



Designing the End-of-Use Consumer Experience in a Circular Economy for the Apple iPhone

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Designing the End-of-Use Consumer Experience in a Circular Economy for the Apple iPhone

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EXECUTIVE SUMMARY

The aim of this project was to design an end-of-use experience in a circular economy for the Apple iPhone. The main challenge was to find out what the obstacles were at the end-of-use. During this research it became clear that many consumers don't do anything with their old phone when they buy a new one. These old iPhones are left forgotten in drawers. For a circular economy to work, consumers need to bring back their old phones to the store. In this way, valuable material won't go to waste. To understand the user's perspective, in dept interviews have been performed. It showed from these interviews that many users keep an old phone as a spare phone for when their current phone dies. But that after some time, these spare phones get "replaced" by other old phones. In this way the drawer with old phones is being created. After a while, these phones are left forgotten. The users often don't know what data is on these phones. They don't know what to do with it but can't take distance from it. After the consumer research, the design goal of this research was created: "Users should be able to comfortably and efficiently back-up their data and then delete their personal information, while feeling reassured and confident. The interaction should become a trustworthy and standard operation". The focus of the project was backing-up data from the iPhone, so that the users could feel reassured and confident about deleting data from their old phones, because they had stored their data somewhere save. This resulted in the final design of this project: BackUps. BackUps is an app where all old iPhones a user has had, are stored. The iPhones stored in BackUps are looking the same as they were when they were in use. To have this overview of old phones, the user might become less attached to the physical device, because they now see that all data has been stored in the BackUps. The data stored is stored in the iCloud. An implementation plan is also given. When users return their phone to the store, they will get storage as an incentive. This storage can be used for the data of their old phones.

GLOSSARY

Back-up

When data is stored in more than one place.

Current phone

The phone that is currently in use.

End-of-use

The moment when a product is obsolete and will not be used anymore.

Non renewable resources

Resources that can not renew itself because it will take billions of years which makes them not sustainable. These resources include oil, natural gas and coal.

Old phone

A phone that is not in use anymore.

Synchronize

When data is synchronized it means that different devices contain the same data (this can be done through the cloud).

Spare phone

A phone that is not in use anymore, but is saved by the owner for when their current phone will not work anymore.

Cloud computing

Cloud computing is a remote service where users can access their data using the internet.

Thanks!

To my supervisory team: Conny, Sonja & Flora, for the positive guidance and supervision throughout this project.

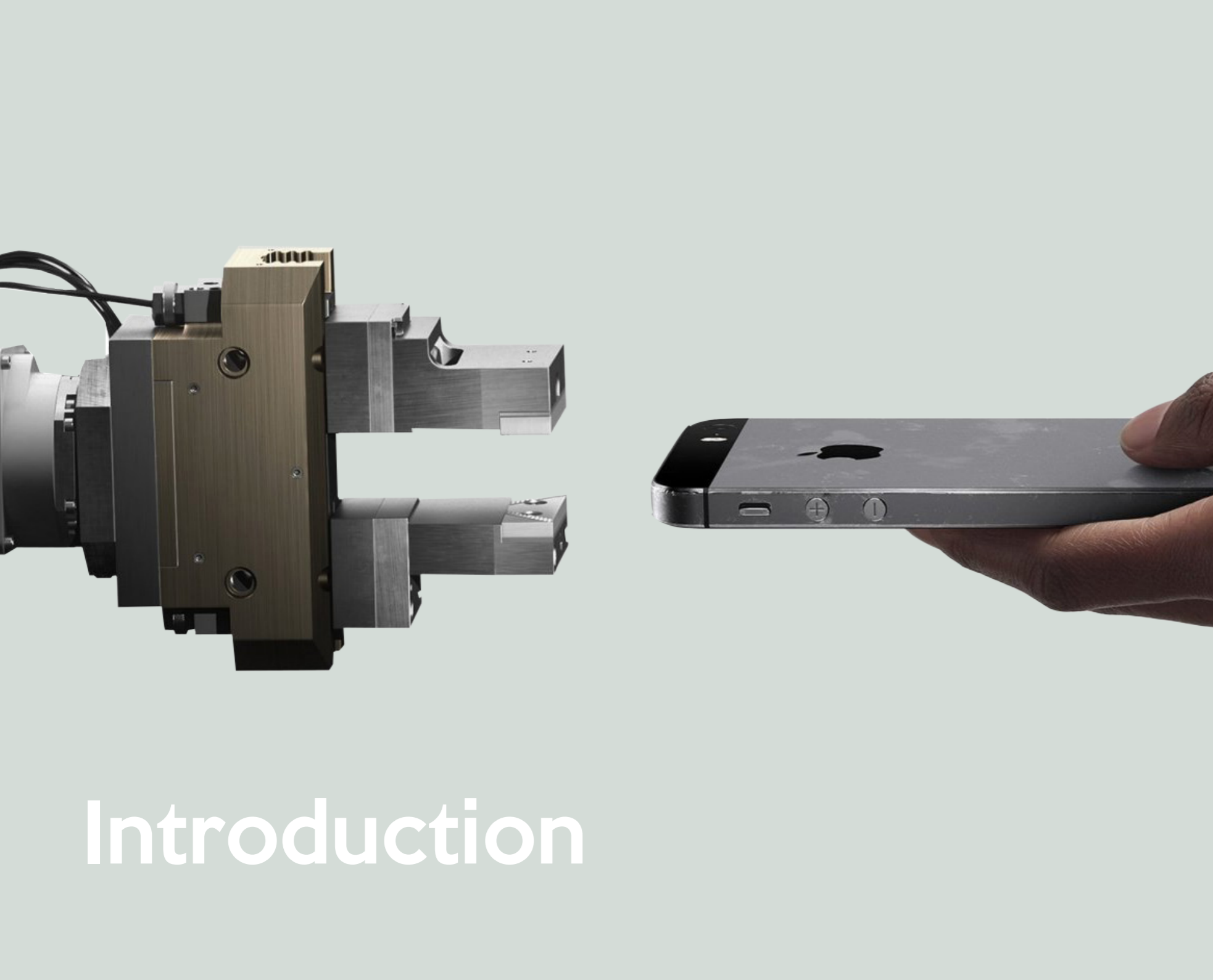
To Ruud for your constant help and support throughout my studies.

To all my family and friends for the love and support these past months.

To Jacob for your love and support

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Introduction

CHAPTER 1

This chapter will explain the project objective, problem statement and a background introduction to Apple. Lastly, the project set-up will be discussed.

1. INTRODUCTION

1.1 Objective

When introducing a new product, the focus of businesses and consumers is at the beginning of a product life: The joy and happiness you feel when purchasing a new product is almost completely the opposite feeling when a product has reached the end of its useful lifespan. However, the end-of-use (see chapter 4.1) should not be forgotten. The linear “take, make and dispose” economic model (see figure 1), the dominant model of our times, is reaching its limits (Ellen MacArthur Foundation, 2015). From a linear model, we should shift towards a circular model (see chapter 2). This means, for a circular economy to work, consumers need to bring back their products to close the loop.

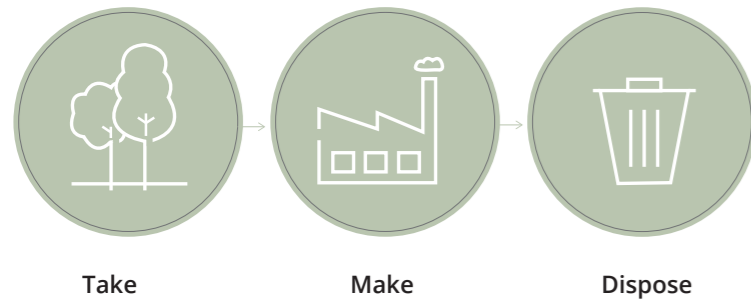


Figure 1

1.2 Project scope

Looking at mobile devices, millions are left forgotten in drawers at home (Benton et al., 2015), therefore the consumer is a crucial part when moving from a linear model towards a circular model and will be the aim of this research. Furthermore, this project will focus on the Apple smartphones: the iPhone. The iPhone as the product

example was chosen because of the high increase in iPhones over the last years: from 1.4 million iPhones sold in 2007 to more than 216 million in 2017 (Apple Inc., 2008; Apple Inc., 2018). With the increase in sales combined with a linear model, all these iPhones will be sent to landfill. But, when shifting towards a circular model, smartphones can make a profitable impact and materials can be reused (Ellen MacArthur Foundation, 2013).

1.3 Problem statement

When working towards a circular model, the first challenge is to understand why consumers do not bring back their smartphones to the store (or online) when its reaching the end-of-use. A second challenge is to find a way to make consumers return their smartphones. Hereby, the aim of this project is to create a meaningful end-of-use experience between smartphone and consumer.

1.4 Apple: Company background

Apple Inc., founded by Steve Jobs and Steve Wozniak in 1976, is a multinational corporation and known for its easy to use products like the iPod, iPhone and MacBook (Rawlinson, 2016). According to Apple, the environment is one of their key values and is viewed and supported at the highest level of the company (Apple, 2017). They state: “We are busy working toward our next frontiers in clean energy, materials recovery, and green chemistry. We are proud of our work and look forward to continuing our journey” (Apple, 2017). Apple is working towards a more circular economy and is currently searching for ideas to achieve its goal (Presentations at Apple headquarters, June 2018).

1.5 Project set-up

The first chapter gave a short introduction to Apple and a circular economy. After this, a background of the end-of-use experience

1. INTRODUCTION

will be introduced together with an analysis of consumer behavior and mobile devices. This will result in various design implications, leading to the design goal of this project. The design goal resulted ultimately in different concept, where one is chosen to develop further into a final design. This will be the end result of this research. An overview of this research is shown in figure 2.

Literature study and consumer research



Conclusion analysis



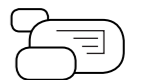
Design Brief



Explorative design research



Conceptualization



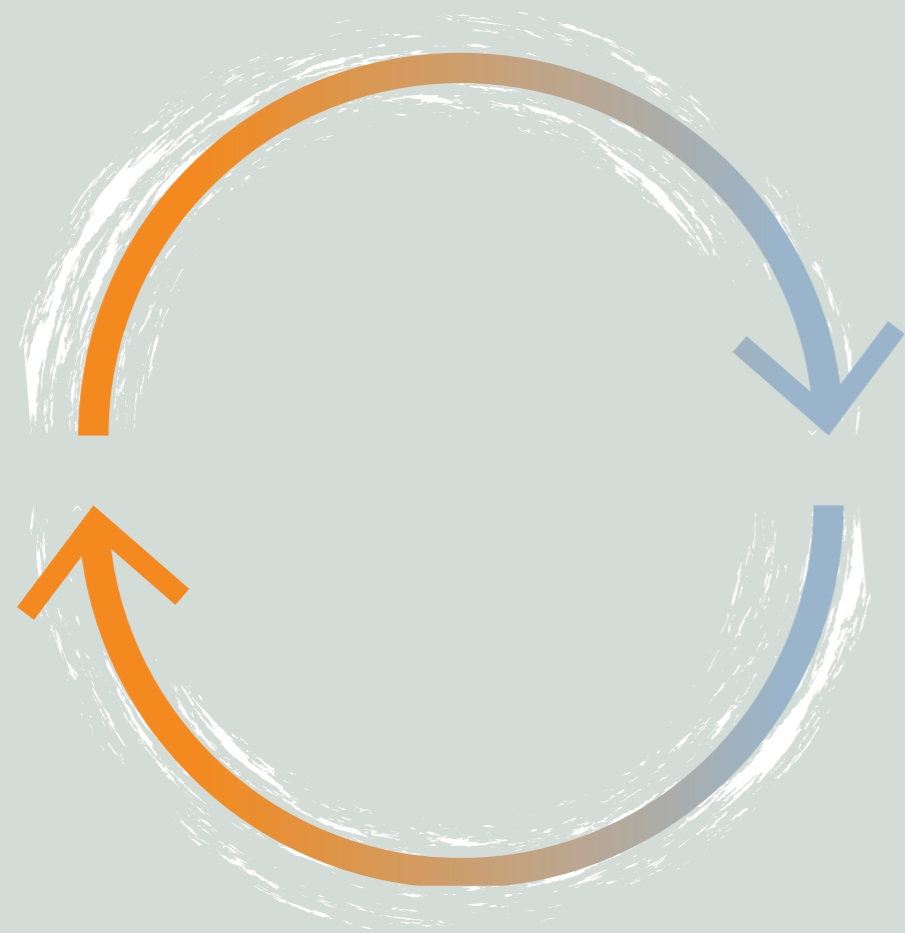
Final Design



Evaluation and implementation



Figure 2



Circular economy

CHAPTER 2

In this chapter, the circular economy will be explained. It will also provide insights in the strategy of Apple and how they address the importance to go circular.

2. CIRCULAR ECONOMY

2.1 An introduction to circular economy

The circular economy is an alternative for the linear “take-make-dispose” model. It aims to keep products, components, and materials at their highest utility and value at all times (Ellen MacArthur Foundation, 2015). A linear economy is a way where production growth requires growth in resources gained from the environment which means more waste into the environment and little attention towards the sustainability of the process (Bonciul, 2014). With a linear economy, waste that is thrown into the environment will only increase and thus a new solution needs to be designed and integrated.

The new and alternative economic model pursues to change the global economic development by not using finite resources for consumption (Ellen MacArthur Foundation, 2015). Figure 3 shows a graphic representation of a circular economy. This graphic is made by the Ellen MacArthur foundation. It explains the circular economy by dividing it into three important principles: “preserve and enhance natural capital”, “optimise resource yields” and “foster system effectiveness” (Ellen MacArthur Foundation, 2015). In a circular economy there should be no more waste, products that are at the end-of-use or at the end-of-life are being reused, remanufactured or recycled. The three principles defined by the Ellen MacArthur foundation can be achieved by following the ReSOLVE framework (Ellen MacArthur Foundation, 2015) which will be discussed below including Apples view and actions concerning the circular economy.

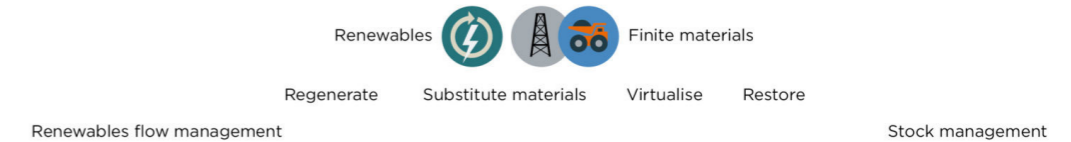
2. CIRCULAR ECONOMY

OUTLINE OF A CIRCULAR ECONOMY

PRINCIPLE 1

1

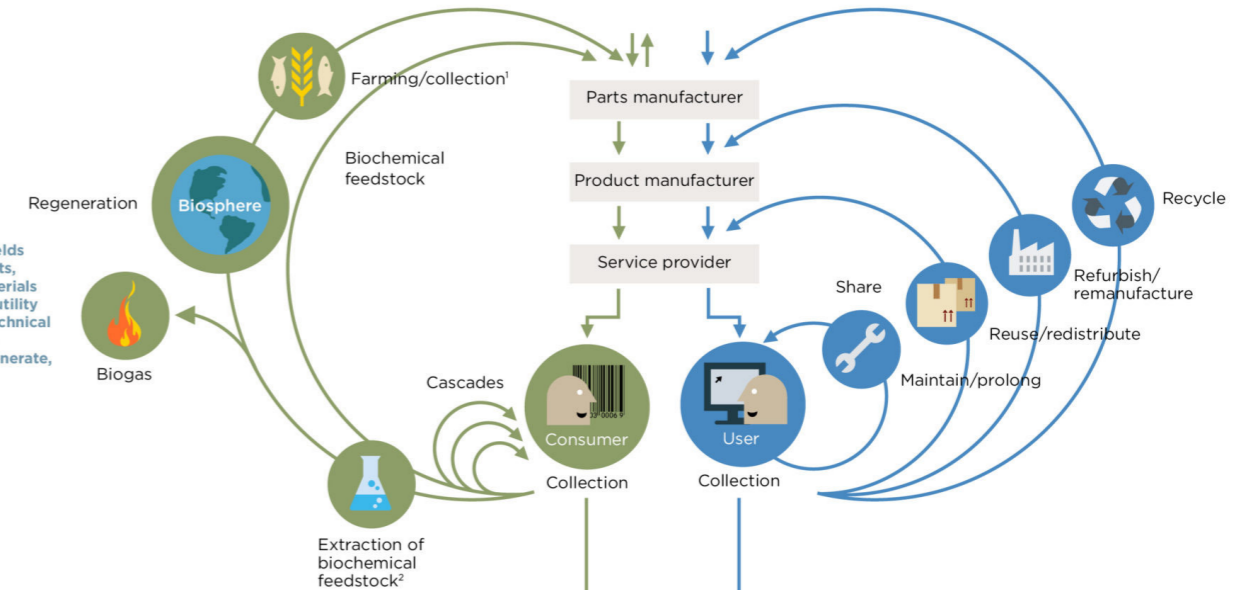
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows
ReSOLVE levers: regenerate, virtualise, exchange



PRINCIPLE 2

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles
ReSOLVE levers: regenerate, share, optimise, loop



PRINCIPLE 3

3

Foster system effectiveness by revealing and designing out negative externalities
All ReSOLVE levers

Minimise systematic leakage and negative externalities

1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as an input
Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Braungart & McDonough, Cradle to Cradle (C2C).

Figure 3 A circular economy. Source: <https://www.ellenmacarthurfoundation.org>

2. CIRCULAR ECONOMY

2.2 Resolve framework

The Ellen MacArthur foundation (2015) came with a framework: ReSOLVE (Regenerate, Share, Optimise, Loop, Virtualise and Exchange). In this framework there are six areas where businesses and countries could react upon if they want to move towards a circular economy. To gain more insight in Apple's business model and the actions Apple is taking to become more circular, the ReSOLVE framework will be discussed together with Apple's business model, with a special focus on the iPhone.

1. Regenerate

To regenerate, in terms of the ReSOLVE framework, a company should "shift towards renewable energy and materials; reclaim, retain and regenerate health of ecosystems and return recovered biological resources to the biosphere" (Ellen MacArthur Foundation, 2015). Apple is showing in its environmental responsibility report of 2017 that they use 100% renewable energy for 100% of their facilities (including all stores, data centers and offices). Also, they planted over 9000 drought-resistant trees at their new campus in Cupertino. It is stated in their environmental responsibility report (2017) that one day they want to make new products without mining new materials from the earth. They want to achieve this goal with the use of recycled or renewable materials. This shows Apple is working towards a more sustainable economy. But they do not mention the use of renewable energy for the production of their products, which is probably one of their highest consuming sources of energy.

2. Share

According to the ReSOLVE framework, sharing is meant to prolong the product loop. They give three possibilities to do so. The first option is to maximise the utilisation of products. Second, when sharing among different users or by reusing products (second

hand) a product loop can also be slowed down. The last possibility is focussed on maintenance, repair and design for durability (Ellen MacArthur Foundation, 2015). The ease of maintenance and repair is important when it comes to the extension of a product life. It requires a cooperation between designers and engineers, where they need to develop concepts for certain components to be easily repairable or exchangeable (Bakker, den Hollander, van Hinte, & Zijlstra, 2014). There is a market for second hand iPhones, but the maintenance and repair for iPhones is difficult. The iPhone has bespoke fixings, where the components such as the battery are hard, or even prohibited, to replace (Andrews, 2015). Apple is known for its bespoke fixings and will probably not change anything in that area. Repairing a broken iPhone will be difficult in this way and can make the product loop shorter than it might be when the repairing can be easily done.

3. Optimise

Optimisation means to increase performance/efficiency of a product without making changes to the actual product or technology. This can be made possible by removing waste in production and in the supply chain (Ellen MacArthur Foundation, 2015). An example is the lean philosophy used by Toyota Production System (TPS) (Spear & Bowen, 1999). Spear & Bowen (1999) described the TPS as "standardization of work, uninterrupted work flows, direct links between suppliers and customers, and continuous improvement based on the scientific method". Apple describes in their environmental report (2017) four aspects for a closed loop supply chain, where one of the aspects is to "Make efficiently". Hereby, they mean to minimize the use of materials during manufacture and for their designs. They state: "We're committed to making sure all the waste created by our own facilities and in our supply chain is reused, recycled, composted, or when necessary, converted into energy." They launched a "Zero Waste Program" for suppliers

2. CIRCULAR ECONOMY

in 2015, for this program they focused on final assembly sites in China. To date, all iPhone final assembly sites are certified as Zero Waste (Apple, 2017).

4. Loop

Important is to keep components and materials in closed loops, where finite materials can be recycled, and products or components remanufactured (Ellen MacArthur Foundation, 2015).

4.1 Daisy

The iPhone contains materials which are valuable, these materials can and should be reused. One of the steps Apple has taken in meeting its values is introducing the Daisy last April this year. The Daisy is a disassembling robot, which reclaims valuable materials stored in the iPhone. It is the follow up from the earlier designed disassembly robot "Liam", which Apple introduced in 2016 (see

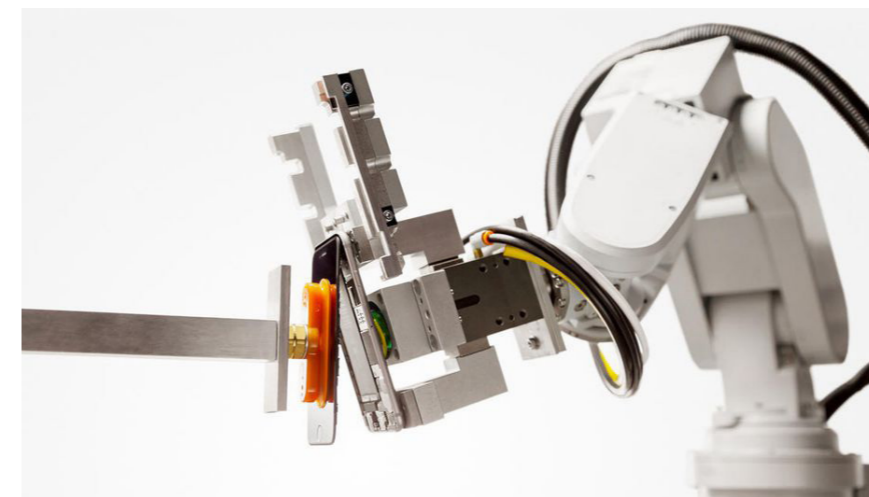


Figure 3, Dismantle robot: Liam. Source: Apple.com

figure 4). Instead of disassembling one specific iPhone (iPhone 6) by Liam, the Daisy can disassemble 9 different models of the iPhone: iPhone 5, iPhone 5s, iPhone SE, iPhone 6, iPhone 6 Plus, iPhone 6s, iPhone 6s Plus, iPhone 7, and iPhone 7 Plus (Apple, 2017). According to Apple the Daisy can take apart up to 200 iPhone devices per hour (Apple, 2017). It can reclaim materials like aluminium, gold, silver and copper. The intention is to install Daisy in different places around the world. To work at its full potential, the supply of iPhone devices needs to be regular and reliable. Therefore, the consumer and their willingness to return their iPhone at the end-of-use are crucial in the success of Daisy.

4.2 Apple GiveBack

To promote returning old iPhones and the reuse of materials, Apple started a campaign called "Apple GiveBack" last April this year. It is a campaign where consumers can return their old smartphone (any brand) to the store or online. They will receive a gift card (if the smartphone still has value) to spend at the Apple store. The returned smartphone will be recycled by Apple or a third party. If the phone is in good shape, then it can be refurbished. If not, Apple will send it to a partner, who will recycle it. If the smartphone is an iPhone, it might go to the Daisy, but they don't give the consumer a guarantee that this is the case. They offer help to assist the consumer by deleting personal information on the iPhone, but they state: "You are solely responsible for removing all data, including confidential and personal data, from the device prior to shipping. Neither Apple nor the approved partner accepts any responsibility or liability for any lost files or data" (Apple, 2017). This means that the consumer is responsible for deleting personal information, which might be a barrier in returning an old iPhone due to difficulties in understanding the steps to be taken. If going to the store, the customer support can assist the consumer by storing it in the iCloud or Time Machine (Apple, 2017). The GiveBack campaign is

2. CIRCULAR ECONOMY

as well good for the environment as it is for Apple. Apple will gain more appreciation from consumers because they are taking action for the environment. But, the Apple GiveBack campaign is not yet working to its full potential. Apple is focussed on the beginning of a product life. They sell their iPhones really good en well thought out. But the end-of-use is different, to really let everyone return their phone, something more needs to happen than the Apple GiveBack campaign. Right now many people leave their old phones at home. The Apple GiveBack campaign sounds good, but in reality it works not in a way a first use is designed. The first use is important for Apple, the end-of-use is becoming more important but it is not the same experience. Apple started working together with Brightstar to collect old phones. When users want to return their old phone, they need to go online to apple.com. Here they can fill in their address and phone information. The user will then receive (some days later) a package to put the iPhone in and send it back to Brightstar. This requires a lot of steps and is time consuming. Often the user will not get any incentive. So improvements can be made concerning the end-of-use.

5. Virtualise

When books, magazines and music become virtual, then there will be no books, paper magazines or CD's needed. This is a direct way to virtualise. Indirect, includes online shopping or virtual offices (Ellen MacArthur Foundation, 2015). Apple introduced in 2001 their first iPhone. By introducing the iPhone, a new world opened up. With the iPhone, apps were introduced that could replace stand-alone products (e.g. clock, calculator, iBooks, iTunes etc.). Also, in 2011 Apple introduced iCloud, where consumers can store all their content online. iCloud can wirelessly save information and automatically pushes it to all Apple devices connected with the same Apple I.D. (Apple, 2011).

2. CIRCULAR ECONOMY

2.3 Conclusion

Apple is working on being sustainable and focusses on being environmentally responsible. For this project the areas "Loop" and "Share" are for special importance. The "Loop" area is about keeping products in a closed loop, where this obviously connects to a circular economy. Next, the "Share" area is important for this project because it explains that the second-hand market is important for keeping products longer in use and thus will slow down the product loop. Connecting this to the mobile phone industry, there is a great link to the importance of returning an old phone when buying a new one, because in this way the loop will be closed, or the loop will be slow down because old phones might have a second life.



Mobile devices: linear or circular?

CHAPTER 3

In this chapter facts and figures are given concerning the mobile phone industry. Trends are discussed and finally a conclusion can be drawn if indeed mobile devices should go circular.

3.1 Facts and figures

To show the impact of mobile devices on the environment figure 4 is made. The figure shows facts about the number of mobile devices produced. Also, the facts and figures are shown to visualize the importance of the mobile phone industry to go circular. It is clear from these facts that there are many mobile phones being made, then used and finally are being discarded.

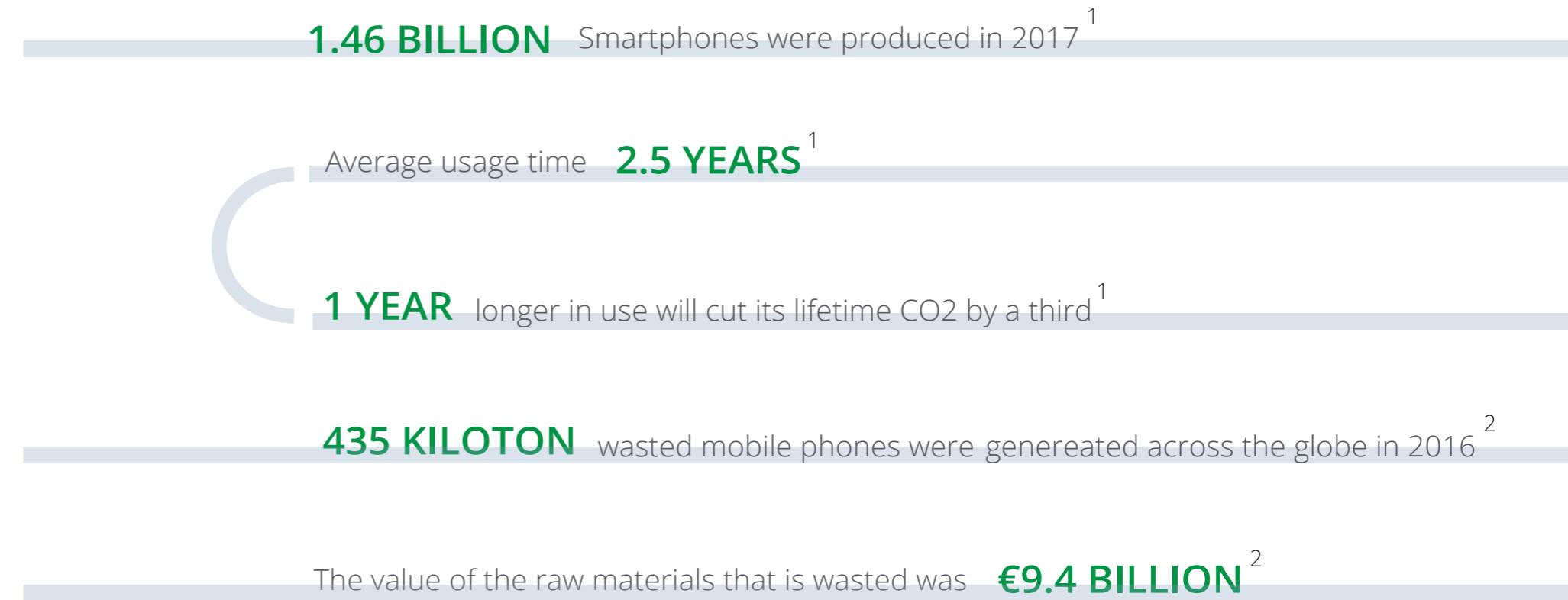


Figure 4, Facts and figures, sources: 1. Baldé, C. P., Forti, V., Gray, V., Kuehr, R., Stegmann (2017) and 2. Benton et al. (2015).

3.2 Trends

In this chapter, the most important trends will be discussed concerning the mobile phone industry. The trends are analysed so a bigger picture can be drawn of the current situation. Finally, a conclusion can be made derived from the discussed trends to make a complete picture of the current situation. First, trends in general will be given, then the trends concerning the mobile phone industry are provided.

Trends in general

1. Being environmentally responsible is becoming a more important matter for consumers (Georgia, 2018). With this upcoming trend, businesses have to respond. Consumers are expecting more from companies these days, whereby companies have to play a part in being environmentally responsible and by taking an active role in working towards a sustainable and eco-friendly society (Georgia, 2018).

2. The value-action-gap: consumers are more aware of the environmental problems. But there is a “value-action”-gap where consumers do have the willingness to change for a better environment, but do not yet behave and act towards the problems concerning the environment (Barr, 2006).

3. The government is becoming an important part of the awareness and is taking actions towards a more sustainable and eco-friendly society (e.g. The Paris Agreement).

4. To date, the fourth industrial revolution has started and will have a big impact on data that is saved on smartphones and/or in the cloud. Cloud computing can make data storage more efficiently on large farms of computing systems, the data that will be stored is sent via the internet (Marinescu, 2013). Whereas in the first industrial revolution (from late 18th to mid 19th century) mechanization and steam power was invented, the second industrial revolution (from late 19th to mid 20th century) mass production was introduced

and the third industrial revolution (from mid 20th to early 21st century) the automation and computers were invented, the fourth industrial revolution is all about cloud computing, internet of things and cyber physical systems (Bortolini, Ferrari, Gamberi, Pilati, & Faccio, 2017).

5. According to Sciencemag (2017), there is more data created in the past 2 years than in all the history of mankind. This number will only be increasing as a smartphone is replacing so many devices (e.g. a camera, books, clocks etc.). Personal information on a smartphone is sensitive information and private. All this data needs to be stored somewhere. When designing for the future, this rise in data (and thus storage space is needed) will be taken into account.

Trends in the mobile phone industry

6. Most important replacement motives are upgrade discounts with contract renewal, damaged or lost phones and newer technologies or versions (Wilhelm, Yankov, & Magee, 2011).

7. Providers offer free or steeply discounted new phones when consumers sign or renew their contract. This is a strategy that encourages brand loyalty (Wilhelm et al., 2011).

8. Next, a trend that will stimulate a circular economy in the mobile phone industry. Large provider companies start to campaign for consumers to return their old phones. Like, “Recycle Deal” from T-Mobile or trade-in deals from Vodafone. Recycle Deal from T-Mobile is actually a form of leasing and leasing is a form of non-ownership, where the consumer is using the product without owning the product. This business model is reassuring that mobile phones will be returned at the end-of-use (Benton et al., 2015). When leasing a mobile phone, the service and maintenance is taken over by the retailer or manufacturer. Hereby, the consumer does not have the “hassle” (broken phone, component replacement etc.)

you have when owning the product (Bocken et al., 2014). When returning an old phone to the store, the consumer will receive an incentive (e.g. gift card). And when returned to the store, the old phones can be refurbished or recycled.

9. When large provider companies are starting to offer lease subscriptions, where the phone is not owned by the user but by the provider. This effects also the future vision: when smartphones become a service, the data at the end-of-use should be handled carefully during transferring and deleting personal information.

10. Lastly, second hand markets are evolving. Benton et al. (2015) states that “second-hand devices requiring minor repair are worth repairing for three to five years after sale, even after logistical and refurbishment costs are taken into account”.

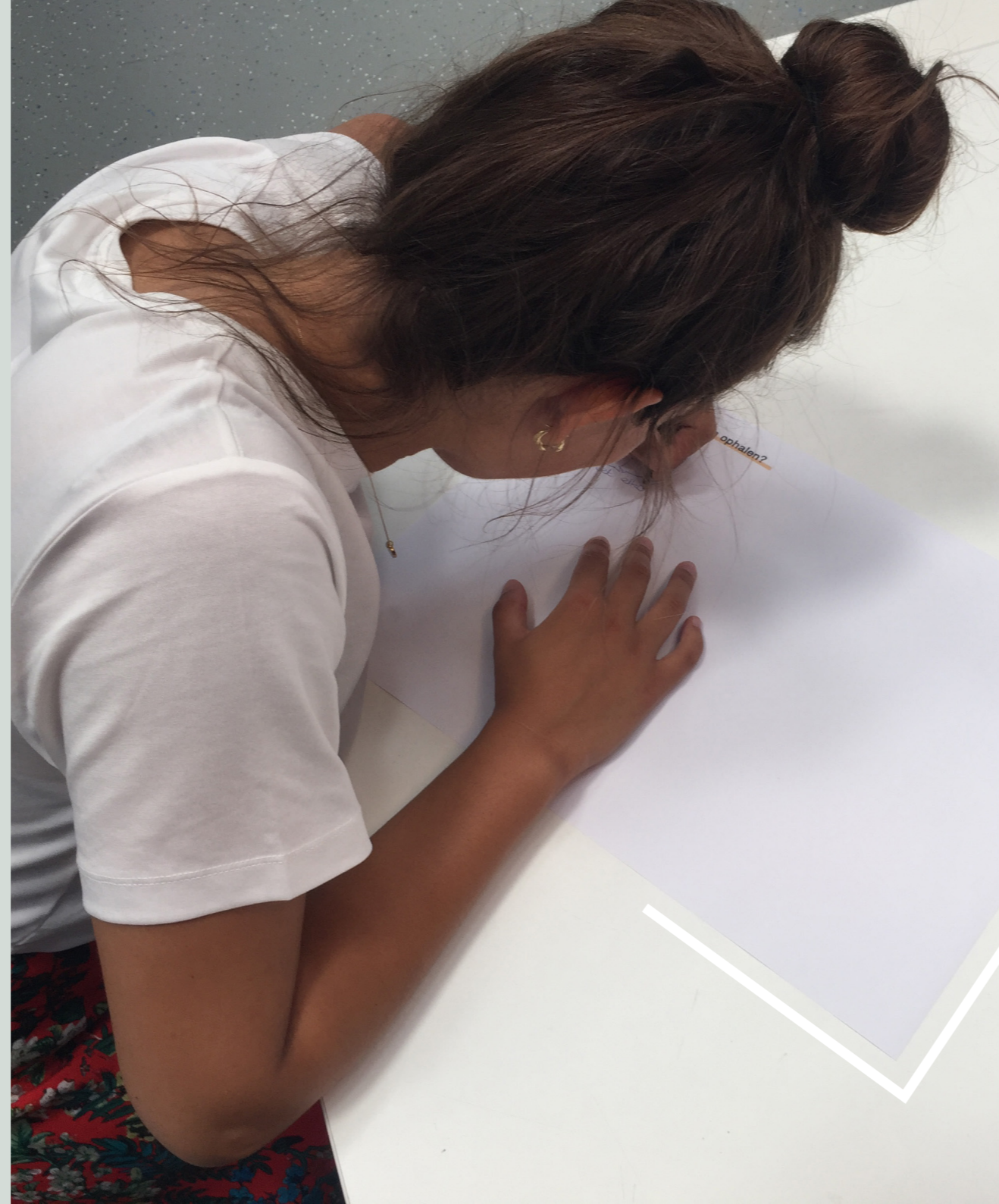
3.3 Conclusion

Consumers become more aware of the environmental problems and thus being environmentally responsible is becoming a more important matter. Therefore, companies have to react for consumer interest. But there is still a “value-action”-gap that will hold back consumers to take responsibility and to take action. The environmental attitude can differ far from the environmental behaviour of the consumer. This is where companies can have an impact. When companies are taking action to a more sustainable world, the consumer will indirect support the environment as well.

The government is also an important influencer in this picture. They can be a big influence in the change towards a more sustainable and eco-friendly society. Concerning the mobile phone industry, providers and mobile phone companies can be a large influence on the consumers’ behaviour. Actions by T-Mobile and Vodafone are already being taken. Large companies are starting to support a circular economy. But action is needed from the consumers as well. Overall, there are a lot important parties who can have a significant

influence in becoming more circular. Consumers, the government and companies will have to make changes in behaviour, strategies and vision. This project will focus on the consumer part of the picture, their behaviour is an important part for a circular economy for mobile devices.

Consumer research



CHAPTER 4

The consumer research that is performed during the exploration phase will be discussed in this chapter.

4.1 Introduction

In this chapter, more information will be given about the literature research to the end-of-use. Then, qualitative research that is performed will be discussed.

4.2 Background end-of-use

To understand what is meant with “the end-of use” in this paper, it will be shortly explained. The start of the end-of-use is the moment when a product has become obsolete (Hollander, Bakker, & Hultink, 2017). A product might still function but it is not in use anymore. It is not to be confused with the end-of-life (EOL) of a product. The end-of-life means that a product has reached the end of its “useful lifespan” and is beyond recovery at product level (Hollander et al., 2017). The difference between the two definitions is that the end-of-use is determined by the consumer (user of the product) and the end-of-life is “determined” by the product (when it has reached the end of its “useful lifespan”).

4.3 Questionnaire

In the preliminary phase a questionnaire is used to gain more insight into the decisions of the consumer. It helped to get a view on the behaviour of the consumer at the end-of-use of smartphones. Quantitative research is used because it gives insight into the frequency of the consumers choices they make at the end-of-use. The questionnaire was taken to determine the most interesting target group for this research. The questions in the questionnaire were derived from the research question: “What do consumers do with their smartphones at the end-of-use?”.

Because the target group was yet to determine, the participants of this questionnaire were people with ages between 20-70 and with different educational backgrounds. The questionnaire was filled in by 60 participants. The questionnaire was made with “Google

Forms”. The questionnaire was open for 48 hours, after the 48 hours, 60 people had respond. The questionnaire was send to friends and family, with the question to share among their friends and family.

The participants were guided through decisions they made when their old smartphone was at the end of its life. The questions (see appendix 1) were multiple choice, but with every question there was an “other” option. Here participants could write down what their answer was if it wasn't listed in the given answers. The decision made by participants to keep an old phone at home was the focus of this questionnaire and thus the participants who chose this answer are the most interesting to discuss further.

It appeared that 36 participants kept their old phone at home when they bought a new one (see figure 5). Reasons for keeping an old phone were different for many participants. Three main reasons were: unknown what to do with it, there is still personal information on it and to have a spare phone. The last reason was the most chosen answer: out of the 36 participants who said they saved their old phone at home, 22 (more than a third of all the participants) does this to have a spare phone for when their current phone does not work anymore (see figure 6).

The results of the questionnaire are used as an estimation of what direction would be interesting to choose. The participants were from all ages, it only mattered if they had a smartphone (and it should not be their first one). In total the number of participants was 60. This gives a good estimation to go into further research. It did not matter whether the participants had an iPhone, every smartphone was accepted because the aim was to find out what people do at the end of use.

To conclude, people who keep their phone as a spare phone were chosen for further research, because this group was the largest group from all the participants who kept their old phones at home.

What did you do with your old phone?

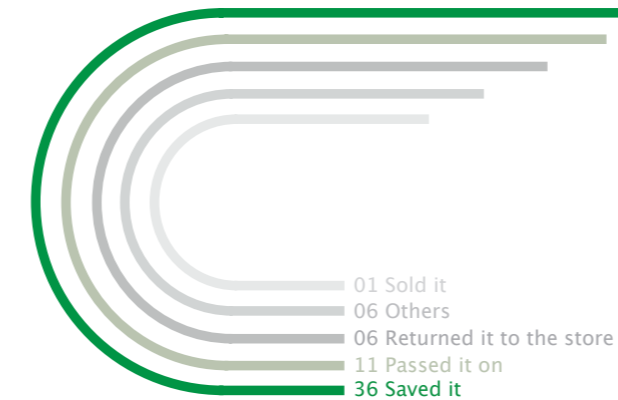


Figure 5

Why did you save your old phone?



Figure 6

4.4 In dept interviews

Interviews were taken to get more understanding of the consumers and the decision to keep a phone at home. It helped to obtain information about the decisions and actions of these consumers. The interviews were taken with a specific goal: "Do people keep their phone at home just to have a back-up phone? (or are there other reasons?)" and "Have they ever used this phone as a back-up?".

The interviewees were consumers who keep their old phones at home. In total 8 people were interviewed. The interviews took place at their home to obtain more contextual information. The interviews took about one hour. The interviews were recorded and later this information was translated into quotes and with these quotes statement cards were made (see appendix 2). As preparation, four main research questions were created:

1. **Where** is your spare phone?
2. Can you **turn on** the spare phone?
3. Do you **need** a charger, pincode or simcard?
4. Would you still **keep this** phone as your spare phone?

There were only four questions created because the interview was led by the information and occurrences during the interviews. After the interview the statement cards were created and the analyzed, the results will be discussed below.

Two main conclusions were derived from the qualitative results. First, the interviewees said that they had their old phone at home, so it could function as a back-up phone. But during the interview it appeared that this was not always the reason. Because some phones did not work anymore, or they could not find a charger, or they didn't know the pin code anymore. So not all phones that were

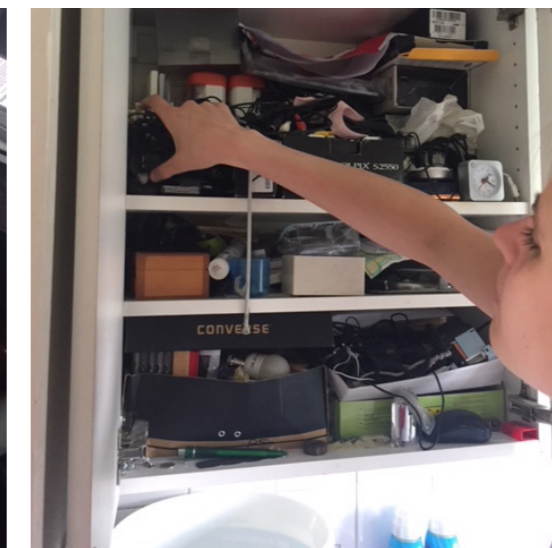
kept at home functioned as a spare phone.

Second conclusion that derived from the interviews was about the emotional attachment towards the old phones. Interviewees said the old phones were nostalgic. When asked why, they gave two reasons: the experience of holding the phone and the personal information on it, like old photos, which they might want to see someday. But not one of the participants really knew what kind of information and photos was on the old phones. They were also uncertain if they had this information somewhere else, besides on that particular phone.

From all the participants, nobody would return their phone when asked during the interview. Some said it could function as back-up phone, but they had multiple old phones and not all phones worked as back-up. These multiple old phones had information on it, which was a second reason for not returning it to the store. The where confused what to do with the information that was still on their phones.



Picture 1, Consumer research

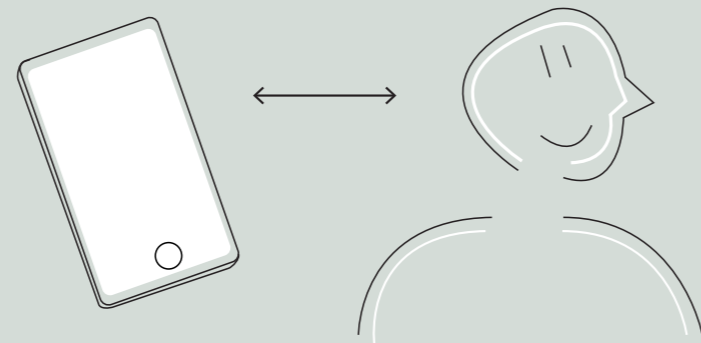


Picture 2, Consumer research



Picture 3, Consumer research

User-phone attachment



CHAPTER 5

Literature study is done to get more insight in the attachment between user en smartphone.

5.1 Introduction

To come up with a fitting solution to the problem statement, further research has been done to understand the relation between user and phone. In this chapter the strength of attachment, different kinds of attachment and replacement motives will be discussed. Then, conclusions can be drawn, and a focus will be shaped.

5.2 Attachment

The strength of attachment between user and product is described by Odom, Pierce, Stolterman, & Blevis (2009) as “how much the owner cares about the durability of the particular object or how easily the owner would readily discard the particular object.” If people are attached to a product this means that this product is special to them. When there is a strong attachment between product and consumer, it is unlikely for a user to dispose the product (Schifferstein & Zwartkruis-Pelgrim, 2008).

Reasons for a strong user-product attachment are different. It seems obvious that people become attached to a product when its functionality and performance are high. But, when people are attached to a product, it is not only because of its utility. Even when a product is not functioning as it should, people can still have a strong attachment towards a product (Schifferstein & Zwartkruis-Pelgrim, 2008). According to Schifferstein & Zwartkruis-pelgrim (2008) there are seven determinants of attachment: (1) enjoyment, (2) memories to persons, places and events, (3) support of self-identity, (4) life vision, (5) utility, (6) reliability and (7) market value. Another research has found that key components for the relationship between user-smartphone is the personalization of your phone, whereas storing personal memories (like photos) are a reflection of “the self” and will make the relationship stronger (Fullwood, Quinn, Kaye, & Redding, 2017). These two researches make seem that a relationship between user and phone will become stronger when

the phone supports the user in making memories and reflecting the users’ self-identity. Fullwood et al. (2017) showed that users have relatively low emotional attachments to their smartphone and high emotional attachment to the personal memories and services that it offers. Which would mean that when a phone is not functioning as its full potential, users can still have a strong attachment towards their phone, this attachment is then made because of the determinants 2 and 3 given by Schifferstein & Zwartkruis-pelgrim (2008): memories to persons, places and events & support of self-identity.

Another research has showed that users express a stronger attachment with a product, when it is used in a ritualized manner. A ritualized manner means that an activity has become habitual. When something is habitual it reflects companionship and relaxation (Fullwood et al., 2017). When looking at mobile phone usage, many actions are habitual (e.g. checking time, checking incoming text messages or setting an alarm every night) and thus a user can have a greater affinity towards their phone.

As Odom et al. (2009) explain the strength of attachment, they say that this is also connected to how easily the owner would discard the product. Wilhelm, Yankov, & Magee (2011) researched the ease of disposal of a mobile phone and give three main reasons: (1) the discount given by providers for a new and upgraded phone, (2) the need for a new phone, because the current phone is damaged or lost or (3) new technologies and versions are available. These three reasons do not say anything about the emotional attachment to the personal memories and services that a phone offers. Fullwood et al. (2017) explain this is as: “the features which allow users to personalize the phone and reflect an aspect of “the self” are transferable and not locked in to one specific device”. The attachment to a smartphone itself is only for a shorter period of

time. Namely, the time it is in use, which is approximately around 2.5 years (Ellen MacArthur Foundation, 2013). But the attachment towards the personal memories will still be there. Which may cause that people keep their phone at the end-of-use. During the user research it is became clear that some interviewees saw the old phones as nostalgic. This attachment is only after a longer period of time. When a phone is in use, the user is more attached to the services it provides. When the phone hasn’t been used for a longer period of time, the phone itself becomes nostalgic.

5.3 Conclusion

Concluding, personal information and a smartphone can be seen as two different kinds of attachment, whereas the smartphone functions as a utility product and the personal information is a reflection of self-identity. Users may feel attached to their smartphone. But it is more likely they are attached to the personal memories and services it provides. This project will focus on the personal information on smartphones (see figure 7). Knowing people are probably more attached to their memories on their smartphone than the smartphone itself, helps to see why they are more likely to keep their phones at home. The personal information is still on the old phone when they have a new phone. After old phones are left forgotten in drawers, the information on them will also be forgotten. So, the challenge will be to help consumers by returning their phone and deleting their data without any information loss where trust is an important feeling that needs to be pursued.

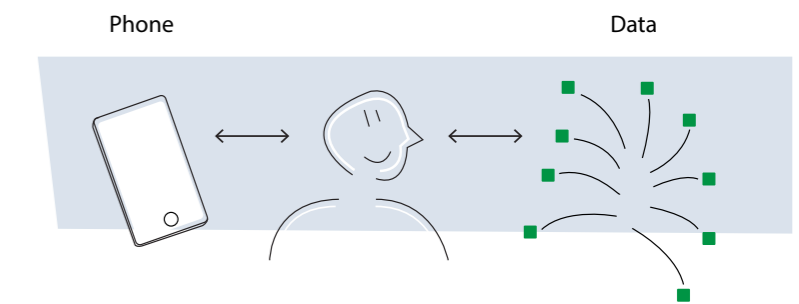


Figure 7, user-phone attachment

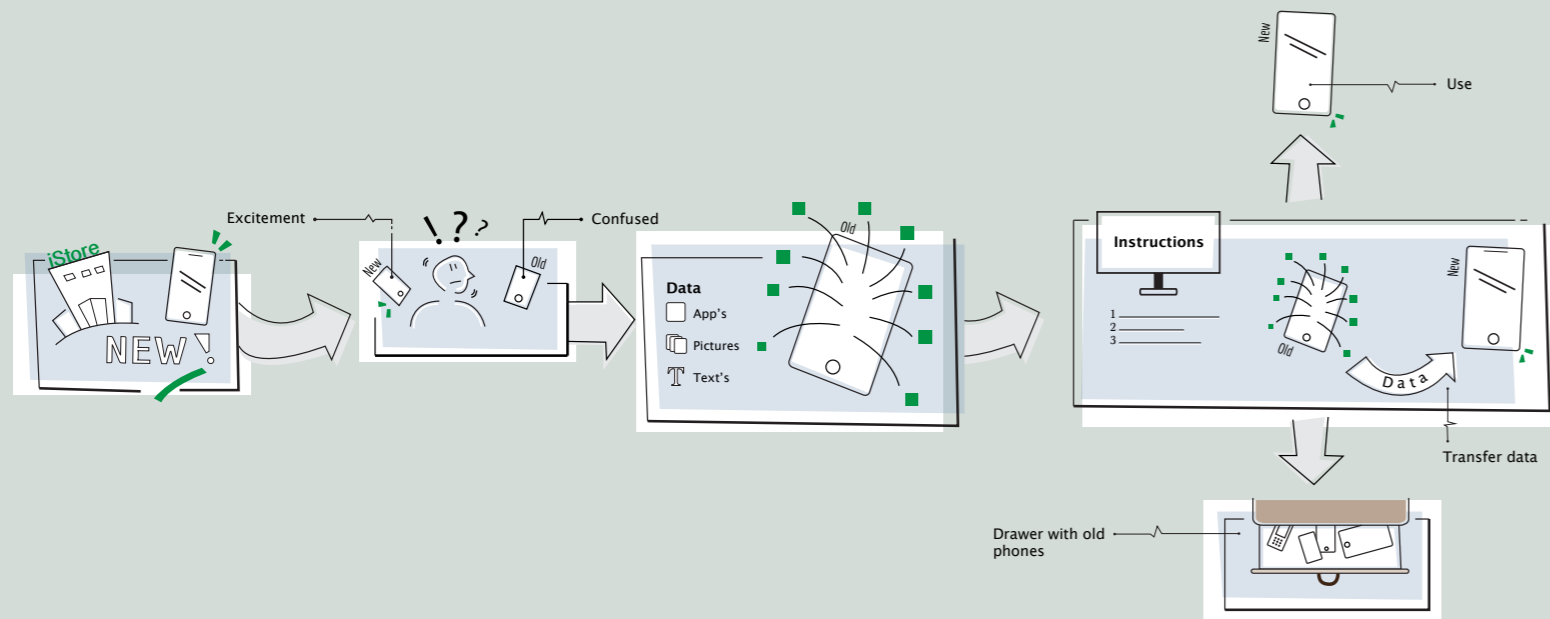
CHAPTER 6

From the performed research, a visualization is made to give an overview of the most interesting insights and opportunities and the problems to tackle

- Opportunity
- Problem to tackle
- Insight

Research / topic	Main conclusions	See chapter
Circular economy	<ul style="list-style-type: none">● Mobile phones have a short replacement cycle● “Take make dispose” model is reaching its limits.	2
Consumer research	<ul style="list-style-type: none">● Reason for not returning a mobile phone: personal data is still on that phone.● Many consumers do not know what is data is on their old phones.	4
Trends	<ul style="list-style-type: none">● Cloud computing is important for the future vision● Smartphones become a service● More data produced than ever.	3
Attachment	<ul style="list-style-type: none">● Relatively low emotional attachment to phone and high attachment to personal memories.● Personal information is a reflection of the self.	5

Design brief



CHAPTER 7

In this chapter the design goal will be presented and the current and desired situation are explained.

7. DESIGN BRIEF

7.1 Design goal

The design goal is formulated based on the analyzed results of the consumer research that is performed. The design goal consists of two aspects: the intended interaction and experience. The design brief is placed in a hierarchy of abstraction; first a big picture is drawn of the intended interaction, then the goal is specified.

ABSTRACT

Users need to bring back their mobile phone to the store at the end-of-use.

Users need to delete the personal information on their old phone in order to bring back an “empty” phone.

Users should be able to comfortably and efficiently back-up their data and then delete their personal information, while feeling reassured and confident. The interaction should become a trustworthy and standard operation.

SPECIFIC

To explain the intended experience an interaction vision is created:

Shifting between phones (current to new phone) should be like New Year’s Eve. Looking forward to a new year, which can feel like a fresh start. But also looking back at everything that the old year offered and what has been achieved.

The interaction vision is created to show that an old phone does

not need to be connected to a negative experience (forgotten, old, broken, etc.) but can also be something valuable and enjoyable. The interaction vision is created to be a guideline for the intended experience for the final design.

7.2 Problem selection

The end-of-use of mobile devices is often forgotten when a phone is being designed. The end-of-use is important when the economy shifts from linear to circular. One of the reasons consumers keep their old phone at home is because there is personal information on it. The interaction between consumer and iPhone at the end-of-use is confusing and uncertain. The research question that will address this problem is: How can we reassure the consumer that personal information is saved and then deleted, and the old iPhone can be returned to the store?

7.3 The current situation

The current situation is analyzed and will be discussed. The focus of this study is on three main actions at the end-of-use:

1. Making a back-up of all personal data
2. Transferring all personal data
3. Deleting all personal data

When talking about all information on the iPhone there are meant three different kinds together:

1. Data (e.g. music, photo’s, video’s etc.)
2. Applications (e.g. app’s)
3. Settings (e.g. security, language etc.)

First the users’ choices at the end-of-use will be explained. After the consumer research it appeared that the main choices that can be

made during this process concerning the old phone are:

1. Keep
2. Dispose
3. Sell
4. Pass on
5. Return

In the current situation, many consumers keep their phones in drawers at home instead of returning it to the store. If consumers want to return their old phone to the store three main actions (making a back-up, transferring data and deleting data) need to be completed. These three actions are researched to find out what difficulties they each have during the steps that needs to be taken.

First, the consumer needs to make a back-up of all the information on the current phone. This means that all the information on the current phone is on that phone but more importantly, also somewhere else. This can be in the cloud (using software) or on a computer (using hardware). Because this project focusses on the Apple iPhone, only the options Apple provides for their consumers, will be discussed. When going to the website of Apple (www.Apple.com), they give instructions on how to make a back-up of your phone (see figure 8). The choices are: using iCloud or using iTunes. The instructions contain a lot of information and steps that the user should read and perform. During these steps, there is no confirmation given about the performed steps or insights in the duration of the steps. Also, when performing the steps, a user should have two screens: the current phone and another screen to read the descriptions. In this way it is not made easy to simply back-up the personal information, many questions can be asked and could make the user confused: what do you want to back-up? When do you know for sure the back-up is completed? And how

7. DESIGN BRIEF

can you find things ones you have made a back-up?

The second step will be to transfer data from the current phone to the new phone. Transferring data is made easy by Apple when

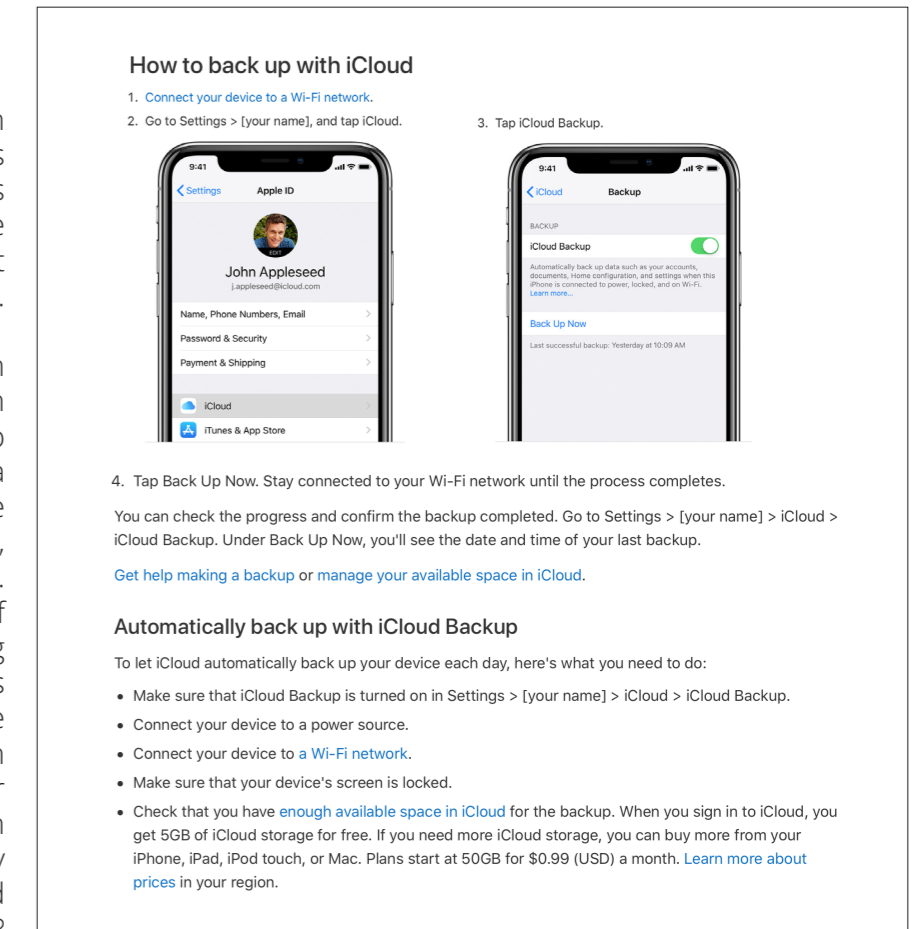


Figure 8, iCloud back-up, source: Apple.com

7. DESIGN BRIEF

they introduced Quick Start. In essence, the consumer only needs to hold the two phones together and the transfer process will start. The steps to be taken are shown in figure 9. Quick Start can only be used by iOS 11 or higher versions. The steps that are showed in figure 9 seem like a lot of difficult steps but there is a big difference in restoring data and making a back-up of your data. When restoring data, the user is guided through the steps on the iPhone. When the user wants to back-up data, the user needs to find the actions to be taken themselves. Furthermore, there are two other options to transfer data. These are, taking your back-up from the iCloud (see figure 10) or from iTunes and transferring it to your new phone.

The final step will be to delete the information on the current phone, so it will be ready to be returned to the store. The steps given on Apple.com: The user must go to *Settings* > *General* > *Reset* > *Erase All Content and Settings*. When deleting all the information from a phone, the user agrees that everything will be gone after this action. This is a tense step to take, because there is no way back after this step. That is why the user must feel reassured and confident about the back-up that is made earlier.

Conclusion

When consumers have reached the end-of-use of their smartphone, often they do not return it to the store. When they do, several steps need to be taken. These steps are explained on Apple.com and can be performed on the iPhone using iCloud or iTunes. During these steps, there is no confirmation given about the performed steps or insights in the duration of the steps. The consumer might get confused when and if a back-up is completed or if all the information is deleted from their phone. Next the data must be deleted from the current phone, which might feel tense because it is a non-reversible action.

7. DESIGN BRIEF

Use Quick Start

You can use an iPhone or iPad that's already running iOS 11 or later to automatically set up a new device. This process occupies both devices, so make sure that you choose a time when you won't need to use your current device for several minutes.

Transfer your SIM card or contact your carrier

If your new device needs a SIM card, here's what you need to do:

- If your carrier gave you a new SIM card, put it in your new device.
- If your new device uses the same kind of SIM card as your previous device, [transfer the SIM card to your new device](#).
- If your new device needs a different kind of SIM card than what you have, or if you aren't sure, [contact your carrier](#).

Bring the two devices close together to begin

1. Turn on your new device and place it near your current device running iOS 11 or later. The Quick Start screen appears on your current device and offers the option of using your Apple ID to set up your new device. Make sure that it's the Apple ID that you want to use, then tap Continue. If you don't see the option to continue on your current device, make sure that Bluetooth is turned on.
2. Wait for an animation to appear on your new device. Hold your current device over the new device, then center the animation in the viewfinder. Wait for a message that says Finish on New [Device]. If you can't use your current device's camera, tap Authenticate Manually, then follow the steps that appear.
3. When prompted, enter your current device's passcode on the device that you're setting up.
4. Follow the instructions to set up Face ID or Touch ID on your new device.
5. When prompted, enter your Apple ID password on your new device. If you have multiple devices, you might also need to enter their passcodes.
6. Your new device offers the choice of restoring apps, data, and settings from your most recent iCloud backup, or updating your current device's backup and then restoring. After you select a backup, you can choose whether to transfer some settings related to location, privacy, Apple Pay, and Siri. If you want to update the backup on your device, make sure that Wi-Fi is enabled on your device.



Figure 9, Quickstart, screenshots from Apple.com

Use iCloud

Use the steps in this section to back up your previous device device.

Transfer your SIM card or contact your carrier

If your new device needs a SIM card, here's what you need to do:

- If your carrier gave you a new SIM card, put it in your new device.
- If your new device uses the same kind of SIM card as your previous device, [transfer the SIM card to your new device](#).
- If your new device needs a different kind of SIM card than what you have, or if you aren't sure, [contact your carrier](#).

Then use the steps below to transfer your iCloud backup to your new device.

Transfer your iCloud backup to your new device

1. Turn on your new device. A "Hello" screen should appear. If you've already set up your new device, you need to erase it before you can use these steps.*
2. Follow the steps until you see the Wi-Fi screen.
3. Tap a [Wi-Fi network](#) to join. Follow the steps until you see the Apps & Data screen, then tap Restore from iCloud Backup.
4. Sign in to iCloud with your Apple ID and password.
5. When asked, choose a backup. Make sure that it's the correct one by checking the date and size of each. If asked to update to a newer version of iOS, [learn what to do](#).
6. If you purchased iTunes or App Store content using multiple Apple IDs, you're asked to sign in to each. If you can't remember the passwords, you can skip this step by tapping "Don't have an Apple ID or forgot it."
7. Stay connected and wait for the restore process to finish, then complete the rest of the onscreen setup steps. If possible, keep your device connected to Wi-Fi and plugged into power after setup. This allows content like your photos, music, and apps stored in iCloud to automatically download back to your device.

* To erase your device, tap Settings > General > Reset > Erase All Content and Settings. This erases all data on your device. After you erase it, your device restarts and the "Hello" screen appears.

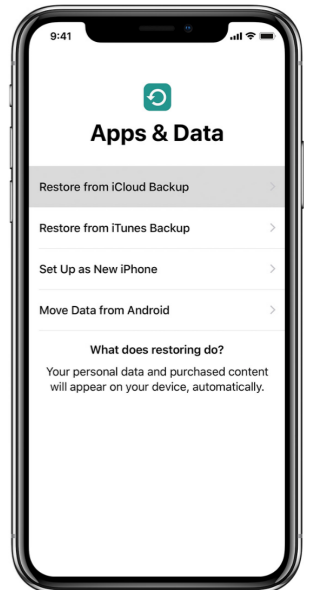


Figure 10, Transfer data with iCloud, screenshots from Apple.com

7.4 The desired situation

A desired situation is created to strengthen the design goal. When creating a desired situation, the desired user experience is also more clear. This situation is not an end result, but it is a direction to pursue (see figure 11). Right now, the system of returning an old mobile device to the store includes deleting data that are given on Apple.com. In the desired situation the user will already understand what needs to be done to clear all information from the current phone, while feeling reassured that all information of that phone is saved in iCloud. In this project the focus will be on backing up information from an iPhone and to create a clear overview of this information.

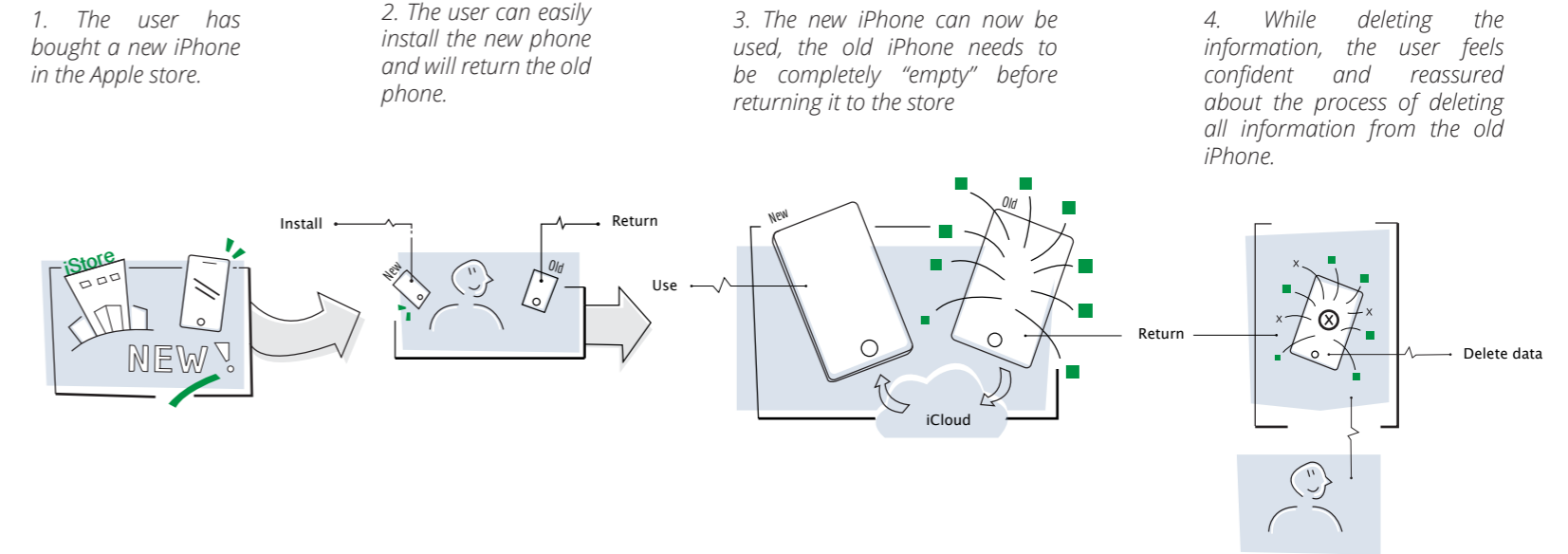
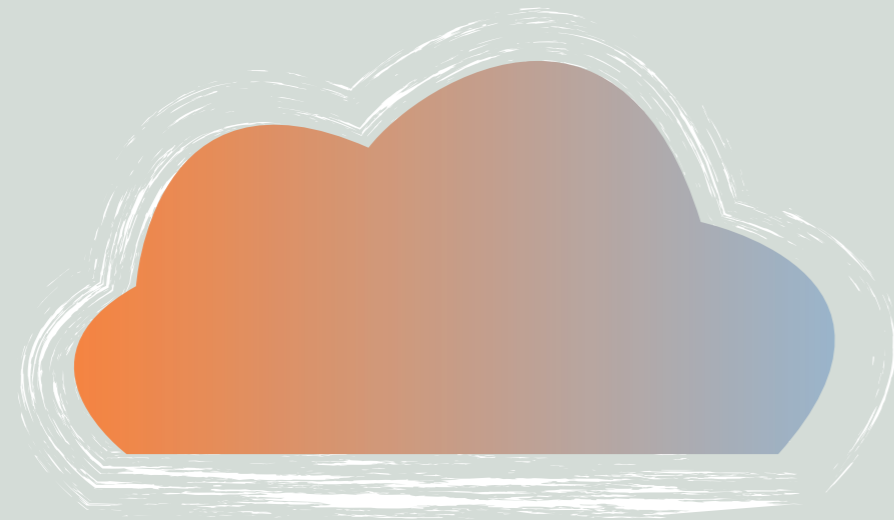


Figure 11, Desired situation



The iCloud

CHAPTER 8

Because the focus of this project is on storing data in the iCloud, the current process of making a back-up is researched and will be explained.

8. The iCloud

7.1 Introduction

The essence of the design goal (“Users should be able to comfortably and efficiently back-up their data and then delete their personal information, while feeling reassured and confident. The interaction should become a trustworthy and standard operation.”) is to make a back-up of personal data from the iPhone. To come up with a solution to do this comfortably and efficiently, the current process of making a back-up is studied. Currently Apple offers iTunes and iCloud to make a back-up of your iPhone. In chapter 3.2 it is explained that cloud computing will play a big part in the future scenario, and thus the focus in this project will be on the iCloud and not on iTunes.

7.2 Making a back-up in iCloud

In 2011 Apple introduced iCloud, where consumers can store all their content online. iCloud can wirelessly save information and automatically push it to all Apple devices connected with the same iCloud ID.

Synchronize

iCloud is a mostly invisible tool that helps you to store your data. It means that data (e.g. a photo taken on your iPhone) is pushed to all Apple devices that are logged into the same iCloud ID (See figure 12). This action is called syncing, which is an informal word for synchronizing. It is “an act of getting two elements into harmony” (www.yourdictionary.com). In this way you can access all your data on every Apple device you own.

Back-up

iCloud is also a tool to store all data of the iPhone. This data can be anything from the iPhone: from apps to settings to photos. Making a back-up can be done automatically, the user can turn on “iCloud back-up” in: *Settings > iCloud > iCloud Backup* (see figure 13)

on the iPhone. In figure 13, two user journeys are displayed. The first journey is to access iCloud settings. In these settings the user can choose which data they want to back up. When the user is at the final window “Info” (screen 5) the user can choose which apps to back up, but when scrolling down, the iPhone explains: “Photo Library is backed up separately as part of iCloud Photo Library”. To access settings for the Photo Library, the user should go to screen 2 or 3. Here different settings can be chosen for backing up photos. The user journey to back-up data in iCloud might be difficult to understand with so many screens to go to. Options are not clear, and it is complicated to understand where the user can select which data to store in the iCloud.

The second journey is when the user scrolls down in window number two and goes to “iCloud Backup”. Here the user can switch on or off the automatic backup function. Also, the latest successful backup time is given here. It is unclear why the second user journey is not integrated in the first user journey where all the other settings of iCloud are displayed. It doesn't seem easy to find these options.



Figure 12, iCloud

8. The iCloud

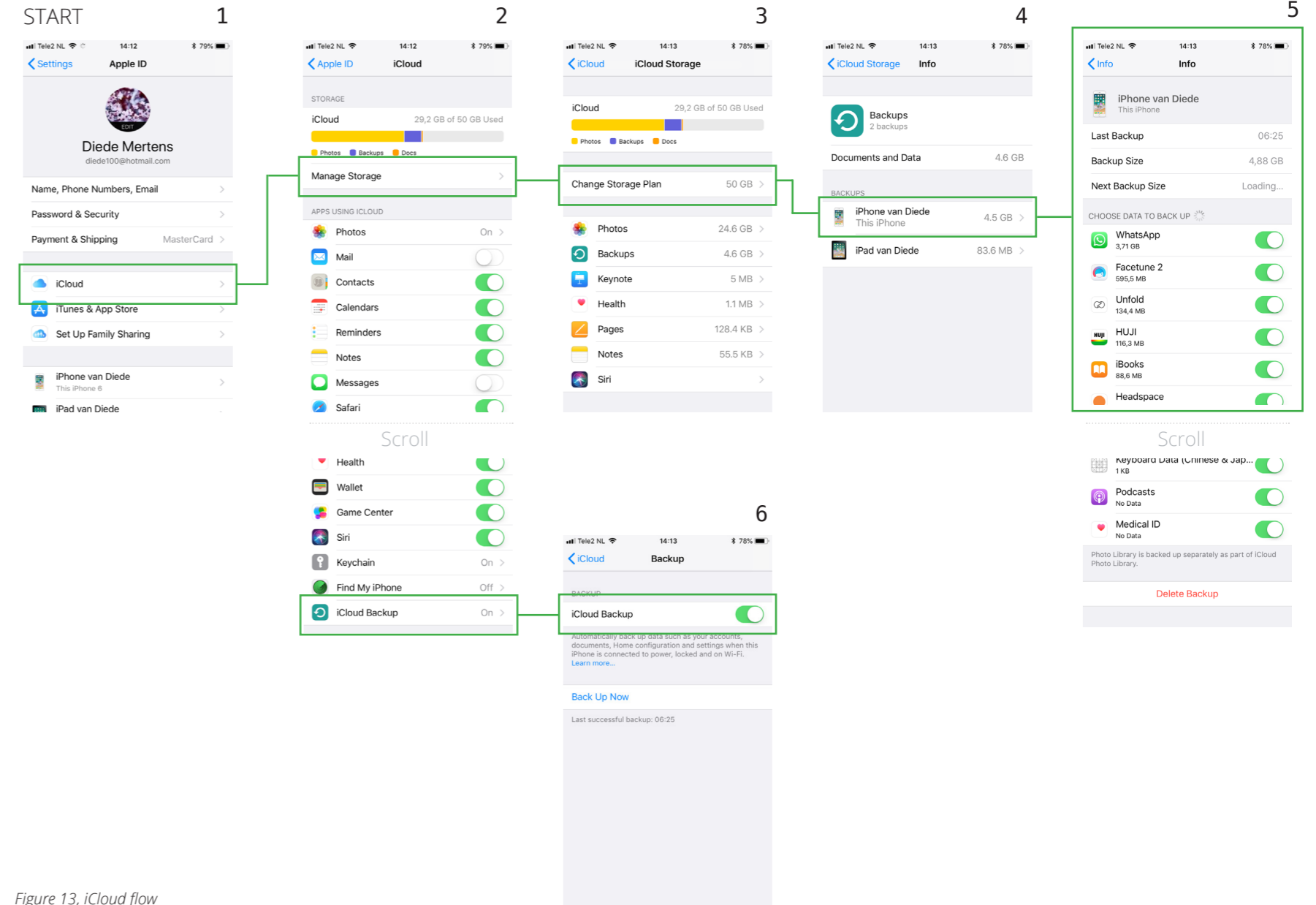


Figure 13, iCloud flow

7.3 Access to iCloud

iCloud is a paid service provided by Apple. The user can use 5 GB for free, but this is probably in many cases too little. The user can upgrade to a monthly paid subscription of 200 GB or 2 TB (See figure 14). To see what's in your iCloud, the user can go to www.icloud.com (see figure 15), but as well (and as Apple designed it to be) on their Apple products. What is saved in the iCloud can be handled in settings on the iPhone. A user can choose here what kind of data they would like to save or not save in the iCloud (See figure 13). Back-ups stored in the iCloud can easily be transferred to a new device, in this way a new iPhone will look like as if it had always been yours.

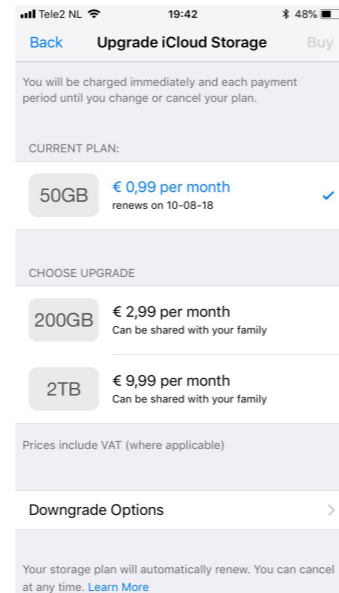
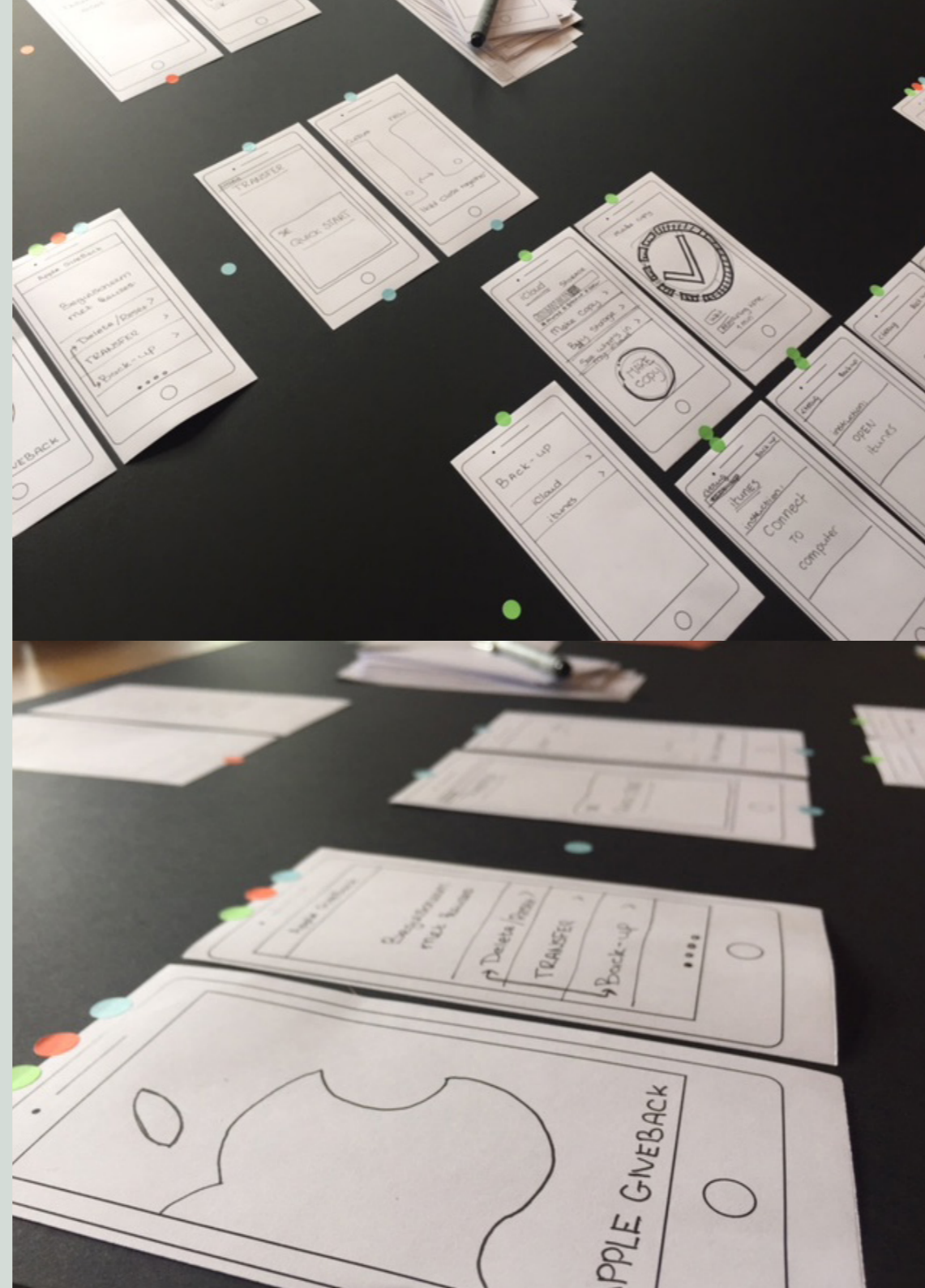


Figure 14, iCloud subscriptions



Figure 15, iCloud webbrowser

Ideation & conceptualization



CHAPTER 9

In this chapter the ideation phase and the conceptualization phase are shown. First three idea areas are given, than two concepts that derived from the idea generation are developed and explained.

9.1 Introduction ideation

The ideation phase is illustrated in figure 16. Different sessions were performed to come up with ideas that fitted the problem statement. The ideation started with brainstorming, using techniques like how to's, minddrawing and brainwriting (these techniques are explained in Van Boeijen et al., 2010). By diverging and then converging, small ideas came together into actual ideas that could be used for a final design. During the converging process it appeared that there were three clear themes in the solutions that came up: (1) data-deleting oriented, (2) a combination of the end-of-use and the first use and (3) data organizing and back-up solutions. These three solution themes will be discussed before continuing to the final concepts.

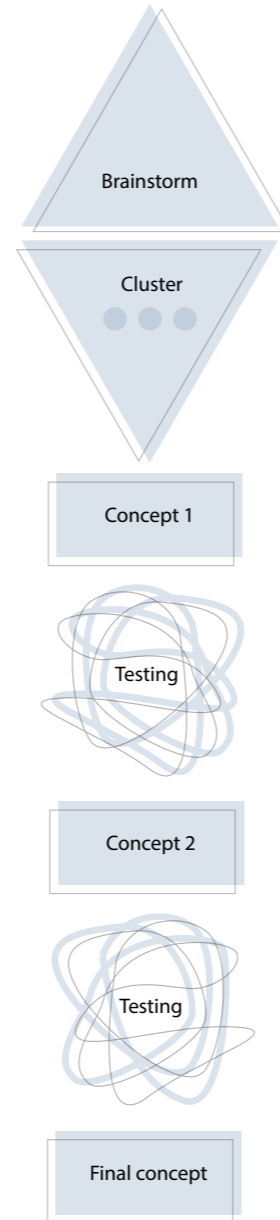


Figure 16, process

9.2 Idea generation

Ideas 1: Deleting data

When a phone has reached the end-of-use, data must be deleted before returning the device. During the consumer research it appeared that not everyone trusted deleting data on the iPhone. It was something that was stressful: handling all your data (which sometimes may feel like your whole life). Questions that needed to be answered during idea generation were:

1. Is everything deleted?
2. How can you know for sure all data is deleted?
3. How can users have more trust in deleting data?
4. How can the deleting of data feel more reassured?

Several ideas came up, for example, destroying data by destroying your phone. Apple designed the dismantle robot "Liam", so an idea could be that that a smaller version would be in Apple stores to really break the memory card. This idea was not a solution to the problem, because some of the returned phones might still work and could have a second life. Another idea was to look into the software of the iPhone, how is data deleted? And is everything really gone when you click the "Erase iPhone" button? When an iPhone is set to its factory settings, not all data is destroyed. It can be recovered with recovery programs. To really delete all data (to 0% recovery), a user can use a random writer or a secure erase tool." He explained that data is a series of binaries numbers which are mixed up or cut into pieces when the iPhone deletes data and that when data is deleted by the iPhone, it can be recovered.

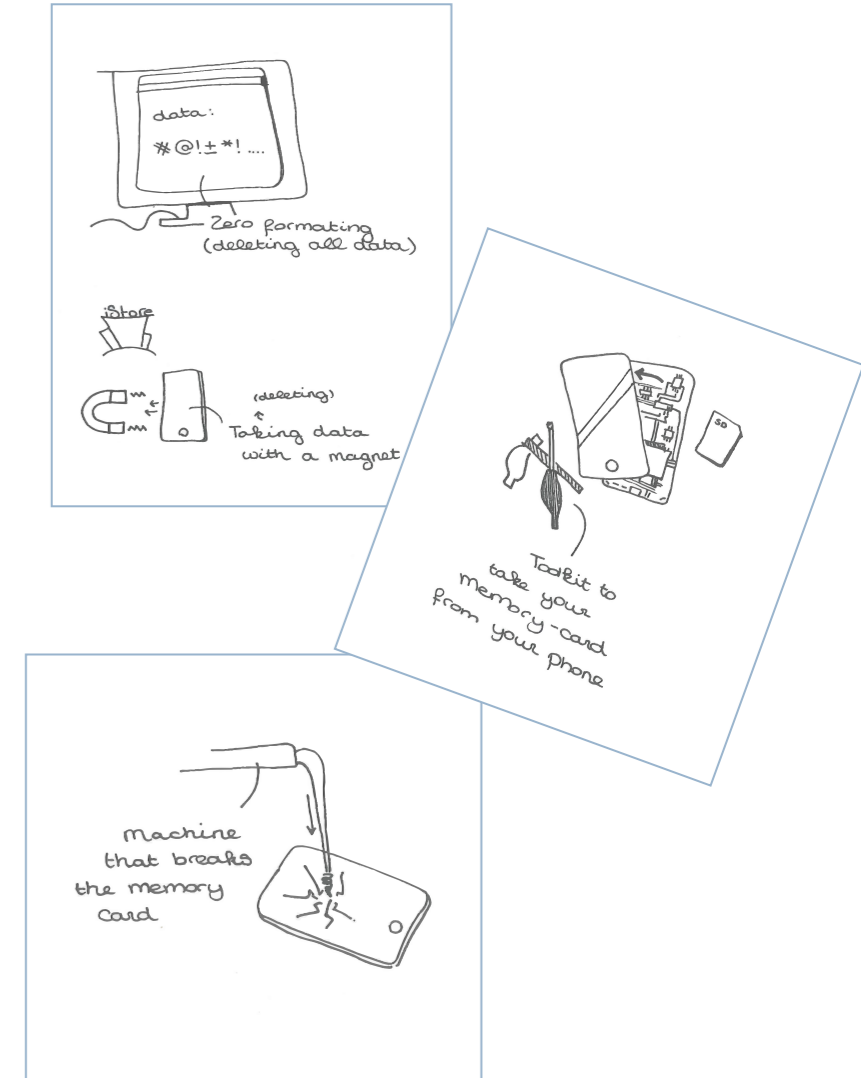


Figure 17, ideas 1

9. IDEATION & CONCEPTUALIZATION

Ideas 2: end-of-use + first use

The ideas in this design theme all apply to the moment when a user switches from an old phone to a new phone. When this moment arrives, a user can be reminded that the old phone needs to be returned. An idea that derived was an end-of-use app. In this app the user could easily transfer, save and delete data before returning the old phone. Another idea was to change the package from the new phone, where there was an option to send the old phone back in the same package. Other ideas included different kind of incentives or a pick-up service provided by Apple. Later it appeared (when visiting the Apple headquarters in Amsterdam) that Apple does not want to intervene in the experience of buying and unboxing a new iPhone, which eliminated some ideas in this theme.

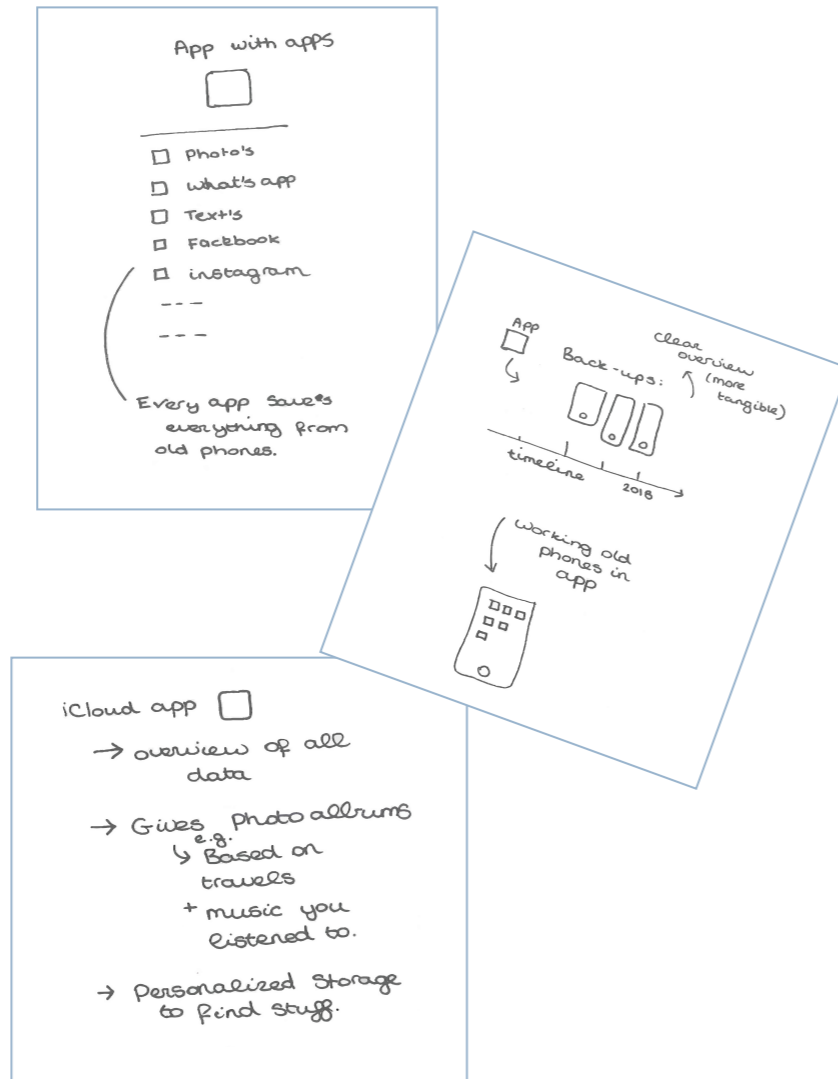


Figure 18, ideas 2

9. IDEATION & CONCEPTUALIZATION

Ideas 3: Data management

Making a back-up, using iCloud and managing data on your iPhone can be difficult and unclear. It appeared from the consumer research that many interviewees didn't know what information was still on their old phones. Ideas to manage personal data on the iPhone seemed like it could help in returning old phones. When a user has overview of their data and trusts that it is save in the cloud (or somewhere else) could help them eventually in deleting data from their phone. Questions that derived concerning this theme where:

1. How can you make managing data clearer?
2. What does the user might want to see from the information that is stored?

An idea that derived from this theme was an app where the user could see the information that was on the current phone, as well as information that was on old phones that the user ones owned. Other ideas also included apps that gave more overview in data that was stored in the iCloud.

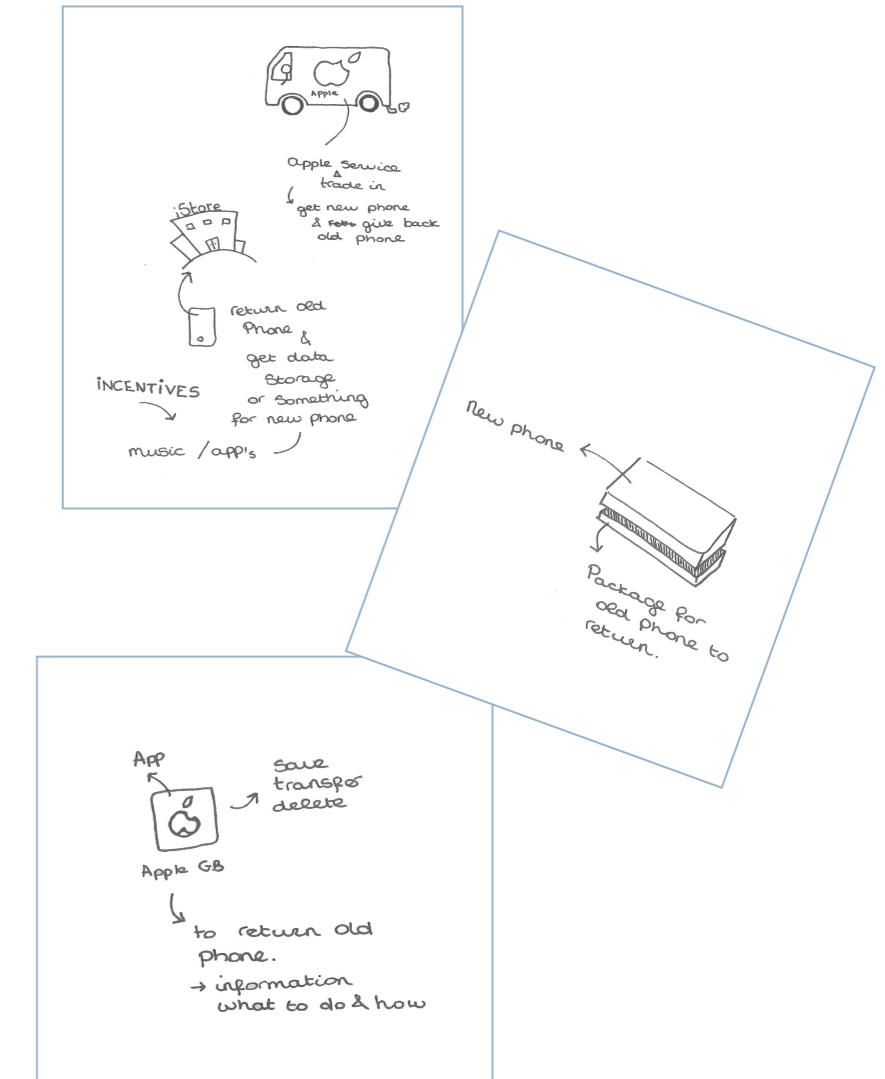


Figure 19, ideas 3

9.3 Introduction Conceptualization

From the ideas, two concepts were created. These concepts are explained in this chapter. First the app “Apple Giveback” will be discussed, then the app “BackUps”. At the end of this chapter, one of these two concepts will be chosen to develop further and will be developed into a final design.

9.4 Apple GiveBack App

The Apple GiveBack App (see figure 21) became an idea because of the campaign called: GiveBack. The app is designed to offer a solution for users to easily save, transfer and delete personal data from the iPhone. With the app, users can manage their data with a clearer overview. During the three main actions that the app offers, users are constantly getting feedback on the process. In this case the user might feel more reassured that every step that needs to be taken at the end-of-use is performed right and no data will be lost.

User journey

On page 62 pictures (5&6) are shown from the creation of the user journey. First, the user journey was made on paper and displayed on a large foam board. In this way, changes could be made easily. When there was a clear user journey formed, tests could be done with participants to see if they understood the steps to be taken in the app. These steps are visualized in figure 20. The user can choose between two main actions when opening the app: (1) to transfer data or (2) to return the phone to the store and receive an incentive.

(1) Transfer data

First the user will get a choice: how do you want to transfer? Transfer and delete or transfer and save the information in the cloud? Then the user can choose what to transfer: initially everything will be

transferred, unless the user chooses to eliminate data. Via Quick Start (designed by Apple) all personal data (as mentioned this contains: data, applications and settings) can be transferred when the user holds the current phone next to the new phone. When the transfer of data is done, the user will get a notification. During the transfer, the estimated time will be shown. When the user is done with transferring the data, the app will ask if the user wants to return their old phone and will then guide them through the steps of returning a phone.

(2) Return the phone to the store

Also, the app will make the process of returning an old phone to the store easier. When the user chooses to return the current phone to the store (via the app), the app will first ask if a back-up must be made. When the user chooses to make a back-up first, then the choice will be if the back-up should be in iTunes or in iCloud (these two options are the options Apple provides). While making a back-up, the user is again being guided through the steps that needs to be taken, also an estimation of the resuming time will be given. When a back-up is made, the app will guide the user through the steps for returning the phone. These steps include the mandatory tasks: removing the sim card and turning off “Find my iPhone” function. The last task is to fill in the users’ address, so a package can be send to the user for the old phone to send back to Apple. When the user does not need to make a back-up, because the data is already stored in iCloud or iTunes, the app will automatically go to the screen where the user needs to take the sim car out and turn of “find my iPhone”. Than the user can fill in an address to

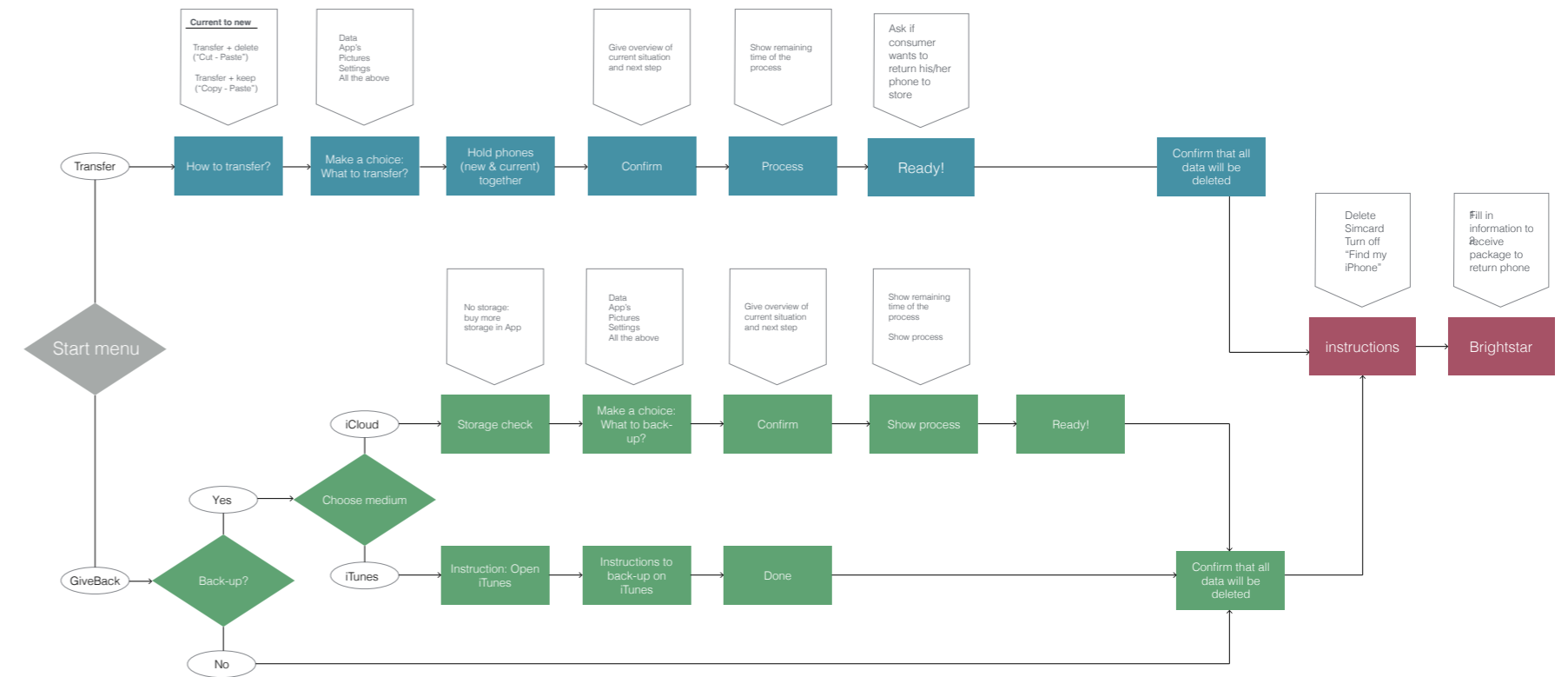


Figure 20, user journey in GiveBack app.

receive a package to send the old phone back.

Discussion

When testing concept 1, it appeared that some steps that needed to be taken were more obvious and clear than others. Making a back-up was the most tense action of the app, because of all the information that needed to be deleted afterwards. So, to make a back-up, it needed to be clear and reliable for the user, then it might result in trusting the process to delete all personal information in the next steps. Also, when visiting the Apple headquarter in Amsterdam, it was said that Apple focusses on the first use, where the user interaction is a meaningful and exciting experience. When the end-of-use is closely connected to the first use, it will become a less meaningful and exciting experience. To delete and to make a back-up of all data that is on a users' phone is a tense step. Because this was the an interesting problem to resolve, another concept is created to find a solution to this part of the experience of the end-of-use.



Picture 4 Designing a user journey on foam board



Picture 5 Discussing with user

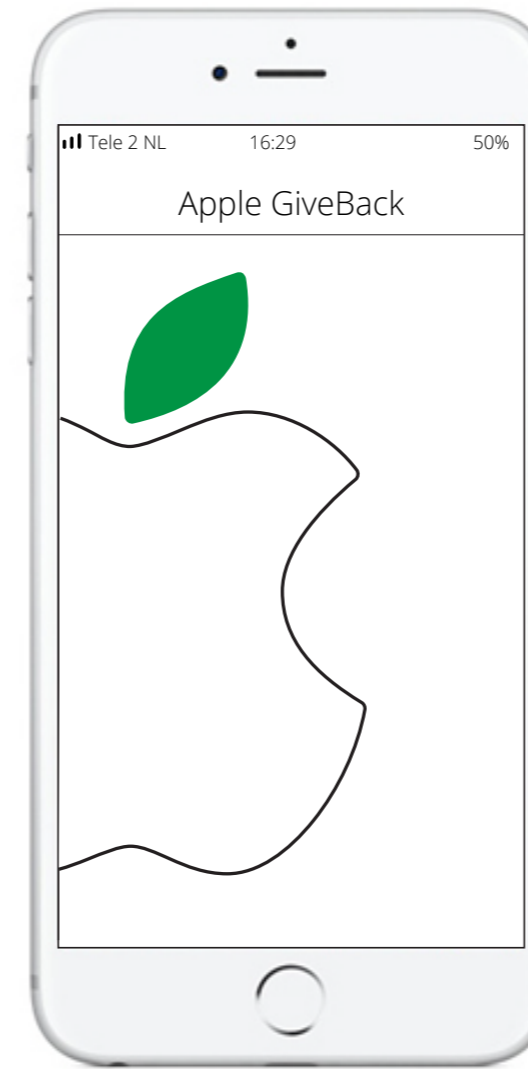


Figure 21 Apple GiveBack



Apple GiveBack

9.5 BackUps App

Next, further ideas needed to be explored to come up with a solution to make the user feel reassured and confident while deleting and backing up data, as said in the design challenge. From these new ideas another concept is made, called: Backups. This is an app as well, and is standard installed on the iPhone. In this app, the user will have an overview of all their personal information that previously was on their old phones. The old phones will be displayed by a screenshot of their home-screen (see figure 23) at that time. In this way, the user will have an overview of old phones with the look that it had when it was in use. The app uses iCloud to store all information. This decision is made because of the rise of the amount of data. Over a lifetime, a user, will gather so much data, that it is almost impossible to store this data via hardware throughout a users' life. The insight that is gained here, is derived from the consumer research that is performed in chapter 4. From the consumer research it appeared that many consumers did not know what information (e.g. photos, video's, app's etc.) was on their old phones. This insight became the starting point for the second concept.

User journey

A drawing of a user journey is shown in figure 22. The essence of this journey is to have a clear overview of all personal data throughout the years a user has had an iPhone. These old phones are saved in the iCloud. The years are categorized by the time a phone has been in use. In the app the most important part is the overview of a users' old phones and data on those phones. When opening the app, it will immediately show all the phones the owner has used. When choosing a phone, the user can choose to see a personalized overview of the time this phone has been in use. This means that highlights, e.g. photos that are taken during the time of

use of that phone, will be shown. The user can also choose to see a more detailed overview of their data. Then, a list of all the apps that are on that phone can be shown. The user can delete the whole app, if he or she does not want to save the information (of the app) in the iCloud, this process is non-reversible: when deleted here, it is deleted from iCloud.

Conclusion

The app BackUps is designed to solve the problem of making a back-up and deleting personal information. The interaction should become a trustworthy and reassuring experience. Because this app will solve this problem, it is chosen to develop further into a final design.

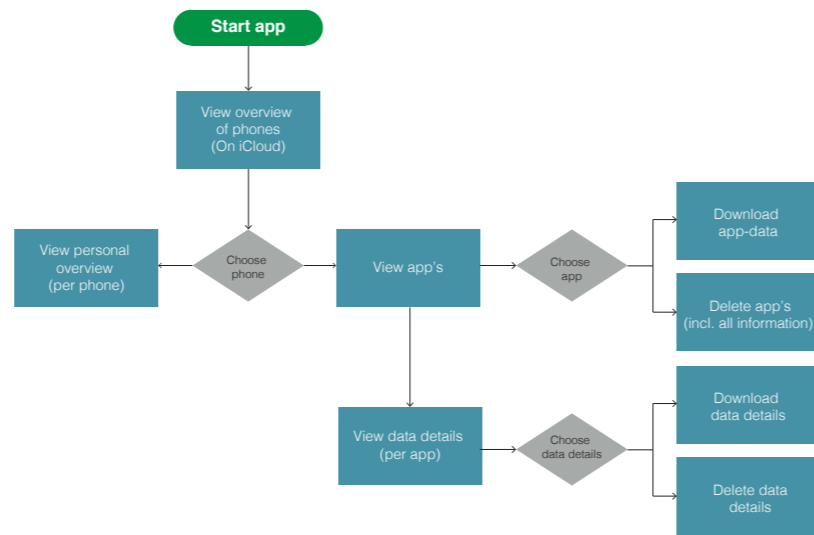


Figure 22 User journey

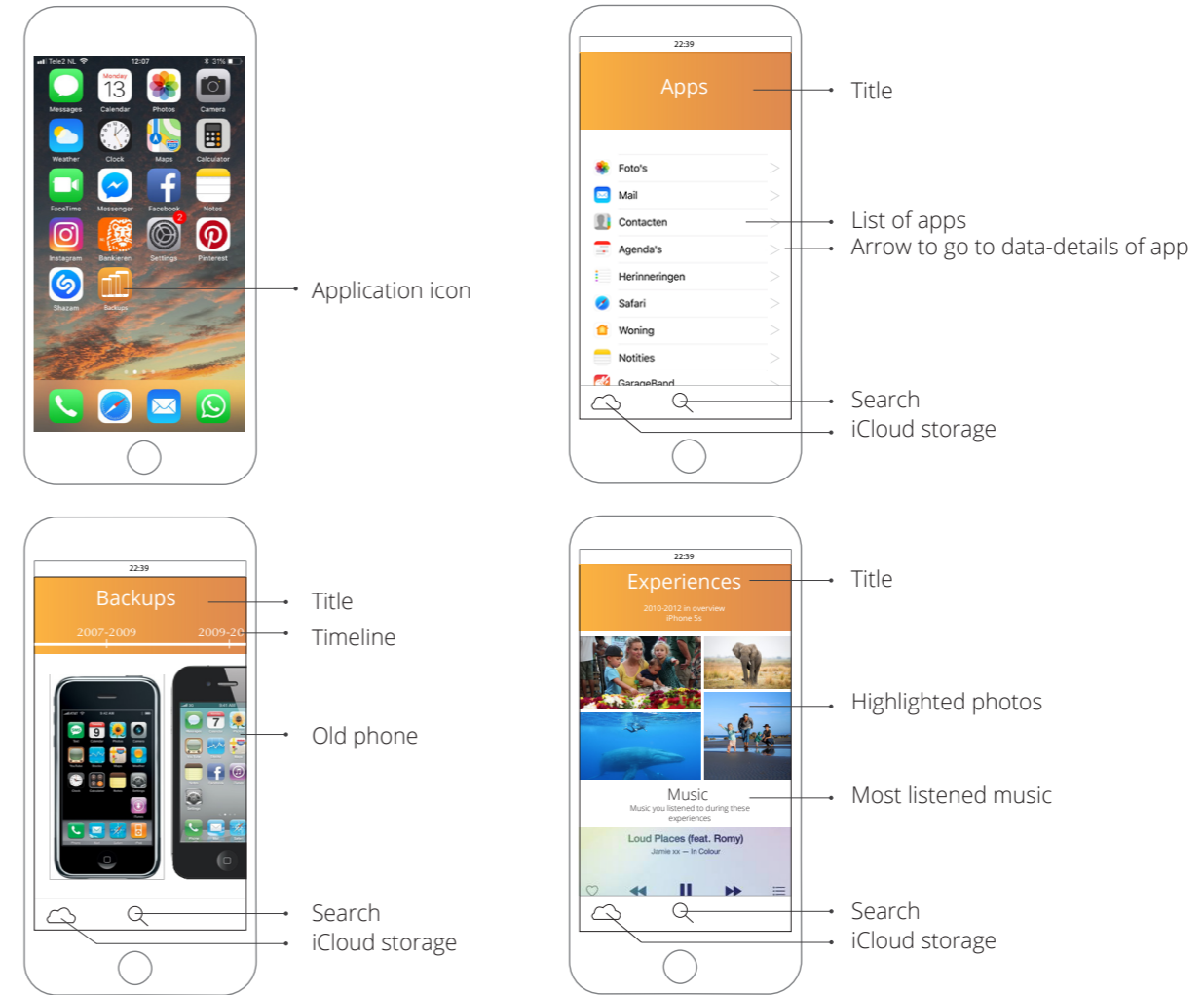
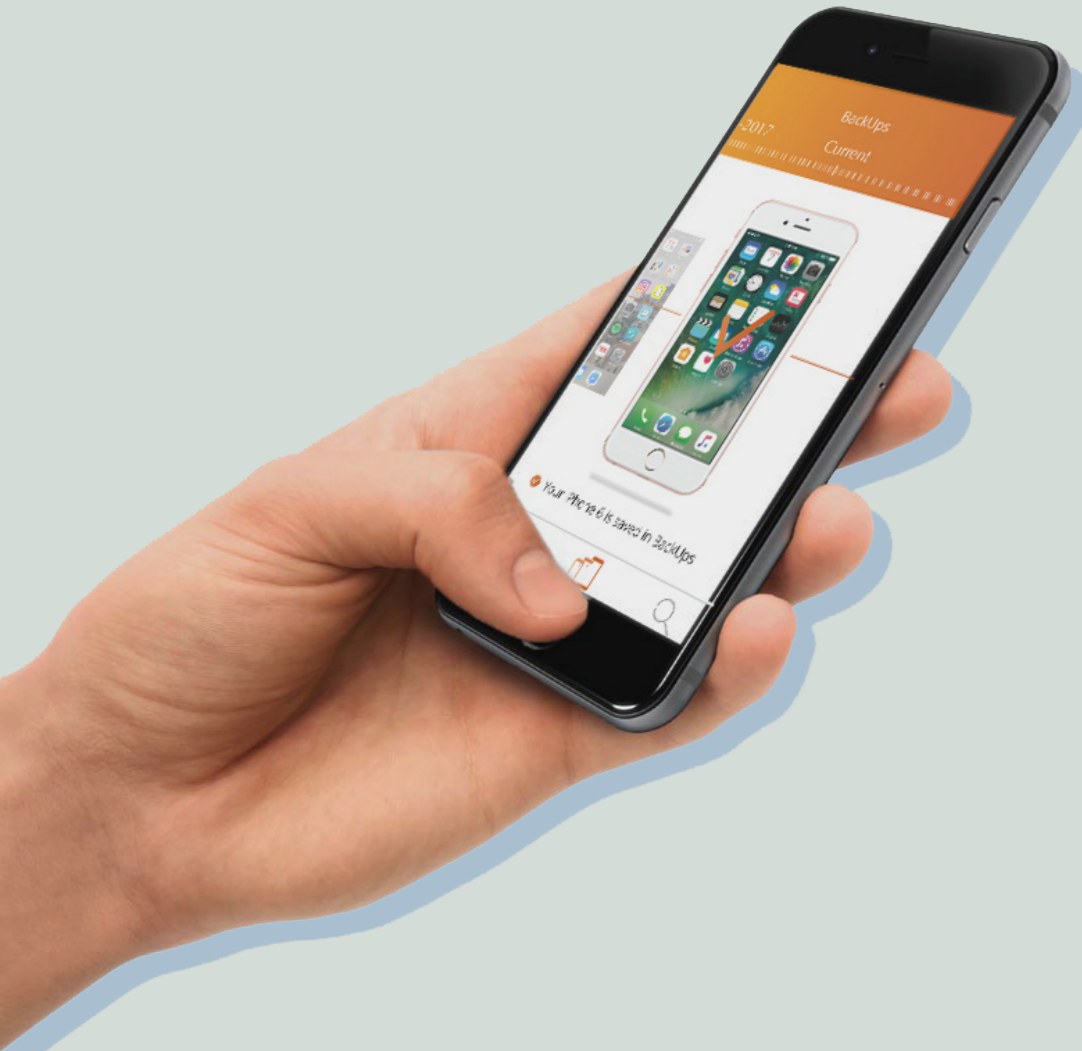


Figure 23 Concept



Final design

CHAPTER 10

This chapter will show and explain the final design: BackUps. At the end of this chapter a implementation plan is given. The chapter ends with some final changes to the final design and a disucssion.

10.1 Introduction

BackUps is chosen to be developed further into a final design. The app will make a back-up of your current device and will save this when the user has a new phone. From all the iPhones a user has had throughout his or her life, the app will save back-ups in the iCloud or in iTunes. The idea is to give the user a reassured feeling about the data on their phones. They will feel reassured because their information is well organized and saved in iCloud or iTunes, and thus the information on their old phone can be deleted without the feeling of losing information during the process.

10.2 Functionalities of the app

The app organizes data per iPhone. All iPhones a user has had throughout their life, will be shown in "BackUps". The app provides an overview where the user can look into their old iPhones. The iPhones displayed in the app are screenshots of the home screen. When the user selects an iPhone, it will show the home screen of that phone. The user can click on the apps to see the data of that phone.

The app offers two main functionalities: (1) making a back-up and (2) giving a personalized data overview per phone.

(1) Making a back-up

The user can make a back-up when opening the app. By first use, the app will ask if BackUps can store all information from the iPhone in the iCloud or in iTunes. When the user chooses one of the two options, the app can be used. The app will automatically make a back-up of your current phone when the user chooses to back-up in iCloud. All data from the iPhones will then be stored in iCloud (see figure 24). When switching to a new phone, there will be a phone added in the start menu of the app. So, throughout a users' life, the phone he or she owned will be saved in BackUps. The user can choose what to back-up. Initially the app will back-up everything: personal data, settings and applications. But the user can choose to eliminate apps to back-up or to delete more specific data (e.g. a photo or a conversation). Also, the user can download or share specific data if they want to. Figure 25 shows different scenarios of storing the personal information. This figure is made to explain the situations for storing different kinds of data. It makes clear that users can store all data to the iCloud, but the iPhone will always need some storage for the applications and the settings. BackUps can not work solely in the iCloud in a future situation because it needs the system software to run the application.

(2) Personalized overview

The user can also choose to see a personalized overview of the time a phone has been in use. Here, photo's will be displayed, and music is shown of the users' time during use of this particular phone. In this way, maybe over 10 or 20 years, a user can look back at some of his or her old phones and see immediately what period of time it was (like student time, travel time, first job etc.).

Another, smaller, functionality is the search button. Users can search for dates, specific places or songs for example. All data that is stored in the iCloud can be download to any device of Apple. Another smaller function is the iCloud storage function. The user can find their available storage and monthly payment here. If a user does not have enough storage, new storage subscriptions can be bought here.

The current phone will also be displayed in the app. But there will be no years shown in the timeline, but it will say: "Current phone". Users should know that they have a back-up of their current phone, so that at the end-of-use, they will be confident to delete data.

The next pages will explain the app further, all screens are displayed and discussed. Than an implementation plan will be given. The chapter ends with a discussion and conclusion concerning the app BackUps.

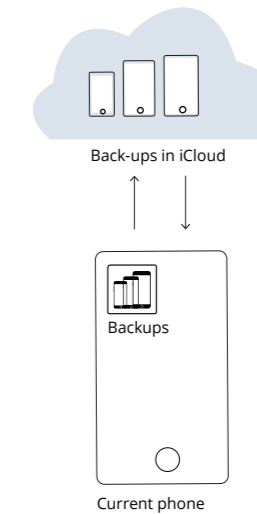


Figure 24 BackUps saves data in the iCloud

	Only local (iPhone)	Only central (iCloud)	Local and central (back-up)
1. Data	✓	✓	✓
2. Applications	✓	✗	✓
3. Settings	✓	✗	✓

Figure 25 Scenarios

10. FINAL DESIGN

Start screen

Screen 1.1 is the start screen of the app. When the user opens the app (when it is in use already), this screen is what they will see first. The app shows that the current phone is backed-up in BackUps. Then the user can swipe through the iPhones he or she has had (see screen 1.2, 1.3 and 1.4). The lay-out of these phones will be the same as when they were in use (same apps and background). Also, on the top of the screen, there is a timeline displayed. The timeline also functions as a scrollbar, when the user wants to go to an earlier phone, they can scroll through time using the timeline.

On the bottom of the screen there are three different icons:

1. iCloud storage: to see the storage of iCloud
2. Home button: to go to the start screen where the different phones are shown
3. Search button: to find specific data.

Color choice

The bold color orange is chosen because the color orange is associated with the happiness from yellow and the energy from red. The orange color is also related to the success and progress (Bruens G., 2007). Other colors were tested but were not perceived as the orange color. The other colors can be found in appendix 3.



Screen 1.1



Screen 1.2



Screen 1.3



Screen 1.4

Selecting a phone

When the user wants to look into an old phone, they have to click on that particular phone. When they do this, the phone will be shown larger on the screen and will be operable as it used to (see screens 2.1 and 2.2). The user can swipe through the different tabs and see all the apps on that phone.

On the bottom of the screen there is a function to swipe up. When the user swipes up, memories will be shown. These memories are created by the user during the time this particular phone was in use. The app BackUps shows highlighted photos and music here (see screen 2.3).



Screen 2.1



Screen 2.2



Screen 2.3

Deleting data in BackUps

When a user wants to delete data in BackUps, they can do this per app or more specific (e.g. only a picture). Deleting an app will work the same way as it is working on all iPhones right now: hold a finger for longer than 2 seconds on an app and all the apps will start to wiggle and crosses are shown to delete the app (see screen 3.1). This will work the same in BackUps. When the user wants to delete more specific data, they can go to the app and delete this data in the app. This will be discussed on page 78 and 80.

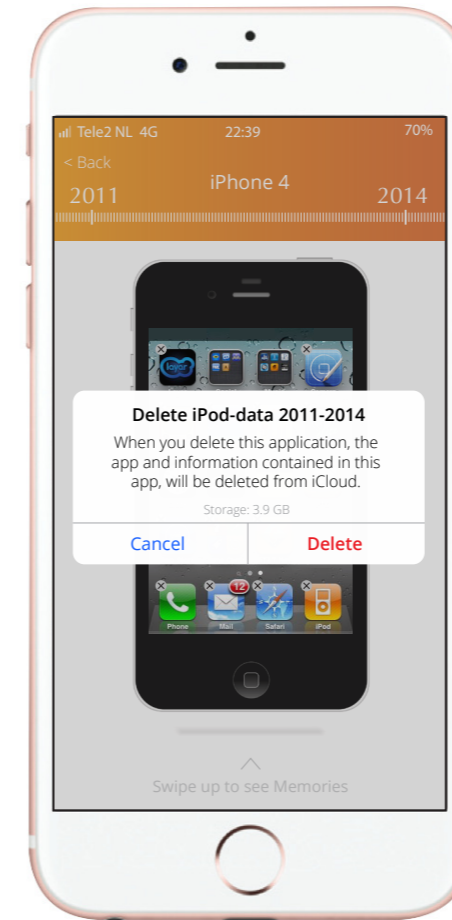
When the user deletes an entire app, BackUps will ask if the user is sure and will explain what is going to be deleted when they will click "delete" (see screen 3.2). The user will delete the app, but only the data from that period of time will be deleted. The app will still be visible in other phones, with data from that specific time period.

Deleting data on current phone

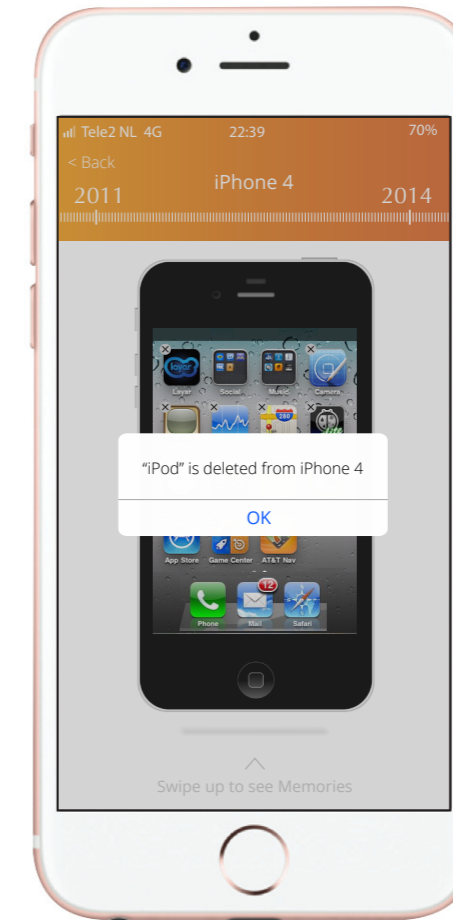
When a user deletes an app on their current phone, they may not want to delete its data in their back-up. When BackUps automatically backs-up the data from the current phone, this will mean that the deleted app on the current phone, will also be deleted in BackUps. To prevent this problem, screen 3.4 is designed. It will ask the user if the app that is deleted in the current phone (as an example the app "Duolingo" is used) also must be deleted in BackUps or if the user wants to keep the data in BackUps. This screen will pop-up the first time opening Backups after deleting an app on the current phone.



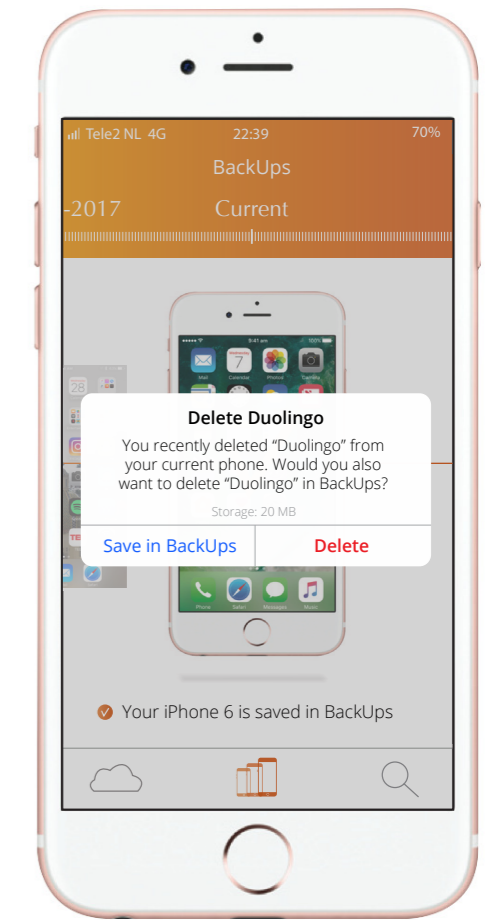
Screen 3.1



Screen 3.2



Screen 3.3

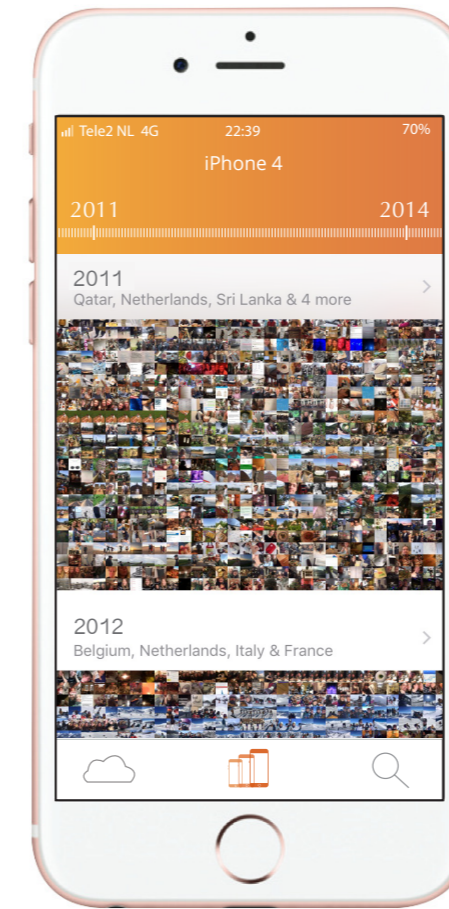


Screen 3.4

10. FINAL DESIGN

Opening the app: Photos

As an example, the app "Photos" will be shown in "BackUps". When the user opens the app "Photos" in "iPhone 4", photos from the time that phone has been in use are shown. Screen 4.1 and 4.2 are an example of an iPhone 4, used from 2011 till 2014. First the user will see the photos ordered per year, then when the user selects a year, the photos of that year are shown. The timeline on top of the screen is to scroll through the years so the user can easily skip from 2011 to 2014.



Screen 4.1



Screen 4.2

Selected phone

Timeline

10. FINAL DESIGN

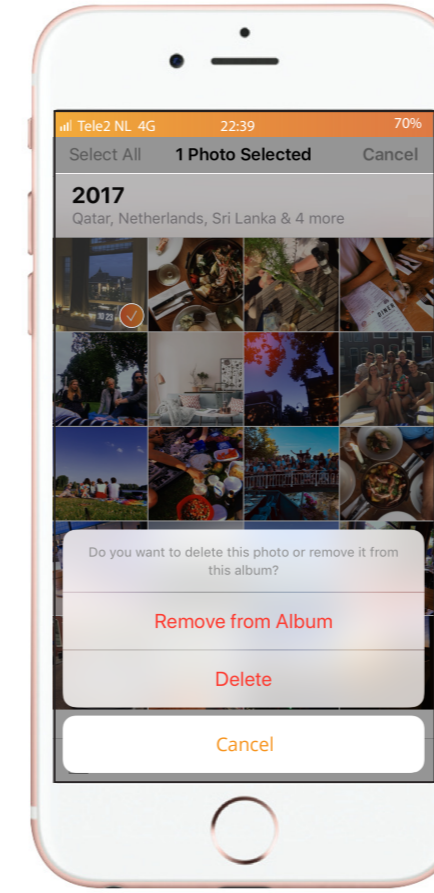
Deleting or downloading a photo

The user can delete a photo within the app “Photos” opened in “iPhone 4”. Deleting a photo will work the same way as it is when deleting a photo on a current iPhone. The app will ask if the user is sure before deleting the photo. When the photo is deleted, it is deleted from the iCloud. When the user wants to delete a photo, the photo needs to be selected first. The user can select multiple photos to delete at the same time. When BackUps asks if the user is sure to delete the photos, the size of storage space that will become available is shown. The user has to click “delete” or “cancel”. When the photo is deleted screen 4.5 is shown. Then the user has to click “Ok” to go back to the photos (screen 4.2).

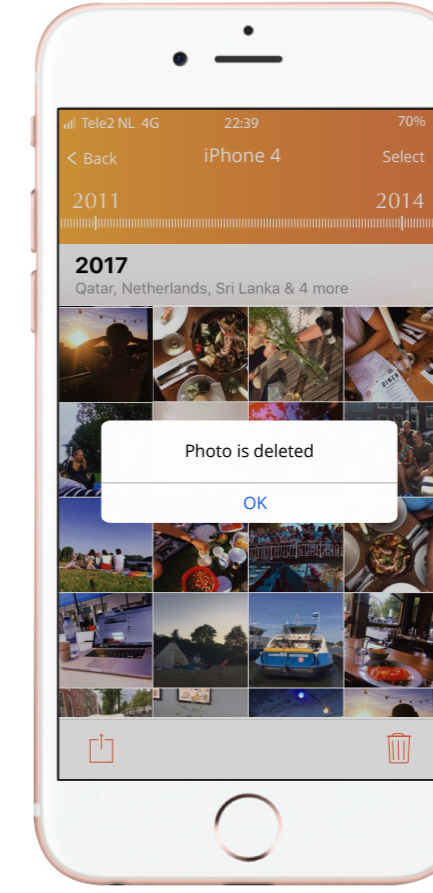
Screen 4.6 shows the pop-up screen for downloading or sharing a photo. This screen is the same as when a photo from a current phone is being shared or downloaded. When the user wants to download or share, they can delete the photo afterwards if they want to, they will have a copy then somewhere else. To download the icon on the left bottom of screen 4.3 must be used. The “bin” icon on the right bottom from screen 4.3 is to delete a picture.



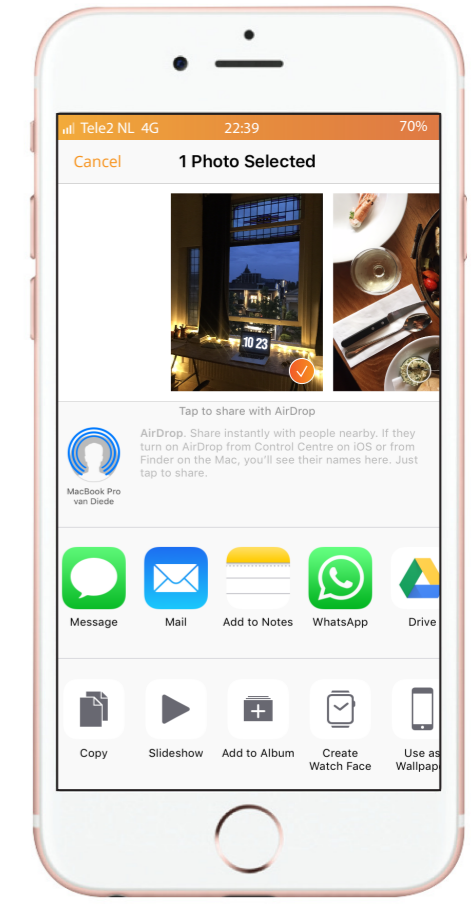
Screen 4.3



Screen 4.4



Screen 4.5



Screen 4.6

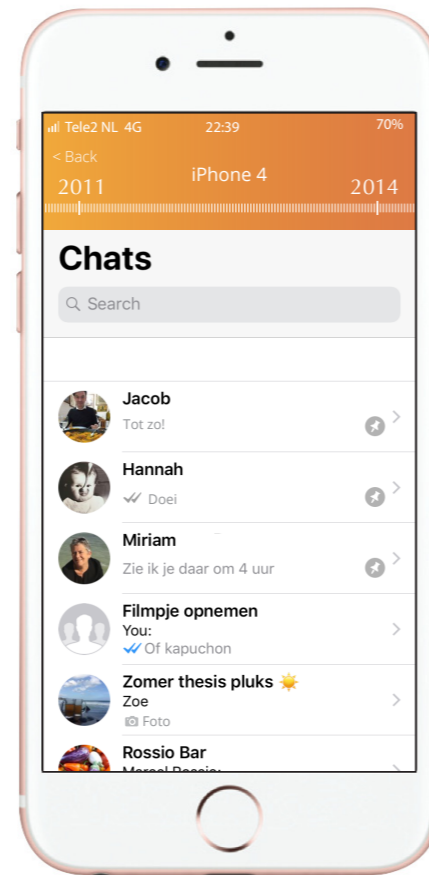
10. FINAL DESIGN

10. FINAL DESIGN

Opening the app: Whatsapp

Another example to show how data will be stored is shown with "Whatsapp". This is a conversation app. The conversations are being saved in iCloud, when opening the app, the lay-out will be the same as when using the app. But when the user opens a conversation, they can not continue the conversation in the app, they can only choose to "download" or "delete" the conversation. In "Whatsapp" there is also a button for "Media". The user can see the media that is send in this conversation. This media can also be downloaded. It will look similar to screens 4.3, 4.4 and 4.5. When deleting the conversation, the storage that will be gained will be visible on the confirmation screen (see screen 5.3) When the user deletes the conversation, it will be deleted between the timeframe in which the app is opened (for the screens on this page this means 2011-2014). The timeline works as a scrollbar (see page 89).

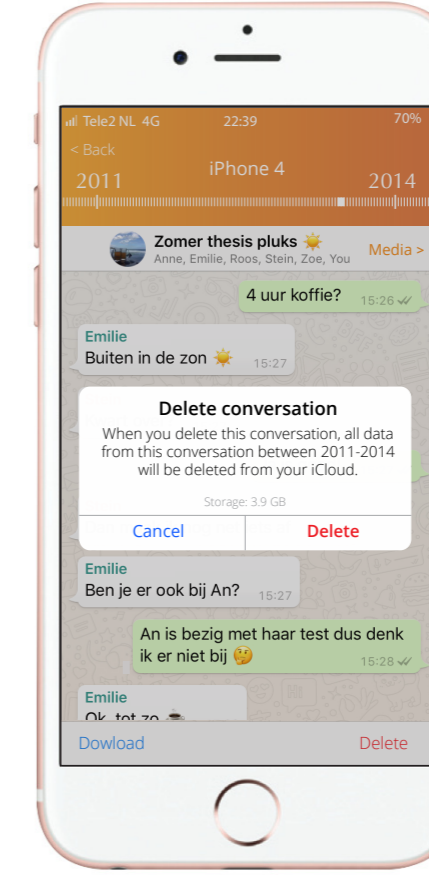
To open WhatsApp in BackUps, there is software needed to display the conversations. The software for WhatsApp will continue to develop, which means that to open conversations in BackUps, there is software needed. This is because some might delete WhatsApp from their current phone, but still want to save the conversations in BackUps. To open WhatsApp in BackUps, BackUps needs software, so WhatsApp conversations can still be read after several years (when WhatsApp is developed further) and when WhatsApp has been deleted from the current phone. In an ideal situation all apps would be provided with a small software program where data of that app can be showed in BackUps.



Screen 5.1



Screen 5.2



Screen 5.3



Screen 5.4

10. FINAL DESIGN

No data saved

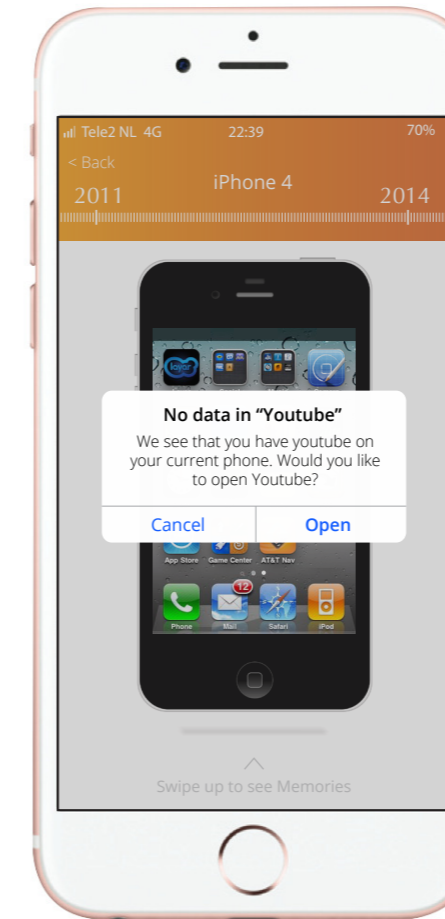
When there is no data saved from certain apps, the icons will still be visible. This is to show the user that the old phone is saved and looks the same as it did before. But some apps do not have data to be saved or the data has been turned off to be saved. In this case there are two options BackUps will give the user:

1. Open app on current phone

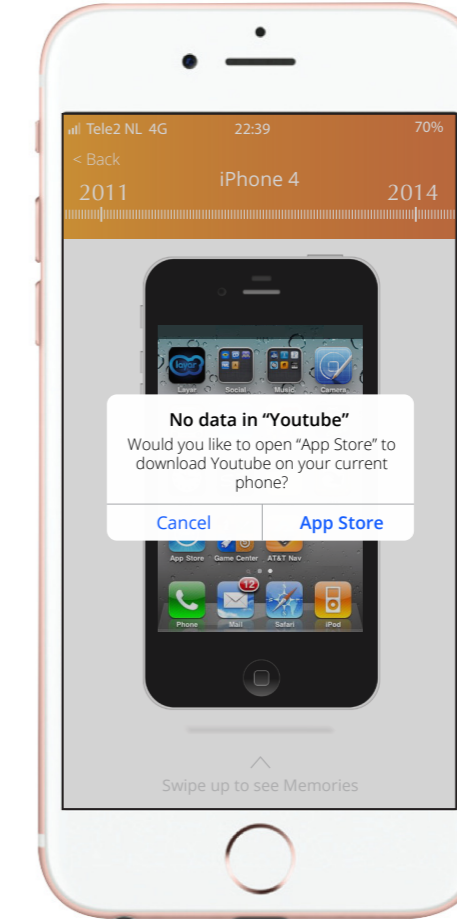
BackUps can see if the current phone has the same app (in screen 6.1 and 6.2 “Youtube” is given as an example) and will give the user the option to open the app on the current phone. Because it does not contain any data stored in the iCloud, it can not open the app in BackUps.

2. Open the App Store to download the app on the current phone

If BackUps can not find the app on the current phone, then it will give the option to open the App Store and download it again. The user can download the app again for the current phone, it will not work in BackUps but on the current phone.



Screen 6.1



Screen 6.2

10. FINAL DESIGN

10.3 First use

The first time using BackUps is different than the actual usage of the app. This is, because the user needs to follow some steps to set up BackUps. Important as well, is to attract the user and guide the user through steps that need to be taken before the app can be used. The functionalities will also be explained in first use. The screens that will be presented only during first use are explained below.

Opening screen (Screen 7.1)

When a user opens BackUps for the first time, a short summary of the main functionalities will be shown. In this way the user can understand what the app can do, and it will attract the user to click further.

iCloud or iTunes (Screen 7.2)

After the opening screen, the user will have to choose where to back-up their data: in iCloud or iTunes. This project will only focus on the interaction with iCloud.

Select data (Screen 7.3)

The third screen will ask the user if all data must be backed-up or only selected data. When the user chooses to select data, the app will then show a screen with apps to turn on or off for making a back-up (See screen 7.4). If the user chooses to continue and thus chooses to back-up everything from their current phone, the app will start making a back-up (see screen 7.8).

Select apps to back-up (Screen 7.4)

In this screen, the user can select apps to back-up. The apps that the user does not select, will not be backed-up.

iCloud storage check (Screen 7.5 and 7.6)

The next step will be to check whether the user has enough iCloud

storage to store the data from the current phone to the iCloud. When the user does not have enough storage, the option to buy more storage is given. When the user does have enough storage, they can click "start" and the app will start making the back-up.

Buy storage (Screen 7.7)

The user can buy more storage here. The app will guide the user in buying more storage, not all screens are designed here because the steps to be taken to buy more storage work the same as on a current iPhone. After buying more storage, the user will be guided to screen 7.5 where they will see they have enough storage and then can click "start" to continue.

Automatically on/off (Screen 7.8)

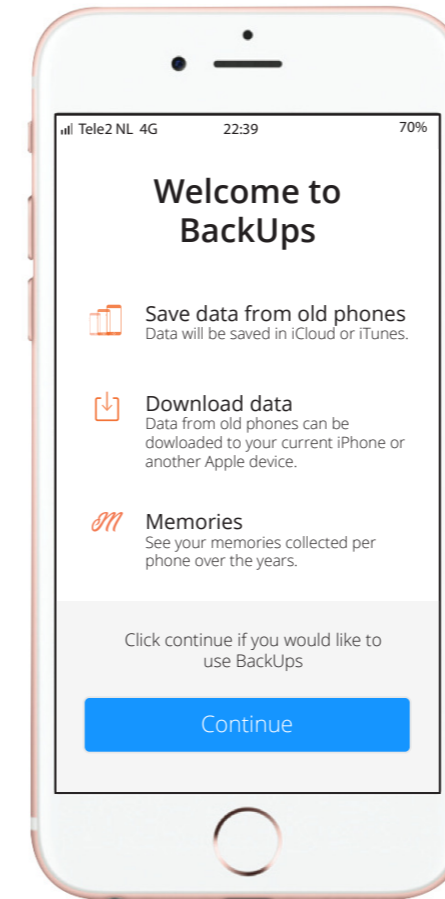
The user can choose whether to back-up automatically or manually. If the user turns on automatically, a back-up will be made when the phone is connected to power, locked and on Wi-Fi. If the users choose to manually back-up their iPhone in BackUps, the app will then remind the user to make a back-up. The user can choose how frequently they will be reminded.

Loading screen (Screen 7.9)

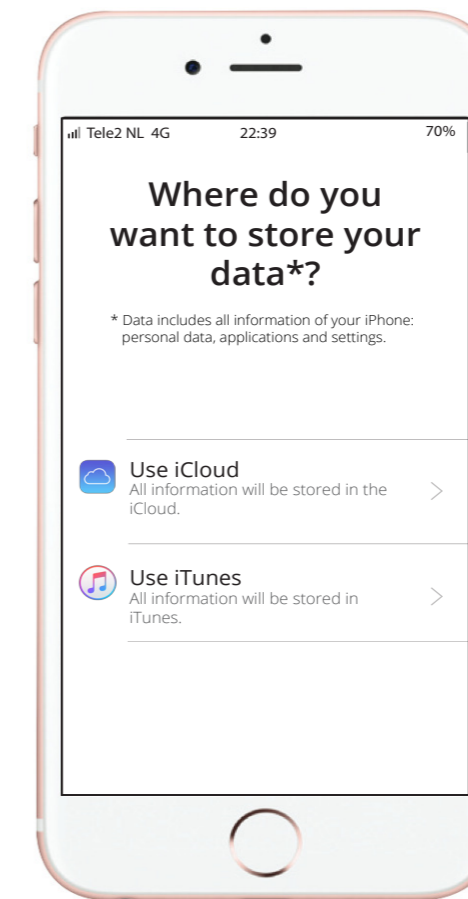
In this screen, the user needs to wait till the app has made a back-up. During the waiting time, the app will give the estimated waiting time in seconds.

10. FINAL DESIGN

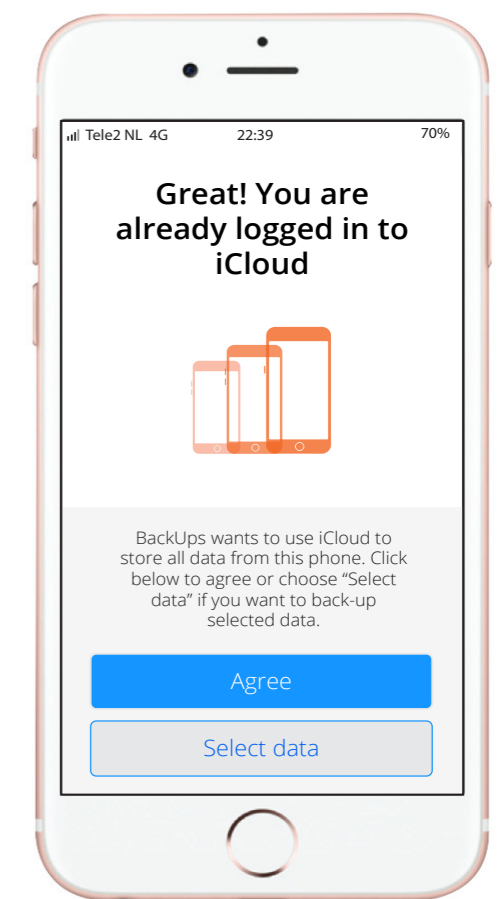
Log in with Apple ID if not logged in yet.



Screen 7.1



Screen 7.2

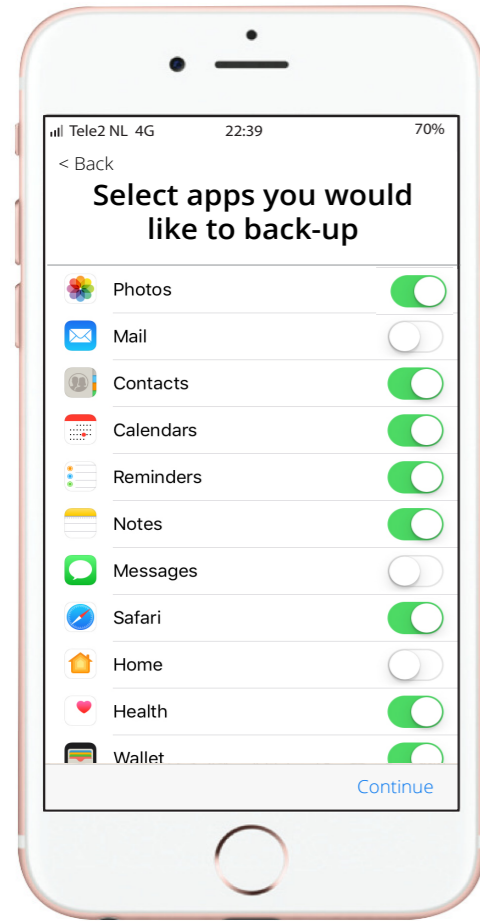


Screen 7.3

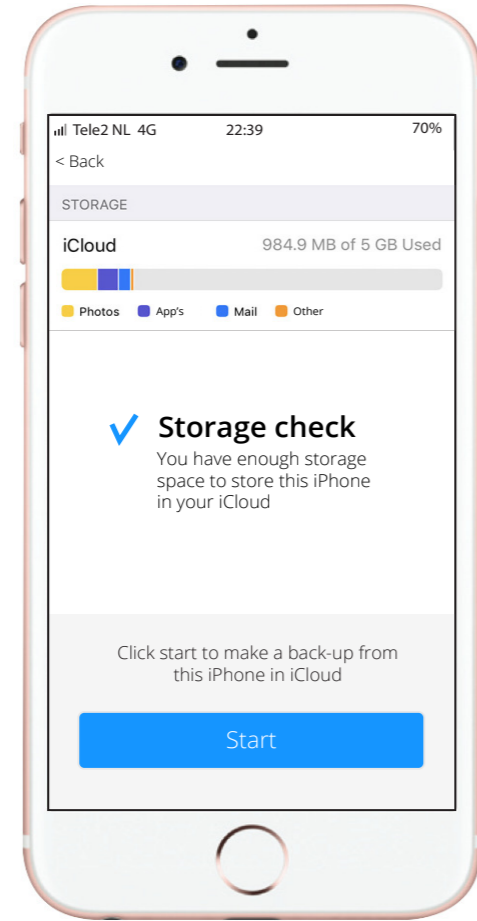
10. FINAL DESIGN

10. FINAL DESIGN

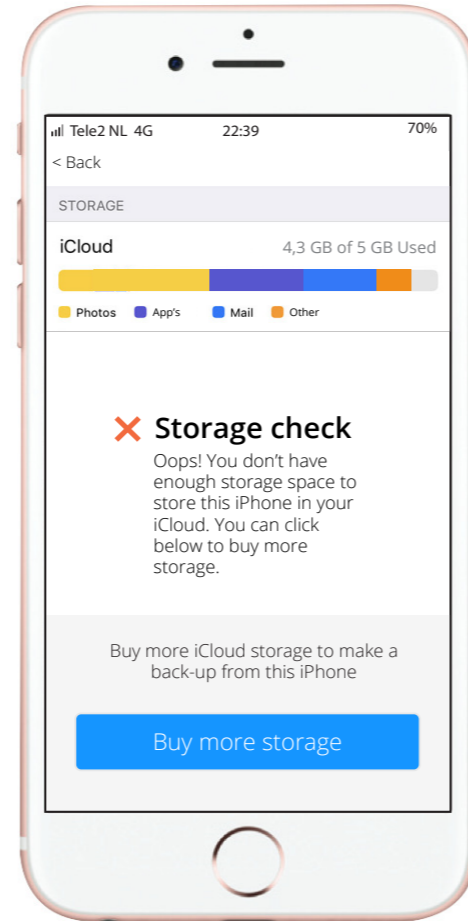
App is ready to be used.
Screen 1.1 will be shown.



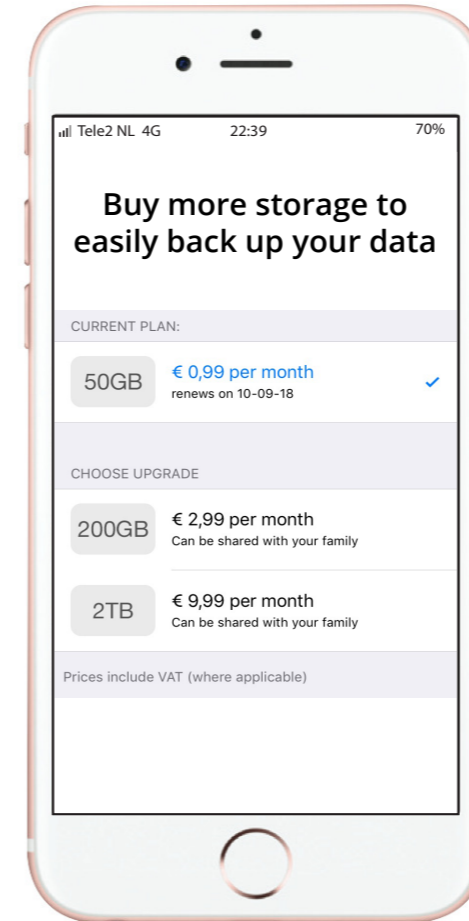
Screen 7.4



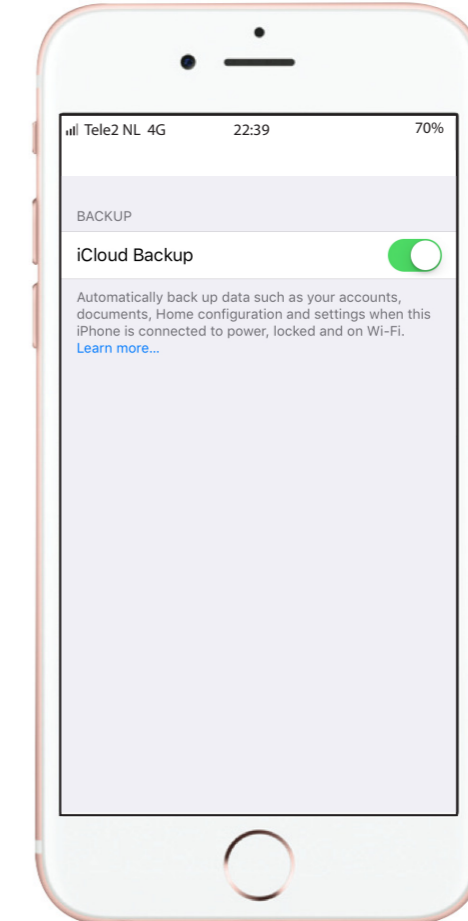
Screen 7.5



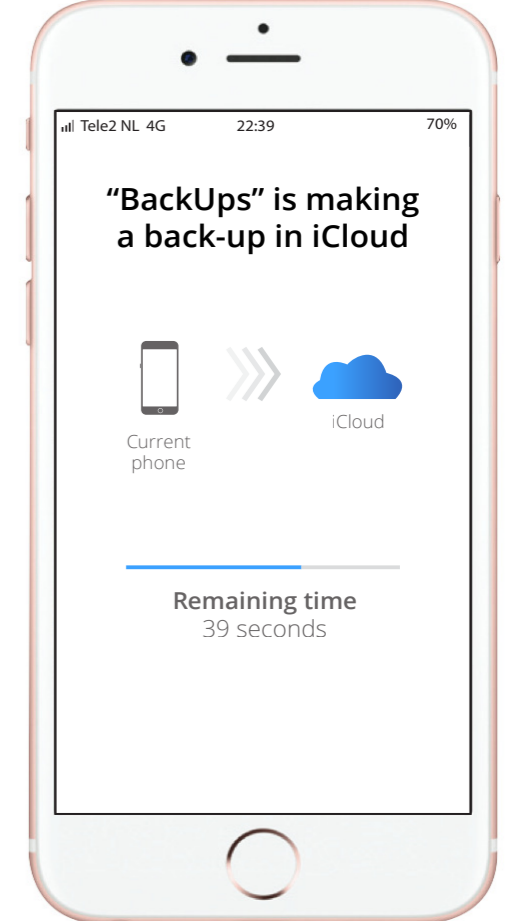
Screen 7.6



Screen 7.7



Screen 7.8



Screen 7.9

The interaction



Screen 1.1

To see other old phones that are saved in BackUps the user can swipe to the right. With every swipe, another phone is displayed in the middle of the screen. When swiping to the right the user goes back in time. When swiping to the left, the user goes forward in time.



Screen 1.3

To select a phone, the user can click on that phone to "open" it. Then the user can see the data of that phone.



Screen 2.1

When the phone is opened, the user can swipe through the different tabs that were also there when the phone was in use. The lay-out is the same.



Screen 2.2

This is the same interaction as shown on screen 2.1. This is another tab that is saved on "iPhone 4".



Screen 2.2

When deleting an app, the user has to hold their finger for a longer period of time (around 2 seconds) on an app, when the user does this, the apps can be deleted. This is the same interaction as it is on the current iPhones.



Screen 5.2

The timeline on top of the screen is also a scrollbar. The user can scroll through time to see the conversation. The scrollbar works also for other screens where it is shown.

10.4 Implementation

With the app BackUps, there will be storage space needed in the iCloud. Users who will use this app for their phones, need storage space. Right now, Apple provides four different subscriptions. The first subscription is free, the user can use 1GB storage in the iCloud. When the user wants more storage in the iCloud, they need to upgrade. The first upgrade is 5GB for €0,99 a month. This is not a real large number, but it might hold back some consumers. For the app BackUps there is probably more storage needed than the 1GB offered for free. Users will save their data over the years, the storage needed will keep rising. When it is more than 5GB the user can then upgrade to 200 GB for €2,99 a month or to 2TB for €9,99 a month. For the implementation of the app BackUps many consumers probably will not want to pay for more storage. A solution to this problem can be to offer more storage or discount on the monthly payment for storage in the iCloud when consumers bring back their old phone. Different models can be implemented for this problem, for this research two models seemed most interested:

1. *Monthly payment discount*

When users return their old phone to the store, they will receive a discount on their monthly payment for iCloud. For example, instead of paying €0,99 per month, they pay €0,49 per month. But because the prices for iCloud are not so high, this might not attract consumers to return their phone. And the end date of the discount is also a problem to this solution. When consumers return their old phone, they will get discount, but for how long? A solution might be until they buy a new phone and thus need to return their old phone. But this is hard for Apple to keep track of. So, if it is possible it would be the best if the consumer will get a free subscription when they return their old phone back. The second model will continue on this idea.

2. *The storage for the old phone is free*

The amount of storage that is on the old phone of a user will become free in iCloud. Users return their phone and receive storage to back-up and save the data from their old phone. This way, the user can store all their old phones and will not have to pay for storage space. A disadvantage of this solution is that Apple will not make as much money on iCloud as it could.

Concluding, there can be offered discount or free storage space if users return their phone to the store. But Apple needs to come up with a model where both parties (consumers and Apple) can benefit from. Apple might benefit from this model, because it can evolve in more customer loyalty. If iPhone users are using BackUps and there is an incentive as storage, this will keep the customers connected to Apple. When they buy a new phone and all other phones are already in the iCloud, they will most likely not choose another data storage system.

Lastly, the access of BackUps is being thought of. There are two ways to access BackUps. It is a standard app on the iPhone, but will also have an icon on the website www.icloud.com (see figure 27). Here users can see all their old phones stored as well. It will look the same as it will on the iPhone.



Figure 26 www.icloud.com

Final changes

The final design is made into a prototype with the use of “InVision”. InVision provides a service where designers can make an app, which will make it look like it is working, but actually it is a prototype. The designer can upload screens into InVision. These screens can than be connected to eachother, which will make the app seem like it is working. With this prototype, final user tests have been performed. The goal of the final user tests was to find out if the app was intuitive and if the main functionallities of the app were easy to understand. The research questions were:

1. *What do people initially do with the app?*
2. *Does the user understand the functionalities of the app?*
3. *How does the user perceive the app?*

In total 4 participants were asked to perform the final user test. The participants did not knew anything about the app BackUps. The information that was provided before the test was that BackUps is an app designed for the Apple iPhone to store data using iCloud. Than the participants got four tasks to perform:

1. Orientation (First interaction with the app)
2. Assignment A:
Delete a photo in “iPhone 4”.
3. Assignment B:
Delete the app: “iPod” in “iPhone 4”.
4. Assignment C:
Open “Youtube” in “iPhone 4”.

During the final user tests several focus points came up that needed to change for a better interaction with BackUps. Overall the participants understood the app well and found it easy to use. The main screen was understandable, participants immediately wanted

to swipe through the old phones on the homescreen (as intended).

Results

Resulting from the final user test, some small changes will be discussed, then conclusions can be made while considering the design goal made in the beginning of this project.

1. *Deleting and downloading: text or icon?*

Two examples of data are given in the prototype: Photos and Whatsapp. During the tests it appeared that for deleting photos, icons were used (see screen 5.2). But when the participants needed to delete a conversation in Whatsapp, text was used (see screen 4.3). For the final design icons will be used on the bottom of the screen. When the user clicks on an icon, the app will ask to confirm, in this screen the user can choose between: “Cancel” or “Delete”. Concluding, both will be used, first an icon then text.

2. *First use: first use BackUps or first use on new iPhone?*

The design focused on the first time using BackUps. But there is not yet a focus on the first time using BackUps on a new iPhone (so BackUps was already in use on the old phone). In this case, the user wants to continue using BackUps, and should not have to go through some of the steps as it would have when it was the first time using BackUps. Screen 7.1 till 7.8 can be skipped in this situation, the user opens BackUps and it should start with the home screen, because it has been already in use.

Discussion and conclusion

Looking back at the design goal set in chapter 7: Users need to delete personal information on their old phone in order to bring back an “empty” phone and: users should be able to comfortably and efficiently back-up their data and then delete their personal

information, while feeling reassured and confident. The interaction should become a trustworthy and standard operation. The final design focusses on backing-up data. There are no tests done to deleting data while the user has BackUps in use. This could not be tested because BackUps is only a prototype right now. The only “test” that could be done was to ask participants how they would feel if BackUps would really work. Participants thought it would help that if they had BackUps they would know that their information is visible and is accessible by their new phone. They don’t need their old phone anymore to hold on to personal information that is on that old phone.

During the user test in the beginning of this project participants gave two main reasons why they kept their old phones: (1) because there was still personal information on it and (2) because they needed a back-up (spare) phone for when their old phone would not work anymore. With BackUps, the first problem can be solved: users would know what kind of data is on their old phones. The second problem is not directly solved but, in a way, it can be. When people save their old phone to have a spare phone, they eventually buy a new phone and their current phone will become a spare phone and their original spare phone will have no function anymore. This is the moment they need to bring back their original spare phone, but when it is not used as a spare phone, users don’t know what to do with the data on it if they would not use BackUps. With BackUps, they see that their data is saved and stored in iCloud and now they can delete the data with a more reassured and confident feeling that there won’t be any data loss.

As said, BackUps is a prototype right now. It does not work yet. On page 80 it is mentioned that WhatsApp (and other non-Apple apps) need software to display the data that is saved in BackUps.

If BackUps would work, it will need software for all apps saved in BackUps, otherwise it cannot be displayed. The ideal solution that is given is that all apps will provide an extra software system for BackUps. This solution is maybe not the easiest one. A solution that can be done as well, is that BackUps saves the data but cannot display it as the app would do. For example, WhatsApp, the conversations and media is saved by BackUps, and will be displayed by software from BackUps and not by software from WhatsApp. A disadvantage of this solution is that it does not look the same as WhatsApp.

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APPENDIX 1 Questionnaire

1. What is your age?
2. What is the brand of your current smartphone?
3. When did you get your current smartphone?
 - Less than 1 year ago
 - 1 year - 2 years ago
 - 2 years - 3 years ago
 - 3 years - 4 years ago
 - More than 4 years ago

4. What did you do with your old phone?

- I..
- Saved it
- Returned it to the store
- Threw it away
- Gave it to somebody else
- Other..

Answer question 4: Saved it

- As a back up for when my old phone dies
- I don't know what I should do with it
- For privacy reasons
- Other..

Answer question 4: Returned it to the store

- Why?
- I got money for my old phone
- Other..

Answer question 4: Threw it away

- Why?
- Short answer..

- Where?
- Short answer..

Answer question 4: Gave it to somebody else

- To whom?
- Short answer..

APPENDIX 2 In dept interviews

Quotes derived from the in dept interviews:

- Ik hoop dus dat ik 'm kan vinden, misschien in de kelder in een verhuisdoos.
- Misschien heb ik ook wel met het verhuizen het hele bakje weggegooid, of misschien heb ik 'm toch ingeleverd.
- Als ik deze zou gebruiken dan zou de sim kaart het niet doen, dus dan zou ik 'm alleen gebruiken met wifi.
- Deze mobiel is alleen als back-up voor hele korte termijn, totdat ik een nieuwe mobiel heb. Hij is te slecht om te houden totdat mijn abonnement is afgelopen.
- Ik kan er niet tegen he, dat ik het niet meer precies weet (de pincode van mobiel, niet van sim kaart).
- Het is nostalgie, al die mobiels.
- Ik zou niet weten wat ik zou moeten doen om alle gegevens eraf te halen en waar ik die gegevens dan zou moeten laten.
- We bewaren het overal in huis, in de kledingkast in de slaapkamer en in een laatje hier in de woonkamer.
- Ik heb nog een mobiel liggen bij de T-mobile store die gemaakt zou worden maar die heb ik nooit meer opgehaald (is nu 1 jaar geleden).
- Mijn vriend heeft 'm een keer gebruikt als back-up.
- Er staat nog informatie in van mijn vriend.
- Er zit nog een SD kaart in met apps en foto's.
- Ik hou deze mobiel nog omdat hij nog werkt, stel iemand moet 'm nog een keer gebruiken..
- Er staat ook nog heel wat op de mobiel waardoor ik 'm niet wil inleveren.
- Als ik 'm naar fabrieksinstellingen zet dan weet ik niet of ik alles eraf heb gehaald. Stel er staan per ongeluk nog dingen op.
- Ik weet niet zo goed of je op een bepaalde manier nog dingen terug kan halen nadat je alles naar fabrieksinstellingen heb gezet.

- Ik vertrouw het wel als ik weet dat mijn mobiel helemaal uit elkaar gehaald wordt en niet hergebruikt wordt.
- Het is een gevoel dat je hebt, ze kunnen tegenwoordig zo veel.. (gaat over dat ze misschien nog gegevens van je mobiel kunnen halen nadat je alles hebt gewist).
- Ik heb nog een mobiel (iPhone 4) die is kapot, ik heb wel m'n foto's van die telefoon door iCloud, maar ik kan de mobiel niet meer aan krijgen dus niet alles eraf gooien en terugzetten naar fabrieksstand.
- Ik weet niet wat ik ermee moet doen.
- Het kost ook moeite om 'm weg te laten gooien ergens.
- Hij ligt hier ergens, maar ik weet niet waar.
- Hier is mijn oude iPhone maar die is kapot, die krijg ik niet meer aan.
- Mijn oude iPhone breng ik niet terug, want er staan nog dingen op.
- Ik gebruik niet de iCloud of iTunes, ik back up alles handmatig want ik vertrouw Apple niet.
- Ik moet eerlijk zeggen dat ik niet wist dat ik deze telefoons überhaupt nog had.
- Als ik deze kapotte iPhone weg zou doen zou ik 'm verbranden of kapot slaan, maar waarschijnlijk bewaar ik 'm voor eeuwig.
- Ik vertrouw de industrie gewoon niet.
- Als je je telefoon laat repareren dan zeggen ze altijd heel makkelijk stuur je telefoon op, maar juist dat idee van opsturen ben ik heel huiverig over. Je weet niet wat er dan mee gebeurd.
- Ik gooi 'm liever eerst 10x kapot en geef 'm dan weg.
- Deze telefoon doet het niet meer, maar ik wil 'm niet weg doen.
- Ik vertrouw de service van Apple wel, maar de bedrijven die ertussen zitten om mijn mobiel terug te sturen vertrouw ik niet.

APPENDIX 2 In dept interviews

Statement cards

Statement cards were used to analyze the results of the in dept interviews. An example of a statementcard is shown in figures 27 and 28. The statement cards helped to find categorize problems that were encountered during the interviews. All the quotes (see page 97) were translated and created into an statement cards. The statement cards were categorized. The categories that derived were:

- 1. Reasons to keep old phones
- 2. Trust
- 3. Personal information
- 4. Places of the old phones

Categories 1,2 and 3 have an overarching theme: it all had to do with information on the old phones. For category 1, it was one of the reasons given. Categories 2 and 3 are about trust in de companies that handle old phones and the attachment towards the old phones because the personal information was still on those phones. Because overall the personal information was found important by the interviewees, this was the direction to go further with.

colorbar	
para-phrase	She does not know where she saved her back-up phone.
quote	Ik hoop dus dat ik 'm kan vinden, misschien in de kelder in een verhuisdoos. Space for notes during session

Figure 27 Statement card

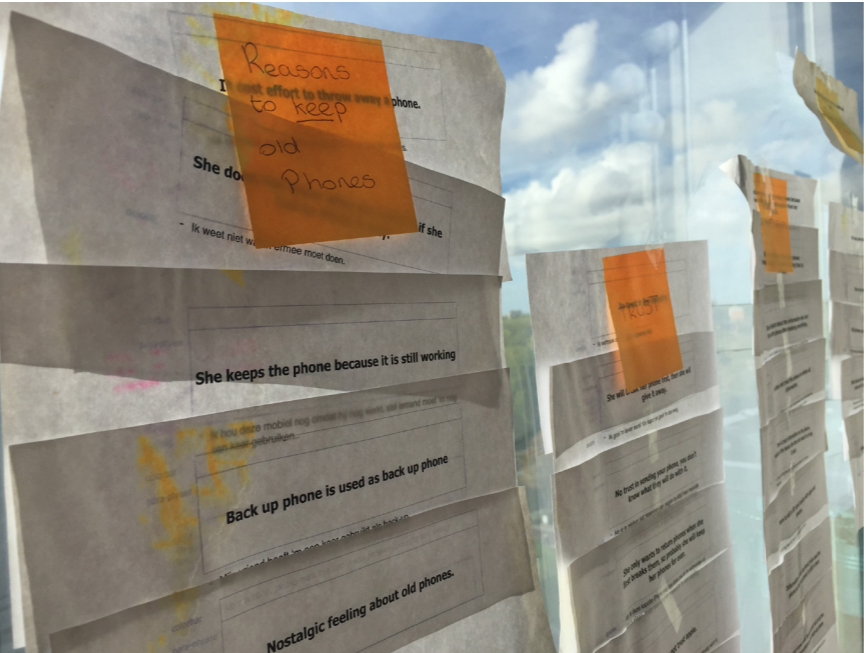


Figure 28 Statement cards

APPENDIX 3 Colors

Different colors for BackUps

In figure XX there are different colors applied in the home screen of the app BackUps. Red was not chosen because it can stand for a negative emotion and it is an too agressive color. Furthermore the colors blue and purple were tested. These colors seemed to cold for the app. The feeling orange is giving is energy and happiness, which makes orange the chosen color.



REFLECTION

When I started this project, I did not know a lot about the circular economy. I started with a blank canvas. In the beginning I started with getting familiar with the subject, I watch a lot of video's and read many papers to get myself familiar with the subject. The information I gained during this research was difficult for me to put down on paper. I am a visual person, writing texts is unfortunately not my strongest point. This was throughout the project a returning problem. Eventually I fought my way through it, in the end, I feel like there is still a lot to add or to define, but I am content with the overall outcome.

After paper research, I started to do consumer research, I needed to find out why people didn't return their phones to the store. With a questionnaire and in dept interviews, the picture became clearer. The interviews I performed at home gave me a lot of insights. But the problem was difficult to tackle. How do you get people to do something, that they aren't doing? This was for me a difficult problem to solve. I started to look at the way users needed to return their old phones right now. Here I found some obstacles which brought me to my first idea: Apple GiveBack. During the research it appeared that one action in the process of returning a phone was most tense: making a back-up and then deleting all information. It was clear that this was a problem for many. I started to design the app: BackUps. This app was made into a prototype. With this prototype I could test the functionalities and the interaction. But what I could not test was whether people felt reassured, because the app did not contain their data, so it didn't feel as tense as when the app would actually work. So, the impact of the app could not be tested, which is logic, but unfortunate.

Overall, I am happy about the process and the outcome. It took me quite some time to get used to a schedule and the heat (during the summer times), but it all came together. I think the final design is

an interesting app, which user might want to use when it would really work.