself DIY enablers



Figure, 033. iFixit

iFixit

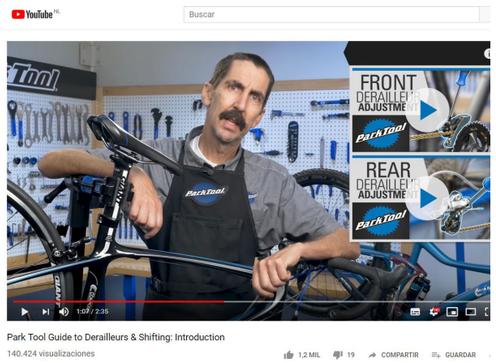
Tackling the issue of lack of resources such as tools and knowledge to conduct a repairment task, ifixit propose a model in which mobile repair tasks are accessible to people by increasing the ability to replace a spare part.

Nowadays, mobile phones are embedded in people’s life multiple tasks are being conducted along the day increasing the usage rate, which makes likely that parts get damaged. ifixit allows users to buy spare parts and essential toolkits to replace parts by providing users with video tutorials that explain in a simple fashion how the task needs to be done. Empowering consumers to conduct tasks which in the past have been conducted only by experts.

Intrinsic motivation

Ackermann (2017), found an additional motivation factor, that belongs to the interest individuals have while conducting product care. Rebellion to the brands, was identified as a driver for consumers to find other ways to repair their products, as a response to the limitations brands attach to their products, such as making them sealed, and non-accessible to make consumers depend on their servicing.

In line with this, the Restart project research, has shown that people does not trust on commercial repairers, some of them stated that they felt forced to go back to the manufacturer and that makes complicates and makes the process more expensive. Due to the past experiences related to servicing products, consumers are now likely to find alternative sources to solve an issue with a product, the design proposition can guide consumers towards conducting new manners to solves tasks. (services bundled offerings) Or create new service models which are focused on repair and maintenance.



Figure, 034. Youtube channels. ParkTool tutorial.

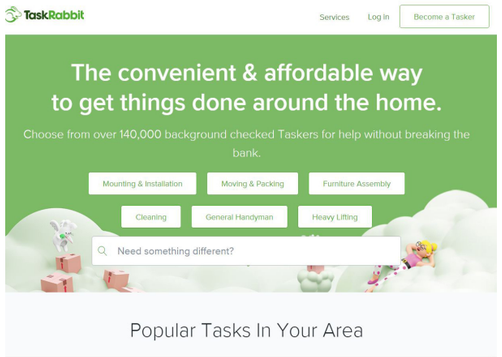
Youtube channels

Individuals which have gained experience and knowledge in different ways to service, update or upgrade a product, make knowledge open and accessible to any user by creating video tutorials that explain the way in which the task should be conducted.

In line with this initiative, online communities are another mean in which consumers can have access to knowledge which is not provided by the companies and that enables them to conduct tasks by receiving support from other users. Online catalogs are available in these communities to let consumers get to know how to intervene their products and find new ways maintain and repair the product in depth.

Service propositions based on tasks

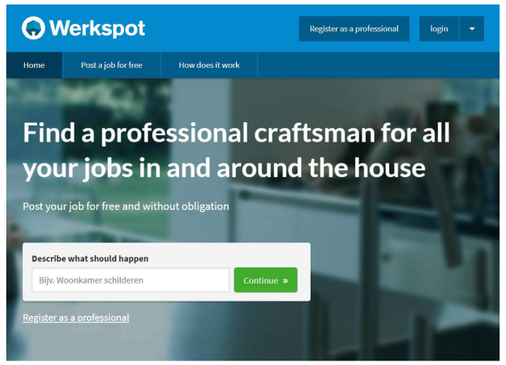
Services are gaining more importance as they provide users with peace of mind when conducting tasks which are commonly time consuming and boresome to conduct. Companies such as, TaskRabbit and Werkspot, are focusing its business revenue on providing extended support and assistance while conducting activities related to home projects and renovations which are commonly conducted by home product stores.



Figure, 035. TaskRabbit. Website

TaskRabbit

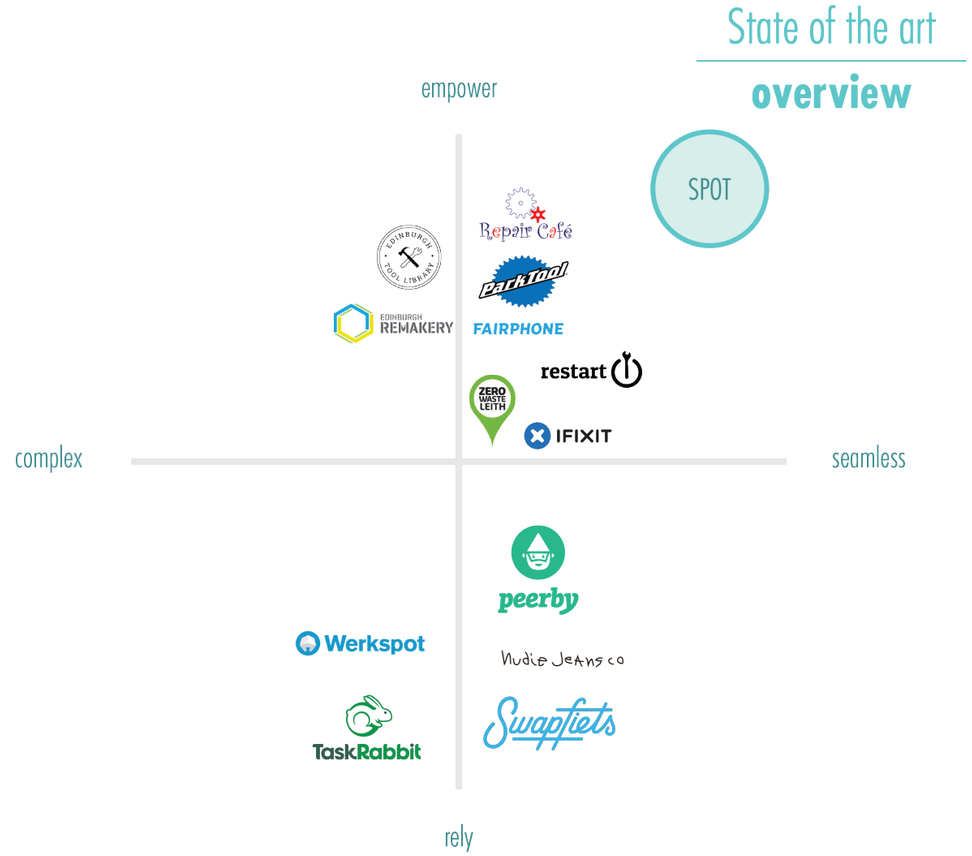
Is an example of how tasks can be delegated to another person which can provide support in a new range of activities such as product installations, home projects and doing the move. It is focused on home tasks and provides access to an interface in which skilled people are available to help. The community assess the quality of each tasker and provides an score that guides users along the booking.



Figure, 036. Werkspot. Website

WerkSpot

Is a Dutch variation of a task-based model which focuses its services on home crafts that users can request depending on the renovation they need to conduct at home. It is a pay-per-service initiative and gives users to the freedom to select the offer they prefer.



Figure, 037. State of art overview

A visual overview, mapping the current alternatives based on the benefits they offer to the customers, and the degree to which users are relying on a service or conducting activites themselves.

These intitiatives in are plotted in two axis (empower/rely) and (compex/seamless), aiming at finding the preferred spot for the intervention.

2.8 Cultural **relevance**

As presented in the former section, cognitive factors, feelings, former experiences, and individual interest have an impact on the decision-making process, and need to be taken into account while creating content that aims at engaging users with a target behaviour. In order to increase the relevance of this user-proposition match, culture is here included as one of the drivers that influence people to act. Framing of messages in persuasive communication has been addressed in several studies (Rothman & Salovey, 1997; Rothman, Bartels, Wlaschin, & Salovey, 2006), as a means to increase patients' interest in health actions, such as, screening, and exercise.

Furthermore, it has been used in studies researching differences in elaboration comparing culturally different countries. Aaker & Maheswaran (1997) measured the elaboration process of respondents from Asia and the United states, when presented with a set of cues related to their context. The study results show that, collectivist cultures are likely to prefer a heuristic processing model and prioritize a consensus information analysis, whereas individualist cultures tend to process information in a systematic manner validated with attribute information.

Finally, cultural background has been as well, subject of research in persuasive appeals, Han and Shavitt (1994) found that North American individuals are more related to appeals which are based on self-reliance and achievement, conversely East Asian individuals have a preference towards collective goals, family and community based objectives.

The general findings suggest that cultural background has an impact on persuasion, and that the degree to which the message fits the recipient's cognitive models, increases the involvement as a result of a thoughtful elaboration process. Petty & Krosnick (1995), identified that attitude change resulting from a thoughtful process are more easily recalled in the future and have a stronger persistence period over time. Design needs to understand the way in which culture has an impact on people's behaviour in order to increase the effectiveness of the propositions used to involve consumers in product care. Hiebert (1976), described culture as the unified system of learned patterns and behaviours; Ideas and products, distinctive of a society. Hofstede (1991), explained culture as a collective programming of the mind that identifies members of different groups.

Designing for cultural relevance Hofstede (1991), developed a cultural dimension theory that uses six dimensions to understand differences of culture across countries. These dimensions are as follows: individualism (IDV), power distance PDI, masculinity, uncertainty avoidance UAI, long-term orientation LTO, and indulgence.

Individualism IDV measures the extent to which a society is organized into groups and the degree of dependence to the groups. Individualist societies are focused on attaining personal goals which are led by competition. Collectivist societies aim at achieving common goals that can improve the wellbeing of the group.

Power distance PDI draws in the way power is distributed and the degree in which inequality is accepted within the laboral structures. High PDI shows that inequity is encouraged by authority and structures. Low PDI indicates that power is decentralized encouraging participatory dynamics that promote a direct communication.

Masculinity refers to the values and mindset orientations that drive individuals of a society. Masculine societies are driven by an outcome-oriented mindset in which competition, achievement, and success are key. Conversely, a feminine society is driven by a relationship-oriented mindset that promotes caring values, empathy and collaboration.

Uncertainty avoidance UAI assesses the way that society manages the unknown factors of future events which hamper the willing to foresee consequences of actions. Rules and regulations are used to provide stability to its members and avoid high-risk situations.

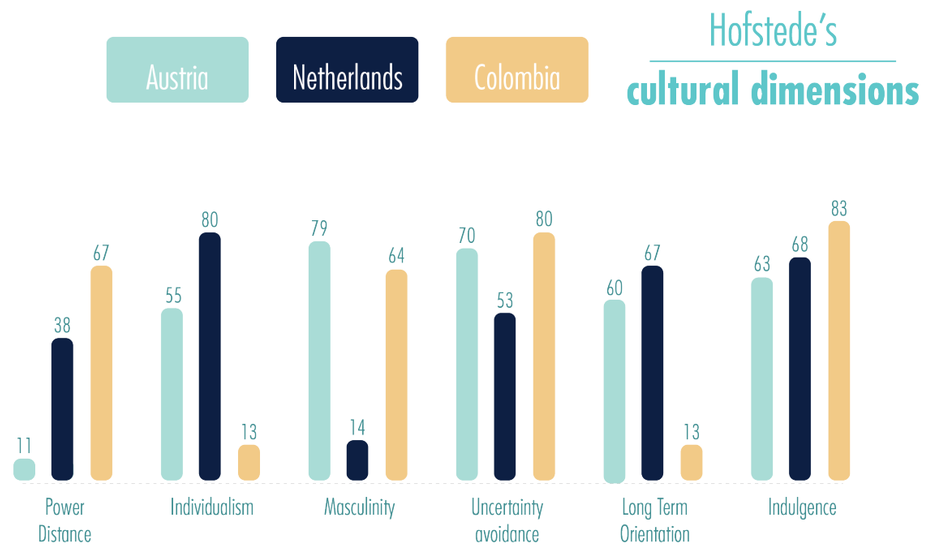
Long-term orientation has to do with the way a society focuses on either achieving future goals in which thrift and planning are key or on aiming at achieving short goals that bring immediate gratification and don't take into account future consequences of these actions.

Indulgence refers to the extent to which people control their desires and impulses based on the way they were raised.

Several studies have addressed cultural relevance in design using the individual and masculinity dimensions of the model. Berg-Weitzel & Laar (2000), conducted a study focused on deodorants' packaging design in six countries. The findings from this study pointed out that cultural relevance in packaging had an influence in consumers willingness to buy. Even though the study shows that there is an influence, standardization can also be convenient for companies while positioning a product into the market since it offers producers the possibility to reduce costs by using a neutral design that can be accepted in every country.

A cross-cultural study between three countries Cultural background, is here seen as a means to adjust design propositions for different contexts, as it has been used in previous studies (Berg-Weitzel & Laar, 2000), considering individual differences that are attached to the context. The purpose behind designing persuasive means to make people care more taking into account cultural differences, aims at increasing involvement of individuals, by tailoring a systemic design proposal to the users including culturally relevant factors, suchs as orientation mindset and time orientation.

A cross-cultural study in product care
In order to test the cultural differences, three countries are selected Austria, Colombia, and The Netherlands, will provide the sample with comparable data which can shed light on the way culture has an impact on the way design propositions can increase involvement in product care activities. Individualism and Long-term orientation, are the dimensions which evidence the most significant differences between the three countries, and are expected to have an influence on the care behaviour and therfore persuasive means. The graph below depicts the differences between each country regarding different cultural dimensions.



Figure, 038. Hoofstede, Geert. Cultural dimensions, comparison between Austria, Colombia and The Netherlands.

Taking into account the individualism dimension, Colombia has the lowest score 13, Austria a mid-range score 55, and The Netherlands the highest score 80. Based on these results, the study expects that the design proposition for individual societies, increases involvement by introducing personal goals, and self-improvement features, whereas for a collectivist society, features such as, group achievement, and common goals based on collaborative work are likely to be more influential.

Former research has addressed the impact of an individualist society and a collectivist society with regard to communication studies (Cho, et al., 1999; GudyKunst, et al., 1996; Lin, 2001). This study, aims at using this dimension to identify behaviour dynamics in which design can increase the involvement in product care. As mentioned before, collaborative models have been introduced as part of new social behaviours, understanding the influence of each mindset can provide designers with cultural relevance to create persuasive means.

Research has found, that a collectivist society has an ambiguous communication, whereas individual society has clear communication. Hall (1976), identified that communication in American and Europe tends to be direct and explicit. Therefore, the study aims at identifying the cultural factors that can influence people to care more of their products.

Long-term orientation, is expected to provide the study with additional cues on how to design persuasive means by understanding how planning and thrift, can influence individual's involvement with product care, by setting future goals, and conversely, how immediate gratification can further motivate individuals to conduct product care activities. Colombia has a low socre in this dimension 13, classified as a normative society in which the focus aims at achieving quick results, compared to Austria 60 and The Netherlands 67, both classified as pragmatic societies in which a future-oriented mindset provides structure towards achieving prospective results.

2.9 Problem **statement**

Designers need to identify factors that drive consumer care activities, when aiming at steering current behaviour and introducing sustainable propositions which can support a circular economy.
Persuasive design, has been used in a variety of propositions aiming at guiding the interaction between consumers and products. Current models and methods to work on persuasion, are based on product-user interaction, but are not taking into account the underlying factors which take place once the design intervention is introduced, an additional view of strategic persuasion, needs to be addressed in future implementations as a means to provide consumers with clear routes, which are based on a prospective approach aiming at having continuity in the future and not in satisfying a temporary or immediate need/goal.

Mayor attention has been given to behavioural economics in marketing domains, as a means to convince consumers to buy products and services which are adjusted to their context and their profile, but these are based on generating revenue from new interactions and technologies instead of using those developments to stimulate a better way to take responsibility of consumption and create consumer awareness with regard to their individual impact on current environmental issues.
Design for product care has been addressing the way in which several strategies can work to stimulate a sustainable mindset among consumers which vary from the way the products are designed to the emotional bond a product entails. In order to guide consumers interaction, it is also necessary to add another layer, which has been proven as an influential behaviour factor which is cultural relevance and design adaptability to the user. On the other hand, different routes towards motivating consumers to take part in sustainable actions need to be presented as a systemic approach which can increase the impact of multiple propositions within a network.

Takeaway

Based on Foggs' behavioural model, design interventions can select multiple routes to increase the likelihood of users to start changing their current decisions. Motivation can be a focus point for several design interventions but as it requires continuity and variation with regard to, the information, rewards, and means given to the user; design implementations should take into account a prospective implementation in order to redefine former interactions and update the offerings that are used to support this change.

Problem statement

Current research in product care aims at finding different strategies to introduce a sustainable mindset that motivates consumers to conduct care activities. In order to support this objective, it is relevant to understand how to apply persuasive design as a means to stimulate consumers' mindset change from attitude to action, by using resources in a connected manner which can extend the impact of design interventions.
The project aims at investigating the way in which customization, strategic vision (learning) and involvement factors can be used to stimulate consumers motivation leaning toward adopting a sustainable behaviour.

Researching the factors that influence product care

The following chapter addresses the research study, that was conducted to gain understanding on product care behaviour, based on two main factors, the engagement process in product care, which takes into account, reasons to care, current activities, and the context of care. Followed by, possible differences in this behaviour between culturally different countries.

3

In this chapter

In order to research these issues, care activities were assessed in three countries by using a product set that allowed participants to relate to the behaviour in a personal manner. The initial section, describes the research process, the set up of the study and details of the sample, next, the second section shows the analysis, the drivers that are guiding the interest in conducting care, and the conclusions drawing the initial insights and requirements that give the foundation for the design intervention.

A cross **cultural** Study

The project context takes into account differences regarding long-term orientation and individualist mindsets.

Cultural backgrounds are researched in order to find the relevance for design propositions

3

Product care was assessed **in three countries.**

Researching the factors that influence **product care in three different countries**

On the basis that, the project aims at using design to create a system that motivates consumers to care more, a cross-cultural study is conducted aiming at testing the influence of motivation, and ability on users involvement in product care activities, willing to find underlying factors that influence/ persuade users to conduct care.

The study assessed cultural differences when carrying on maintenance and repair for a specific set of products, which was created to provide participants from three different countries which are as follows, Austria, The Netherlands, and Colombia, with easily accessible/relatable opportunities to care. In order to understand how to further motivate consumers to be actively involved in care activities, quantitative questionnaires were designed aiming at understanding current preferences and limitations.

3.1 Method

In order to understand the influence of motivation, and ability on users' involvement in product care activities, quantitative questionnaires were given to the participants in each country. After conducting a pretest to validate the product-set that was going to be used in the study with 20 international students, the study was carried out with 339 individuals from the three countries.

3.2 Sample

The sample of the project was composed of 339 individuals from Austria, The Netherlands, and Colombia (organized along the study, based on the country's distance). An online questionnaire, was used to identify the impact of the variables that motivate product care activities in the three countries. The Netherlands, has 95 respondents, Austria 84, and Colombia 160. This resulted in, a sample of 339 individuals, their mean age was 2,17, SD=1,158 (25) years; their gender was SD=1,55, SD=0,510 (112 male, 227 female). Participants were selected from the academic environment of the researchers, along with personal environment, providing the study with variety in gender, age, occupation, and skills related to product care.

3.3 Pretest

We conducted a preset, to select 10 products to assess care activities used within a daily basis, that would define the applicability of a product-set for each country. For this purpose, each product was presented asking the participants to evaluate the degree in which they were related to it, resulting in a total of 14 respondents that were used to define the final set. Based on the product categories used in former studies by Ackermann, Mugge & Schoormans (2018), we selected a product set which had a mixture between product categories, and variance between high and low care tasks complexity, and high and low market value. In this way, we used the following product categories from the mentioned study: Household appliances & tools, consumer electronics, means of transport, clothes, shoes & accessories, and sport equipment, accessories for hobbies.

A sample of 14 international students (M age = 24) participated in the pretest, they were told that they would be presented with a randomized set of products, that these products could relate to them differently based on a low to high scale and that these relations could vary depending on their personal preferences. To determine which products would optimally relate to participants in the three countries, we measured two factors, frequency and relevance. To measure frequency we asked participants to rate the frequency of product usage from daily to less than a month (1= daily basis, 3= less than a month). With regard to relevance of products, participants were asked how relevant they considered the products were in their life (1 = very irrelevant, 7 very relevant).

Aiming at understanding how cultural differences influence the way in which people conduct product care, and the degree to which involvement varies depending on the product, a 1 to 7 semantic scale was used to measure the personal interest to perform care activities for each product of the product-set. (SCALE)

Based on the ratings for frequency and relevance, a set composed by 10 products was selected, this set included the following products: backpack, bike, car, glasses, hiking shoes, kettle, laptop, leather garments, shoes and watch. The goal was to select a set of products that related the most to the participants. Firstly, identifying the usage and next, the importance of using the product as a way to define the most suitable product-set to assess care activities in the study.

The pretest worked as well as a way to set the structure for the main study, in which multiple selection questions, rating scales, and care activities degrees where defined by having informal interviews with the participants after conducting the pretest. Based on the results from the preset, questions, scales, and, care tasks for the study were defined.

3.4 Procedure

Students were recruited in the three countries, in The Netherlands by means of online communities of the University and outside different buildings, in Austria via online communication, and personally after design lectures, in Colombia by using online means of student communities and word-of-mouth which provided the sample with two groups of respondents, students and working professionals which belong to a higher age range and varied occupation. Participants were told that they could win one of two, ten, and, four Dopper bottles respectively depending on the country by taking part in the study. The education level of the largest cluster of participants was Masters' degree (58%)196 individuals, followed by a 30% 102 individuals which were students and workers at higher vocational level, and 12% 41 participants were students at middle vocational level. check

Participants were invited to participate in the online experiment via community chats, emails and personal requests. Participants were told that the aim was to provide current research in product care with additional insights, regarding consumer behaviour and care activities. Product care, was defined at the beginning of the questionnaire as a means of clarification. After providing their consent, participants were presented a set of questions divided in three blocks which corresponded to the behavioural factors addressed by the study. Products, motivation, and ability, each block contained a set of questions identifying the current behaviour and interest in product care activities. After assessing frequency and relevance the care behaviour was evaluated (e.g. reasons to care, current tasks, tools and limitations to conduct product care activities)

Following this, participants were asked to answer a set of questions pertaining to demographics and background variables such as, gender, age, education level, country, and employment and additional step was for the participants that were interested in taking part in the contest to win a Dopper bottle to add their email address.

3.5 Measures

Willingness to care and care tasks were measured to assess the current behaviour as a means to undercover the relevant factors in which design can work on motivation. To assess the difference between cultural models, the six-dimension model of national culture presented by Hofstede (1991), and used in a variety of cross-cultural studies (Hofstede, 1991; Triandis, 1995; Cutler et al., 1997) was employed, taking into account for the study the Individualism and the Long term orientation dimensions. This cultural model has six dimensions which function as a tool to assess the differences of people aiming at understanding the prefered ways of communication in the work environment, it compares the behaviour of people from different countries using a 1 to 100 point scale.

Last, frequency and relevance, were assessed to identify the degree in which care activities were being conducted by the participants, next, cultural

dependant factors such as the socio-economic levels and personal interest, were used as a means to find whether a correlation effect was present between frequency and relevance to care. Drivers of care were assessed in the study by giving the participants three main categories seen as driver to care which are as follows: functionality, economic factors, and personal interest in sustainable practices.

The current care behaviour, was assessed by asking the participants, which activities were conducting when taking care of their products, cleaning, repairing, conducting maintenance, tweaking the products, conducting periodic inspections, and contacting friends to solve doubts, were the variables used in the study, to undercover the drivers of product care in culturally different countries.

Limitations, of care were included as a means to research the underlying reasons pertaining to current care actions. Additional reasons were included in the questionnaires to have access to those variables which were not explicitly addressed in the set.

3.6 Analysis

The results from the questionnaires were transcribed and coded, next a quantitative analysis was conducted using the software SPSS. The coding process started making use of the software excel in which the different blocks of the questionnaire, products, motivation, and ability, were used to code the results from the three countries, which resulted in 53 variables, pertaining to the blocks mentioned before, and including a set of limitation variables that were identified in the study resulting in additional codes and subcodes to cover all the relevant aspects. After having defined the main variables, the individual coding started by including the information from each participant along the different variables. After having defined the route in which the targeted behaviour was assessed, the codes were reorganized aiming at having a coherent sequence that allowed the researcher to identify the insights pertaining to each block in an organized fashion. These variables and the overview of participants replies are presented in (Appendix A)

These variables were used to assess the relevance and frequency of the current care behaviour, the way in which external factors such as social dynamics, and personal interest differences, were influencing participants motivation to conduct a specific care activity. At the beginning of the analysis, participants' responses were given a code which was a binary input 1 and 0 for responses which had one option, and a value range from 1 to 6 for responses which were composed of multiple options. After having coded and organized the data in the software, variables pertaining to each block were created and later controlled by running a descriptives analysis. Frequency and relevance were the factors used to understand the current care behaviour by using the product-set participants were able to assess each product separately.

After conducting a cross tab analysis between the countries and the products mentioned above the following differences were identified with regard to the frequency and the relevance to care.

Conducting care activities was assessed in the sample by presenting different levels of care to which respondents were able to relate with their daily care. Cleaning and repairing are the activities that are conducted by most of the respondents, consequently maintenance is located in a mid-range which can be fostered by the design proposition.

By conducting a cross tabulation personal care was identified as a factor which can be strengthened by the design intervention. conclusions recommendations

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Individual	332	1	3	2,18	,848
Country	332	1	3	2,18	,848
Age	332	1	5	2,17	1,158
Gender	332	1	3	1,55	,510
Degree	332	2	6	3,82	1,124
Valid N (listwise)	332				

Figure, 039. Descriptives means

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Watch frequency	332	0	3	2,34	,969
Shoes frequency	332	0	3	2,03	,84
Bike frequency	332	0	3	2,30	,905
Glasses frequency	332	0	3	1,71	,965
Leather frequency	332	0	3	2,35	,952
Car frequency	332	0	3	1,98	,978
Backpack frequency	332	0	3	2,26	,878
Hiking shoes frequency	332	0	3	2,34	1,005
Laptop frequency	332	0	3	1,76	,853
Kettle frequency	332	0	3	1,86	1,012
Watch relevance	332	0	7	3,51	2,329
Shoes relevance	332	1	7	4,69	1,855
Bike relevance	332	0	7	4,05	2,138
Glasses relevance	332	0	7	4,54	2,336

Figure, 040. Descriptives Frequencies

3.7 Results and discussion

Based on the analysis of the quantitative questionnaires, the findings are presented based on the relations of the factors that influence care. The following subcategories present the findings from a general scope to specific relations between factors, and drivers. In addition, the influence of these factors is discussed aiming at providing a route for the design intervention.

3.7.1 General insights on care behaviours

After conducting surveys in each country, factors pertaining to the current care behaviour relevant for the three countries were assessed. Influential factors were identified in the study as drivers that make people carry on care activities including, product functionality, personal interest, social dynamics, and additional drivers that motivate people, together with limitations that impair their interest in conducting care. Personal interest is related to sustainable practices which aim at diminishing the environmental impact of ones individual consumption, such as using products for a longer period of time, conducting care activities to maintain products in sound condition, replacing parts instead of discarding the product, and buying products which are designed to longlast more than disposable goods.

> "I prefer to treat my products carefully, so I avoid maintenance fees in the future" (AL, 108. Another care reason)

> "I care about reducing the amount of waste that is produced and saving maintenance fees which are expensive by doing it myself" (AL, 209. Another care reason)

> "when I notice something is off I fix it. Or when I have free time I spend some time" (AL, 7. Another care reason)

> "Repairing things using YouTube for instructions (e.g. bike repair)" (AL, 30. Another care reason)

Social dynamics, refers to factors that individuals from a particular group share and the way in which others' behavior influences one personal interest. These function as triggers to motivate people to care more of their products.

> "I always like to ask my friends, and family when conducting a new care activity" (AT, 114. Additional option tools accessibility)

> "Social acceptance: I don't want my shoes/ backpack to look dirty to others. Also for the well function of it: washing the glasses/laptop screen so I can see properly" (AL, 5. Another care reasons)

Another layer of social dynamics pertains to the availability of tools which was identified in the study as one of the factors that limitate conducting certain care tasks, which are available within the social circle of the individual. They were asked whether they had access to tools within their network.

> "Facebook group of my apartment building, so neighbours" (AT, 24. Another option tools)

> "I borrow them from places around me, faculty bicycle pump and wrenches. Or the bike pump at the station" (AT, 7. Another option tools)

> "I sometimes use sharing apps in which I can borrow products for a short period of time, such as peerby et" (AT, 85. Another option tools)

In addition, collaborative dynamics function to engage people with care activities and share knowledge with regard to a particular products which are more relevant to people than others.

> "I sometimes swap, a friend of mine is good in sewing. So, when there is a hole she can fix it" (AL, 24. Another care reasons)

> "Products' lifespan can be extended by giving them away to other people when they are not longer required" (AL,273 Another care reasons)

3.7.2 Drivers for product care

As mentioned before, four main drivers to care were found in the study and are related to the involvement level consumers have in product care. Product functionality, personal interest, social dynamics, and additional drivers, within this factors a set of subfactors was identified time, laziness, quality of the product, unrepairable products, and effort vs results.

Functionality of products was identified as one of the main drivers to conduct care, since participants reported that their interest was in having their products functioning at all times which also relates to a personal driver that is based on the type of relationship the users have with the products at hand. (revise descriptives table care reasons economic, functional, personal)

Personal interest is related to an intrinsic motivation to care which is either led by an activity to which the product is the means to and end, the case of work tools, and sports equipment, or led by concerns regarding sustainability which according to Ackermann et al. (2018), it is related to "a general attitude towards longevity of products".

Different levels of frequency and relevance were identified among participants in the study, these levels varied depending on personal interest in the products considered. For products such as bicycles, personal interest in cycling makes people willing to improve their skills and ability in order to increase their performance in the sport. A similar effect was identified for products which are used in a daily basis work tools such as laptops.

> "Out of interest of a product (e.g. rear derailleur of a bike) I take stuff apart and thoroughly clean it" (AL,26. Additional care reasons)

> "keep updates in the electronic products (such as software updates)" (AL,27. Additional care reasons)

> "Sometimes for fun. I have an old Beetle, working on it is sort of a hobby" (AL,28. Additional care reasons)

> "For some situations such as relocating the chain of my bike I feel confident enough to do it myself, so I will do it and maybe ask for tips to some friends. But if I have to replace the whole wheel, I don't feel confident even if I can find the tools, so I would bring it to the repair shop" (AT, 5. Another option tools)

3.7.3 Intention gap

These variables, drive the care behaviour, and were expected to function accordingly, when relevance is high, the frequency of care tasks increases. Conversely to this, the results show that participants behaviour is not linear, and that having the intention to conduct care, does not implies that the actions are performed. Even though, respondents indicated that carrying on these activities for certain products such as, a backpack, was highly relevant, they were not performing these activities with the same frequency, or they were not conducting these tasks by no means. This is due to low ability to conduct a care task, arising from lack motivation to allocate time, to perform the activity. Another factor identified, is the quality of the products, participants reported that their expectations were higher when considering a product that was included in the mid to high-end segment, such as work tools as the laptop, cameras, bikes, and hiking backpacks. Care determinators were identified by Ackermann, Mugge, Schoormans, (2018), as part of their study in consumers' perspective, and were used in the study to assess the differences in motivation.

In line with this, regarding the overall interest in conducting care, the findings from the study show that most (percentage) of the participants consider that they take care of their products. (based on a question with four points 1-4, in which one is always, and four is never (M=1,72, SD=0,670)) and addressing ability, (percentage of the sample) considered that they know how to conduct maintenance and repair

of their products. (assessed using a six-point scale in which 1 = I think, I am an expert and 6 = I don't have a clue (M=2,88, SD=0,78)). The results shows that even though, participants say they care of their products, and have the knowledge to conduct a care task, their actions do not reflect this intention since their interest in conducting such tasks is rather low, they are aware of the relevance of care but they are not strongly motivated to act.

TAKEAWAY

Therefore, the design intervention resultant from this research, needs to find a route to increase the interest of the participants in product care activities by providing them with simple tasks which they can perceive as enjoyable and easy to do, which match their personal interest and skills. According to Olds & Milner, (1945), the variability of the tasks people are asked to do increases focus and engagement along the process.

3.7.4 Product-dependent care

Quality of the products, was identified as an influential factor for frequency, when respondents' expectations on the products is high care activities are expected to happen in the future but not as often as stated in the questionnaire.

> "I just don't care about things. If they damage I only buy the strictly necessary. Otherwise I just don't buy it again. I try to buy good quality from the first time as most of stuff is designed to last a short time so that you have to buy it again." (BA,36. Limitations to care)

> "I only care about products which I invested a considerable amount of money" (BA,43. Limitations to care)

> "Depending on products' lifespan my interest to care varies, some products are made to run-down rapidly" (BA,113. Limitations to care)

Design for reliability and robustness, was presented in the former chapters as part of the design strategies to reduce replacement, reliable products are expected to longlast more than cheap products and that is the reason why respondents relate quality and robustness to having a less demanding product in terms of care activities.

Low involvement in product care was related to past care experiences which did not meet consumers' expectations, since the time invested in the activity and the results were not satisfying nor reflecting the desired outcome.

> "I am not motivated to conduct tasks since the effort that carries with it compared to the final results is not always worth it" (BA,17. Limitations to care)

The relationship with the product determines the degree in which motivation to conduct a care task changes. Cleaning (M=0,93, SD=0,259) Repairing (M=0,68, SD=0,467) Share tips (M=3,46, SD=1,504) Social circle access (M=2,03, SD=0,798) Fees (M=0,41, SD=0,492) Damage (M=0,41, SD=0,492) Knowledge (M=0,39, SD=0,489) (Figure, 039 frequencies and means)

3.7.5 Limitations to care

An additional set of factors that decrease motivation to care, were found in the study as part of the additional reasons and limitations to care that were included in the questionnaires at the end of each block.

The findings regarding limitations to conduct care activities may represent a general unwillingness to conduct product care activities. Apart from the general factors of the sample presented before, six additional factors were identified as limitations to conduct product care which are as follows, lack of time, lack of interest, laziness, quality vs lifetime, unrepairable designed, effort vs result. The following scheme, depicts the limitations found in the study and shows relations between each other in order to understand the way in which this factors are related and can be seen as an opportunity to work on motivation.

Time, was the factor which was mentioned the most in the study, participants referred to it as one of the major limitations, and as depicted in the scheme above, it is related to the laziness to conduct care activities. There are two layers of limitation factors which are differentiated based on their weigh compared to the overall result and that are influencing consumers' behaviour in a stronger degree. Based on this limitations overview, a cluster was made in order to find relations between the factors and the current behaviour, this relations are shown below.

The first layer which is in turn the most influential, is composed of the following factors: time, lack interest, laziness, and depending on product-lifespan which is related to, quality long lasting and only for expensive products.

> "Time, due to work days I don't always have the time for time consuming product care, such as repairing my car. Only in the weekend. I also like to take my time with things such as repairing my car or bike. I only do small activities during the week" (BA,28. Other limitations)

> "The time it costs if you do it yourself or the costs it will cost if you ask an expert to do so" (BA, 39. Other limitations)

> "Sometimes I don't have or make time to repair something. So I bring it to an expert" (BA, 38. Other limitations)

> "Generally when I have a cheap product I do not care about taking care of it" (BA, 267. Other limitations)

"Laziness, I usually only take action when it is to late. Only with products that are expensive and I am dependent on (such as laptop) I spend a bit more time on taking care"(BA,283. Other limitations)

The second layer is composed by: saving expert/fees, unrepairable designed, availability of spare parts, effort vs results, and only conducted by an expert.

> "Unfortunately, some products are made to be unrepairable" (BA, 137. Other limitations)

> "Sometimes products are not made to be repaired" (BA,142. Other limitations)

> "Spare parts are quite hard to find" (BA, 154. Other limitations)

> "Effort vs. result. Sometimes the effort is too high to get to the result. Or the result is not what I expected with the effort I put into it." (BA,17. Other limitations)

> "I prefer to take it to the workshop, since there you can find all the spare parts required." (BA, 209. Other limitations)

3.7.6 Factors resulting from the study

Low added value, and lack of proof of care were the factors identified in the analysis of the current behaviour gap found in the study, and during informal interview setups which were conducted after the questionnaires were completed. In this analysis, the root of the gap was identified by asking participants the reasons why they were not interested in taking part in care activities, which according to Serrat (2010), is a technique that works to undercover the root of a cause.

Low added value, refers to the way in which care activities are assessed by the consumers when considering a particular task, they don't see an immediate value for their products, nor for themselves, and that is the reason why their replies show that some products are maintained only until a flaw happens.

> "Only repair products when they are broken, don't have the time to take care of all my

products" (BA,39. Other limitations)

"I prefer to buy a new one when having problems with a product" (BA,77. Other limitations)

"I use products until they are no longer functional" (BA,107. Other limitations)

Furthermore, proof of care is addressed in this research project drawing from the proof of concept PoC, used in software development to determine whether a system complies to a specific feature of the objective it was created for. This project, translates the proof of concept into the design process as the proof of care, in order to understand the essential components of a persuasive mean, it is understood as the reinforcing cue a user needs to experience after conducting an activity.

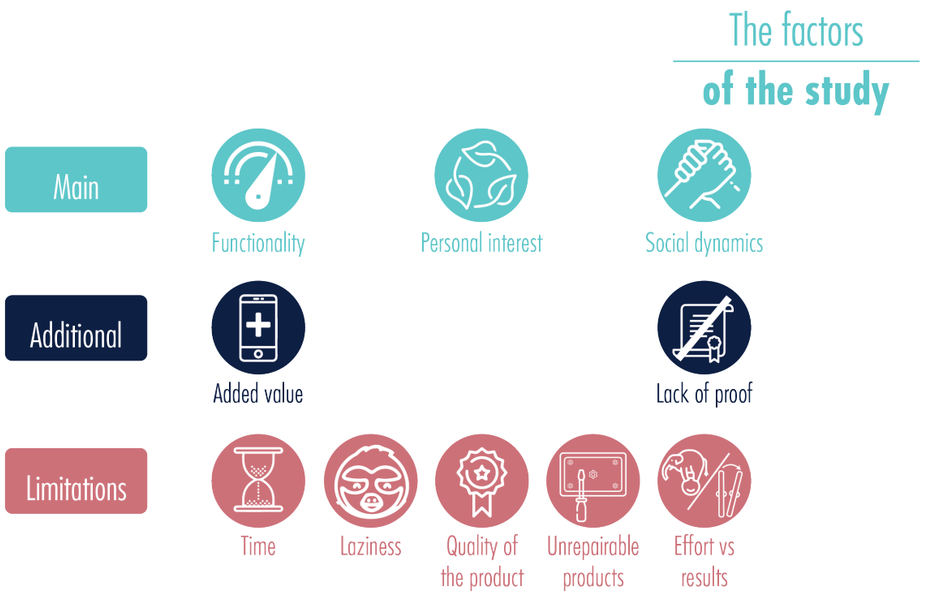
The additional limitation, effort-results is related to the proof of care, since participants in the study reported lack of interest resulting from a negative outcome after conducting repair and maintenance tasks, this means that users conduct a care-benefit analysis while considering to carry on a particular task, and this task can have positive or negative effects on motivation.

"Effort vs. result. Sometimes the effort is too high to get to the result. Or the result is not what I expected with the effort I put into it." (BA,17. Other limitations)

Therefore, a proof of care is needed as part of the persuasive process in order to validate the usefulness of the task users are about to conduct, and on the other hand, to provide users with peace of mind when facing care tasks in the future which they have no experience. (Seen as a benefit for the intervention explained in the following chapters)

TAKEAWAY

Recalling former positive experiences, has been identified as a motivational cue in care studies (Ackermann, 2018) this principle can be used to provide that personal validation that supports users' while turning their intentions into actions.



Figure, 041. Main drivers

3.8 Discussion

The scope of the study, was to understand the way in which product care activities are influenced differently by cultural, personal and product-dependent factors. By conducting 339 quantitative questionnaires, we gained insights into limiting factors for product care, using different product categories which are relevant within the daily basis for participants pertaining to the three countries. In order to design a system that persuades people to conduct more care, Fogg's behaviour model was employed. In addition, willing to explore cultural influences in product care, Hofstede's dimensions were taken into account. Drawing from the findings of the study, relevant factors to persuade consumers and guide a design intervention are identified. To test and adjust the proposition in the future, additional tests are needed to undercover the effects of culture in a broader sphere of the society, since the study had a greater amount of high educational levels participants, the sample can be extended and further explored by taking into account participants from other educational and socioeconomic levels.

Supporting former findings in design for product care (Ackermann et al., 2017), the study found that motivation to care is rather low, and it is only high when a relevant product either a daily tool or a personal product is taken into account. Current interest in care activities fades away rapidly after the initial intervention is conducted and participants are not willing to invest more time in these activities. In addition, participants ability to conduct a specific task is limited by

Following Fogg (2009), behaviour model in which pleasure, hope, and social acceptance together with its deterrent counterparts, pain, fear, and social rejection are presented as factors that influence motivation. Five factors of motivation, together with six limitation factors, were observed in the study, which can be linked to the motivators that are part of the behaviour model, since these factors contribute to attaining positive experiences with the products at hand. The main drivers which are, functionality, personal interest, and social dynamics, relate differently to the model and can provide additional support along the care journey. Functionality, was identified as a must for the participants it drives the initial interest in conducting care activities, followed by personal interest in particular products and in sustainable practices, and social dynamics such as, sharing knowledge and tools with friends, function as additional triggers and motivators, once the care interest has been raised. The latter factors relate to the need to be acknowledged in society, participants indicated that they were sometimes peer pressured to have their products in neat conditions since they did not want others to see their products dirty.

The factors of limitation addressed in the sample along with additional undermining factors found in the sample, are related to the ability factors presented by the Fogg's model which are as follows, time, money, physical effort, brain cycles and non-routine. Participants expressed that care activities were not part of their priorities therefore, they were not willing to allocate time to conduct such tasks, in addition they mentioned that maintenance fees were expensive, and spare parts availability was low, finally they reported that the effort demanded compared to the results were not worth. Having access to the tools required to perform an activity was identified in the study as an additional factor which relates to ability.

As reported by Ackermann et al. (2018), former experiences with certain product and maintenance or repair activity "work as facilitators, as previous experiences influence the ability to take care". In line with their findings, the study found that participants who were more experienced with certain product and conducted tasks in the past, were more likely to invest extra time in such tasks. These positive experiences can therefore, function as triggers to motivate people to carry on care activities.

3.8 Chapter conclusions & takeaways

Based on the initial premise, that cultural differences will imply designing different tools/means to motivate people to care depending on their provenance, the

findings presented show that cultural differences do not directly influence the product care behaviour of the respondents, when including factors such as socioeconomic level and educational level, and as a consequence, we decided to work on a unified persuasive system for the three countries, which needs to include an element to address personal differences and cultural orientation models in a different fashion since these preferences vary between users. The factors tested in the study, showed similarities in care behaviour among the countries which can be addressed by such a system, nevertheless, cultural background needs to be addressed from a different angle, mindset orientation which pertains to each country and addressed by Hofstede (1991), in his cross-cultural research. The variables that were employed in this research were relevant to the set of countries that were selected for the sample.

The research shows, that people are not strongly motivated to conduct care activities, consequently, the focus of this project is to design a persuasive system aiming at increasing consumers' motivation to care taking into account individual preferences and drivers that were relevant along the analysis, in addition to the six additional limitation factors which were ascertained as means to work on motivation from a design intervention. Regardless of being interested and aware of the relevance of conducting care, participants' actions do not reflect their intentions, elements such as cues to motivate them along the process are not present in all the stages of the care journey, hence their motivation fades away after being confronted with tasks which are demanding, former negative experiences, and fruitless content which they can not easily relate with.

On the other hand, even though individuals are aware of the sustainable impact of their behaviour, their interest in care, is product-dependent which means that participants who care of their products are conducting tasks led by intrinsic motivation that is attached to attaining a goal pertaining to a particular activity such as cycling or working. This particular purpose makes people more likely to increase their willingness to enhance their ability aiming at increasing their performance in the activity, but since it is focused on a single product its impact on attaining a sustainable behaviour is limited and does not motivate care in a broader scope.

This study complements the literature in product care (Ackermann, 2018; Ackermann et al., 2018) by taking into account cultural differences and individual interests as drivers that motivate people to conduct care tasks. Since design for product care can be fostered from a wide range of scopes, it is relevant to focus a design intervention addressing personal drivers and products which can be influential towards improving care in a broader manner. By providing users with gradual cues, and constant feedback that provokes their interest and actions, a persuasive intervention in design can increase the allurement of care. The results represent additional insights in designing persuasive means by addressing the key drivers of the interaction.

The following chapter, will include a summary of the drivers of product care, along with the most relevant insights gained to this point taking into account the theoretical background and the research study, the second section will introduce the design guidelines required to empower consumers to conduct more care activities, which drawing from the persuasion models and strategies presented in the theoretical background, delineates its own route towards engaging users to conduct product care.

The study allowed the project to identify the way in which the proposition needed to be designed, having key factors to be supported along the care journey instead of having different products of care per country. The sample showed, that users from the three countries, shared factors such as functionality, and personal interest in sustainable consumption. But it did not provide the difference in care behaviours that was expected to raise as a result of socio-economic differences and cultural differences between the three countries.

Persuasive design as a facilitator of care

The following chapter, collects the insights gained during the first chapters, and translates them into design guidelines. First, a set of strategies, methods, and design branches to persuade users to conduct care are presented, next, the applicability for design is addressed explaining how the insights gained along the project, can provide designers with a route to use persuasion to work on motivation to perform product care.

4

In this chapter

Drawing from the former findings on consumers' behaviour, we want to build a system that is motivating people along the entire care journey, which can conjointly give users tricks and tips, based on their products, and their personal interests. After conducting a quantitative research study, the project merges the insights gained from the theoretical background, with the findings that allowed the project to undercover the elements that have an impact on consumers' behaviour, and product care activities, drawing from these findings the design guidelines are presented in this chapter.

4.1 Goal of the **intervention**

After having gained knowledge and understanding the way in which people are influenced by multiple factors and means, the project goal was specified and adjusted based on the results from the research study.

Persuasive goal

-The goal of this project is to design a persuasive system that helps consumers increase their motivation to care more. The aim of this study is to see whether motivation, ability and learning have an effect on persuading people to care more.

Drawing from the insights gained through the research in product care and persuasion processes, three essential factors are identified to design a suitable system which can steer users' behaviour to carry on care tasks. Since the persuasion process varies mostly depending on: the individual preferences, the means and products taken into account. The following factors are depicted as requirements towards attaining the general goal. The design proposition needs to address consumers' individuality, include relevant tasks, and consistent cues throughout the entire care journey functioning as a system that supports the interaction in multiple stages.

Products can elicit different actions in consumers' behaviour, which as found in the study, are dependant on the degree to which a person is related to the product at hand, when a daily tool was presented such as, a laptop in the case of the students, the relevance and frequency were higher, conversely when leather garments were assessed, these factors were rather low.

In addition, this project aims at proposing a route towards introducing product care in daily activities which can be used by designers and companies to embed a sustainable behaviour in the future.

4.1.1 Design for **product care**

Current studies on product care, have provided design with an specific route to work on increasing consumers awareness to conduct activities that aim at extending the lifespan of products which in turn is willing to persuade consumers to refrain from replacing goods.

How can design foster product care?

This research project was conducted in five stages which are as follows, navigate, recognize, devise, tailor, and uphold, based on the Double diamond model presented by the Design Council, (2005) a framework was followed in order to guide the process and define a specific outcome for each stage. This iterative model started with a broader scope in design for product care which is coined divergent thinking leading to a narrow scope focused on persuasive design, called convergent thinking. This process allowed the project to find the best route towards making product care appealing to consumers, by using design as a means to translate insights from quantitative research into persuasive tools. (Figure, 04. The framework of the project. Triple Diamond)

Insights for product care

The study provided the research project with in depth understanding regarding product care behaviour in three different countries. Since care activities were mostly related to functionality in the three countries, and the socio-economic level did not have a significant impact on product care, the study worked as validation to include generalization as a requirement for the proposal.

The design proposition to persuade consumers to care needs to be applicable and relevant in the three countries, instead of having a separate mean specific per country. As it was stated by Weitzel & Van der Laar (2001), in former research in packaging design addressing cultural differences, there are two routes in which a company can match their products to the market, one is using context characteristics to adapt the design to the specific target, and the other is using a global design which has neutral appearance that has an equal impact in the multiple targets.

According to Weitzel & Van der Laar (2001), this decision of designing context-specific or broad products, depends entirely on a cost-benefit analysis, and on the situation at hand, which in some cases the designer can increase its impact by adapting the content to the target population or by introducing a general design. This project, takes the general approach in design as the preferred route to make the intervention relevant in the different countries by focusing the persuasion process on functionality of the products instead of on independent context factors.

On the other hand, Hofstede's cultural dimensions, are taken into account as cultural guides to increase the effectiveness of the communication created for each country and the type of tasks offered to the target population. The dimensions long term-orientation, and collectivist mindset, suggest that the intervention can have four different routes in order to create a match between the users' personal orientation and the content presented. These four routes are as follows, short term, long term, individualist and collectivist; the persuasive concept needs to introduce care activities attached to other dynamics which can foster users' interest, for instance individualist users can have cues along the journey focused on personal improvement and competence, and collectivist users can have a collaborative cues and opportunities to improve care and share care with friends.

Content relevant interactions

These routes are proposed as a way to maintain motivation along the consumer journey by increasing the touchpoints with care. Based on findings from product care research, in which the intention gap is likely to be reduced by accompanying users in the course of time. The project aims at creating relevant triggers that must be manifested during the different stages of care. Motivation is expected to longlast more when having phased triggers, which are relevant to each step of the journey, and which allow the intervention to have a gradual engagement.

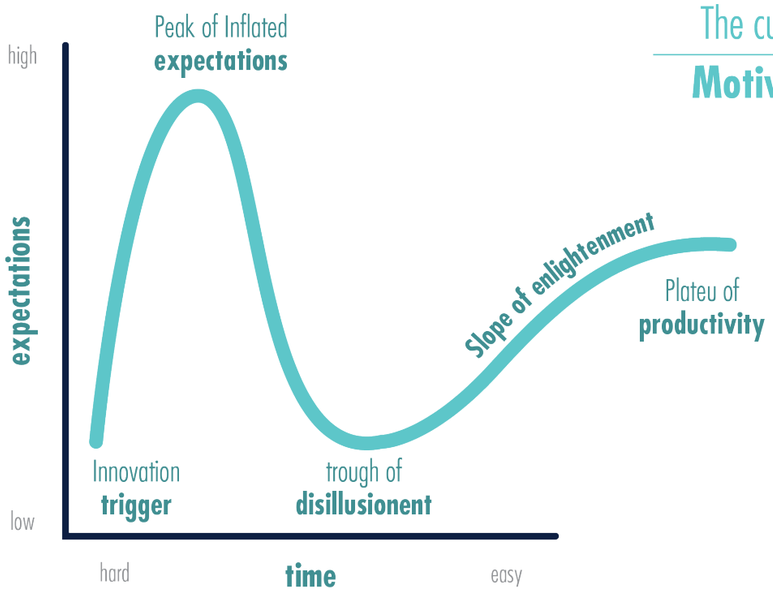
Gartner (2008), introduced the Hype Cycle, to understand the key phases of the life span of technologies, in which expectations, and time, are mapped along five phases. The Innovation trigger, starts the process, it provokes the interest in the potential technology, as a result of early proof-of-concept stories, resultant form no usable products. The following phase, coined as, Peak of Inflated Expectations, uses advertising material, to raise the interest in the technology producing success stories from early adopters, the next phase, Trough of Disillusionment, refers to the stage in which interest in the particular technology fades as a result of failures in testings and implementations, consequently, the Slope of Enlightenment, works as a validation process, to identify which generation of products is capable of delivering the expected value, which will succeed in the last phase, the Plateau of productivity, the technology is paying off as a result of the extended adoption.

The hype cycle, is here related to the persuasive process to the extent that both, express the way in which technology or a digital mean evolve over time, to seize the resources required to its deployment. Drawing from the Hype cycle, the curve of motivation, is portrayed below taking into account the way in which users' expectations change through the time, it depicts the engagement process of users with certain activity that happens in a phased-manner. At the beginning of the interaction, the interest is high, as a result of the sense of novelty that the intervention carries with it, users are getting to know the advantages and possibilities, the following phase coined as the peak of inflated expectations, raises the interest in the mean, after validating the relevance of elements, next, Trough of Disillusionment, interest fades, as a result of failures related to expected benefits, next, the Slope of Enlightenment, works as a validation process, to identify the prefered configuration of the intervention (persuasive system), last, the Plateau of

productivity, is when extended adoption is reached by satisfying users needs.

TAKEAWAY

Eyal (2011), proposed a randomized introduction of triggers which can continue improving motivation once the first interactions has passed, the intervention needs to be understood as a system of elements that function together to maintain the interest of users in the activities through the time.



Figure, 041. The curve of motivation

The figure above, the curve of motivation, comparing the traditional route of an implementation, and the preferred route for the project.

4.1.2 Persuasive **cycle**

In order to provide the intervention with clear steps and touch points that support users in a sustained manner along the care journey the persuasive cycle is proposed. The following image depicts the way in which the persuasion process needs to be tailored combining the Hook model and the persuasion elements pertaining to the Fogg's model.

In order to create a relevant interaction, that stimulates consumers' motivation to care, a set of factors that influence consumers' behaviour were identified, and further explored in pursuance of designing influential cues in attaining a relevant goal adapted to the users' interest. Functionality was attached to the benefits of care since it was identified in the sample as one of the most relevant drivers of maintaining products.

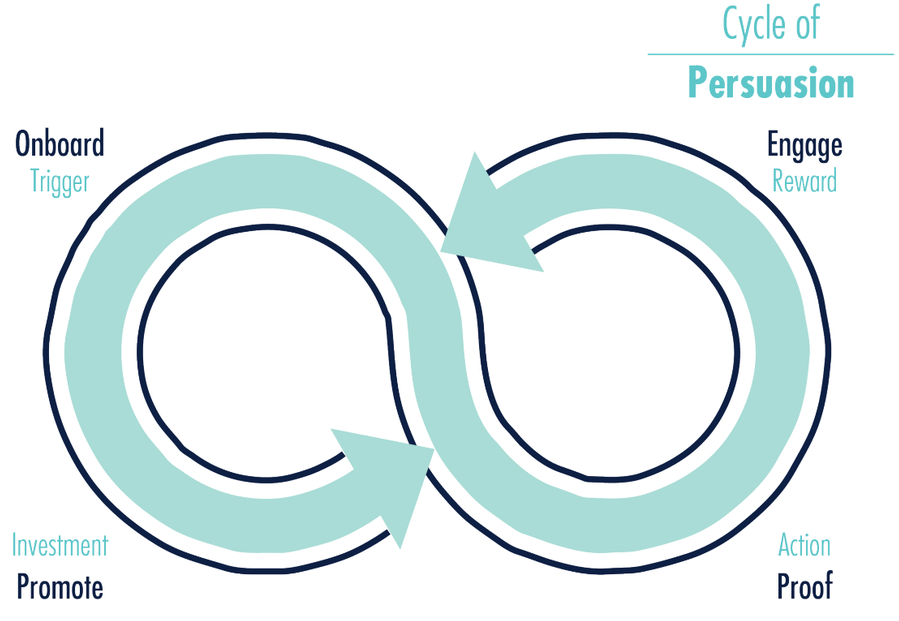
The intention of the project, is to further explore the capabilities of design to persuade people to care more. Considering that, most of the literature available, during the research of the project, was focused on the Fogg behaviour model as a method to guide the persuasion process, or on design strategies, but not the link between the two, I decided to ask an expert in the consumer research and behavior for advice. During the session with the Prof. dr. Jan Schoormans, aiming at finding how to use the factors pertaining to the Fogg's model, as a means to outline the opportunities for a design intervention to work n persuasion. The following factors, ability, motivation, and opportunity, were drawn as three routes in which designers can funnel their efforts to persuade consumers to act and in the long-term form a behaviour.

Ability, is related to the capabilities a person has to conduct a task at hand, it is related to the knowledge the person has, with regard to the addressed task, and to the required tools to perform the addressed task. Design, can be used as a means to increase ability, providing people with easier access to knowledge, which can be attained, either by working on the way in which information is presented, or by focusing on, finding alternatives and means, that can be used to make both knowledge and tools more accessible and desirable.

Motivation, is referred to the interest a person can have in a particular task, which can be understood as the degree of involvement with the task at hand. Involvement, can be measured differently based on three factors which are as follows, social value, economic value, functionality, and personal value of interest to the user such as sustainability.

Opportunity relates to the physical spaces, and setups such as workshops, lectures, and trainings, in which the task can take place. (Figure, 042 The cycle of persuasion)

In order to use design as a means to guide people, along the product care journey, ability, and motivation, were selected to be addressed in the project. Due to the capabilities of design to increase the impact of persuasive interventions, which can take into account both factors in a holistic manner, and by reason of abilities to explore the drivers of consumers, with regard to knowledge, and tools; and to find routes to work on motivation as a means to increase ability and conversely.



Figure, 042. The cycle of persuasion, based on the hook model.

4.1.3 Bridging behaviour **key elements**

Aiming to fill the intention gap, that has been addressed in behavioral change propositions, this project, lists the key elements that can drive a persuasive interaction, building them gradually to increase the effectiveness of the mean, and the interest of consumers along the journey. Furthermore, the intention gap can be bridged by ensuring that the following factors to conduct care are supported along the process. The following image depicts the way in which this intervention bridges the intention gap.

Functionality and care

Based on the findings of the study, functionality (M=0,94, SD= 0,233) (Figure, 00. Descriptives analysis, table 00) was identified as a relevant motive which respondents take into account when conducting repair and maintenance, it is the primary objective to perform any of the tasks related to extending performance of products. Thus, it is a main driver for care from which the proposition needs to build upon the interaction, it also works as proof of care, which makes users willing to repeat a particular action in the future. This indicates that, for all the individuals form the three countries, conducting a care activity, will at first need to assure functionality of the products at hand, and subsequently, additional benefits such as, aiming at extending knowledge and ability, can be introduced in a progressive manner, to involve users in a care behaviour, that raises from a functional need, into a personal choice. (Fig. 5 table correlations)

In addition, care activities need to be performed in a simple way, which evidences the benefits of care in an immediate way, aiming at providing consumers with peace of mind, after performing tasks to have their products in sound condition after following a process that reduces complexity, and time required to attain a particular goal. The design intervention, needs to be tailored around users interests, including a degree of personalization related to the products, and their capabilities, which was identified during the analysis of frequency and relevance to care. (M=,) (Figure,)

Personal interest

In line with functionality and care, the design proposal needs to offer users the opportunity to discover and choose their own path towards achieving care goals. This personal direction, is supported by an adaptable product-set, and servicing tasks, that are more relevant to them, based on the initial findings of the sample. Additionally, this process needs to feel free to the users, in the sense that they can select what they want to do, what type of products they want to care, when they want to cary on tasks and what they want to learn, conversely, to a mean that forces the users to follow a fixed pattern, that is not relevant to the same degree to all the different user profiles.

Intrinsic motivation and self-reinforcement

In line with Ryan & Deci (2000), there are two types of motivation: intrinsic motivation and extrinsic motivation. Intrinsic motivation relates to personal drives that make people act in a certain way, extrinsic relates to external factors that have an influence on people's decisions while aiming at attaining a particular goal. In order to spark consumers' interest in performing care tasks, the design intervention needs to provide users with a different cues which guide the persuasive process.

Intention gap

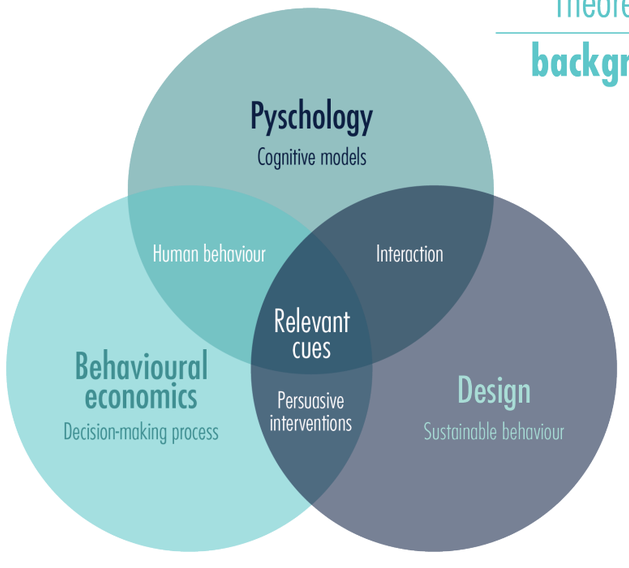
The Sustainable Consumption Roundtable (2006), stated that, designers are responsible for planning the way in which consumption occurs as well as bridging the intention-behaviour gap between mindsets and daily actions. Which according to Orbell & Sheeran, (1998); Storm, (2016), it is a phenomenon in which people decide to amend their behaviour but fail to take action. With regard to environmental challenges, a green mindset has been the object of study, to understand the reasons why people are interested in adopting this behaviour, but they are not taking action upon their initial interest, that in some cases is diluted throughout the time. Extensive research has been done to understand the gap between what people say and what people do (Eck, 2009; Young, 2004; Basu & Hicks, 2008; Chen & Chai, 2010).

In line with these findings, Ackermann, Mugge, & Schoormans, (2017), found a gap between attitude towards sustainable practices, aiming at extending lifetime of products, and the action related to conducting product care tasks. The reason why respondents in the study presented a low level of product care, is that current care tasks are missing relevant triggers, that lead consumers to take action. Even though, they have the ability to conduct product care, and are motivated to do it, the task is not completed, because throughout the process, the motivation fades away as a result of missing cues that provide users with sustained motivation to act.

In order to close the current intention gap, the propositions needs to turn product care into a personal journey, which is supported along the process with variable cues that are responsive and adapted to match the individuals' preferences and current interest in care tasks and products. In order to achieve this, it is necesaary to increase the touchpoints of the customer journey, and reinforce the intentions of users to conduct care.

Based on the previous insights the following scheme works as a means to portray the manner in which the methods and strategies work together in attaining a behavioural change.

Theoretical
background



Figure, 043. The theoretical background

4.1.4 Cultural **relevance**

Takeaways for design

The study took into account Hofstede's cross-cultural dimensions to identify the way in which cultural background can influence product care, the following dimensions were taken into account since they scored differently between countries and this difference was relevant to test. Below the key insights from each dimensions are presented and related to possible means and routes to be addressed from a design intervention.

Individualism Collectivism

In order to motivate consumers to care more, the design proposition needs to have different layers related to the orientation each group have. On the one side, individual cultures can be more prompt to take part in a competitive set which can be fostered by including comparable features based on performance and self improvement, whereas collective cultures, can be more attracted by a set of features that fosters collaboration and sharing such as, friends overview dashboard, vlogs, tutorials.

Long Term orientation vs Short Term orientation

Planning can be used for both profiles as a way to receive feedback on their care behaviours and keep track of their processes. For long term individuals a longer time span with milestones can be included in order to support their willingness to achieve goals in the future, whereas for the short term oriented individual, a short time span with immediate rewards can increase the effectiveness of the persuasion process.

Socio-economic level

After conducting the sample, there were not relevant correlations with regard to care activities and the assessed country. The initial assumption, with regard to the impact of the socio-economic level of each country on the behavior of participants, did not have a significant difference. It was conversely, similar among the three countries, and this proves the need of taking a broader scope for the design which can be relevant for the three countries. Tailoring a system which can work in the three contexts, instead of developing independent means per country.

4.2 From research to **design guidelines**

This following section, aims at providing the project with the guidelines required to create a persuasive system that supports consumers' along the entire care journey, drawing from theoretical models, design strategies, and the insights gained in the former chapter. It presents (five) elements, to structure, and increase the relevance of the system concerned. In order to design a system capable of bridging the current intention-action gap and persuading consumers to care more, the following requirements need to be taken into account.

Learn & improve

Learn and improve

The journey of care, needs to be understood as a gradual intervention, that allows the users to improve their ability along the time. In order to do this, the content needs to be constantly updated, together with the available possibilities to conduct a care task. Users need to be engaged in the interaction, in a way that makes them tailor their personal journey, as it was found in research in consumer behaviour, when individuals invests time, and effort, in a particular activity or product, they tend to value more the product (Ariely, Mochon, & Norton, 2012), and their interest grows while learning new manners to take care of their products.

Supportive interaction

Supportive interaction

It is necessary to reinforce consumers along the process in a sustained manner, since their current motivation is low, and decreases as a result of negative experiences with regard to former tasks that were conducted aiming at improving the product, but the final result did not met the expectations set at the beginning. Apart from having easy and simple tasks, the system needs to provide the users with a proof of care that is motivating and relevant to their personal interests. Positive goals, have been found by Zhang & Fischbach (2010), as effective means to engage people while pursuing the set goals, they allow people to overcome issues along the process, and as a result, they contribute to increasing performance in a general manner.

Engaging & updated

Engaging and updated

Motivation needs to be supported along the entire care journey, in order to achieve this, the system needs to include an enjoyable design which triggers the users to use the product and conduct activities which are now been seen as boresome or are not a priority. Eyal (2017), stated that in order to engage consumers along a persuasive interaction it is necessary to variate the triggers and the rewards which are used along the journey to avoid consumers to decreased their interest in the product at hand, in line with this, Lockton (2009), presented gamification as one of the strategies that aims at including a fun factor to the design in which a process can be presented and supported in a fashion.

The social factors can be used as triggers to motivate consumers to conduct care, by receiving support from their social circle and reducing their limitations related to limited knowledge and tools while increasing their interest in care.

Customizable & balanced

Customizable and balanced tool

Since consumers preferences are always changing and vary in an important manner between on and other, the design system need to be capable of offering the users with a personalizable interaction when referring to their products and their personal preferences. In addition, consumers ability changes depending on their relation with the products at hand and their possibilities to conduct a care task, therefore, the system needs to be flexible and tweakable to cover a broader range of skills, and

interests. Including just the appropriate balance, between easy, and highly technical tasks, is key to motivate consumers to conduct care activities, since the ability grows with the challenge, tasks adjusted to the users' skills can stimulate their intention to care.

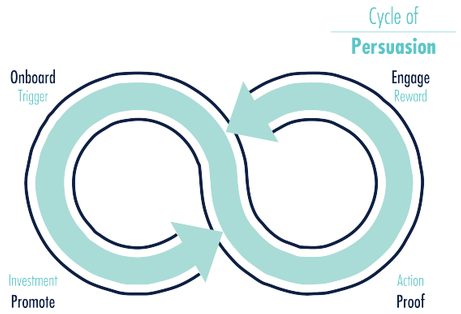
Easy to use

Easy to use and effective

The tool needs to present care activities as simple as possible in order to reduce the current concerns users have with regard to the time that these tasks demand. The processes included, e.g. repairing and maintenance of certain product, need to be intuitively followed by the user aiming at reducing extend explanations and overwhelming information. Both the used mean, and the information need to be relevant to the users in order to augment their motivation, this mean need to be accessible to them in their current routine and not as an additional product which can take more time to be accepted by the users. Research suggests, that behaviours which are easy to conduct, contribute positively when turning the intention into action (Sheeran, Trafimow, & Armitage, 2003).

General structure of the intervention

Based on, Eyal's persuasive process, a framework for designing persuasive means (systems) is introduced as a means to guide the ideation phase and the iterative design process of the project, it is based on a cycle that has four steps: trigger, action, reward, and investment, which work as accompanying elements for the persuasive intervention. The structure of the intervention, aims at increasing the continuity of the cues presented to the users, to engage them with a care behaviour, which has been identified as a point of improvement to extend the capabilities of a behavioural intervention (Ackermann, et al., 2017). Below the Hook model is presented as means to guide a persuasive interaction.



Figure, 042. The cycle of persuasion

Ritual & Routine the purpose of the consumer journey Eyal (2014), presented situational dynamics, as a way to map daily routines and rituals aiming at achieving a habitual change. On the one hand, routine maps, enable the designer to have an overview of the current touchpoints, the user has with a specific product, or activity. On the other hand, the ritual maps, allows the designer to go beyond the existing habit, identifying emotions, and the opportunity space in which the intervention can have a stronger effect. Aiming at creating a solid structure for the intervention, the project aims at mapping the current touchpoints of care activities, and merging them along with current rituals related to the products at hand, to identify the moment in which drivers to care need to be introduced. The consumer journey is depicted in the following chapter.

In order to increase effectiveness of the persuasion process and the design outcome, flexibility and adaptability, were identified as requirements to tailor designs to the target population, and as a consequence, increase the interest in taking part in certain activity or process.

4.3 Limitations into **opportunitites**

key takeaways

Consumers can allocate time to conduct care in the future, without seeing the current activities as a waste of time. Depicting the consequences after conducting certain task, together with an indicator of learnings, and savings, related to the activities carried out, can motivate consumers to sustain their interest in attaining an active care behaviour and be more active in a general towards supporting sustainable initiatives.

How can persuasive design motivate consumers to allocate time for conducting product care the next chapter will address these possibilities.

Personal reinforcement, is given by using cues along the product-user interaction, that make explicit former tasks achievements. The project intends to create a connection with the individuality of the users, and the mindset orientation they have.

Lack of both interest and time, were identified as the most influential limitations, that prevent users from having the intention of care and taking measures to do so. These factors are therefore a focus point for the design intervention, aiming at engaging consumers with product care by making activities more appealing, compelling, and relevant to them.

4.4 Chapter **Conclusions**

After gaining understanding on, the current care behaviour, the main drivers that motivate people to carry on care tasks, along with mayor limitations, behind the loss of interest in conducting such tasks; the design guidelines are described together with requirements, and strategies that need to be included in the systemic proposition. These guidelines, establish a clear path towards tailoring a persuasive system, which is intended to support users along the whole journey, in order to increase the effectiveness and long-term impact of the system, relevant techniques are mapped based on their fit with the target behaviour, and actions which the proposed system needs to fulfill.

The following chapter will portray the beginning of the ideation phase of the project (tailor), which based on the insights gained, presents the persuasive system that is relevant to the participants, and that integrates the key elements addressed in this chapter aiming at developing a tailored interaction which matches the user's individual preferences, and interests with regard to conducting care activities.

Persuasive means to foster behaviour change

This chapter presents the foundation of the design intervention based on the insights gained in the former chapters. It provides an overview of the structure used to create the strategic proposition which uses a phased-approach to increase the impact of the intervention in the future. Additionally, it takes into account design strategies, and persuasive models to increase the relevance to the users.

5

In this chapter

Based on the design guidelines presented in the former chapter to tailor a persuasive system, which needs to integrate a set of factors, in order to increase the effectiveness of the intervention, this chapter, portrays the ideation process from which the design proposition of the project raises. The first section, presents the structure of the intervention by presenting a phased-approach, The second section, presents a digital mean that is relevant to the users in the current times as the preferred tool to engage the users with care during an initial phase.

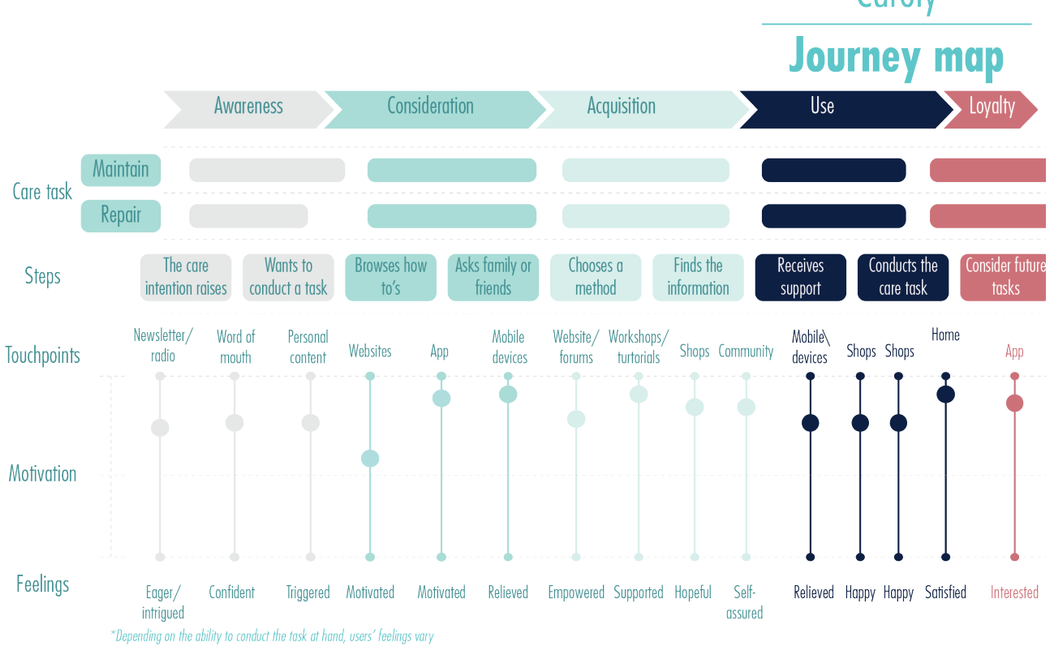
5.1 How to design **relevant persuasive means**

(Ideation process)

After having conducted the first three phases of the study, navigate, recognize, devise, and have gained knowledge on, which behaviours needed to be tackled, which means were the most effective, and how the proposition needed to be designed as a system. The development phase (tailor) of the project, is explained below. (Figure, 04. The framework of the project. Triple Diamond.) metaphor. (Figure, 044. The journey of care)

The first step of the intervention, was the assessment of the current behaviour, in order to achieve this, a customer journey map, allowed the project to understand the way in which the targeted population needed to be encouraged with the design, by implementing the strategies identified before, as a means to create the journey of care. Following the behavioural persuasion scheme, designers can better understand the relevance for consumers, and adjust the propositions to match users' individuality. The figure below depicts the consumer journey map of the design intervention depicting the new touchpoints of the expected situation, compared to the current situation presented in the second chapter (2.3).

The app, provides support along the multiple touchpoints of the customer journey, by using the three horizon scheme, to structure the phased-intervention, the engagement in product care is fostered. Merging the insights gained throughout the project, with design strategies to persuade consumers to act, enabled the project to tailor a gradual intervention that provides support along the entire journey, and enables users to freely improve their current care behaviour.



(Figure, 044. Carely. The customer journey map of the future vision)

5.2 Key elements **to persuade users to care**

The product-set

Based on the findings mentioned in the third chapter, regarding frequency and relevance of the current care activities, and current limitations found, this set is the starting point of the intervention. The product-set, is composed of the following products: laptop, shoes, bike, glasses, and car, which depending on user's interest can be tailored differently, aiming at addressing personal relevance, which following the design guidelines, users individuality is another relevant factor that needs to be taken into account while designing persuasive interactions.

Simplicity and functionality

Simple design has been proved of help to guide users along interactions with products and services, it provides a clear route, which consumers can follow without being overwhelmed by multiple options and elements along the interaction. Dieter Rams, addressed it in his 10 principles of good design, "good design is as little design as possible". Reducing complexity of the options presented to the users, can increase the effectiveness of the persuasive process. Lockton (2009), proposes simplicity as part of the persuasive techniques, used to structure the interventions as easy as possible in order to make users attain a specific goal. Simple layouts and fruitful interactions are therefore used as a means to reduce the cognitive effort and time users need to invest while using the by the first time and along the engagement process.

Interaction elements

Drawing form Lockton's toolkit, Design with Intent, the following are the principles which can be used to design the persuasive system.

Pertaining to the architectural lens, simplicity, segmentation, and positioning, are used to design the structure of the interaction, the elements that compose the app and the relations between them. Overall simplicity is used in the whole journey as a reinforcing value which can increase users' interest in care activities, it is composed of a phased set of screens which guide the users along the journey by providing support and presenting visual cues of the task at hand. (Lockton, et al., (2009) design with intent)

Form the interaction lens, peer feedback, real time feedback, progress bar, summary feedback, tailoring and simulation, were used to provide the journey of care with a visual and traceable progress which includes social triggers and personal reinforcement to increse the relevance of the cues that are presented.

With respect to the ludic lens, levels, challenges & targets, playfulness, rewards, scores, and unpredictable reinforcement, were selected to guide the design of the journey, taking into account, that care tasks needed to be shown in a playful manner, to convince users to conduct care, the unlockable features that support consumers through the journey were structured including the techniques mentioned above.

Perceptual lens, color associations, metaphors, proximity & grouping, and similarity, guided the visual design of the elements of the app, the main bar, the look and feel and the visualization of the journey of care. The methaphor works as a means to motivate users to continue their process in orde to achieve a set of rewards that are visualized in My Journey.

Concerning the cognitive lens, commitment & consistency, expert choice, habits, personality provoke empathy, reciprocation, social proof. These techniques were used to sustain motivation through the care journey by making experts' advice accessible at any time and in a seamless fashion.

Machiavellian lens bundling, is intended to structure the service offering that pertains to the third horizon, in which a bundle service is tailored based on the users' needs regarding their products, this bundle is presented in levels of care, frequency and assistance required to solve an issue or keep track of a set of products.

Security lens, What you can do, what you know, and what you have done, are used to stimulate users along the process making their care activities visible by relating them to personal and social impact.

Gamification, as described by Lockton (2009), in the design for intent toolkit, gamification, which is part of the ludic lens, can provide design interactions with an enjoyable character which increases interest and motivation. Fun and effective tasks, are of help while designing persuasive interactions, which need to draw the attention of users, and support them along the journey, by increasing the amount of touchpoints the interaction needs to have, as an opportunity to build a relevant journey which provokes users to act.

Seamless processes integration

Integration between tasks demanded to the users, need to be led in a continuous, and gradual manner, in order to properly guide users through the care process, and enable them to build upon their knowledge while attaining the desired actions. Seamless communication has been addressed from multiple scopes, and interventions, as a means to reduce the burden of conducting a particular task, which in the past required a bigger effort from the users. Effortless transitions, between the actions demanded, can reduce the complexity of the interaction.

Nowadays, companies are offering a variety of products and services, which are accompanied by a digital platform, which strengthens the products' capabilities by providing extended support, that allows consumers to foresee downtimes, and keep track of their performance and maintenance processes.

5.3 Looking for effective means **to persuade users**

After having identified the touchpoints that were more relevant to the participants, an assessment of the possibilities to reach consumers in a personal, and easier manner, was carried out. Four categories were identified which are as follows: face-to-face means, which refer to on-site setups such as, workshops and pop-up solutions such as, the ones identified in the state of art analysis, the remakery, repair cafes, training centres. Remote means, which are related to a broad range of online services, in which digital products such as, software, apps, websites, are gaining relevance in the market, and at the same time, are working together with physical products to extend the capabilities users obtain when purchasing these products. Product design means, which are related to designing specific products to attain new behaviours, such as sports-tracking systems, smart-tracking devices. Finally, direct or forcing means, pertaining to an interlock strategy (Lockton, 2009) which restrict users' actions until another is accomplished, that uses tools such as, near field communication tags (NFC tags) to force consumers to conduct certain activities when, entering a place, when interacting with a product, which are designed in a machiavellian view.

After conducting a cluster analysis of the former possibilities to persuade people to care more, two factors were rated highly suitable to tailor a proposition which complies to the design guidelines and requirements drew from the previous stages, face-to-face and remote means are therefore, selected to guide the intervention that according to the intention-gap sustained guidance along the journey and variation in the means and the interactions can strengthen and increase the effectiveness of a persuasive intervention.

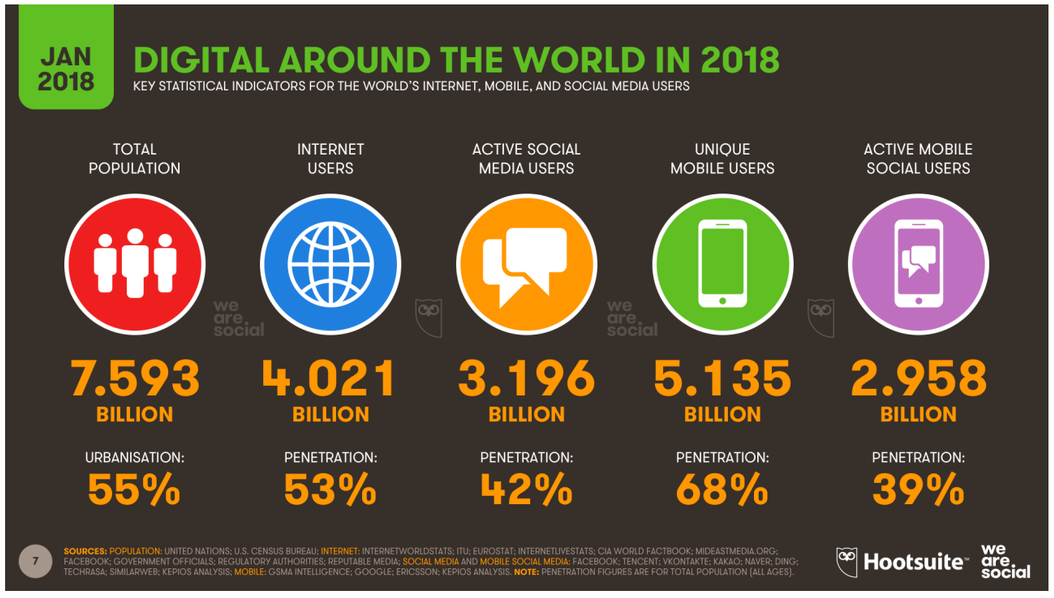
At first, digital alternatives are the most relevant category which nowadays, are highly accessible to the users by means of the personal devices such as laptops, tablets, mobile phones, smart watches, supported by the extended possibilities this digital environment internet of things (IOT) offers, when referring to connectivity among devices and transferability of data. Since these devices are already being used by the users, and are easily accessible, the system was thought to be developed for these means, starting the intervention with a mobile version and after that, including a desktop version, in order to reduce the learning curve that a new product carries with it.

Why an APP?

Mobile phones, are being used in a major scale around the globe, according to Deloitte (2018), more than one-third of consumers around the world check their mobile within five minutes of waking up in the morning, and 20 percent of them check their mobile more than 50 times a day. According to Kumar (2004), mobile communication makes contact between people possible almost anytime, via a "handheld devices". This immediacy changes the way people, communicate, have access to information, together with their behaviour. The image below functions as an example of these current digitalization growth.

In addition, current trends towards digitalization are changing the dynamics in which products are put into the market, going from single products to systems of products which are composed by physical products and services that provide extended support by using apps developed for mobile devices. These digital trends, are leading businesses to develop interactive content, which needs to be accessible at all times.

Based on the insights gathered from the study, in which functionality of products can be used as a factor to improve care, an app is selected as a tool to increase consumers interest in product care. Since it is an accessible mean to the target population it can



Figure, 045. The digitalization trends. Transition to mobile devices.

increase the effectiveness of the persuasive process. The flexibility of this mean allows the design process to test and evaluate the way in which different triggers, and interactions along the user flow, can hamper or foster the desired outcome.
The implementation of the project, is structured following a three horizon scheme, which works as a future visioning tool, that provides a clear route by having achievable goals and improving product care in a gradual manner. (Figure, 44. The customer journey map)

The future vision, allows the process to increase the impact of each phase by focusing on a particular goal. Based on the findings from the study, a product-set, profiling screens and adaptable content are presented to the users as a means to increase motivation. The users can select which products they want to add into their product-set and assess their relevance to determine which activities have a priority.

5.4 The goal of **the design intervention**

The design intervention, aims at raising awareness among consumers, with regard to product care activities, and its impact, both at a personal level, which is directly related to them, and in a broader scope, related to their context, such as, the environmental impact of consumer goods and social dynamics. The purpose, is to onboard consumers on product care tasks, which are relevant to their personal interest, the study provided the project with three levels of care presented as low, medium and high that are outlined below. (Figure, 00. GOALS SCHEME road towards onboard, proof, engage, promote)

The low involvement level, refers to the group that is not interested in carrying out care, nor has the ability to do it, and as a consequence this group does not see (relevant) value in care. The medium involvement group is the one that is currently conducting some activities to care of their products, but that is lacking of relevant motivation to have a consistent care, their ability is higher but it is only sufficient for some products, the intention gap, is here represented by a low care frequency. The high involvement group, was identified as users who can conduct care, both because they have knowledge and tools to take care of an specific product, which is highly relevant to them as a result of personal interest in an specific activity or a bond with the product.

Depending on the level of the users, the app offers possibilities to extend or promote care. Low skills users, can ask for guidance to other users along the care journey, next PROPOSITION

5.5 The persuasive cycle **in design**

Below the design cycle for the project, is portrayed which it is based on the Hook model, as means to guide a persuasive interaction. (Figure, 044. The persuasive cycle) Drawing from the Hook model, which has four steps: trigger, action, reward, and investment, the persuasive process in designed is reframed into specific steps that are as follows, onboard, proof, engage and promote, aiming at providing support to the care journey, while using the mean selected for the first horizon which is an app, by identifying how the user flow should be supported. These steps are focused on attracting users to using the app, as a motivator, and persuasive mean, towards increasing and improving current care activities.

The process is iterative, and aims at increasing interest in care in a progressive manner, which first engages individuals, by offering cues that resonate with their personal interests, then, it provides the user with proof of the reasoning behind conducting a particular task, what consequently, builds interest in care that is further expanded and embedded into their behaviour. The process starts by attracting users to the platform, by presenting a personal way to conduct care tasks. Next, it gives them a proof of the interaction, why is worth it for them at a personal level, next, it provides relevant content tailored based on the former interactions, and offers new benefits, finally, the interaction is repeated, as part of users habits which stimulate the behaviour by sharing knowledge with other users. (Visual persuasion scheme, interest, proof, engage, promote) HOOK ? the persuasive journey DESCRIPTION

Onboarding, proof, engage, promote

In order to strengthen motivation and interest in conducting product care activities, it is necessary to provide users with self-reinforcement, regarding their product care journey, which works as a stronger drive to make people act.The likelihood that people conduct a task again is higher once previous success is recalled.

Onboarding, is the first step of the persuasion cycle presented and it aims at attracting user to the platform by offering them a personal benefit related to product care. Proof is the next step of the persuasion cycle proposed in the project and refers to the ability of the design mean to make users validate the effectiveness of a care task which later on, will build confidence towards care activities. This stage is based on simple care tasks which along the process motivate users to conduct them and at the end provide users with an overview of their performance which counts as a gain that grows with the time. Engage the next stage, is achieved by adding a set of features that serve as triggers to conduct care tasks which vary depending on the context and the personal preferences. Promote, intends to form a behaviour through the time, which raises interest in supporting sustainable initiatives and increases personal awareness of the immediate impact of user's actions entail. (Figure, 042. The persuasive cycle)

Each feature supports a factor that increases motivation, at a personal level caring products due to functional benefits of having a regular maintenance, a financial drive, these factors need to be supported along the process,by using triggers that can make people consider the possibility to act upon product care, self-reinforcement, is used to create relevant triggers which take into account former experiences regarding product care, and turn them into a motivational mean which has a personal vision to care.

Achievements are added as part of the initial set of features the app offers, aiming at providing users with personal triggers which can increase motivation by recalling former positive results of their care, which according to, Ackermann, (2018) can work as a mean of motivation to conduct tasks in the future. This works as a proof of care, that motivates users while considering to conduct coming tasks, which can be a simple way to increase motivation throughout the process. The concept of proof, is addressed in this project as a personal validation of the process users conduct, which is needed to indicate the added value of care.

5.6 The persuasive **strategy**

Manzini (2003), presented strategic design as a sustainable alternative to change the traditional scope on product design, in which physical products are sold separately, towards introducing propositions which connect products and services in a systemic fashion that creates added value by synchronizing its parts to function together to satisfy consumers' needs. In this way, consumers are accompanied along the journey establishing a connection between them and companies, which in the past was focused on a one-time purchase, and at the end of life of the product a repurchase, but this alternative was overlooking the steps in between. The consumer journey (the journey of care) allowed to identify the way in which a systemic proposition can be presented as part of a implementation strategy, that makes each phase build upon the next one and function together instead of focusing its efforts on a particular aspect.

Aiming at providing extended support to the users along the care journey, (Carely) is presented as a systemic proposition, composed of different

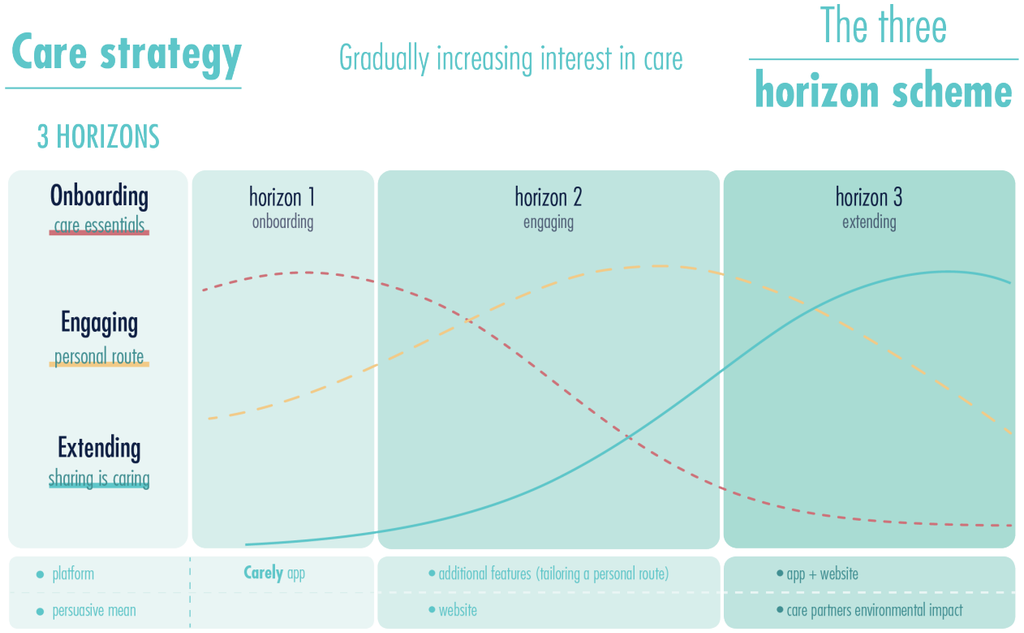
means along a phased implementation, in which each element is linked to each other, and work as an extension of the former one, these elements are as follows, an app during the initial phase, a website for the second phase, and a product service combination in the third phase, which first, builds upon the previous means to increase the capabilities of the general intervention, and thereafter, enables a service offering that covers the range of activities that are out of scope.

Introducing activities in a gradual manner increases the understandability of each stage, and reduce complexity Lockton (2009), presents chunked tasks, as a means to make the process engaging and easy to follow, by that the process composed of simple steps, and phases, is easy to conduct, and it is supported by repeated tasks aiming at building a habit.

5.7 The three **horizon scheme**

The design proposition, is planned based on a prospective plan that has three horizons, in each phase of the intervention, certain goals are embodied in features, and screens within the app, this persuasive route is depicted in the scheme below (Figure, 046. The three horizon scheme).

In order to foster interest and create commitment with product care, each horizon tackles an specific goal ranging from the involvement stage to acting upon care. Each stage builds upon the other, and makes the persuasive process personal and functional. Including a collaborative scheme in which future stakeholders, partners and features can be added as part of following interventions.



Figure, 046. The three horizon scheme. Implementation strategy.

The first horizon, Onboarding, aims at engaging users with care tasks by using the product-set identified in the study as the initial opportunity to improve current behaviour. By providing users the ability to select the care priority of these products, identify their orientation model (long-term/short-term), and their interest in individual or social dynamics, the first interaction, involves users with care tasks which are relevant to them and from which a personal care journey is tailored. The initial personal assessment, is intended to make users aware of their current behaviour, based on the results from the study and aims at engaging them with care.

The second horizon, Engaging, will include a website version besides to the app, in which users can connect with friends and Carely community members willing to solve doubts, and receive support with regard to a specific task or product. The website, will ensure that information remains available after the first interaction with the proposition, which according to Foggs' behavioural model needs to be present along the journey. (Figure, 046. shows an overview of the web version of the product)

In this phase, a point system will be added as a means to reward users for conducting care activities, based on the findings from the theoretical background, and persuasive strategies, rewards need to be present along the customer journey, aiming a increasing current touchpoints and the intervention, empowering consumers to act upon the care intention. These rewards, are presented in a randomized manner which also strengthen the effectiveness of the cues that according to Eyal (2014), need to have a surprise factor to increase motivation, coined variable rewards, which aim at maintaining consumers' interested in the product.

The third phase, Extending, is the merging between the app and the website, after having identified a set of tasks for which users require extended support, either

Figure, 047. The home screen of the website.

as a result of lack of knowledge or tools, a service offering is introduced, specialized in those products, people are not likely to maintain or repair. A layered-service covers two type of professional interventions, to help people with daily care activities. On-site and remote, are the ways in which the service can be delivered, depending on the ability the user has to conduct an specific task. Ability, is here supported by a service layer which adds the possibility within the platform, to order support for specific issues related to the products at hand.

A bundled offering, allows users to define a product-set which they can keep track of and improve in a seamless manner, depending on the type of intervention required, the amount of products, and the response time. The offer is divided in three levels, Basic care, is the layer that covers the essentials of product care which are conducting regular maintenance that is focused on ensuring functionality. The next layer is medium care, it integrates functionality with instant care response which offers a spare product or a priority response in case of breakdowns. Lastly, responsive care is the layer in which users can have access to responsive benefits which propose a reactive care plan in the future. (Figure, 00. Service proposition scheme) visual mixed set and service third horizon)

The service proposition, allows consumers to adjust the degree of assistance they require, presenting two routes to solve a particular issue, the first one, is having expert assistance by an agent, who can go the location, referred as onsite care, the second route, is via a remote agent, that helps to solve issues, that does not require a physical intervention known as remotely. The offer, is bundled, depending on the amount of visits, and tasks the user requires. This last horizon, is presented in order to provide the project with cohesion, and extend the long-term impact of the intervention, which within the scope of this project is going to be briefly addressed, due to time constraints.

5.8 Analysis & **conclusion**

This chapter presented, the manner in which the design intervention is embodied in a digital mean, that is relevant to the current digitalization trends, and users' current behaviours. Next, it takes into account, persuasive strategies, factors, that were identified as main drivers such as, functionality of care, and personalization, in conjunction with, models of persuasion, to propose a system which is structured in a phased-approach. It proposes a persuasive cycle, based on the hook model, to support the engagement process by providing constant reinforcement, that is intended to grow as the interest and actions users' develop.

It is key that the proposition, is perceived as an adjustable journey, in which users have the freedom to decide which activities, tools, and information, they want to include, in order to increase the relevance of the product, and favor the owning process, which in the long-term, can form a behaviour. The following chapter, will present the outcome of this project, drawing from the strategy presented in this chapter, it presents the reasoning behind the decisions along the tailoring process

It is important to address, What features and questions are needed in the proposition to trigger and connect users with the solution to care.

Validation first prototype

This chapter presents the first set of insights gained during the usability test which was conducted following an informal setup. By means of qualitative interviews, the first prototype of the APP was tested aiming at finding two major goals which are as follows: testing the usability of the app itself, meaning the user flow, the clarity of each step related to the other, and the easiness to conduct a task. The second goal, was related to the look and feel, and the way the app conveyed a care motto to the users, by testing a set of names which where related to product care, relevance and categorization were tested.

6

In this chapter

Based on the design guidelines presented in the former chapter to tailor a persuasive system, which needs to integrate a set of factors, in order to increase the effectiveness of the intervention, this chapter, portrays the ideation process from which the design proposition of the project raises. The first section, presents the structure of the intervention by presenting a phased-approach, The second section, presents a digital mean that is relevant to the users in the current times as the preferred tool to engage the users with care during an initial phase.

6.1 The first **prototype**

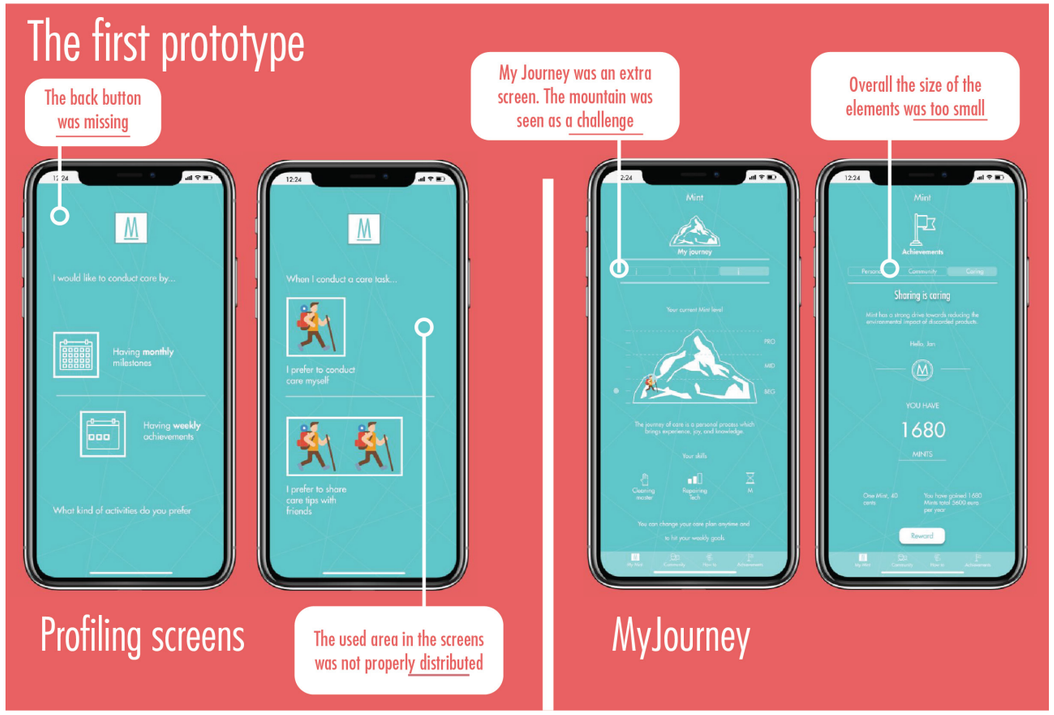
Based on the insights gained in the former chapters, an actionable prototype of an app for a mobile device was developed. Aiming at having a flexible mean to test different ways to trigger users along the process, by using interactive content which responded differently depending on the individual preferences. Next, the possibilities to iterate fast and update the features and actions was an additional reason to use a functional tool. Lastly, testing the usability in a mobile device, can increase the feasibility of the assessment, an illustration of this, is the scale and distribution of the elements which can be better seen on the targeted screen. (figure, 046. The first prototype)

6.2 The **sample**

The first iteration consisted of a sample of five international students, three of them were already related to the project since they took part in the research study, and the other two participants were not aware of the project nor had a design background.

6.3 The **method**

At the beginning of the test, participants were told to use a prototype which contained a limited amount of features which were as follows: the profiling set composed of three screens, the home screen, and an example of a maintenance activity



Figure, 048. The first prototype.

which portrayed a servicing task for a bike. This initial test, was presented aiming at testing the overall flow of the app, and the set of features that were unlocked depending on users' chosen preferences, and decisions along the simulated journey. During the informal setup, participants were able to try each step and basic feature set (home screen, planning, overall performance and maintenance task) back and forth, first having the initial guidance form the designer, and later on by returning to the point which they considered more relevant, or the one that needed to be clarified as a result of its complexity.

How method

A script, was designed to keep the flow/structure of the conversation by presenting each screen in a calm manner aiming at giving the users time to discover the app. Throughout the process, tips and tops were discussed by motivating participants to freely share their thoughts on certain feature, screen, or detail with the designer, this worked as a means of clarification on the goals of the first interaction, and at a later stage, the persuasive intervention as a whole.

The initial step of the test included a quick introduction on the topic, and the purpose of the project, followed by a tryout. The test was divided in two sections, based on the type of insights that were required to make the app more relevant to the participants' context, and personal preferences. The first section was focused on getting insights related to the overall look and feel, and the actual interaction, for this purpose, four factors were taken into account, in order to find user's response to the look and feel of the app (usability, easiness, logic transitions, and seamless process). To assess the first-use interaction, (widget) (UX values)

The second section, assessed the relevance of a specific factor which is the name, since the app intended to engage users with product care activities, the name needed to address this and convey it to the users in a direct manner, which according to Keller (2013), at the beginning of a branding strategy its key to start building recognition. For this purpose, a set of 10 optional names was presented to the participants at the end of the prototype's test. Taking part in the test was expected to form an idea of the intention of the project aiming at forming a criteria to assess the name-set.

6.4 Testing **goals**

In order to validate the way in which the persuasive elements were relating to the users' personal interests, and the intention of the intervention, the following objectives were taken into account to assess the tests that were conducted in the iterative process, these are presented in form of questions which aim at assessing the degree in which the elements presented were addressing the intention.

Is the journey an intuitive process, that is easy to follow and relatable to the users interest?

The logic of the interaction the steps required to attain a particular goal within the app needed to be tested in order to provide the users with a simple route that is functional and seamless.

Are the benefits of conducting care stressed in the app?

Based on the findings from the study, a proof of care was required to make evident the value of care activities. During the testing participants were asked whether they were aware of the immediate benefits of conducting a particular task.

Is the brand identity coherent to the intention of the persuasive process?

A relevant name that resonates in the minds of the users from the different countries needed to be identified in the test. The second part of the test presented the elements of the brand aiming at assessing its relation with the proposition which in turn works as a means of recognition.

How can usability of the prototype be further improved?

It was required to test the user interaction and experience along the journey, since a seamless interaction was expected to reinforce their interest. A guided tour of the app and its screens was given to the participants as they were simulating the journey.

Is the prototype reinforcing motivation to care?

The effectiveness of the tool was tested with the participants aiming at gaining insights with regard to the most relevant elements.

Are the triggers along the journey of care variable enough to sustain motivation of users?

As it was addressed in the guidelines of the project, the cues that are presented to the users through the process need to be constantly updated and tweaked in order to increase motivation. Since the process of care is intended to grow in a gradual manner, the means within the app need to behave accordingly to this goal.

6.5 The **insights**

After conducting the introductory tests, participants gave their opinion on the general intervention and the way in which the target behaviour was presented in the app. The process provided them with an opportunity to get involved in product care by having a personal assessment of their current behaviour. As mentioned at the beginning of this chapter this first iteration had two main goals, testing usability, and relevance of the name, next the results pertaining to each goal together with additional insights that were revealed during the discussions are presented below.

6.6 The **results**

Usability, the user flow

The usability test, showed that there were some points of improvement in terms of readability, user flow and effort invested to attain a goal. The following images depict the points of improvement found and give a detailed description of the issue at hand. (figure, 00. Improvement points uxad) HIGHLIGHT

The initial iteration takes into account that, as first-use, the interaction needs to be as simple as possible to invite users to perform product care. Users stated, that the amount of screens for a first interaction was overwhelming, and as a consequence the journey at some points was longer than expected. This referred specifically to two elements of the journey, the profiling process in which users were told to give their preferences to care, and the maintenance tutorial which had severals steps to attain the reward.

> "The amount of features is quite large, for a first-use interaction and it reduces the focus on one particular action"(BA, 07. First iteration interviews)

Figure, 049. First iteration testing. Interview photo 1.

Considering that the amount of clicks required within the same screen was high (e.g the home screen willing to discover the features available and its functionality), the interaction delayed the process, and reduced the interest of the users that had been raised at the beginning of the interaction. This usability issue was not letting them have a smooth transition between steps in a consistent manner. (Example of a profiling screens with regard to flow)

> "During the set-up and the tutorial, I felt that I had to click a lot to solve one topic"(BA, 07. First iteration interviews)

In addition, the buttons and interactions that were presented during the first test, restricted the freedom of the users to control the journey as they prefered.

> "I am missing the back button, during the test I needed to be able to return and that frustrated me a bit"(BA, 08. First iteration interviews)

The pop-up windows were added to the app along the journey aiming at clarifying the intention and functionality of each feature. This initial version of the app, included more screens to provide additional information e.g (to explain the features pertaining to the home screen and the care cycles, users had to click several times to have access to the explanation and the guide pertaining to the feature at hand). Participants considered important to have these windows, since they offer the possibility to get to know in depth information with regard to a particular process.

> "I like the hovering and pop-up messages because I was able to clarify doubts of the features I was using"(BA, 08. First iteration interviews)

The font size used in the initial prototype was reducing the readability of the screen and the features were not easily recognized. In general terms, the size font used in the first prototype was not readable at all times, since the initial steps (specially the first-time use) have a higher amount of text that works as a guide for the users to follow the profiling process, and start the care journey, the font size needed to be increased and the phrasing synthesized to increase legibility and balance with regard to the free space and the content.

> "In my opinion, the size of the bar and some icons are a bit small, as well as some texts that are not easy to read"(BA,09. First iteration interviews)

The distribution of the elements in the space was in some of the screens not balanced, what reduced the consistency of the structure along the process.

> "Some screens have usable space which is currently not being used"(BA, 10. First iteration interviews)

Visual elements such as progress indicators and screen selections, are missing in the prototype to lead the users through the interaction.

> "I don't see a visual guide of the screen in which I am at the moment, so I can not keep track of the feature that I am using"(BA, 11. First iteration interviews)

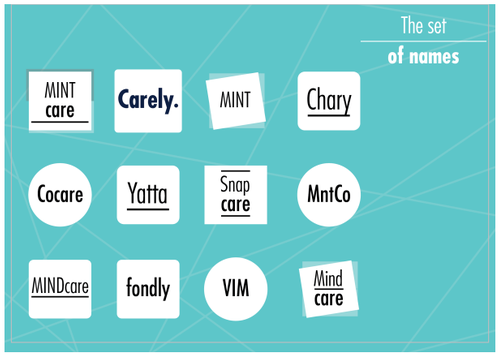
The reinforcement cues were limited to the overview screens, which are MyJourney and Home. The first prototype overlooked the required appearance of supportive material that needed to be given at the end of a task.

> "Apart from the congratulations messages in the general overview, I am missing the supportive messages at the end of an activity."(BA, 11. First iteration interviews)

Figure, 050. First iteration testing. Interview photo 2.

Relevance of the name

The results from the second section of the tests, showed that the set of names used, (which had a variety of alternatives ranging from immediate relations to conducting care, to abstractions of meaning-related words) offered the participants the possibility to relate differently with the concept and the design mean. Within these two categories factual and abstract names, participants were able to select their preferred alternatives. After being debriefed by the app the product care criteria was clear to the participants, what was expected to from a criteria based on the intention of the app. The following image depicts an overview of the name options.



Figure, 051. The set of names tested.

Results of the test showed that people prefer to have a name that conveys a need to care in a direct manner, over an abstract name which needs to be further explained. Essentially, at the beginning of persuasive intervention the information, and intention of taking part in a particular task which in this case is using the app, needs to be seamless, and non-complex relations with the name reinforce this objective.

> "I prefer the names that have a direct relation to care such as Carely, Mindcare, CoCare"(BA, 10. First iteration interviews)

> "Even though Yatta, and are interesting as a concept, You need to have an specific explanation to see the connection, and at first it can be misinterpreted"(BA, 21. First iteration interviews)

Figure, 052. Ariely's example

> **Carely**, is selected as the preferred name for the intervention and the app, since it provides the participants with an idea of the intention and it's easy to remember as a result of its friendly connotation.

6.7 Recommendations for **the second prototype**

Here the solutions to each point of improvement are explained, aiming at tweaking the first version for a second test which build upon the insights explained hereafter. In order to tackle the issues found in the iterations with users, three main improvement points were identified based on the goals of the testing and the findings.

Readability

Overall, the balance between content and free spaces, need to follow a consistent structure that can be provided by a grid replicated along the screens. The introductory text was rephrased and shortened aiming at reducing the load of information, and time required to complete both the profiling process and the care task. In addition, the font size, was increased for the entire user flow, buttons, headers, the main bar, and the reinforcing messages that were also changed to reinforce their visibility stressing the difference between light, and bold fonts.

User flow

The user flow of the app, specifically referring to the profiling steps was adjusted and improved, by combining each profiling step into one screen, and consequently, reducing the amount of clicks needed to complete one step. For instance, the home screen pop-up windows were added in a different way using another principle different that clicking but hovering so no additional screen or click was needed, providing users with more freedom to explore the app and the features but not forcing them to follow a fixed path.

Profiling

The profiling was simplified by reducing the initial interaction to four steps, which guide the users in a faster way to the home screen and to the care task. As a first-time use/interaction the amount of information needs to be carefully balanced to make the interest raise from one screen to the next one.

Takeaway

fast iterations with possible users, the digital mean proved to function as an engaging mean to attract users to the target behaviour, the functionality and variation in features needs to be adjusted to the participants in order to offer a personal route which can be more relevant to them.

Designing a persuasive journey

This chapter, depicts the way in which the persuasive mean is embodied into an App to motivate consumers care more. Based on the insights gained along the project, this chapter explains the motives behind each interaction and the way the systemic proposition strengthen a behavioural change.

7

In this chapter

Drawing from the former chapter in which a prospective route was presented by means of the three horizon scheme, the following chapter provides an in depth view on the features that each horizon carries with it. Last, it gives an overall assessment of the intervention its capabilities and limitations that future research can address.

7.1 From guidelines to **a persuasive system to make people care more**

The research study, provided key insights with regard to influential factors that drive a care behaviour based on the frequency, and the relevance in which care activities were being conducted, the project draws two routes in which people can be persuaded to care more, working on persuasion to increase ability and consequently, as a means to increase motivation, as was presented in the chapter three (Figure, 03).

The implementation of the design proposition, is structured using a three-horizon scheme which works as a means to map the main goal, the stakeholders involved, and required technology for each intervention during each phase. At the beginning, the proposition will use an APP to create a connection between the users and the behaviour, thereafter, a website will be included aiming at extending the possibilities to motivate consumers once they are aware of the relevance of care.

7.2 Defining the **brand elements**

Keller (2013), presented six criteria to create brand elements that ensure recognition and form positive associations with brands, which in the long run help to build brand equity. The criteria are as follows, memorable, meaningful, likable, transferable, adaptable, and protectable. The elements of system designed in this project, were tailored taking into account the criteria mentioned above in order to align the multiple means, the app and the website, along with its communication material, with a brand personality and positioning elements which are describe in detail below.

7.2.1 The **name**

The name of the app needed to provide the users with an immediate cue of its intention, since the app was planned to be introduced as an engaging mean to increase consumers' willingness to conduct care. Users need to identify the purpose at a first glance and start creating connections with the expected interaction. The two different categories of name alternatives, factual and abstract names, were tested during the first iteration of the project in which the prototype was introduced to the participants.

The name alternatives were presented ranging from two scopes, a direct connection with the concept of care which was reflected by using explicit names such as, MyCare, CareCo, JoyCare, Quickare and an abstract relation with the concept of care, either linked by the meaning of words such as Yatta (which means the feeling of joy after conducting a particular task), or by acronyms created from multiple connections between concepts such as, Mnt, CoCare, and MintCo.

Since participants were debriefed at the beginning of the usability test, about the purpose of the app, and how the features were building upon in a progressive manner to form a care behaviour in the future. By the second part of the test, respondents were expected to have formed an educated opinion to assess the names presented, which means that their decision was based on personal preferences but at the same time on the match between the intention of the app and what the name conveyed.

The results of the iteration with different target users, brought to light Carely as the preferred name for the intervention and the app itself. Results of the test showed that people prefer to have a name that is easily recalled and its meaning does not need to be explained, even though other names had an underlying meaning matching the intention, they were not easy to relate nor to remember. The first iteration of the prototype, used the name Mint as the option which related to the notion of care in an abstract manner pertaining to a concept used to assess the state of products which are bought in the collectibles market "in mint condition". During the tests participants did not relate completely to the connotation of Mint, when related to a notion of motivation for people to care of their products, even though some participants did relate to this concept the general understanding on the connection was not distinguishable to the respondents.

Subsequently, a more direct link between the intervention and the name was needed to avoid users misconstrue the intention of the app. Careful mindset was the connotation that prevailed the most among the participants, therefore, Carely, was related easily and spontaneously since it has a friendly and welcoming connotation, according to the participants perception, after having tested multiple names and Carley in the app the initial name was changed. A careful mindset was related to the purpose of the app, since participants mentioned they felt more aware of their current care with such an intervention and that their care behaviour was not the preferred one at the moment. Suitable

> "I realized that I am not caring properly of my products, since I just conduct any of those tasks only when they are strictly necessary" (BA, 27. First iteration interviews)

Drawing from Keller (2013), aiming at achieving brand awareness for the designed intervention, memorability was built by the name, and the icons of the products at hand that are included in the communication of the app, the careful mindset is constantly presented along the carey journey either by visual means such as reinforcing celebrations after conducting certain task, or by using messages that recall the intention of caring products in a thorough fashion. Meaningfulness, on the other hand, relates to the information that is accessible in the app ranging from general benefits with regard to carrying on repair and maintenance activities and to specific features, intentions and possibilities which are included per horizon that function as a means to gradually build awareness and interest in the target activities. Keller (2013), states that general information builds awareness and salience by delivering descriptive meaning, and specific information works on image and positioning by including persuasive meaning.

Additionally, likability is counted by using a name that relates in a welcoming manner to the users as it was identified in the prototype iterations. The elements the mean includes such as the illustrations, icons and the visual design of the user flow, are based on the journey of care which in turn is related to an actual journey aiming at providing support to the fun-caring personality of the brand intending to increase likability and equity among elements and means used along the journey. Transferability, refers to the way in which the name of a brand can evoke the same intention in different contexts and to different consumers, cultural meaning can diminish and hinder the value of certain name, therefore, Carely, was tested with participant from the three countries of the research study and the results shown that this name evokes a sense of awareness with care and conducting activities in a proper manner. The name can be transferred across means such as the website and users pertaining to different countries.

Lastly, adaptability, relates to the degree of flexibility the element of a brand is endowed with, despite of changes in consumers' interests in care, products, sustainable values, the elements are capable of being updated accordingly. Since the implementation strategy of the project presents a phased-approach in which tests are conducted and tweaking.

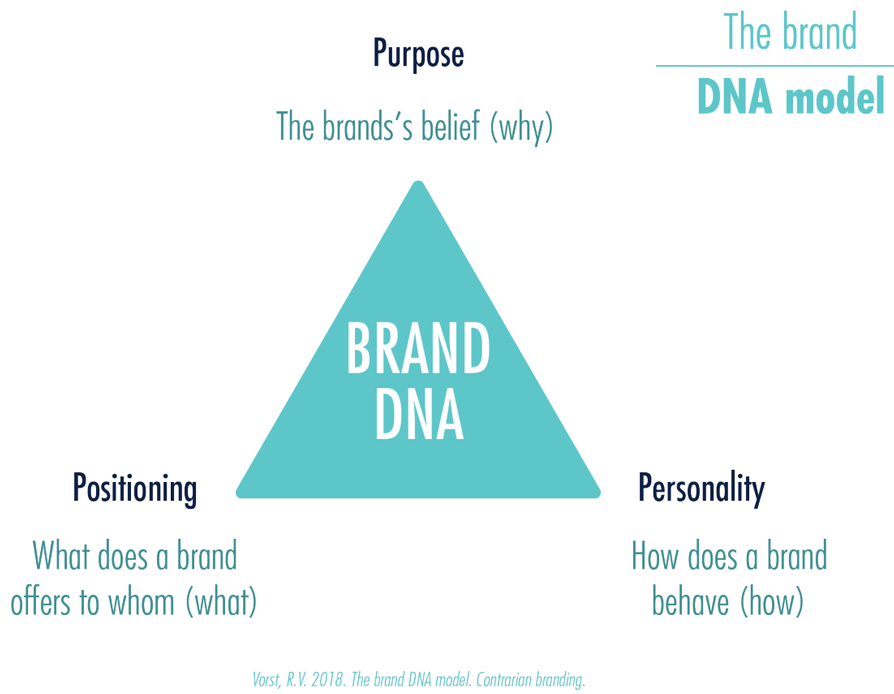
7.2.2 Recognition **Brand DNA**

Additional to the reasoning behind the name selected to guide the persuasive intervention of care, the brand DNA is presented below as a means to reinforce the motto of the persuasive system which is attached to the simplicity of care tasks, that in the past have been addressed as highly difficult, thus the responsibility

was assigned to a service provider or a professional technician. One important driver of the intervention is to make product care task achievable by providing users with simple, interactive and reinforcing guidance along their personal journey. This is created with the purpose of counteracting the demotivating effect the lack of ability, has on consumers particularly, the fact that disassembling products can be an overwhelming task.

Aiming at providing support to this particular goal, the following brand DNA is created to stimulate consumers along the journey and attract their attention in a welcoming fashion. According to Vorst, R.V. (2018), the identity of a brand is composed of two main components which are, meaning and model, in order to build a good brand identity several models have been used (Kapferer, 1992; Keller, 2013; Vorst, R.V. 2018), aiming at mapping the essence of the brand, connecting the different factors and values that need to function as a system to increase recognition among consumers in a consistent manner.

The following model has been developed by Vorst, R.V. (2018), based on the former models, and functions as simple tool to capture the identity of a brand, that is the reason why it was selected to structure the identity of this projects' brand. This model, has three main components which are as follows, purpose, positioning and personality. Purpose refers to the belief of a brand, it is attached to the inner drive a brand has, positioning is the benefit a brand provides to its customers which according to Vorst, R.V. (2018) is "the strategy to make a brand occupy a distinct and credible position", lastly, personality captures the way in which a brand acts, how its purpose is conveyed to the consumers. The DNA of a brand model is depicted in the following scheme.



Figure, 053. Vorst, R.V. (2018). The brand DNA model.

The following is the brand DNA created for the brand, which is composed of three essential elements that function together to strengthen the identity of a brand. These elements are as follows, Purpose, Positioning and Personality.

7.2.3 **Purpose** (why)

> "We believe that product care is enjoyable and simple'

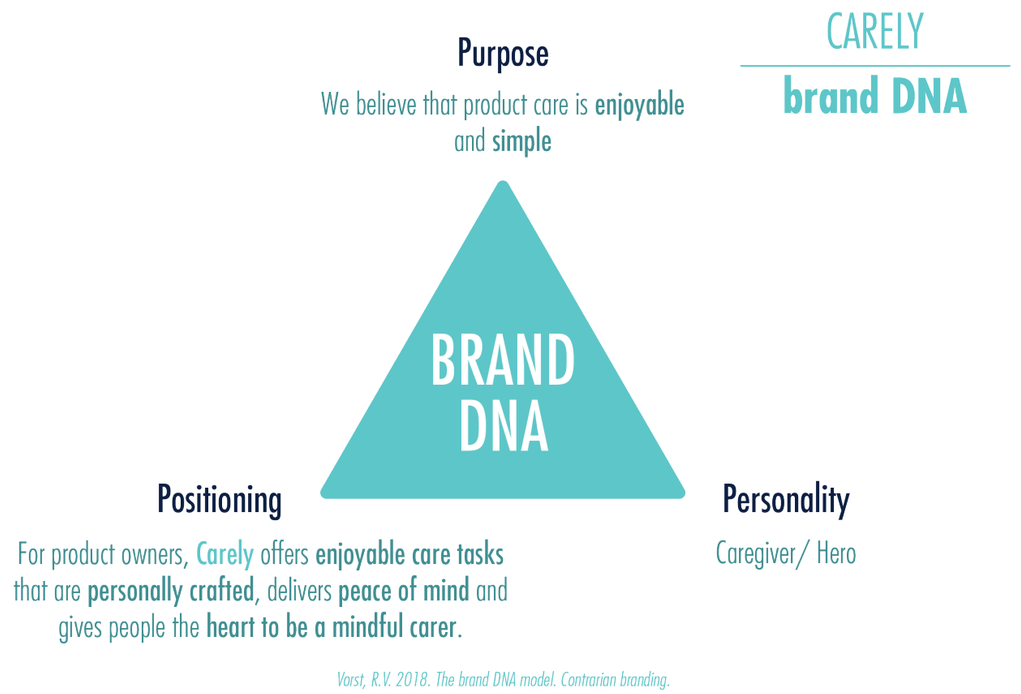
7.2.4 **Positioning** (what)

For product owners, **Carely** offers enjoyable care tasks that are personally crafted, delivers peace of mind and gives people the heart to be a mindful carer.

(Reassurance, determination, heart, spirit)

7.2.5 **Personality** (how)

According to J. Aker (1995), there are fives brand personality dimensions which are as follows, sincerity, excitement, competence, sophistication, and rudgeness. Carely, is identified as a sincere brand, this dimension has fours sub-factors which are, down-to-earth, honest, wholesome, and cheerful. Carely, evokes a mindful interaction with the products we own, it provides direct values which are related to attaining an aware and active mindset regarding conducting better product care and acquiring sustainable behaviours. In addition, the motto of the brand is driven by a cheerful relationship with the users and its products, presented as a friendly source of care.



Figure, 054. The brand DNA of Carely.

Mark & Pearson (2002), introduced twelve brand archetypes as a means to identify the way in which a brand behaves, the personality of Carely combines

Caregiver, is taken into account as the app's essential intention is extending motivation to care, this personality is driven by an interest in connecting people while making them care about others, as well as giving them the ability to craft for themselves. The caring behaviour is enhanced by focusing the caring mindset on the products owned and providing people with aware reasons to care more.

Next, the hero archetype is complementary to the caregiver since it aims at encouraging people to be at their best and the intention of the project is enabling users to extend their ability to care, giving them supportive cues to master product care. These personalities suit perfectly the intention of the project and can strengthen the connection that users have with the brand, the app, and the target behaviour.
The following figure depicts the brand DNA that was explained above.

7.2.6 Categorization

In order to introduce the app in the market spot which has been identified for the intervention, the communication and the means used to motivate people need to have an enjoyable character which invites people to conduct care (Figure, 00. Axis current interventions in care spectrum functional persuasive fun personal)

7.3 The **intention**

Carely, is created as a platform to improve product care, by offering users, simple and reinforcing ways, to conduct repair and maintenance tasks, for the products they consider relevant. The idea behind the concept, is that people relate to a careful mindset, that aims at being aware of the impact of our care actions, and translate that value into a desired behaviour. The app, has four versions (routes) that vary depending on the users' profile, which is based on the factors identified in the study, and drawn from Hofstede's cultural dimensions. *(these routes are explained below in the section pertaining to Profiling)*

At the beginning of the process, four profiling screens are shown to the users, identifying the prefered product-set, the level of expertise with the products and tasks, the orientation model, based on two factors: individual and collective, and, long term and short-term orientation. This process is intended to trigger consumers interest in care by The next set of screens, focuses on the persuasive process which is the core objective of the interaction by presenting tasks, performance indicators, product-related events, and social triggers, based on chosen route, users can select which activities they want to conduct. Content is tailored depending on the initial interaction with the app and this make features and its relevance flexible.

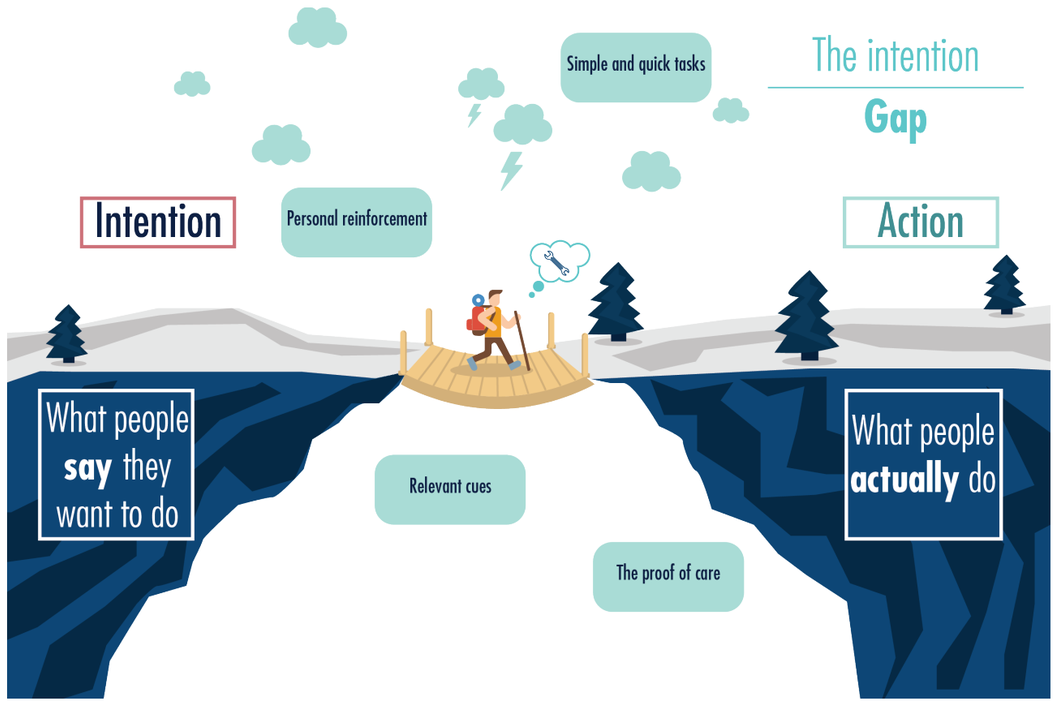
The first phase of the project focuses on
Once the first phase of the project is accomplished, the focus of the interaction changes, aiming at including external factors, such as, cultural and social drivers, which influence the involvement of consumers in the proposition. This, aiming at engaging consumers further with care, by tailoring a personal route based on their needs, interests and ability. Adding sharing dynamics within the app, and collaborative means such as, motivating others within your personal network to conduct care tasks, and scaling up the impact, supporting initiatives which can be beneficial to find ways to solve your community's' challenges regarding sustainability.

7.3.1 General **description**

Ackermann et al. (2018), identified triggers as the missing factors to provoke immediate interest in carrying on product care, and as a result, make care prevail over time, closing the current gap between attitude and action consumers' have. Carely, intends to reduce this behaviour gap by introducing a care journey which provides users with sustained support, cues and reasons to conduct care, which are translated into benefits. (Figure, 055 The intention gap)

The app, is composed of a User Interface (UI) which has four main screens, which are as follows, My Care, Community, How to, and Achievements. Each block, has a set of elements that depending on the user's preferences, can be shortened or extended, based on current skills and interests. The intention of the app, is to build a care behaviour in a gradual fashion, in order to achieve this each horizon of the implementation strategy, has a particular set of features that accompanies a goal. This set of elements, is embodied in three tabs which are presented in each screen, which are unlocked as users interact with the app and their care activities gain relevance.

Each screen, guides and supports, users along the intervention, which is structured following the persuasive model explained above, the four steps of the cycle, interest, proof, engage, and promote, are supported by each phase (for detail explanation read chapter four point 4.5) The initial screens, are aiming at increasing the interest in repair and maintenance, by triggering users to discover the way in which care can be conducted in a simple manner. The additional screens and features, intend to extend the interest in care by reinforcing their personal journey, increasing

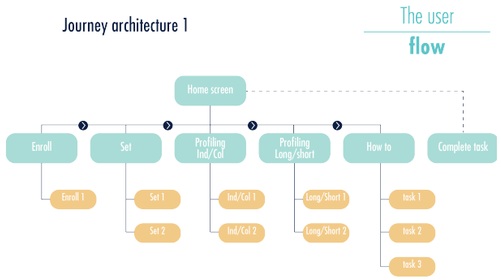


Figure, 055. The way to the intention gap

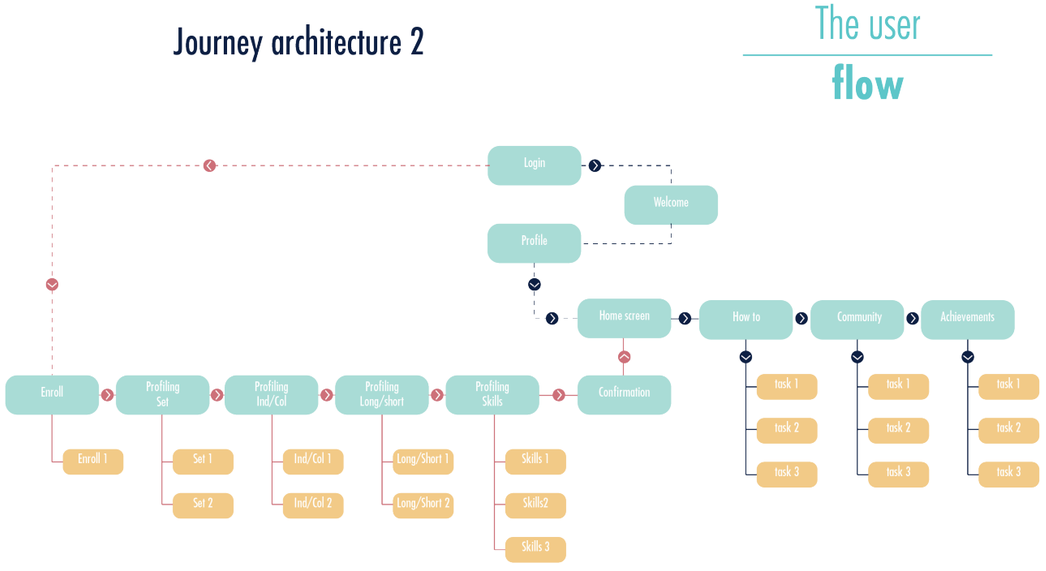
their opportunities to learn about ways to improve performance of their products, together with, ways to keep them running without downtimes, including sharing dynamics between users aiming at keeping them motivated to care.

7.3.2 User **flow**

A description of the series of steps a user takes to achieve a meaningful goal. Pages, logic and actions required.(VISUAL overview) How to clean clean the drive train, add a group, or have an overview of the activities performed heretofore. (Figure, 00. The user flow first prototype) (Figure, 00. The user flow second prototype)



Figure, 056. The user flow. Second architecture.

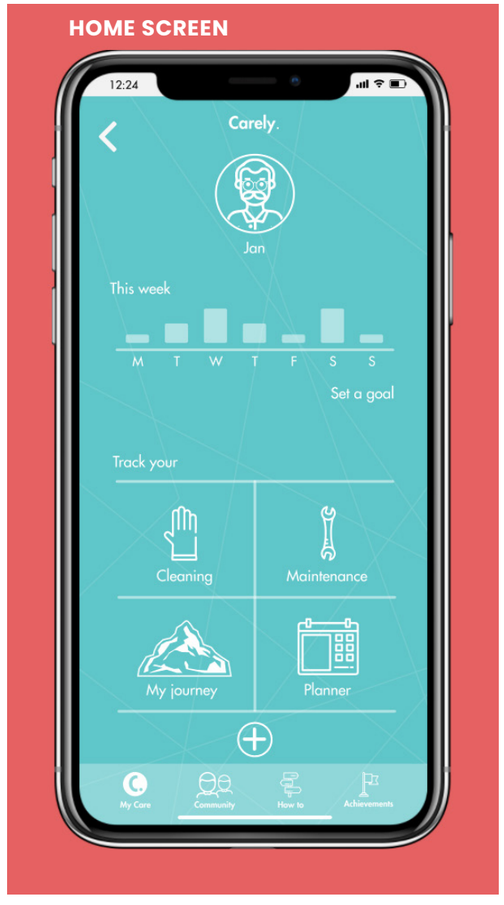


Figure, 057. The user flow. Second architecture.

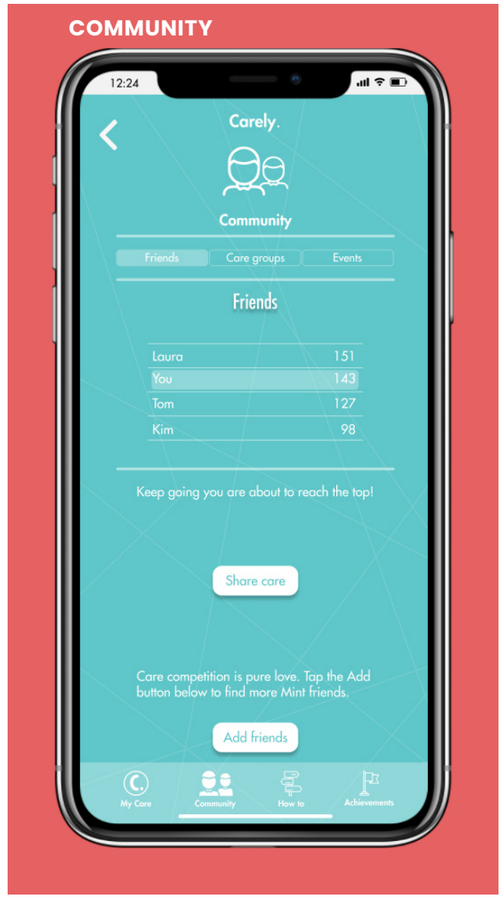
7.3.3 Four **main screens**

My Care, is the home screen of the app, which shows essential information with regard to the care process, and allows the users to track, their activities, progress, plan and conduct care activities. This screen, portrays an overview of care tasks performed within a specific time frame which can be weeks or months, depending on the user interests. Next, it has direct access to care activities that users can conduct at their prefered times, and see their progress in the care journey overview.

Community, is the screen in which sharing dynamics are stimulated it provides a care overview of users' friends as a means to stimulate motivation to care by having a competition factor as it has been used in several sports apps such as Strava and fitbit, to engage users with their exercise goals. (competition) In addition, it has two other tabs which are, Care groups, and Events. Care groups is a feature that is unlocked in the second horizon, and aims at providing users the possibility to get to know other users that are currently taking care of certain products. Events, which is unlocked in the third horizon, intends to add another layer of social triggers by including a set of activities related to the products at hand than take place at the users' context. (the image below is an example of the screens mentioned)

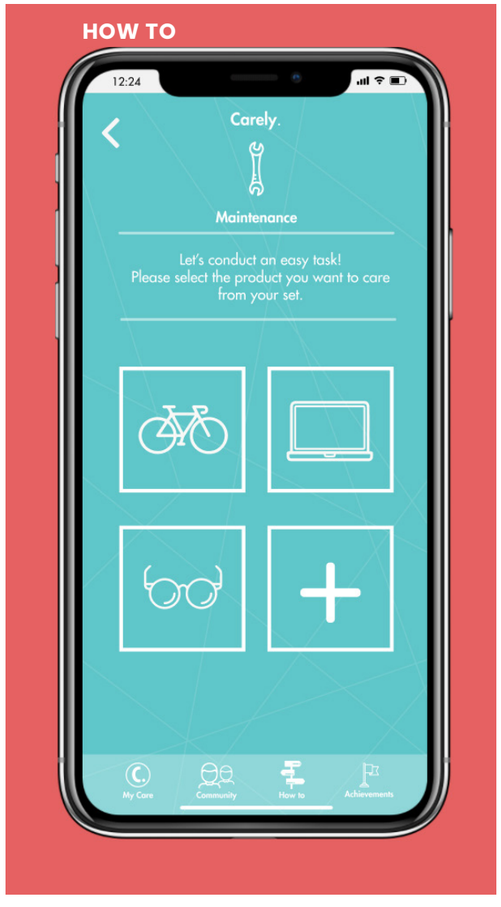


Figure, 058. MyCare screen



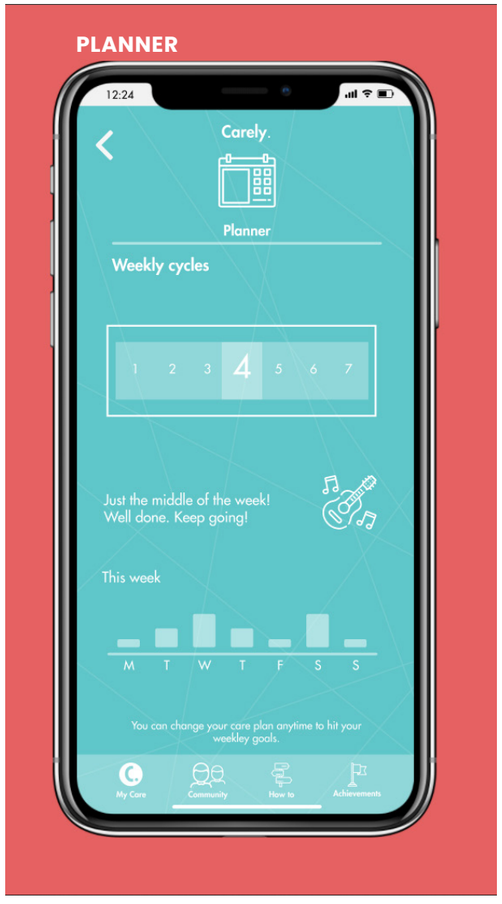
Figure, 059. Community screen, tabs features

How to, is available in the first horizon it is the essential interaction of the intervention from which consumers are going to be persuaded to care, they are prompted to conduct uncomplicated tasks. It is composed of two main options which are cleaning and repair, users can select a product and an activity to undertake, depending on the skills and the resources at hand, next, the user will receive a care task which is explained step by step. At the end of the steps, users access to a direct link to a video tutorial, which explains in depth the process.



Figure, 060. How to's screen.

They are able to store the videos they consider relevant to their process, intending to have information available at all times, being able to find the tutorials easily when required. After conducting a care task, users are awarded using a scoring system named Care, which is meant to be used as motivation trigger along the process.



Figure, 061. The planner screen

The planner, is an additional element that allows users to map out the required interventions for their products, in an organized fashion which depending on their interest to conduct a task, can be of help towards forming a behaviour. The following, is an example of the users' reactions to having a planner in the app:

> "The fact that, I can plan the activities I need to do, help me to keep track of the tasks which are a priority, for instance, when I clean the pedals of my bike sometimes I forget when exactly took place" (BA, 00. Second iteration interviews)

Furthermore, the How to, which is the central element of the interaction supports users motivation to extend their ability to undertake care activities, it fosters users autonomy to perform by using both, an adaptable set-up of the features at hand, that can be arranged depending on individual preferences, in which information and products are included, and a planning tool which intends to increase awareness of their personal process and in the long term foresee the actions that need to be undertaken. Based on the testing of the second prototype, the relevance of the elements was identified as a driver to conduct tasks,

> "I like the fact that as a user, I am able to arrange the content as I feel it has more value" (AB, 0120. Second iteration interviews)

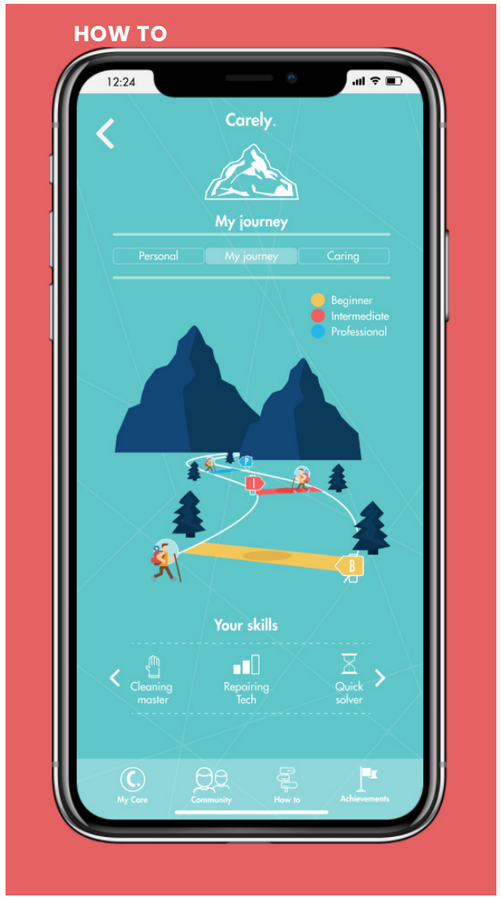
What it is How it works per (Figure 060. How to screen)

Cues Depending on the mindset orientation of the user, a care objective is introduced, either by using gain framed messages, or loss framed messages, which have been used as a means to empower individuals to act upon their intentions (Higgins, 1997). An example of this, are the pop-up messages, which suggest users to carry out a particular activity based on their performance. The following, is a promotion-framed message, "Early check ups of the drivetrain of my bike, will allow me to have it ready to hit the road at any moment", "Cleaning your laptop fans regularly, will enable you to stay focused on your work", on the other hand, a loss-framed message, states "If I do not conduct checkups of my drive train, I will miss the next bike journey", "An unattended laptop, will bring several interruptions you your workflow". These messages relate to the users' mindset orientation aiming at increasing relevance of the actions suggested along the journey. (Figure, 27. Profiling messages)

Figure, 062. Achievements screen

Achievements, is the fourth component which is part of the essential scheme of the app, it is composed of three tabs, Personal, My journey, and Caring, which as mentioned before, are unlocked per horizon. This feature, is used as a trigger to improve care by adding value to the care performance. It provides the users with personal reinforcement, by showing past care experiences, as means to inspire and motivate future intentions to care. In addition, it embodies the aim of the scoring system, into immediate added value by providing personal treats which are exchangeable at any point of the process, (starting in the second horizon) as personal rewards for conducting good care, and includes a social trigger by collaborating with other stakeholders in sustainable initiatives within the users' context.

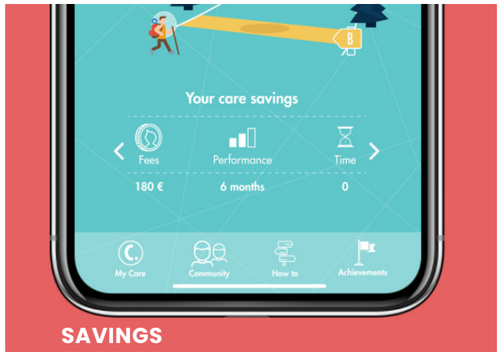
(which in line with Lockton (2009), unpredictable reinforcement along the process)



Figure, 062. Achievements gains screen. Your skills.

The value of conducting care activities, is presented here as gains, which users can obtain after conducting a task at hand. (Carely screen visual) Gains SCROLLING In order to provide users with a proof of care, that is necessary to ensure that their actions are worth it, My Journey, includes a particular feature which integrates, two additional triggers which are, Your skills, and savings. Your skills, is focused on personal gains intended to reinforce their actions, by making tangible rewards regarding their ability to care, a skillset is presented in form of "care positions" (e.g. Cleaning master, Repairing tech, and Quick solver), as a means to increase the interest in acquiring skills and conducting care. The skills component, works in conjunction with Your savings, which follows the same reinforcement intention, but focusing on the impact of performing care on their immediate context, it addresses three elements, financial impact, performance impact, and time invested which in turn relate to the drivers of care found in the study.

The total amount of fees saved along the process, is shown to the users along with the extended performance of the product at hand, (e.g. "thanks to your care, your laptop will perform neatly the next six months", "Now your drive train will run smoothly for another six weeks"). These messages, are an example of the way in which the app stresses the impact of the tasks carried out, working as a proof of care, that validates the behaviour in the long-term. Time invested in care tasks, is used to emphasize the commitment that users have towards conducting repair and maintenance tasks, which functions as a personal trigger to counteract the time limitation found in the study.
(Figure 062. Achievements screen)



Figure, 064. Achievements gains screen detail. Savings.

7.4 Elements of personalization **as a means to increase relevance**

The following elements, were used to structure a personal journey of care, that presents only relevant content, which aims at increasing motivation to carry on repair and maintenance. This process, happens one time only, at the beginning of the journey, and is composed of four steps, that users need to complete inclusive of the enrollment process. This process follows the Interock principle, presented by Lockton, (2009), which uses compulsory actions to guide the interaction of certain process, as requirements to attain a goal, which in the app, relates to having a personal profile.

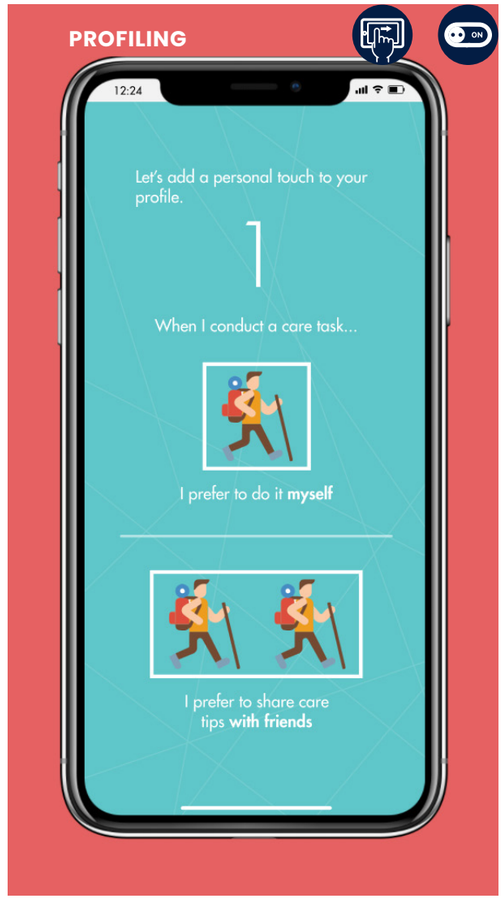
Reading guide

The following, are the icons pertaining to the guidelines of the project presented in the chapter four, section 4.2. In this section, are used to evidence in which stage of the personalization process, were supported by the proposition.

Design guidelines

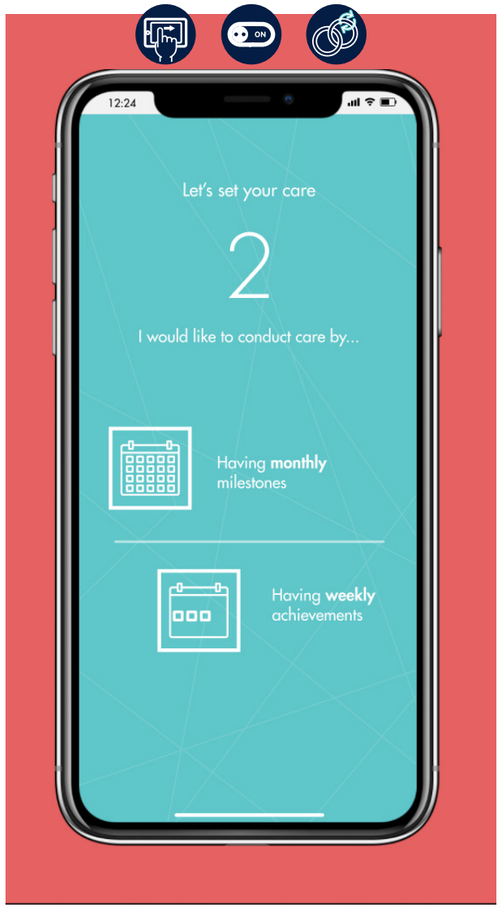
Profiling

Compliant to the design guidelines, this process of the interaction takes into account two of the main requirements which are as follows, customizable tool, and engaging and updated. Providing users with a tailor made journey of care in which their personal interests shape the content and social dynamics the app offers. At the beginning of the process a set of four profiling screens, (Care orientation, care cycles, product-set, and skills level) are presented to the users aiming at defining their interest in care, depending on their orientation model and personal preferences related to the product set, the users are allocated to certain set of tasks and features. *The image below shows the initial profiling process.*



Figure, 065. Profiling screen.

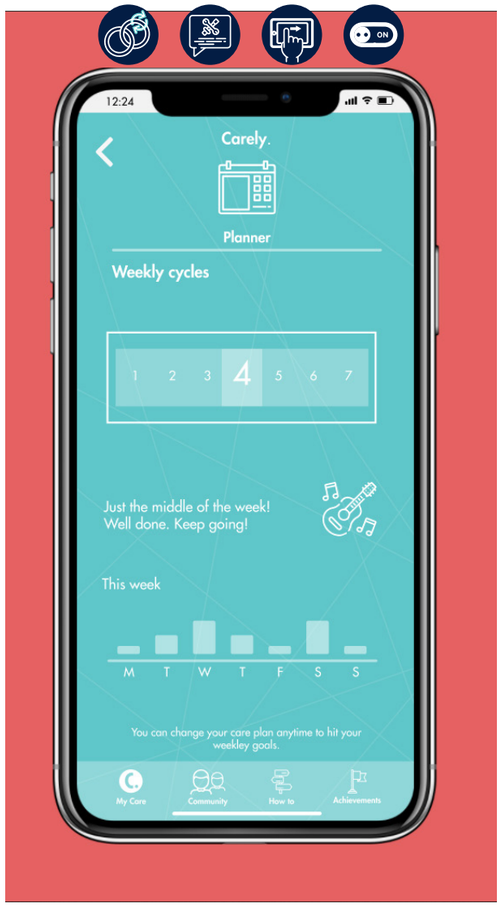
After answering four questions the user's care preferences and skills are identified and following relevant content is presented to them. The profiling factors were as follows, long term orientation, individualism, the personal product-set and the skills per product.



Figure, 066. Mindset orientation screen

Mindset orientation

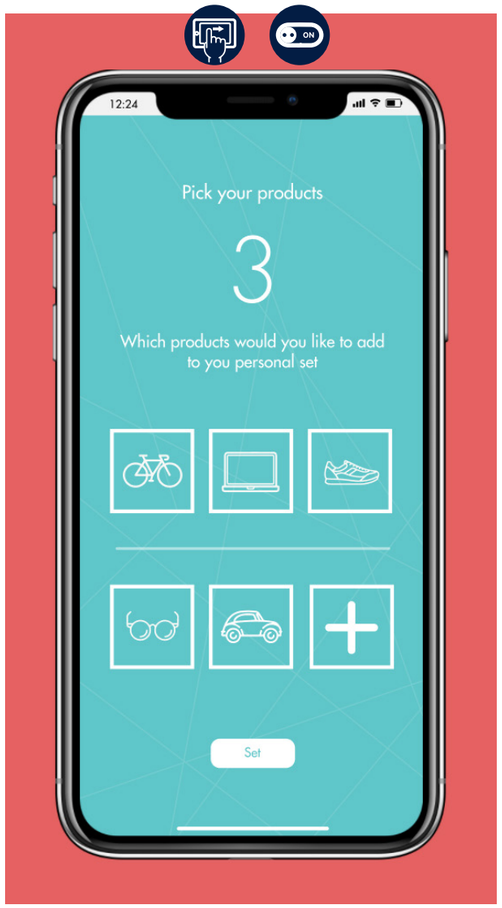
Users identified as, long term oriented, receive a message focused on future benefits whereas, individuals from the short term mindset, receive a message focused on present goals. Additionally, individualist participants receive messages stressing competition and personal achievement, whereas collectivist participants are presented with a community-based approach which stresses the group benefit over the personal. The following image depicts an example of this process.



Figure, 067. The care cycles screen.

Care cycles

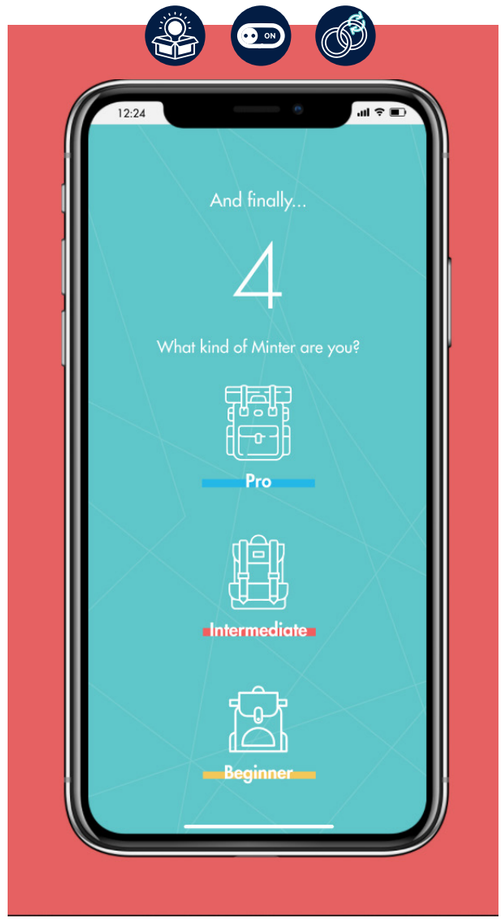
Two initial cycles of care, are included as part of the profiling process, weekly and monthly cycles, these options pertain to the short and long-term orientation, participants from the different countries have. Users that prefer a short cycle, belong to the short-term orientation dimension, and are reinforced by goals which are achievable in an immediate way, minor celebrations of cleaning tasks, quick checkups, and performance tests. Conversely, users pertaining to the long-term orientation dimension, are led by goals that attain a reward in the future, for which they need to work in a phased-manner, to gain the skills and knowledge required to conduct such a task, an example of it, can be being able to disassemble a bike, or a laptop. This, is further sustained by, the levels of skills the app integrates.



Figure, 068. The product set

Product set

The product-set resulting from the study, which is composed of the following products, bike, laptop, glasses, shoes, car, and backpack. Is given to the users, in order to define their initial set of products, from which they want to start conducting tasks, or improve their current care activities. Once the user has selected a product set, they also have the opportunity, to decide whether they want to discard the products which were not relevant to them, or whether they want to include them in the future. The purpose of offering an adaptable set, is to reinforce the sense of freedom, and individuality the interaction wants to convey to the users, as a means to increase the added value of care for the products they are currently using, and which are relevant to them. This supports the customization requirements, engaging & updated, and improve & learn.



Figure, 069. The skill levels

Screen of skills

Three different levels of skills, (beginner, intermediate, and professional) are presented to the users, aiming at profiling their competence and knowledge, with regard to conducting care tasks for a particular product. Each product, is linked to the current ability the user has, aiming at building an additional feature,

which promotes knowledge exchange, between users such as, tips & tools.

Classifying users according to their ability to care, allows the app, to tailor a feature to share care, which allows users to share, tips, how tos, and preferences, that in the second horizon of the implementation, extends, its reach, an assistance feature that enables them to provide or ask for advice is enabled. What I do well what I can improve.

7.5 Feature-set **per horizon**

The design intervention has three phases, in which two different persuasive products, and a service offering, are introduced aiming at increasing functionality, and involvement, in a gradual manner. Drawing from the three-horizon scheme presented in the previous chapter, as the structure of the design implementation, the phased progression of the product, and the interaction through the horizons is here explained in depth. The following figure depicts the features that are unlocked per horizon and the way in which motivation is extended along the journey.

Care strategy

Features unlocked per horizon

The three **horizon scheme**

3 HORIZONS	Onboarding care essentials	Engaging personal route	Extending sharing is caring
Feature-set *per screen	horizon 1	horizon 2 engaging	horizon 3 extending
Profiling process	Four steps	—	—
My skills	Only for the set	Update and track	Improve
My Care	Task manager	Editable + direct access widget	Editable + direct access widget + my products
How to's	Only for the set	My set (editable) + photos	My products (editable) + photos
Community	My friends	Care groups + Sharing is caring	Events
Achivements	Only for the set (personal)	My Journey	Caring
	Gain points	Your skills + your gains	Local care /world initiatives
	Overview	Redeem points	Share points
Website	—	Care information + events (awareness)	Service offering (specialized care)
• platform	**Carely** app	• additional features (tailoring a personal route)	• app + website
• persuasive mean	• initial set	• website	• care partners environmental impact
• Partnerships	—	• Repair cafés + Local shops	• Extended environmental agencies

Figure, 070. Table of features per horizon.

The First horizon

The first horizon, is composed of the essentials of care, four features which are as follows, My Care in which consumers, will have access to, an overview of their care performance 1, based on their preferences, either showing monthly, or weekly cycles, direct access to care activities 2(How to screen) specific for their product-set, an overview of their friends 3, which pertains to the Community screen, that shows their friends' care performance, as a means to motivate them to conduct more tasks, and the overview of their care 4, depicted in a scheme, which allows them to see in detail the activities conducted, and the points gained so far, along with a personal trigger to conduct more activities 5, which is part of the Achievements screen. Within each feature (each screen), there are three sub-features, depicted as "tabs", which are sequentially unlocked, as long as each horizon avances, each tab pertains to one horizon, organized from left to right correspondingly. (Figure,071. First horizon set)

Onboarding
care essentials

Feature-set *per screen	horizon 1
Profiling process	Four steps
My skills	Only for the set
My Care	Task manager
How to's	Only for the set
Community	My friends
Achivements	Only for the set (personal)
	Gain points
	Overview
Website	—
• platform	**Carely** app
• persuasive mean	• initial set
• Partnerships	—

*features unlocked per horizon

Figure, 071. Table of features first horizon.

Goal

Attract consumers to the app by introducing an simple way to conduct repair and maintenance activities.

How the app attains the goal?

The first column of the scheme presented above, pertains to the featureset that will be available during the launch of the app. By offering a customizable journey, people are likely to increase their interest in carrying on care. The first interaction with the app, intends to offer a basic feature-set which focuses on presenting easy to do tasks, stressing the fact that the tasks are simple and quick.

The Second horizon

The second horizon, integrates the additional set of features, which is meant to provide users with engaging opportunities to conduct care. Social care possibilities, are shown in the community screen, these activities are presented to provide users with, additional reasons to conduct a care task, showing product-specific groups, in which members can take part, and share tips, related to the product at hand (second horizon and third) (Figure,00. Second horizon set) (visual features: horizon, goals, means)

In the second horizon, extra features which are required to sustain motivation and increase involvement along the process are introduced. The feeds tab is added as part of the community-based initiative that is introduced as a means to engage users between each other by “sharing care”, the aim is to generate a social dynamic which offers different possibilities to increase users’ ability other than the personal motivation to care. (community-based approaches) On the other hand, in this horizon the integration between the app and the website is essential to extend the possibilities of care and make knowledge accessible along the care journey.

Figure, 072. Table of features second horizon.

Goal

Engage consumers further in care, by broadening their possibilities to take part in activities that extend lifespan of products.

How to the app attains the goal?

The second(color) column of the scheme presented above shows to the feature-set that will be available during the second phase. By presenting additional ways to keep track of care performance, join care initiatives and share care skills and knowledge, the users can extend their ability and interest in care.

The Third horizon

The third horizon introduces a service proposition which is based on the previous horizons and provides the project with extended impact in the future. The additional feature-set depends on the viability and the partnerships. (Figure,00. Third horizon set)

Collaborative achievement

The way in which users are steered towards interacting with the app, is supported by sustainable awareness cues, which are divided in three types. Personal impact on the environment, financial matters (proof of care, savings), community empowerment, and external reasons to care, which were related to taking part in beneficial causes within their context. In line with, (add) proximity builds engagement when people are presented with options that are relevant to them and their immediate context the likelihood to take part in certain task increases, when compared to a foreign context.

Goal

Make consumers sustain their interest and motivation in care activities aiming at forming a behaviour. Broadening the impact of conducting care from a personal scope to the society.

How to the app attains the goal?

The third column of the scheme presented above shows to the featureset that will be available during the third phase. Introducing the sharecare screen which is particularly focused on supporting local or global initiatives related to the environmental impact of consumption. In addition, it includes a service offering which aims at extending the users capabilities to conduct care, once they are aware of the importance of regular maintenance tasks the proposition adds a care service which is focused on those activities which have high technical requirements and that users are not capable of solving. The service proposition is included in both means, the app and the website and presents an extra layer of care, which can be tailored to the users needs and means. The assistance to improve certain product is given in two different manners, on-site or remote, since users needs vary depending on the product at hand, these layers cover the range of difficulty tasks can present.

7.6 Conclusions

This chapter presented the persuasive system in detail, along with the reasoning behind the journey of care, which is the interaction, users’ are expected to have as the implementation timeframes progress.

Based on the testing of the last prototype

Product’s longevity is supported along the journey by including a measurement factor which can work as a reminder for consumers to be aware of the impact and the consequences related to the care task and their product-set. Takeaway PROPOSITION

Drawing from the Design with intent method created by Lockton (2009), the following lenses and principles are taken into account while designing the persuasive system. (gamification, simplicity,) (CHAPTER FOUR)

Validation second prototype

The following chapter presents the insights gained during the second iteration of the persuasive mean, which focuses on three goals, testing usability, functionality of the additional features (which are meant to be unlocked after having being related to the care journey), and assessing the value of the introduction of a website which intends to expand the possibilities to maintain products in sound condition.

8

In this chapter

By means of qualitative interviews with design students, the functionality and relevance of the app is assessed providing a clear route to adjust the mean to increase relevance and reduce complexity along the care journey.

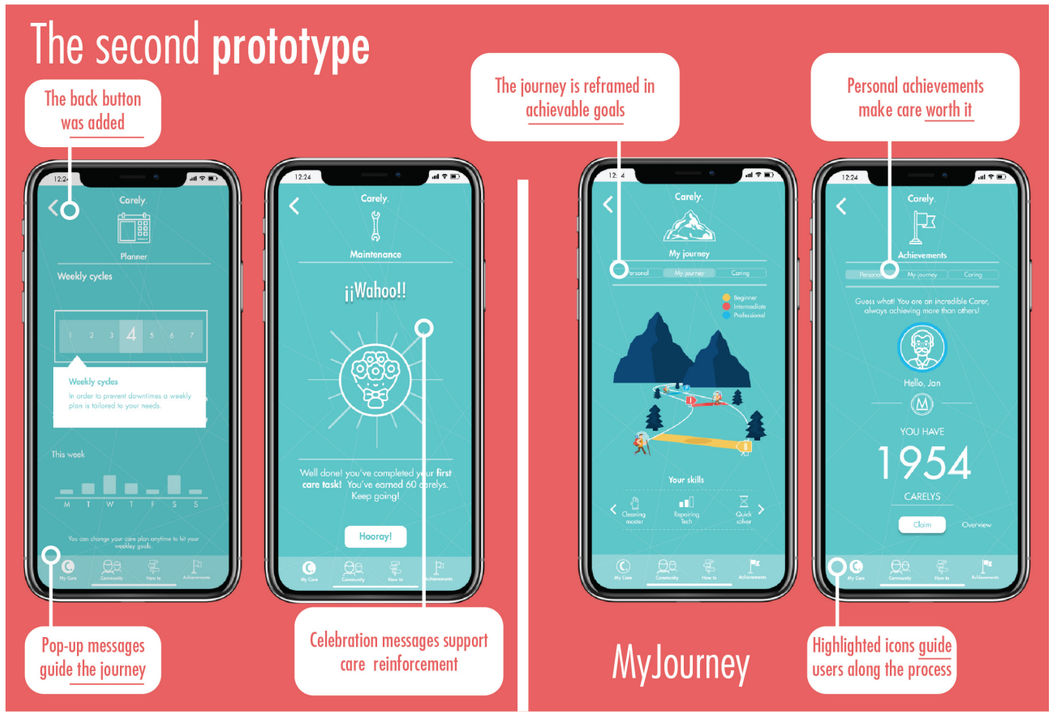
8.1 The second **prototype**

Based on the insights gained in the first-set of iterations and interviews, a second version of the prototype was refined. Aiming at making the care journey more relevant to users, personalizable grids were included to allow users arrange the elements of the home screen, depending to their preferences. Next, the user flow was tweaked by reducing the amount of steps required to conduct certain activity. Guidance of the journey was improved, by adding a back button and highlighted icons along the process that show the users in which stage they are.

Overall, the screens were rearranged including a set of triggers related to the users' performance in the element MY Journey having a flexible mean to test different ways to trigger users along the process, by using interactive content which responded differently depending on the individual preferences. Next, the second iteration included a screen to show the scope of each horizon along the journey and reduce the amount of information for a first-use interaction. (figure, 046. The second prototype)

8.2 The **sample**

The sample for the second iteration was composed of five international design students, three of them took part in the previous iteration, and the other three were new to the project.



Figure, 073. The second prototype.

8.3 The **method**

Participants were told that the version they were testing, was a prototype which included the basics of care and a set of additional features aiming at covering a wider range of possibilities related to the product care journey, and that these additional features and collaborative dynamics were available depending on their preferences. Following the structure of the former testing, participants were able to share their ideas with regard to the feature at hand. The testing started presenting a general overview of the app and the general intention of the project followed by a personal tryout of the care journey including the extra features which are as follows: Community (share care, groups, feed), My journey, Achievements (personal proof, community, financial overview) and the extension of the future implementation of a care services which is embodied in a website was presented.

Each participant took part in the informal interviews separately as they were using the app in the real setting, but having the opportunity to clarify their doubts or share their opinion as the discussion progressed. Before taking part in the test, participants were told that the implementation of the project was structured in three different time frames (horizons), which were used to foster care in a gradual fashion that is supported by different means (extra features, a website, and partnerships) this prospective forward-looking view, aims at supporting the form of a behaviour along the journey. The fact that the content was adapted to their personal preferences and the product-set, varied they way in which the app was configured and the way in which ability was extended.

The test consisted of three sections, the first section aimed at testing the new prototype, which included the improvements in usability made to the user flow found in the first iteration, the second section, intended to introduce the three-horizon scheme as the implementation strategy along with the new set of features to clearly separate the onboarding process from the extended care phases, and lastly, the service offering concept was addressed in a brief manner by the third section.

The second section of the test was used to introduce, the website which contains additional information with regard to the care journey and the impact of product care together with the service offering.

How method

A script, was designed to keep the flow/structure of the conversation by presenting each screen in a calm manner aiming at giving the users time to discover the app. Throughout the process, tips and tops were discussed by motivating participants to freely share their thoughts on certain feature, screen, or detail with the designer, this worked as a means of clarification on the goals of the first interaction, and at a later stage, the persuasive intervention as a whole.

Figure, 074. Second iteration testing. Interview photo 1.

The initial step of the test included a quick introduction on the topic, and the purpose of the project, followed by a tryout. The test was divided in two sections, based on the type of insights that were required to make the app more relevant to the participants' context, and personal preferences. The first section was focused on getting insights related to the overall look and feel, and the actual interaction, for this purpose, four factors were taken into account, in order to find user's response to the look and feel of the app (usability, easiness, logic transitions, and seamless process). To

assess the first-use interaction, (widget) (UX values)

The second section, assessed the relevance of a specific factor which is the name, since the app intended to engage users with product care activities, the name needed to address this and convey it to the users in a direct manner, which according to Keller (2013), at the beginning of a branding strategy its key to start building recognition. For this purpose, a set of 10 optional names was presented to the participants at the end of the prototype's test. Taking part in the test was expected to form an idea of the intention of the project aiming at forming a criteria to assess the name-set.

8.4 Testing **goals**

Building upon the objectives drawn in the first testing, the following goals are taken into account, as a means to understand the way in which the journey was improved by working on usability and presenting the additional features in a separate fashion.

-Is the journey an intuitive process, that is easy to follow and relatable to the users interest?

-Are the benefits of conducting care stressed in the app?

-How can usability of the prototype be further improved?

-Is the prototype reinforcing motivation to care?

-Are the triggers along the journey of care variable enough to sustain motivation of users?

8.5 The **insights**

After conducting the introductory tests, participants gave their opinion on the general intervention and the way in which the target behaviour was presented in the app. The process provided them with an opportunity to get involved in product care by having a personal assessment of their current behaviour. As mentioned at the beginning of this chapter this first iteration had two main goals, testing usability, and relevance of the name, next the results pertaining to each goal together with additional insights that were revealed during the discussions are presented below.

8.6 The **results**

Usability

Being able to test the prototype only in a controlled setup, limits the assessment of the real impact of the intervention while embedded in the users' context. Since they are not able to have the product installed in their mobiles.

> "I would like to have access to the app for a longer period of time, in order to see which functions are valuable to me" (BA, 01. Second iteration interviews)

The use of web-based elements in the device scheme, such as hovering pop-ups, worked as a means of clarification during the accompanied journey, but when the test is conducted without having the laptop (which showed the whole user flow) this element loses relevance due to the differences between mobile and web interactions.

> "The initial test, could be also be done by using a trial which explains each feature, now when I see it in the mobile the hovering messages are gone" (BA, 01. Second iteration interviews)

New set of features and implementation

Going through the entire journey at once was useful to see the way in which the persuasive system grows through the time, but for some participants that were new to the intervention, the information was not easy to grasp.

> "At the beginning of the tryout, I felt a bit overwhelmed by the amount of possibilities the app includes, but as long as the process was explained, and related to the different horizons, the purpose of each screen was clear to me"(BA, 01 Second iteration interviews.)

Personalization is seen by the users as a value added, since they feel that they are controlling the interaction and that external triggers such as social dynamics can let them reinforce their knowledge.

> "I like the fact that I can have my personal process taking photos, and sharing with others how I solved certain issue"(BA, 03. Second iteration interviews)

Additional features pertaining to the third horizon, which are intended to make noticeable the impact of conducting care, in a personal context, can work as reasons to take part in product care, and triggered the participants to think of additional interventions which are relevant to their behaviour.

> "I think that initiatives that show the impact of your carbon footprint can also work as motivators to act "(BA, 04. Second iteration interviews)

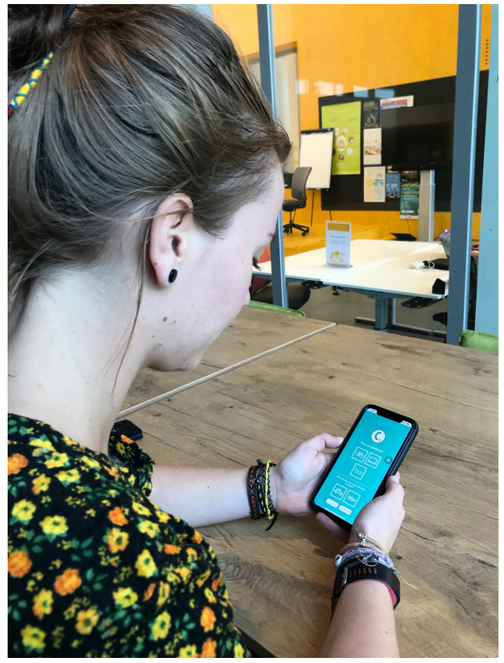
Website service offering

Based on the findings of the second testing process

> "Having a service for the ones I am not able to do, makes sense as long as the response time is quick "(BA, 04. Second iteration interviews)

Apart from having an expert at the user's location or by online means, the service proposition needs to have a balance between the opportunity to learn about care and to solve issues with products.

> "Might be interesting to see how the service, supports the motivation to care, still being responsible of the tasks"(BA, 04. Second iteration interviews)



Figure, 075. Second iteration testing. Interview photo 2.

8.7 Recommendations for **further development**

Drawing from the findings of the second set of tests, the factors of improvement are presented here based on the goals of the second iteration. Aiming at fine tuning the persuasive system and the implementation process, the following routes intend to guide the actions that are required to increase the impact of the intervention in the future.

Readability

In order to guide the users through the persuasive journey, it is required to have a clear division of the features in the app which can relate to the verbal explanation that is given to the participants, since the app is willing to function by its own, the initial process needs to be supported by including a guided tour which can be part of the first-time use. In addition, by including additional screens that point out the respective horizon during the guided journey can reduce the confusion users' reported during the test.

It is necessary to have a set of motivating messages adapted to the users' profiles which is updated as they progress, in order to attain variability of the cues that are presented along the journey. The way in which these messages are presented to the users, can differ according to the users response to former means. It is relevant to have a responsive mean which truly supports users personal journey while intending to form a behaviour.

User flow

The profiling process which was assessed as complex in the first iteration, was simplified and organized per screens (one per step), aiming at supporting the simplicity and easiness of care. Once users are related to the intervention the integration of additional features is seen as a one journey which reacts according to the user and the possibilities of care, and not as unstructured set of features. It is relevant to strengthen the focus on the benefits of each horizon, to make users discover the possibilities that coexist in the app and how one can build upon the other.

Profiling

The profiling process was improved by reducing the complexity of the previous process and including a fourth step, which was measuring the ability of the users per product of the set. Supporting this intention to design a seamless process, the header of theses screens was tweaked by adding the number of the steps which are required to complete the first interaction and an accomplishment screens which reinforces the users for having taken the time to finalize their profile. This process can also work as a motivator to improve care of a wider range of products, since for some of the products they can be experts, for other they might not have the interest yet, but overall, interest can be stimulated by other products, and social triggers.

Benefits of care

It is necessary to evidence the impact of care in a personal context that relates to the users, the second prototype included a set of triggers which were reported by the participants of the tests as highly relevant to evidence how their actions carry positive consequences to them at a personal level such as financial impact, extended performance of their products and time invested in the activities, but also the extended impact on the environment using measures as the carbon footprint and the environmental footprint

Takeaway

Giving the users the freedom to tweak their profile and rearrange the elements in the home screen and the content which they wanted to see, worked to some degree as a possession ritual, in which people owns a product by endowing the object with personal meaning, and in the case of the app, a layout, and set of features, helped them tailor their personal journey,

In addition, personal content of care was stated by the participants as an option which provides them with peace of mind, since the app itself was capable of storing their care data and they were not concerned about missing data such as photos of a disassembly process.

Participants used the app with the extended set of features configuring their personal care set and having the opportunity to grade the value of the additional features in terms of additional gains for their care journey. A more extensive test is still needed to understand in detail how users behave and assess the effectiveness of the elements and overall journey in motivation people to conduct care tasks.

8.8 Conclusions of **the second iteration**

Carely, provided a route towards achieving care goals which were easily executed by the user, this was supported by presenting the tasks in a simple manner, and by adding a respective supportive message which increased motivation. (an example of the task and it supportive message it is shown below) Reducing the amount of steps within the app allowed the proposal to strengthen its focus on engaging users with care activities at first hand, and later on improving their care by adding context specific features, and social triggers such as the community screen which fosters care by creating collaboration between users and presenting a wider range of rewards which can add a surprise factor along the interaction.

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Conclusion and general discussion

This chapter addresses the conclusion on the project, and the research questions that were posed as drivers to design a persuasive system. Consequently, the limitations found throughout the process, are presented in conjunction with future recommendations to develop, and validate the proposition presented in the former chapter.

9

In this chapter

9.1 General **discussion**

The intention of this project, was to understand how to motivate people to conduct more care activities, aiming at providing support to current research in design for product care. A persuasive system, and an implementation strategy, Carely, was proposed to extend the interest and capabilities of product owners in conducting better care. The system, is built in a gradual fashion, which integrates a set of behavioural, persuasive, and design strategies in addition to psychological models, that have been used in different fields as a means to persuade consumers to act in a particular manner, into a persuasion model and a personal tool.

Carely, is the central piece of the persuasive intervention, which focuses on persuading consumers to act according to their sustainable intentions, by increasing environmental awareness from an immediate context. The tool is structured including cultural relevance for design, aiming at tailoring a relevant journey which has four different routes. These routes make the tool adaptable to consumers' mindset orientation, and personal interests related to conducting care. By providing a set of variable rewards, and cues along the consumer journey, Carely, aims at strengthen the persuasion process in product care.

9.1 Cross-cultural research **in product care**

The project started taking into consideration the following research question, "How can we design a system which motivates people to conduct more care", from which the subsequent hypotheses were drawn, "Cultural relevance". To answer the research question, and test the hypotheses, desk research and a cross-cultural study was conducted in three countries, composed of a sample of 350 participants, from which a quantitative analysis was done. Aiming at identifying the care behaviour and the drivers of care for different contexts.

The insights from the research fields and the current interventions, extended the understanding on the targeted behaviour and the drivers of care, resulting in a persuasive tool which is structured in a phased-approach, that increases motivation and interest towards care by merging persuasion models into a personal journey.

"Carely, offers enjoyable care tasks that are personally crafted, delivers peace of mind and gives people the heart to be a mindful carer" The tool, provides sustained support to consumers along the journey of care, to perform relevant care deeds that spark the form of a behaviour, by increasing the touch points and possibilities to repair and maintain products. It merges a varied set of pyschological models, methods in persuasion, and design strategies to create content that is valuable to the users' individuality. It provides designers with a gradual route to work on motivation, that is adaptable when considering the roles of the stakeholders within the domain of expertise.

Overall, this intervention is an alternative to work on persuasion from design, increasing the actions of care along the consumer journey, aiming at attaining a behavioural change.

10. Limitations and **recommendations**

The following chapter presents the limitations of the study, together with the implications of the proposition and draws future recommendations to work on persuasion from design.

Limitations

Aiming at increasing consumers motivation to conduct more care activities along the care journey, this research presents a persuasive approach that merges psychological theories with design strategies to increase and support current initiatives in sustainable behaviour. Next, the findings of the study and the iterative process are presented in a separate manner.

10.1 The research study

The foundation of the project draws from the theoretical background pertaining to psychological models, and design strategies, which offered a wide range of possibilities and insights when aiming at forming a new behaviour, and persuading people to act in a targeted manner. Counteracting the intention gap was identified as a priority of the intervention which includes a considerable amount of methods and insights which were extracted in a synthesized manner in this project. Since these fields and branches, offer several possibilities to understand behaviour of people and tailor relevant drivers to bridge the current gap, extensive research and analysis of consumers behaviour in product care activities is needed to provide the proposition with different intervention routes.

The sample that was taken into account in the cross-cultural study, pertains to a specific group of the society, students that belong to a high educational level, which have an impact on the mindset orientation people have, being at such education level, people expectations and goals vary widely from ones that belong to a lower educational level. Therefore, this influence needs to be expanded by including additional studies in care behaviours that include, participants from a varied range of both, socioeconomic levels, and education levels, aiming at covering the society in its wide reach.

On the other hand, the assumptions that were presented at the beginning of the study with regard to the influence of cultural background, was assessed by measuring the reasons why people conduct repair and maintenance, in order to test the influence of cultural factors in conducting care, additional measures need to be included in future studies in order to understand the direct impact of culture in the drivers of care, an example of it could be conducting tests to measure how framed messages impact the intention to care. Since the study shown a similar care behaviour among the whole sample, a systemic tool that has a general focus was designed.

10.2 The iterative process of the prototype

The app used along the testing process, worked as a flexible and interactive mean that demonstrated the value of the system, but due to time constraints, these tests were carried out in a control environment, having limited functionality and were only used during the iterative process, it is necessary to develop the app in order to properly assess the impact on consumers and the relevance of the features that compose the system. An extended testing needs to be conducted, by giving the users the possibility to interact with the app in a longer period of time, aiming at observing the impact after the launch, and testing engagement factors which are only activated when using the product in the long term, which pertain to the possessive rituals, an example of this is the need of personalization that consumers reported during the iterations, future tests can measure the degree to which users accept the app and own the product.

Forming and sustaining a care behavior
In order to assess the impact of the intervention on bridging the intention gap, the implementation strategy is dependent on two elements, the feasibility of employing the resources required to sustain the app throughout the time, and the alignment of a network of stakeholders, that

enable the added value given to the users aiming at extending the impact of the intervention,

The resources required to maintain the app running in a responsive manner, are a limitation for the implementation, since as long as the interaction grows the variability increases, that demands gathering more data, tweaking the user flow, and functionality of the features included to support the journey of care. By conducting consumer research, introducing a functional version of the app in the targeted context, for a longer period of time, using a pilot testing with a research group, the feasibility of the intervention can be accurately assessed, aiming at undercovering the real value of the features in the persuasive process and the feasibility of the maintenance.

The network of stakeholders that needs to be involved in the process, to increase the impact of both, social dynamics, and rewards given to the users, is reliant of the partnerships made. Three different type of stakeholders can create added value, which are, environmental organizations, currently working to increase awareness of the consumption impact, an example of this is, the footprint calculator presented by the World Wildlife Fund (WWF), secondly, product care-based initiatives such as, the Remakery of the UK, in which communities are involved in conducting repair and maintenance, last, empowerment initiatives that reward users for commuting by bike, in which a network of stores and restaurants can give benefits as, shopping discounts.

10.3 Building product care awareness

The launch strategy of the phased-implementation needs to be further developed, as well as, the former steps to the introduction, which pertain to increasing awareness of users regarding product care, in attaining this, a pre-launch campaign needs to be developed, in which the expectations of the persuasive system (Carely), and the behaviour are reinforced, and related to the users immediate context.

In order to do this, different routes need further exploration. Along the research process of the project, two directions were briefly addressed, as a means to engage consumers in care activities which are introduced in the third horizon of the implementation. The first directions, relates to the general impact of current consumption dynamics in the environment, such as, landfilling of bikes and second-hand electronic devices, by using images of current problems to make evident the outrage, consumers' interest in care can be ignited. The other layer of this direction, relates to the impact on the immediate context of the target users, such as community-based initiatives, like repair cafes and repair workshops. The second direction is related to the immediate impact of actions, which can be stressed by showing the footprint of individual consumption habits, and the carbon footprint for specific products, which can work as motivators to take part in the persuasive journey.

Contributions to current research in product care This thesis supported research in product care, by designing a persuasive system that helps designers increase the relevance of repair and maintenance and motivate consumers to act according to their sustainable intentions. Former studies, pointed out lack of relevant triggers along the consumer journey as a means to bridge the intention-gap, this project extends the possibilities by tailoring a system which offers consumers the possibility to conduct care in a simple manner.

The implementation strategy, provide care interventions with an additional scope based on gradual solutions which accompany the users along the journey, and ensure that motivation is sustained at all times. It introduces persuasive strategies from different fields, which have been traditionally used to convince people to buy products, as a means to shape a sustainable behaviour, turning the controversial aspect of consumers' persuasion, into a tool to make consumers aware of the environmental impact their actions have, including two scopes, one directly related to their immediate context and the other one, to the broader impact in the society.

The digital means were used to embed the target behaviour in a smooth manner, and are intended to be flexible and adjustable to the users, and future possibilities of care. The guidelines to design the system can provide further guidance when aiming at persuading consumers to take part in care activities while forming a behaviour.

Research recommedations

Future work will need to include another set of drivers that influence consumers' interest in care activities such as, cultural background, the mindset orientation, and persuasive means. This includes a sample which can provide an extended overview of the society, in order to undercover the way in which the education level of people, influences the ingrained behaviours, and mindset orientation models which are taken into account in cross cultural research. Furthermore, designers can map the drivers to motivate consumers to care which can be used as a basis to tailor future interventions that relate to the users in a personal manner as a means to increase the willingness to care. Finally, consumers research in product care, will need to include persuasive interventions focused on sustainable behaviours, an example of this are tools such as, the outcome of this project, Carely, guidelines and care strategies, to validate the impact of design as a means to spark product care.

The app was developed using a particular set of products which is based on the findings from the study, aiming at providing current research in product care with a varied set that can relate differently to the users, and work as a motivator to conduct care for products which are not currently taken into account. Additional studies, can take into account the product-set to stimulate the behaviour by offering a varied range of possibilities to carry on repair and maintenance.

Personal reflection

This chapter presents my personal view on the process. The journey through the project going from a research study to a persuasive strategy. It shows the main insights and learnings that shaped the proposition described in this report.

10

In this chapter

10. Personal **reflection**

I have been always triggered about the purpose of design and the way in which our interventions influence others in multiple manners, from time to time we focus our efforts on developing a product/ service which is highly valuable for the Stakeholders, users and to the market, but we leave aside the impact that this propositions have on people.

My interest in product care and consumers' behaviour sparked when I had the opportunity to read about the decision-making process, nudge theories, and the irrationality of our decisions, which has been studied and implemented in a variety of fields. Which if seen from the capability to make people act in a determined manner can be controversial, considering the fact that you tell them what to do. Hence, I was triggered to find a link between these theories mainly used in marketing to steer the decision-making process and design for sustainable behaviour, aiming at counteracting the negative impact of current consumption models.

Merging design branches and strategies such as Design for Sustainable behaviour, design for product care, and design with intent, turned to be the preferred route to this graduation project, after taking into account multiple design, and psychological models. Willing to turn this negative connotation of studying human behaviour, into a tool of positive transformation and engagement in product care. The broad field of research together with the valuable strategies described in books and papers I read along the project, were providing me with that next missing cue that allowed me to link theory and research in order to continue my process and which triggered my capabilities as a designer to envision a relevant product which can relate in a personal fashion to different users.

Cultural differences, are taken into account as part of initiatives that aim at fostering the communication process in international companies and has been addressed in different studies, but again these studies have been focused on the way in which introducing a product into the market can be strongly supported, either by creating a tailored set of communication that resonates in the target population or by changing the image of products that can be seamlessly introduced in different contexts.

The intention of this project was to show the value of design and behavioural economics, in a way in which a persuasive mean can be used to increase awareness and interest in attaining sustainable behaviours, by empowering users to conduct simple actions which can be done in a weekly/monthly basis without being disruptive and demanding to them. To my mind, there is quite an interesting path to discover with regard to using design as a means to motivate people to care more of their products and in the long term to build a behaviour, that engages consumers into a sustainable consumption journey.

Throughout the process, I have learned how to use several strategies that can be useful while tailoring a particular interaction aiming at attaining a behavioural change which has to be build in a gradual manner and more importantly needs to be supported at all times, sometimes when we deliver a project this intervention comes to an end and we do not feel responsible of it anymore because our primary goal has been achieved, I understood along the process that we need to keep tracking our interventions, and using a gradual implementation embodied in a future vision, can provide the proposition with extended value along the time. Allowing the stakeholders involved in the process to measure the capabilities and resources required to support the intervention and assess the impact and feasibility of the project.

I am eager to discover the impact of this project in the long-term, how this proposition can function as a motivator for both, users and designers to embed product care in their actions. Since this project has been developed within the academic environment, the tests, and participants were all part of the same educational level and in some ways of the same social circles. It would be interesting to test the validity of the mean taking into account a sample with a broader range of participants, aiming at including multiple groups of the society. In addition, going from the academic project into the context can provide me with valuable insights to develop the mean in depth and test its capabilities outside the context of the prototype.

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