Graduation report

A MEANINGFUL GOODBYE

Design a closure experience for iPhone users

A service design of Apple TradeIn service

Ren Jinwei
Msc Design for Interaction
Industrial Design Engineering
Delft University of Technology

A MEANINGFUL GOODBYE

Design a closure experience for iPhone users

A service design of Apple TradeIn service

Delft University of Technology

Faculty of Industrial Design Engineering
Landbergstraat 15
2628 CE Delft
The Netherlands
+31 15 278 4750
info@tudelft.nl
http://www.io.tudelft.nl

Graduate Student

Ren Jingwei
MSc | Design For Interaction
rlleo@tatazu.com
http://www.renjingwei.com

Graduation project chair

Dr. ir. C.A. Bakker
Associate Professor
IDE | Circular Product Design

Graduation project mentor

Ir. Mark Sypesteyn
Lecturer
IDE | Design Communication and Visualisation

ACKNOWLEDGEMENTS

Ariel

谢谢你帮我改设计，做测试，做饭给我吃，听我唠叨了半年，别走了，在鹿特丹常住吧。

Pange, Fox

谢谢你们当我的 participants, 一直关心我的毕设，提出了好多有建设性的建议，好哥们一起喝酒聊天，压力也少了不少。

Natalie

作为“学姐“ 给了我很多过来人的建议哈哈，非常感谢。

Micky, Teri, Ryan

不仅当我的 participants, 还听我磨叽了了半年，我要解放了，你们也可以解放了，很多时候我对自己不自信的时候，你们的鼓励真的很重要。

我的父母，没有你们的支持，开明，我不会成为今天的我，谢谢你们，我爱你们！

Ferhat, Arvin

Your inputs from the business perspective were very insightful.

Anderson, Andreas

Thank you for always being there for me along this project, and I will keep in mind what you said to me, “Just keep pushing yourself!”

Bob

I am grateful for the great ideas you came up during the ideation session.

Kersti

A big thank you for your help.

Jo

Thank you for being tolerant of my bad written English in the elaborate proofreading.

My lovely graduation team

Conny, my sincere gratitude to you for being extremely considerate about my situation. I appreciate your coach style and pragmatic way of doing things very much, and I would say, as a mentor, you are a role model! Mark, thank you for joining the team at the first place. The creativity, the useful feedbacks and the infectious positive energy that you brought to me are precious! Flora, thank you for the project initiative and the connection with Apple, the constructive feedbacks at our Skype meetings and additional meetings were very helpful. I have learnt a lot from your systematic and critical way of thinking!

Last but not least, my appreciation to all those people who loved and helped me during this master study, without you, I would not become such a person as I am now!

GLOSSARY

1 CE

An abbreviation for ‘circular economy’.

2 APP

An abbreviation for application: a computer program or piece of software designed for a particular purpose that you can download onto a mobile phone or other mobile devices.

3 EOL

An abbreviation for ‘end-of-life’.

4 EOU

An abbreviation for ‘end-of-use’.

5 TRADE-IN

Mobile device trade-in service is the service that provides the possibility which the consumers sell their EOU devices to get the remaining values back in the form of cash and gift cards.

6 B2C

An abbreviation for ‘business-to-consumer’.

7 B2C

An abbreviation for ‘business-to-business’.

8 TOUCHPOINT

In this project context, a touchpoint is the contact or interaction a service user has with the service.

01
DISCOVER

This chapter introduces the background information of the project, as well as the project assignment and expected outcome. Additionally, the project approach is described in this chapter.

01
INTRODUCTION

1.1 Project background 2

1.2 Project assignment 4

1.3 Project outcome 5

1.4 Project approach 6

1.1 PROJECT BACKGROUND

In modern society, with the prevalence of consumerism, the on-boarding phase of products is very much under the spotlight. The phenomenon is that there is a rich language for creating more and more new things and designing a lot of fantastic, inspiring approaches to start the buying process.

Our relationship with products is designed to be a rich experience providing joy and excitement with each new purchase. Most of these purchases still happen within the scope 'take-make-dispose' linear economy. However, there are more and more companies that are working along with the principles of circular economy (CE), which aims at radically limiting the extraction of raw materials and the production of waste by recovering and reusing as many of the products and materials as possible in a systematic way.

The CE model has mostly focused on the technical and economic aspects of reuse, remanufacturing and recycling without considering consumers, however, consumer involvement is pivotal for the realisation of a CE (Ghisellini, Cialani & Ulgiati, 2016). Even though a product has been designed to circulate in a closed loop, its potential will only be realised if its owner returns it at the end-of-use time point. Unfortunately, specifically in the case of mobile devices like laptops and smartphones, consumers rarely bring back their products, making it hard for manufacturers to close the loop (Ellen MacArthur Foundation, 2012).

This project is part of the Circular Graduation Lab of the Delft University of Technology (TU Delft).

Figure 1.1 Intriguing iPhone advertisement

1.2 PROJECT ASSIGNMENT

When it comes to mobile devices, off-boarding is a less well-acknowledged part of the product lifecycle, the vocabularies around endings are deficient. Both consumers and companies, however, tend to overlook the importance of the EOU consumer experience and its impact on a transition towards a CE. Companies like to introduce 'hello' to new products while neglecting the 'goodbye' stage. They hardly pay attention to what happens after the consumers no longer use them. Consumer-wise, many mobile devices are left somewhere at home because of various reasons including data safety, pollution concerns as well as denial about the ending of lifespan.

Therefore, the design opportunity exists in knowing mobile device consumers' experiences at the off-boarding phase thus to design a valuable approach to enable them have a meaningful 'goodbye' at the end of the product's lifecycle and as a result, to return the mobile devices to the corresponding refurbishment and recycle services to close the loop.

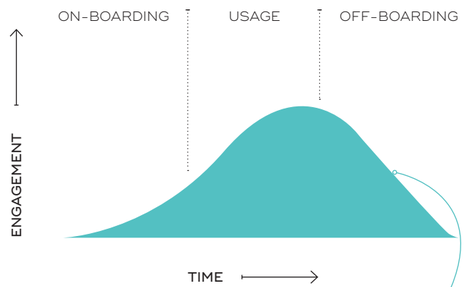


Figure 1.2 Product lifecycle model

"Endings are no longer part of the overall consumer experience. We have moved the source of the problem away from the cause. As consumers, we are able to overlook endings. In business, we have built a culture of ignoring them. As students we are taught they are not important. Endings are dodged and left for someone else to clear up. They are broken away from the rest of the experience."

Macleod, 2017

1.3 PROJECT OUTCOME

The project aims at exploring the entire user journey of mobile devices, particularly identifying the off-boarding experience to create a pleasant consumer 'closure experience' to make the return of EOU mobile devices an inseparable part of consumer products in a CE. The outcome of the project is in the form of a service. Primarily, the outcome is a solution for iPhone users, but it could also apply to the users of other Apple devices as well as the users of other mobile device brands after some variations in the final design.

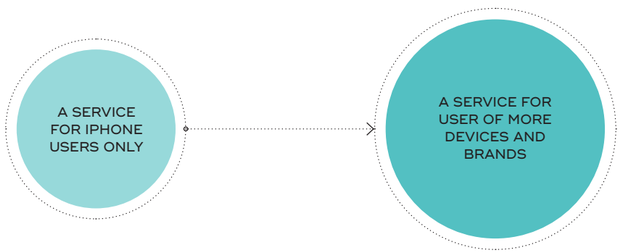


Figure 1.3 Project outcome

"When you have two coffee shops right next to each other, and each sells the exact same coffee at the exact same price, service design in what makes you walk into one and not the other."

31 volts service design

1.4 PROJECT APPROACH

The project was conducted using a user-centred research and design approach. The double-diamond design model (British Design Council, 2005) was used as the framework for doing the project as well as forming the report structure. This model fits the project, as the diverging phase guided the author in exploring the problem context broadly, and the converging phase was helpful in finding the design focus and defining the design vision. Additionally, some methods from service design were used for generating research findings, developing solutions and presenting the final design such as questionnaires, in-depth interviews, the service safari, personas, the customer journey map and the service blueprint.

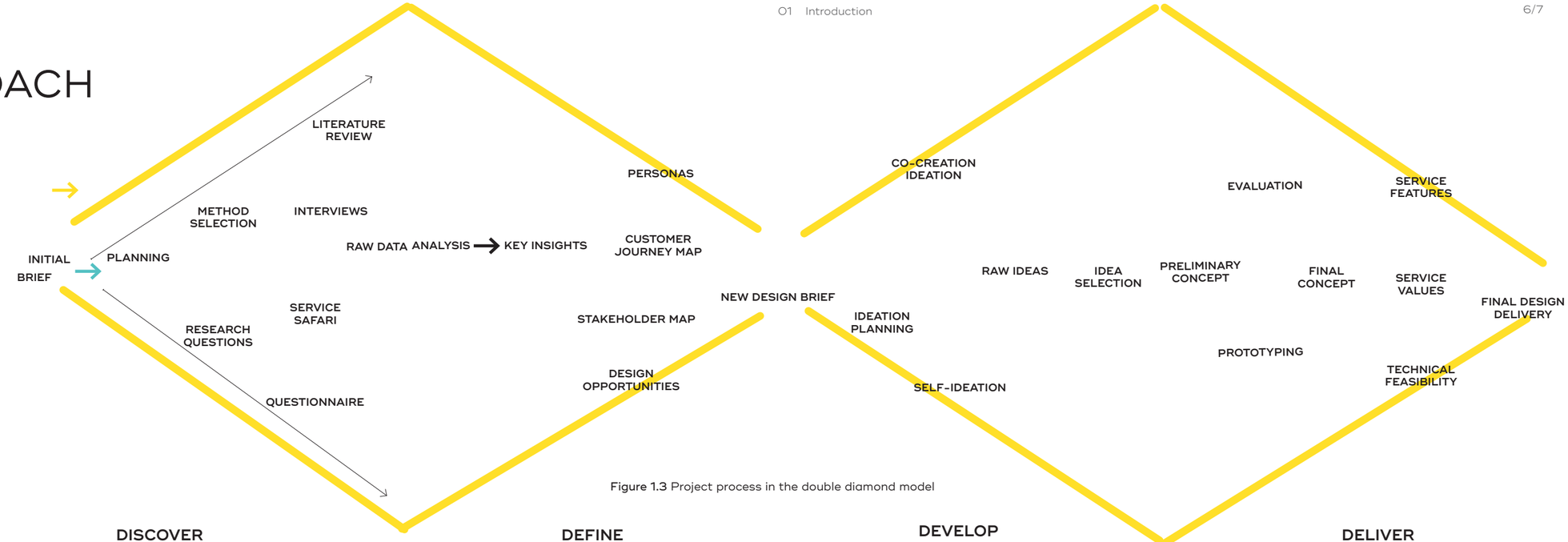


Figure 1.3 Project process in the double diamond model

DISCOVER

The starting point had a diverging approach to grasp a big picture of the project, which consists of context research and user research. It started with the research about the contextual information of the topic.The user research investigated the users' pain points and experiences in the off-boarding phase, namely, in using the trade-in services. The insights gained in this phase were converged into a design brief in the define phase, which can be found in chapter 3.

DEFINE

The goal of this phase was to synthesise the findings from the previous phases into design opportunities, which were eventually developed into a design brief. The design goal and visions defined in this phase served as guidelines for further ideation and design.

DEVELOP

The fourth part aimed at exploring more design ideas and developing a user-friendly trade-in service based on the design brief. For this purpose, a few ideation and evaluation sessions with the supervisory team, experts and potential users were done to iterate on the concept to deliver the final design, which is described in chapter 5.

DELIVER

The goal of the last phase of the project was to finalise the design of the trade-in service, thus to deliver the design in a relatively complete way for the possible implementation in the real context. Meanwhile, the recommendations were listed based on the evaluation results, and these recommendations can be referred to for further improvements.

02

DISCOVER

The following chapter introduces the discovery phase of the project, which involves two parts, the context research and the user research. It describes the research methodologies, activities, findings and discussions. This phase results in a better understanding of the current situation and more profound insights from the users, which are the inputs of the next phase.

02
DISCOVER

2.1 Context research 11

2.1.1 From a linear economy to a circular economy 11

2.1.2 The EOU mobile phone issue 16

2.1.3 Consumer lifecycle and closure experience 18

2.1.4 Stakeholder value network map 20

2.2 User research 22

2.2.1 User research group 22

2.2.2 User research objective 22

2.2.3 User research questions 22

2.2.4 User research activities 23

2.2.5 User research findings 30

2.2.6 User research discussion 44

2.1 CONTEXT RESEARCH

The context research was conducted, starting with understanding the essence of CE and the transition towards it, familiarising with the EOU mobile phone issue, as well as exploring the definition of closure experience for consumers. Furthermore, the context research provided an overview of the parties that are involved in the mobile device trade-in industry within the Netherlands.

2.1.1 From a linear economy to a circular economy

In terms of the relationship with the environment, human society has experienced three models in the process of economic development. Firstly, there is the linear economy model. It is a one-way 'take-make-dispose' linear economic process (Andrews, 2015), that is, human beings obtain resources from nature and discharge waste into the environment. In the early stage, due to the limited ability of human beings in developing nature as well as the self-purification of the environment itself, the impact of human activities on the environment was not prominent.

However, with the development of the industrial economy, the environmental problems caused by this linear model have become increasingly severe, and the crisis of resource shortage has become more and more serious. Meanwhile, the 'end-of-pipe treatment' model was developed (Dutt & King, 2014). This model began to pay attention to environmental issues. However, its emphasis is to control pollution at the end of the production process, therefore the technical difficulty and the corresponding costs are

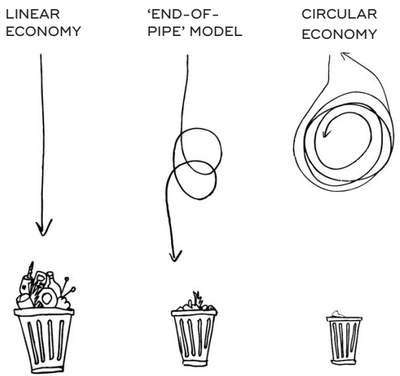


Figure 2.1 An illustration of the three economy models
Source: Earthhero.com

abnormally high. Moreover, the model does not focus on the efficient use of the resources, which means it cannot reduce the waste of the resources.

Facing situations such as global population increase, resource shortage and environmental pollution, as a result of us re-recognizing the nature and exploring the law of economic development, the CE model was developed. It uses the ecological laws to guide the economic activities of human society, aiming at minimising resource consumption and waste discharge, and to eliminate the conflict between the environment and development. The CE focuses on the recycling and the reusing of materials as well as lowering the impact of economic activities on the natural environment to the smallest possible extent. The diagram on the right shows the CE model composed by the Ellen MacArthur Foundation.

PRINCIPLE 1

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

PRINCIPLE 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

Foster system effectiveness by revealing and designing out negative externalities All ReSOLVENevers.

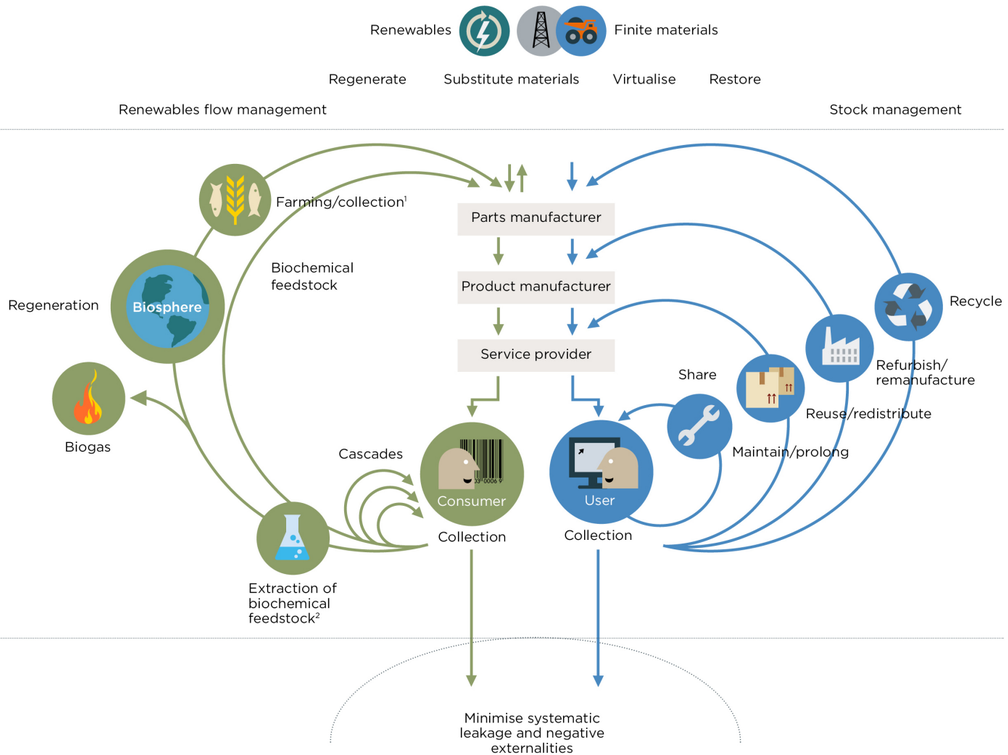


Figure 2.2 Circular economy system diagram
Source: Ellen MacArthur Foundation

Some photos from photo series ‘Removed’. Photographer Eric Pickersgill removed the smartphones and digital devices from his portraits of everyday life.

2.1.2 The EOU mobile phone issue

One result of a linear economy model is the electronic waste. Meanwhile, in recent years, mobile phones have become the world's most frequently replaced electronic products, which led to the fact that EOU mobile phones are the major source of e-waste. In mature markets (Western Europe, North America and Japan), consumers own 1.1 mobile phones and average usage time is down to less than 2.5 years (CIA World Economic Factbook, 2011).

Mobile phones contain substances that are harmful to the human health as well as the soil because these substances difficultly decompose in the environment. With the rapid frequency of changing mobile phones, the number of EOU mobile phones is a threat to the environment. As a matter of fact, some EOU mobile phones can be refurbished and resold in the market to keep their value. Other EOU mobile phones can be recycled and their materials can be reused as resources. However, the current EOU mobile phone collection rate is very low. With collection rates in Europe hovering around 15% and mobile phone designs becoming increasingly integrated, there is hardly any component reuse or remanufacturing, and the secondary mobile phone market (while fast-growing) is almost negligible at around 6% of the primary market (Ellen MacArthur Foundation, 2012). It can be concluded that there should be some solutions to increase the collection rate in order to close the circular loop.

COMMENT

In 2003, to solve the increasingly severe problem of environmental pollution caused by discarded electronic products, the European Union officially promulgated the directives on disposal of discarded electrical appliances and electronic products (WEEE). The regulation on mobile phones in the WEEE directive is: all mobile phones producers and sellers in the EU market must establish a complete system for collection, recycling, and recovery before 13th August 2005.

1.1

In mature markets (Western Europe, North America and Japan), consumers own 1.1 mobile phones.

2.5

The average mobile phone usage time is down to less than 2.5 years.

15%

The current EOU mobile phone collection rate in Europe.

Figure 2.3 A pile of printer parts dusted with toners

Figure 2.4 The mountains of 'e-waste' in Africa

Figure 2.5 An Indian boy recycles e-waste

Figure 2.6 Old mobile phones in the drawer

COMMENT

The author would like to encourage the reader of this report to have a transition towards the 'EOU' mentality, that is to say, to treat the 'EOU' product with a circular behaviour to make better use of its remaining value.

EOL and EOU: The definition from Techopedia states that an end-of-life (EOL) product is a product that does not receive continuing support, either because existing marketing, support and other processes are terminated, or because it is at the end of its useful life. Alternatively, as consumers, we can comprehend it as a product that has lost its functionalities, turning it into 'waste'. However, in the CE, we regard 'waste' as a resource for new processes. Therefore it would be more appropriate to use the term 'EOU' than 'EOL'.

2.1.3 Consumer lifecycle and closure experience

In order to have the concrete and consistent fundamentals to start the project. It is essential to be clear about some terms and models, such as 'consumer lifecycle' and 'closure experience'. Macleod (2017) identified such terms in the book 'Ends. Why we overlook endings for humans, products services and digital, and why we shouldn't'. In this project, the author of this report decided to use Macleod's interpretations in this project.

In the book, Macleod simplifies the product or service lifecycle into three phases, on-boarding, usage, and off-boarding.

"The consumer lifecycle is a model used in marketing to define stages through which a person goes when purchasing and consuming something. For example, as a consumer, you recognise you have a need to buy something. Maybe it's more milk or something more complicated like a new car, or to sign up to an internet provider. Then you might look at some different options for where you are going to get this new purchase. Once you have decided, you then make the transaction, hand over the money, sign up and commit to the service. You then use the service or product until a point when it is not required. The science of this process can be reflected as a consumer lifecycle."

Macleod, 2017

"In this context, on-boarding is made up of starting experiences. These are the actions that persuade the customers to commit to the product or service: they form the start of the relationship between consumer and providers. Examples of starting experiences are advertising that attracts you to a product or service, marketing that enhances the product and makes it look more attractive and Terms and Conditions that establish the agreement between provider and customer."

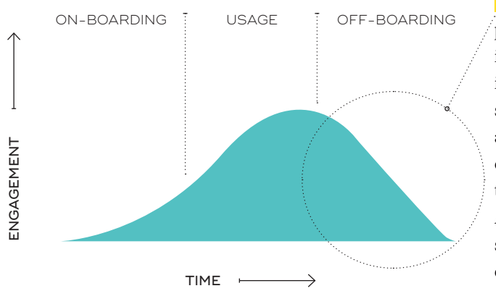


Figure 2.7 Product lifecycle model

"The usage phase complete tasks, empowers people and orders chaos. It is the stable committed relationship between the consumer and the service they use, or the product they own. Examples of usage experiences are paying into or drawing from a pension scheme, daily usage of a car or regular usage of an app."

"Off-boarding is a less well-acknowledged part of the product or service lifecycle. It is made up of closure experiences of different kinds, such as the effort needed to neutralise the effect of the closure, to terminate the relationship between consumer and purchase. Typical closure experiences are the completion of a mortgage, the deletion of unwanted photos online, the appropriate disposal of an unwanted product, saying goodbye or closing unused accounts. Off-boarding acts to tidy up the impacts of consumption, and neutralise its ills."

The 'closure experience' researched and designed in this project can be defined as the experiences that the users have in using mobile device trade-in services, more specifically, iPhone trade-in services. An 'iPhone trade-in service' is the service which the consumers 'sell' their EOU iPhones to, and get remaining values back from in the form of cash, gift cards and so on. In the scope of the Netherlands, iPhone trade-in services are provided by Apple (program name: Apple GiveBack) in collaboration with Brightstar, retail shops like Amac and MediaMarkt, Telecom providers and other third-party trade-in service providers.

2.1.4 Stakeholder value network map

To have a holistic view of the involved parties in the trade-in services, as an expansive version of the stakeholder map, a stakeholder value network map was created to demonstrate the relationships and the value exchange between various stakeholders.

"A successful service design project requires integrating stakeholders as early as possible in the project development process, opportunities to iterate the product development process together with the stakeholders involved in the project should be created as soon as possible."

Stickdorn & Schneider, 2017

The current trade-in services constitute a complicated system that has a wide variety of stakeholders. All the stakeholders presented in the map influence the user experience either directly or indirectly.

Let us take 'trading in an EOU device' for example. Firstly, the users need to find a working and trustworthy service to do so. They will have to either do it directly via a third-party service or indirectly via companies that provide trade-in services for Apple, retail shops and telecom companies, such as Brightstar. It is described in sections 2.2.5 and 2.2.6 that this step requires a lot of effort. That is to say, the fact that more service providers are involved in the system does not bring more convenience and value to the users.

The entire value flows in this system are rather practical and indirect. The users will only get cash or gift cards, depending on the efficiency of the service providers, logistic channels (such as PostNL, DHL, UPS) and banks. The value that other stakeholders would obtain is mostly in the form of EOU devices and money. The extra values such as brand loyalty and satisfaction are not expected to be there because of the poor user experience reflected by current trade-in services (section 2.2.5).

In conclusion, the complexity of the system does not bring many advantages to the stakeholders as it is supposed to. The trade-in service needs to be better designed. Therefore, the positions of some stakeholders will be relocated, some unnecessary value flows will be cut and others could be enhanced, the type of the value flow in the system will be more various too.

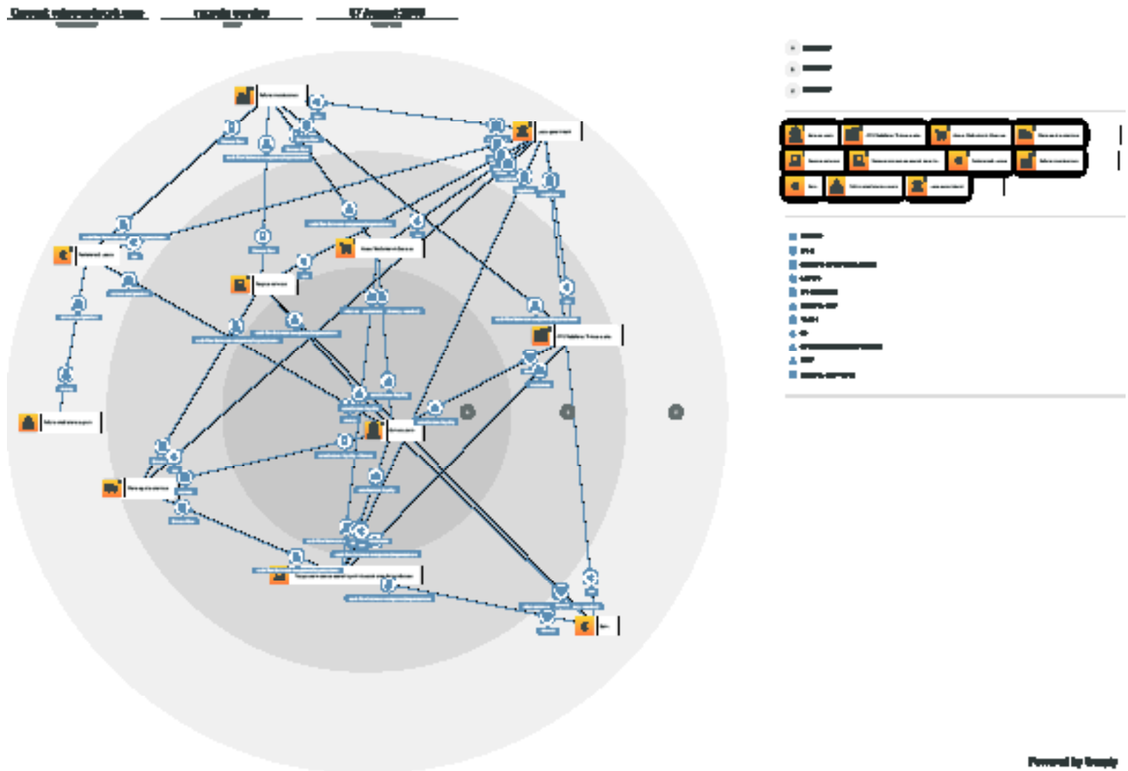


Figure 2.8 Stakeholder value network map

2.2 USER RESEARCH

Besides understanding the context, it is also crucial to know more about the users. Thus, the author has conducted some qualitative research in the field to identify the pains and gains of the users.

2.2.1 User research group

In the first diverging stage of user research, namely, the questionnaire research, in order to keep a broader scope of the user research to detect more possibilities, mobile device users of all operating systems were involved. In later research activities, only iPhone users were selected as the target user group, because the focus of the project was narrowed down as the author and the supervisory team agreed on.

2.2.2 User research objectives

The user research has threefold objectives:

- **Objective 1.** To truly empathise with the target users, thus to have a view of the current situation in the lense of target users.
- **Objective 2.** To create an area for identifying potential design directions and opportunities.
- **Objective 3.** To gain inputs for forming the author's visions on addressing this project.

All three user research objectives were met in this project. 'Objective 1' was fulfilled by answering the following research questions. The answers to 'objective 2' and 'objective 3' served as inputs for the 'define' phase whose results can be found in chapter 3.

2.2.3 User research questions

To meet the research 'objective 1', the following research questions were formulated as guidelines to keep a better focus on each research activity. They are:

1. *What are the perceived Apple experiences?*
2. *What triggers people to get a new mobile device? Which channels do they use?*
3. *How do people interact with their EOU mobile devices?*
4. *Do people have a strong emotional attachment to their mobile devices? Particularly EOU ones?*
5. *Why do people keep their EOU devices at home?*
6. *For using trade-in services provided by Apple and other parties, what are the experiences and bottlenecks?*
7. *What is the intended 'closure experience', namely, the trade-in experience?*
8. *What do people like about other recycle schemes, trade-in services and similar return services?*

The answers to these questions can be found in sections 2.2.5 and 2.2.6. These answers were not written in a sequential order. However, the author drew some indications to better navigate the question and the corresponding answers that sporadically spread in the text.

2.2.4 User research activities

For answering the research questions, an extensive user research was done including the activities described below were done. As Figure 2.9 shows, the author tried to seek the answer to each question in at least two research activities so as to not have biased findings, but instead, have a deeper and more comprehensive understanding of the current situation.

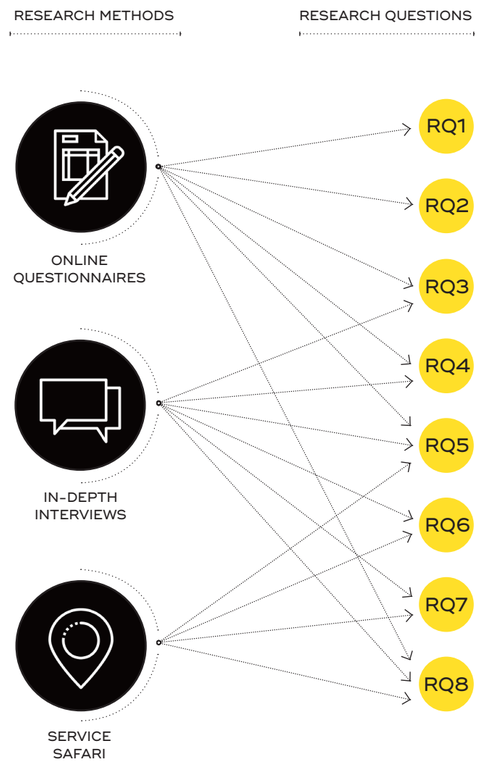


Figure 2.9 User research activities

ONLINE QUESTIONNAIRES

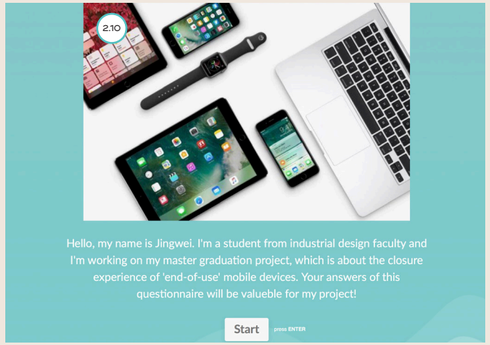
In this preliminary phase, a questionnaire is useful for gaining information about the target groups, product use and opinions on existing products (Boeijen et al., 2014).

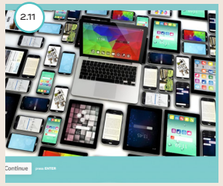
The goals of using an online questionnaire in this project were to grasp an overview picture of the entire mobile phone journey while paying extra attention to the off-boarding phase, identify research directions and recruit target users for future research, design and evaluation activities.

The chosen platform to make the online questionnaire was Typeform (see Figure 2.10) as it is user-friendly and provides more functionalities in analysing the research data. The online questionnaire has 17 questions which were composed by an introduction of the author and the project, two demographic questions and other questions regarding participants' possible relation changes at different phases of the mobile phone lifecycle, how they dealt with EOU devices and the corresponding experiences, as well as their experiences of using other recycling services. Two images (Figure 2.11 and 2.12) were displayed between different questions in order to better immerse the participants in the context.

For a better iteration on the questions, a pilot test with 4 participants was done (see Appendix A). The adapted final version of the online questionnaire can be seen at: https://renjingwei.typeform.com/to/BGRvO5

The questionnaires was distributed mainly through social media and word of mouth. There are 72 responses, 60% females and 40% males. The age range is from 22 to 58, most participants are in their 20s and 30s. The findings of the questionnaires were analysed and used as inputs for formulating in-depth interview questions to scale down the research scope.





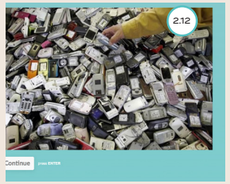


Figure 2.10 The landing page of the online questionnaire

Figure 2.11 The image used to immerse the participant

Figure 2.12 The image used to immerse the participant

IN-DEPTH INTERVIEWS

Interviews are helpful for understanding consumer perceptions, opinions and behaviour concerning products or services. (Boeijen et al., 2014).

Due to the limitation of the research methodology, the data from the questionnaire was sketchy and superficial. Many assumptions and 'whys' were not properly answered. To keep a focus on the deeper layer of the target user's experiences, five followed-up interviews were conducted. The interviews were done in a semi-structured way to keep it open and flexible. They aimed at knowing user behaviour and emotions in both usage and off-boarding phase of the customer journey in using an iPhone. The interview notes were taken in Chinese for fast recording, and the scanned version of these notes can be found in Appendix B.

Among the five interviewees, three are females, and two are males. All of them are iPhone users who have at least one EOU iPhone. Two of them have used the Apple trade-in service before while the other three never used any trade-in services. These interviewees were recruited through the online questionnaires. The qualitative data retrieved from the interviews was analysed together with the questionnaire and service safari data to extract insights for formulating design brief.

Andreas. Male, 29 years old, Oostende, Belgium. UX designer.

✗ Never traded in any devices.

Natalie. Female, 26 years old, Delft, the Netherlands. Industrial designer.

✗ Never traded in any devices.

Teri. Female, 26 years old, Breda, the Netherlands. Offshore engineer.

✗ Never traded in any devices.

Xiaozhe Wang. Male, 28 years old, Delft, the Netherlands. Maritime engineer.

√ *Traded in an iPad with the Apple trade-in service*

Linhui. Male, 29 years old, Amsterdam, the Netherlands. UX designer.

√ *Traded in an iPhone with the Apple Trade-in service.*

Figure 2.13 Basic information of the interviewees

SERVICE SAFARI

During a service safari, designers go out 'into the wild' and explore existing services. Service safari can put designer into the shoes of customers (Stickdorn & Schneider, 2017).

However, the data extracted from previous user research could be biased, because the problem was examined by empathising with target users, which means their interpretations are mostly used. To get some raw data, the author decided to dive into the context and 'get his hands dirty' in the fieldwork.

To know how the trade-in services work and what the experience is like, a few trade-in services were personally experienced by the author. The trade-in service safari contains an offline part and an online part. The chosen city to do the offline part is Den Haag because it is close to Delft, and it has a variety of shops needed for an elaborate offline service safari such as telecom providers, electronic device retailers, Apple resellers and the official Apple store.

The service safari contains using the online and offline trade-in services provided by Apple, retail shops and third parties, namely, Brightstar from Apple; Services from Amac, Coolblue and Mediamarkt; Third-party services: Recycle Michael and Rebuy. As well as other similar 'return' services, such as Ziggo return service, Ace & Tate try-out service and iWatch repair service.

Figure 2.14 The service list of service safari

The author has an iPhone (iPhone SE, 64GB, space grey) in use, and he started the trade-in service safari with a made-up task which is likely to happen in reality amongst iPhone users.

"I want to trade in my iPhone."

In the offline part, the author followed a path from Apple store, T-Mobile, Amac, MediaMarkt, whose staff suggested him to go to Cashconverters which was the last stop of the offline service safari.

The task could not be completed due to these reasons:

Apple store: It is an obligation to spend the voucher that was obtained from trading in an Apple device immediately in the shop on buying other Apple devices. However, the author did not plan to buy a new Apple device.

T-Mobile: The two employees at T-Mobile said this service was currently suspended at the time.

"We have stopped doing this for almost 1.5 years."

Amac: Amac suspended trade-in service too (Figure 2.17), due to the fact that Leapp did trade-in services for them, and Leapp filed for bankruptcy.

MediaMarkt: MediaMarkt gave the author similar answers. This is the conversation the author had with a MediaMarkt employee:

MediaMarkt: "oh, we should update our website and tell our customers we don't do this anymore."

Author: "why did you stop doing it?"

MediaMarkt: "oh, the machine to check the condition of the phone didn't work really well."

The employee at MediaMarkt suggested that the author sold his iPhone SE to a place called 'Cashconverters' which is a pawn shop. Due to the long queue, unpleasant atmosphere and concerns of data leakage, the author did not trade in his phone at Cashconverters.

The author then decided to finish his task through some online trade-in services. As expected by the author, Amac and Coolblue did not provide online trade-in services (Figure 2.18), since their offline services are suspended. Coolblue cannot confirm when the service could be back in use, however at the moment of writing this report, it is still suspended (Figure 2.18).

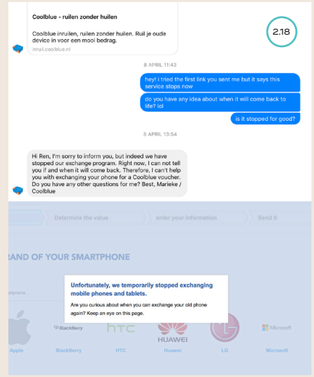
Mediamarkt's web page only provides an indication of the trade-in price and an explanation of how it works. The actual trade-in can't be done online.

The author then tried third-party trade-in services Recycle Michael and Rebuy. Due to some privacy concerns, the author chose not to trade in his iPhone there.

Finally, after trying these offline and online services, the author was able to finish his task at Brightstar, a third-party trade-in service provided by Apple (Figure 2.21). The author did not foresee that a simple trade-in task would have so many barriers and challenges. In other words, a target user could be discouraged at any step.

In order to gain insights from a broader spectrum, besides the trade-in services of the mobile device which are mainly digital, the author also tried other 'return' services that focus on the physical 'kit' which users could use to 'return' the products. The goal was to get some inspirations for the physical product design.

The following services were tried out in this part: Ziggo device return service (Figure 2.20), Ace &Tate try-out service (Figure 2.19) and iWatch repair service (Figure 2.21).



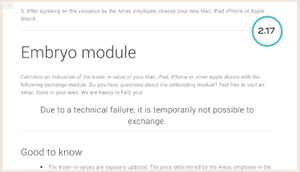


Figure 2.15 The iPhone was being checked by Apple employee

Figure 2.16 Cashconverter shop, its slogan and interior

Figure 2.17 Screenshot of Amac website

Figure 2.18 Screenshot of Coolblue website and Facebook message with Coolblue

Figure 2.19 The return kit from Ace & Tate with a double tape on the seal part

Figure 2.20 The return kit from Ziggo, including stickers, instructions and a box

Figure 2.21 The return kit from Brightstar, including instructions, a return label and a box

Figure 2.22 The return kit from iWatch repair service

2.2.5 User research findings

The user research findings were clustered into two major categories. 'User behaviours' towards mobile devices and 'user experience' in using Apple devices, recycling schemes, trade-in services and similar return services.

User behaviours

The participants bought a new mobile device because the old device does not perform the desired way anymore, the reasons are:

Battery issues.

Slower speed.

Incompatibility with new apps.

Some components do not work properly.

Simply because the old one was completely broken, and the new one is just better.

The shops where people get a new mobile device vary, including offline retail shops such as MediaMarkt, Coolblue and the official Apple store; Telecom providers (KPN, Vodafone and T-mobile) and webshops. Price is still a vital factor. There is no significant correlation amongst participants' demographic information (age, gender) and chosen shop type.

"The cheapest store ... probably MediaMarkt."

RQ 2

What triggers people to get a new mobile device? Which channels do they use?

RQ 4

Do people have a strong emotional attachment to their mobile devices? Particularly EOU ones?

Participants who claimed to have an emotional attachment with their EOU mobile devices are much less than the author assumed, most participants consider their mobile devices as practical tools. They may develop some emotional bonding with their mobile devices during usage, however this bonding can be easily replaced by a new device.

"I don't have a special relationship with my mobile devices, they're mainly practical and I keep using them as long as they function well enough."

"It's like an EX, you loved it, you had a great time, but it doesn't fit anymore and it's time to say goodbye."

Figure 2.23 Screenshot of the questionnaire result on Typeform

As figure 2.23 shows, 82% (59 out of 72) of the online questionnaire participants had at least one EOU device, 73.7% of them claimed to have 'never sent it back'.

Of all 59 online questionnaire participants who 'never sent it back', their EOU devices have different endings. The off-boardings are dispensed. Mainly, these devices were kept at their homes, in an idle condition, as a backup device or some components were reused for the home setting.

"Did not know what to do with it, so I put it in a drawer."

"Keep it in the house for my kids as a toy."

"Samsung phone used for root in order to make use of NFC/RFID communication."

RQ 5

Why do people keep their EOU devices at home?

Amongst these 59 online questionnaire participants, half of them have ever considered to 'send it back' while the rest have not, few participants claimed they would not send their EOU devices back because they would like to keep them as a collection or reuse it for home automation interface.

In combination with the findings from the in-depth interviews, the barriers for people to 'send it back' are:

They do not know such possibilities exist.

They have concerns about data and privacy.

They think it is energy and time consuming.

They have tried, but the trade-in service does not take their devices because they are too old.

All the participants who claimed to have 'traded in' their mobile devices before, did the actual trade-in by proactively seeking for trade-in options, and they were not offered any trade-in possibilities beforehand. That is to say, the trade-in activities were only initiated if the users wanted to, and not because they were suggested to do so by other parties.

User experiences

RQ 1

What are the perceived Apple experiences?

It is positive

The participants who have used Apple devices all described the 'on-boarding' and 'using' experience of Apple positively. Some feedbacks are 'easy', 'a light to eye', 'vivid', 'integrated', 'user-friendly' 'intuitive', 'confident', 'simplicity'. This is to say, the 'on-boarding' and 'usage' phases of Apple device lifecycle give the users positive experiences.

RQ 8

What do people like about other recycle schemes, trade-in services and similar return services?

It is simple and connected

The participants like the directness, convenience and connectedness in recycling schemes. Recycling clothes at H&M only requires them to drop the clothes bag in the bin (Figure 2.24). Same as the plastic bottle recycling at the supermarket, people can do it in the supermarket while shopping, and get a coupon immediately.

"It was quite easy, easier than I expected."

Taking Ace & Tate as an example, if the users do not like the products that they received. They can send them back directly using the same box, and the users just need to peal the double-sided tape on the seal part of the box (Figure 2.25). No extra box and box folding step (like Brightstar and Ziggo box) are needed.

Figure 2.24 H&M clothes recycling

Figure 2.25 Ace & Tate return box

RQ 6

For using trade-in services provided by Apple and other parties, what are the experiences and bottlenecks?

It is distrustful

"After I upgraded to iOS 11, it suddenly became so slow, I feel like Apple did it on purpose."

"Getting rid of equipment is always a problem. Need to securely remove data before doing anything with them I wouldn't trust a 3rd Party."

"Very convenient, but I can not ensure my personal information security on the old device."

Privacy concern with third-party trade-in services, irrelevant personal information is asked by service providers (Figure 2.26 and 2.27)

"Why do they need so much irrelevant personal information, even age and gender."

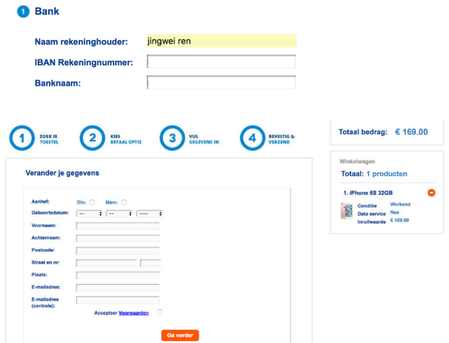


Figure 2.26 Screenshot of RecycleMichael trade-in page

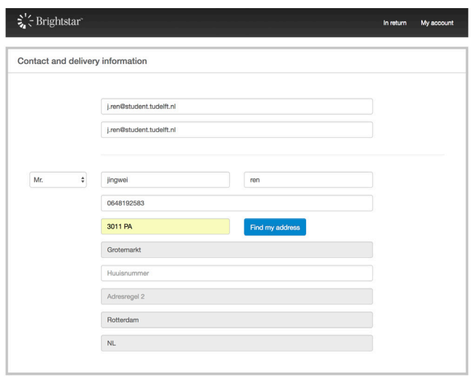


Figure 2.27 Screenshot of Brightstar trade-in page

RQ 6

For using trade-in services provided by Apple and other parties, what are the experiences and bottlenecks?

COMMENT

Coolblue does not provide offline trade-in service, and Amac is currently suspending their trade-in service. This is due to the fact that they do not have any in-house trade-in system. Their services are depending on their partner's capability. Leapp's bankruptcy (https://leapp.nl/) led to the fact that Amac is not taking back any devices.

It is demanding

"They(trade-in services) were somewhat hard to find."

Because many trade-in services are temporarily unavailable while they should be available, the users either have to be very lucky to 'encounter' an effective option on their first try or they have to keep trying until they find one. As it is described in section 2.2.4, it takes many steps for the author to even find a working option.

At the Apple online trade-in service (Brightstar), the users have to go through a lengthy 'terms and conditions (Figure 2.28); and agree on it if they wish to continue.

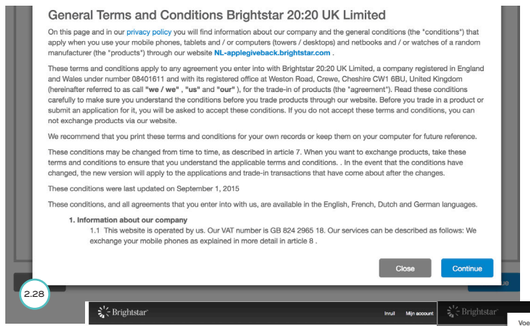
On Rebuy and Recycle Michael, no box for sending back devices are provided. The users have to prepare and pack their devices on their own.

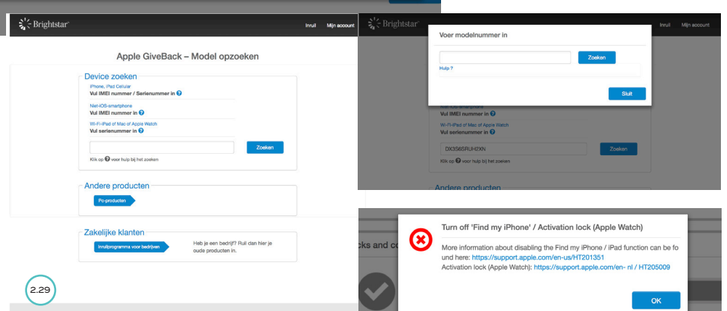
Both serial number and model number were asked on the Apple online trade-in service (Figure 2.29). However, technically Apple has all relevant information in their system with any of these numbers.

From a business perspective, there is no price difference between different colours of the same iPhone type. However, on Rebuy, the users still have to find the right type of pairing with the right colour on the list that has 167 different iPhone types (Figure 2.30).

As the bottom right corder of figure 2.29 shows, The users have to turn off the 'Find my iPhone' option when the iPhone is still in usage, otherwise the trade-in request cannot be processed further.

In order to return the device to Ziggo, the users have to fold the box following the instruction that has 6 steps (Figure 2.31). The same for the box received from Brightstar (Figure 2.32).





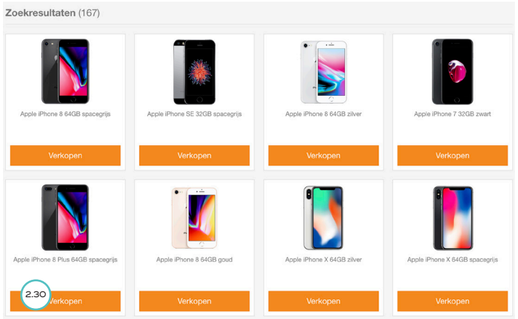


Figure 2.28 Screenshot of the 'terms and conditions' page of Brightstar

Figure 2.29 Screenshot of the 'serienummer' and 'modelnummer' page of Brightstar

Figure 2.30 Screenshot of Rebuy 'phone type selection' page

Figure 2.31 The box and folding instruction from Ziggo

Figure 2.32 The box and folding instruction from Apple (Brightstar)

RQ 6

For using trade-in services provided by Apple and other parties, what are the experiences and bottlenecks?

It is frustrating

As mentioned before, many shops should provide trade-in services, but as a matter of fact, they do not. The users feel frustrated since they cannot even get the trade-in start.

There is a huge language barrier for non-Dutch speaking people to do online trade-in because all online trade-in service websites are in Dutch. Since people need to rate their devices' condition, some words become difficult to comprehend when the questions are translated into English by 'Google translate' (Figure 2.33). This also led to a confusing and uncertain situation where the users could make a wrong answer to the questions

It is uncertain and not confident

The users have to answer many questions about the device condition to get a trade-in value offer. However, this is still not the final value yet, because the trade-in service provider will assess the device after they receive it. There is a chance that the value will decrease since the service provider considers that there is a significant difference between the condition described by users and the 'real' condition.

The users can choose to send back the devices with their own packages. Nevertheless, the responsibility will remain unclear if there are some damages.

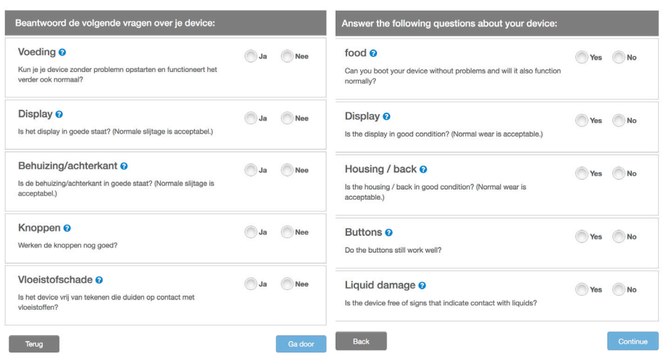


Figure 2.33 The original page and the page ranslated by Google

It is careless and dominant

When the mobile phones became slow, participants did not get any actionable suggestions from the mobile phone companies about what to do.

If there is a disagreement on the device's condition between service providers and users, the users have no way to 'object', they either have to accept the new offer or get their devices back. The user will even have to pay for the return shipping.

It feels like 'give me or not, I am in charge'. It is not supportive or caring at the moment when the participants want to buy something from the mobile phone companies.

On the Apple official website, it is written that Apple only takes the 'iPhone 5 or newer' (Figure 2.34)? What about the iPhone 4 or older iPhones? This gives the users an impression that Apple is not doing this because of social responsibility but making more money.

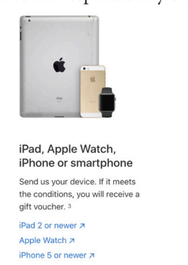


Figure 2.34 Screenshot of the trade-in page on Apple official website

"Yes, you can always return feature phones or iPhone 4 or older iPhone to Apple, but Apple won't give you any voucher for that."

If the users would like to trade in their devices at the official Apple store, It is an obligation to spend the voucher gained from trading in immediately in the shop on buying a new Apple device (not even on other non-Apple accessories).

Apple online trade-in service asks the user to fully charge the device before sending it back (Figure 2.35).

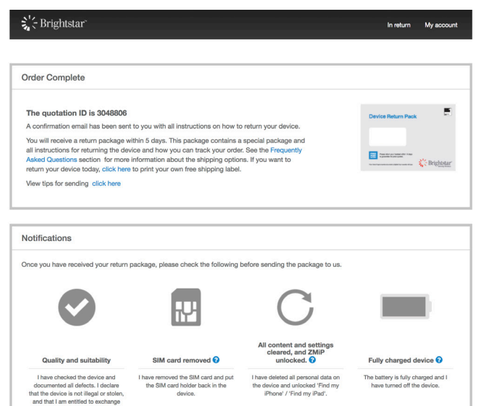


Figure 2.35 Screenshot of the trade-in page of Brightstar

RQ 6

For using trade-in services provided by Apple and other parties, what are the experiences and bottlenecks?

It is confusing

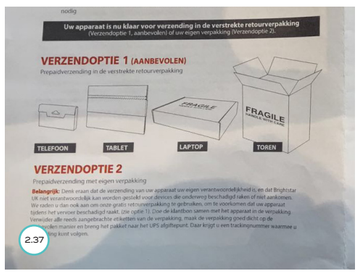
Many people may get confused at some specific steps but there is no timely supports from service providers.

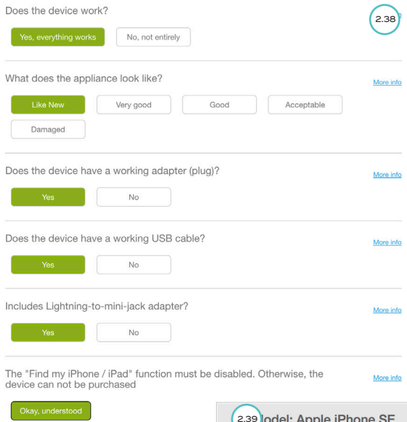
The paper instruction to fold the trade-in cardboard box is different from the instruction on the actual box (Figure 2.36).

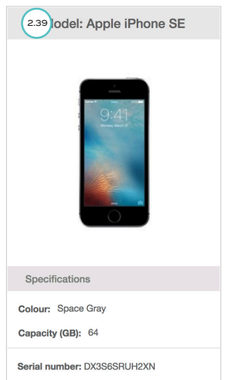
As figure 2.37 shows, there are some irrelevant (for the service users) messages on the instruction paper which may cause confusion

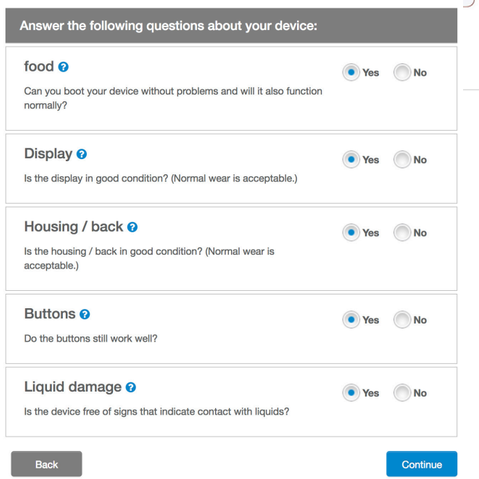
The users have to rate the condition of the trade-in iPhone in every service (Figure 2.38), however they are not confident about if they do it correctly or not.

The users have to go through the lengthy terms and conditions (Figure 2.28). They will hesitate on whether to read it or not. Will there be some traps?









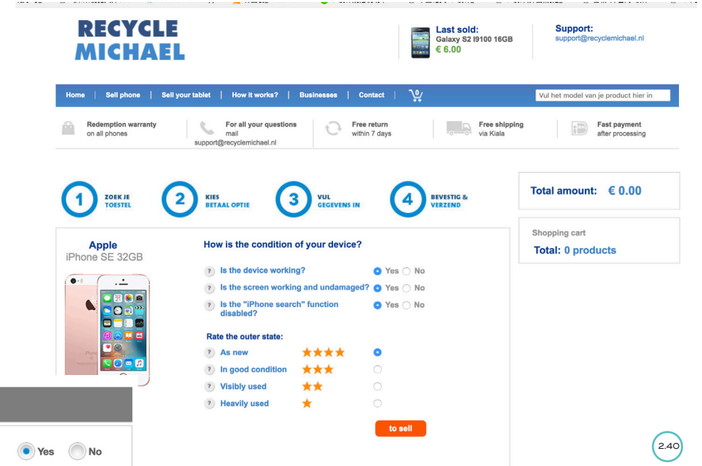


Figure 2.36 The instruction on the paper and box are different

Figure 2.37 Irrelevant message on the instruction paper

Figure 2.38 Screenshot of mobile condition page on Rebuy

Figure 2.39 Screenshot of mobile condition page on Brightstar

Figure 2.40 Screenshot of mobile condition page on RecycleMichael

RQ 6

For using trade-in services provided by Apple and other parties, what are the experiences and bottlenecks?

RQ 8

What do people like about other recycle schemes, trade-in services and similar return services?

It is inconsistent

If the users trade in EOU devices at an offline Apple store, they are obliged to use the voucher immediately at the store. However, the users will get an Apple gift card from the Apple online trade-in service (Brightstar), and people can use it later on

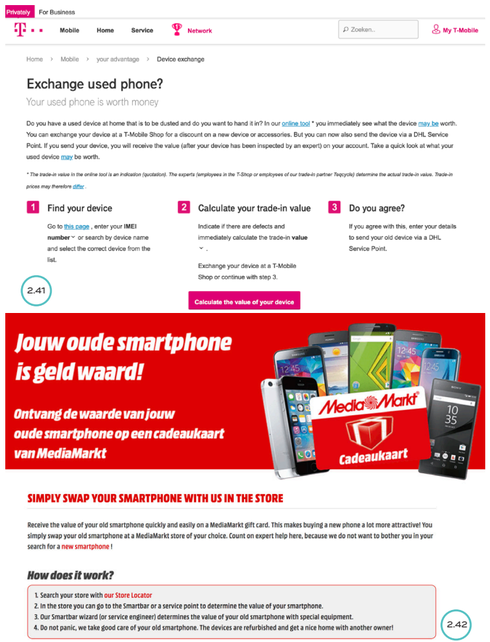
The inconsistency between online and offline channels of the same company. For example, T-Mobile offers online and in-store trade-in service (Figure 2.41) but the employee at the Den Haag T-Mobile store said the service has been stopped. Another example is that the online MediaMarkt trade-in page (Figure 2.42)suggests the users do it in their offline stores while the offline store at Den Haag claimed that the service has been stopped.

"I know where to go to buy new Apple products, I mean, the advertisements are everywhere, but I don't even know there is even a trade-in possibility."

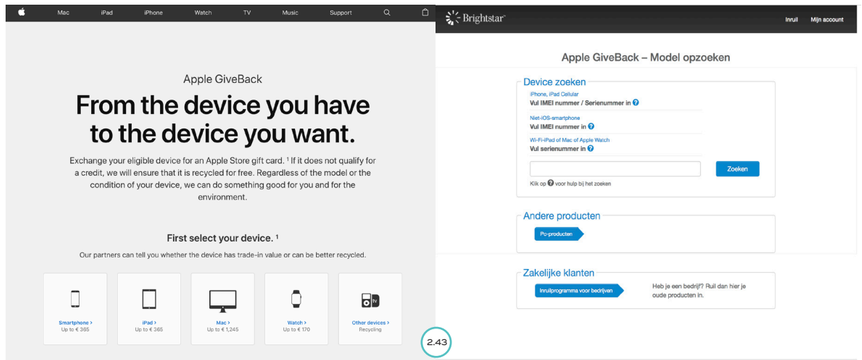
The users see this trade-in webpage on Apple official website (Figure 2.43). However, they will be redirected to another webpage of Brightstar (Figure 2.43) if they click on the button to start trade-in. The two websites use different design languages thus gives the users an inconsistent experience.

The inconsistent Apple package experience. In figure 2.44, from left to right, there is the iPhone box, iWatch repaid service box and the box from Apple online trade-in service (Brightstar).

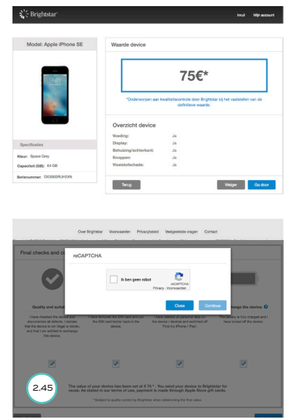
The user who uses the Apple online trade-in service will get an envelope in which a small cardboard box is attached for sending back the device. It is material wastage, and it is not consistent with the brand image.



2.41 2.42



2.43



2.45

2.44

Figure 2.41 Screenshot of T-Mobile trade-in page

Figure 2.42 Screenshot of MediaMarkt trade-in page

Figure 2.43 Screenshot of Apple trade-in page and landing pag Brightstar

Figure 2.44 Collage of different Apple packages

Figure 2.45 Screenshot of mobile condition page on RecycleMi

“WE NEED TO UNDERSTAND THE POSITION WE NOW FIND OURSELVES IN. IT’S NOT ENOUGH TO DESIGN BETTER ENDINGS, ALTHOUGH THAT WOULD BE AN EXCELLENT START, IT IS ABOUT UNDERSTANDING THE FULL SIGNIFICANCE OF THE POSITION WE ARE IN: EMOTIONALLY, ENVIRONMENTALLY, SOCIALLY, AND COMMERCIALLY.”

MACLEOD

A Plastic Bag Floats Underwater At Pulau Bunaken, Indonesia. Photograph By Paul Kennedy

2.2.6 User research discussion

The findings in the previous section provide a clear overview of the current situation from the perspective of the target users. Following that, the author developed his interpretations of 'why it is happening now?' and 'how it is supposed to be in the future'. These interpretations were formulated in the format of conversational 'Q&A', the questions proposed by the author himself are the ones that the readers might also ask themselves. The answers to some of the research questions can be found below.

RQ 4

Do people have a strong emotional attachment to their mobile devices? Particularly EOU ones?

Question: ***"Why are most EOU devices left at home? Is it because people have an emotional attachment to these devices?"***

Answer: Before starting the project, one major assumption the author had towards to the reason why people leave their EOU devices at home is that 'people may have an emotional attachment to these EOU devices'. After the research phase, the author did not think the assumption to be valid.

COMMENT

The 'Internet of Things' is the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data.

We all could recall the earlier ages when people were using feature phones, the shapes, colours, sizes were various, and the functionalities were limited. Notably, the content in those feature phones was rather difficult to back up and transformed into a new phone. This could lead to a certain type of emotional attachment to the object itself, or maybe to the illusionary attachment to the object itself because of the content and the convenience of having a mobile device.

However, with the evolution towards smartphones, the appearances and functionality are more and more similar, there are not many new smartphones with significant new features, which would trigger people to replace their old devices as people do in the era of feature phones, as well as the early stage of the smartphone. The replacement of smartphones became more and more subconscious. Rather than the smartphone itself, it seems like people are more attached to the content stored in their smartphone, the connectivity with the outside world and the social effect along with it. The smartphone itself becomes more like a carrier of these things. Another interesting phenomenon derived from the user research is that even if people may develop some emotional attachments to their smartphones during the usage phase, these attachments can easily be replaced by another smartphone, a new and better one. With the high internet speed and the 'cloud' technology, backing up the content and restoring it to another 'carrier' had never been this convenient, the attachments could be transferred to another smartphone.

In the future, the author believes that people and smartphones will be more connected with each other. Maybe the device will not be called 'phone' anymore, and it will become the gateway to the 'Internet of Thing' , it will no longer be just a 'device' but an interface where human beings will be capable of interacting with the content in the 'cloud', it will be an expansion of the whole, thus amplifying human capabilities.

As a conclusion, the author considers that the emotional attachment to mobile phones has constantly decreased, and will continue to decline. The author then decided not to follow this direction for the continuation of the project.

Nevertheless, the author believes it is still an interesting theme to address on research: the attachments to physical products (such as chairs, tables and other ornamentation objects) and to products that are able to provide a social effect, like a smartphone.

RQ 5

Why do people keep their EOU devices at home?

Question: ***"If the assumption above is not true, what are the reasons that people keep the EOU devices at home?"***

Answer: The main reason that people is that the off-boarding is not connected to the usage phase of the current device or the on-boarding phase of the new one. This led to the state of affairs in which most people's off-boarding behaviour is simply to leave the EOU devices forgotten at home. Since the connection is missed, only people with a strong determination to offboard the EOU device would start to carry it out on their own. They need to proactively search for an effective service to even start off-boarding, which requires many efforts as described in the previous sections.

Specifically, the moment to have an awareness of off-boarding, namely, trade-in, should not be limited to the time subsequent to when users consider their mobile devices as EOU. If the trade-in intervention is moved somewhere forward, then the mindset to address this problem will not be limited to answer the query "how can we create an internal motivation for people to trade-in their EOU devices that are lying in the drawer?"

Alternatively, the design intervention can be held at the following moments, but not limited to them:

1. When people buy a new phone, they get to know trade-in possibilities.
2. When a new device is being unboxed, the users see trade-in possibilities.
3. Before the purchase of a new mobile device, when the current device's performance is getting poorer, the user gets some actionable suggestions or notifications, such as a trade-in or other off-boarding possibilities.
4. When their devices' value depreciates, the users can trade them in to get the most value out of it.

Question: ***"One reason is that the off-boarding phase is not designed in connection with the other phases in the entire lifecyle, are there any other reasons?"***

Answer: Yes, there are some other reasons. Even though we all know that everything has a fixed lifespan, like family members and pets. That applies to mobile devices too. As human beings, we tend to deny death, and we ignore endings, consciously or subconsciously. This led to the existence of many articles, tutorials, courses and even designs that make it easier for people to face the reality of death and how to better cope with it.

However, there is a significant characteristic of our family members, friends and pets: they are unique; we cannot simply replace them with a new 'better performance' one, as we do in consumer products, particularly mobile devices. What we currently notice is that there is a fixed lifespan for mobile devices and that the companies are secretly doing planned obsolescence. These companies still want their customers to have a feeling of durability about their products.

Still, what if these mobile devices all of a sudden are broken or start being slow? Will the users be angry at the companies because these products are not as 'durable' as promised? Not exactly, the companies use some marketing and psychological strategies to convince possible consumers just to get a new, fancier device. More significantly, users can transfer all their data from the old device to the new device via the 'cloud'. How fantastic it is! Whose responsibility to care about the old ones then?

"Most human action is taken to ignore or avoid the inevitability of death."

Ernest Becker

AUTHOR TIP

Please take some time to reflect on this.

Now, dear reader, have a moment to question yourself please. Imagine you are instilled with the notion that your arm can easily be replaced by a new one with no side effects if it is cut by accident. Or the fact that you could get a new and smarter brain if your old one has Alzheimer. Would you even care about (off-board) the old ones after they get replaced by the new ones?

Back to the mobile device industry, the companies are not taking their responsibilities as much as they are supposed to. It is not optimistic to expect the users to take the initiative under the condition that the behaviour is not naturally aligned with human nature.

However, there are always exceptions. Even under these difficult circumstances, there are still people who wanted to off-board their EOU devices. Yet, the barriers in doing so are countless, as described in the previous sections. The user experience is not sufficient enough to attract them to do it again or even finish the current off-boarding activity, namely, trade-in the EOU device.

→ **Question:** ***"How should the Apple off-boarding experience be?"***

Answer: Apple should take responsibility more proactively. The current off-boarding experience is different from Apple's on-boarding and usage experience, which were reported to be positive by the users. Apple should provide a more consistent user experience in all phases, that is to say, the off-boarding experience should be more pleasant and in line with the other phases. From a business perspective, it is not a bad idea to cooperate with a third party (Brightstar) to provide a trade-in option to off board EOU devices. However, the user experience has to be positive and consistent with other Apple experiences. Nonetheless, it does not exist in the current situation.

RQ 7

What is the intended 'closure experience', namely, the trade-in experience?

→ **Question:** ***"To be more specific, how should a trade-in service be?"***

Answer: The result of the 'trade-in' service is a crucial building block for the CE, which has a positive impact on the environment. Therefore, better storytelling and more transparency are needed. By using the service, the users can have a feeling of contributing to the CE. In addition, the service itself and its touchpoints should be designed to be as much environmental-friendly as possible to fit its context.

The sequencing of the service should be better arranged. The rhythm of current trade-in service is irregular, it should be in a more sequential manner.

The tone of the current trade-in service is too dull, dominant, and boring. It should be supportive, caring and joyful like the on-boarding and usage phase.

It should be effortless, as simple as buying, as easy as using. Keep the essential steps but eliminated the unnecessary steps.

03
DEFINE

In this phase, the author analysed the findings and identified some design possibilities derived from the discovery phase. To better communicate the user research results, five personas and a customer journey map were created based on that. A design brief was made as the framework for the design and evaluation phases.

03
DEFINE

3.1 Personas **50**

3.2 Customer journey map **57**

3.3 Design opportunities **60**

3.4 A new design brief **61**

3.4.1 Design goal 61

3.4.2 Visions 62

3.4.3 Product qualities and guidelines 64

3.1 PERSONAS

Personas are archetypal representations of intended users, describing and visualising their behaviour, values and needs (Boeijen et al., 2014). In this project, the following five personas were created to get a better understanding of the users of the service to be designed. These personas also helped the author to keep in mind different needs to be fulfilled by the final design. Using 'emotional attachment with mobile phones' and 'circular behaviour' as two dimensions, the author categorised the five personas in the quadrant diagram below (Figure 3.1). The five personas are described individually in this section.

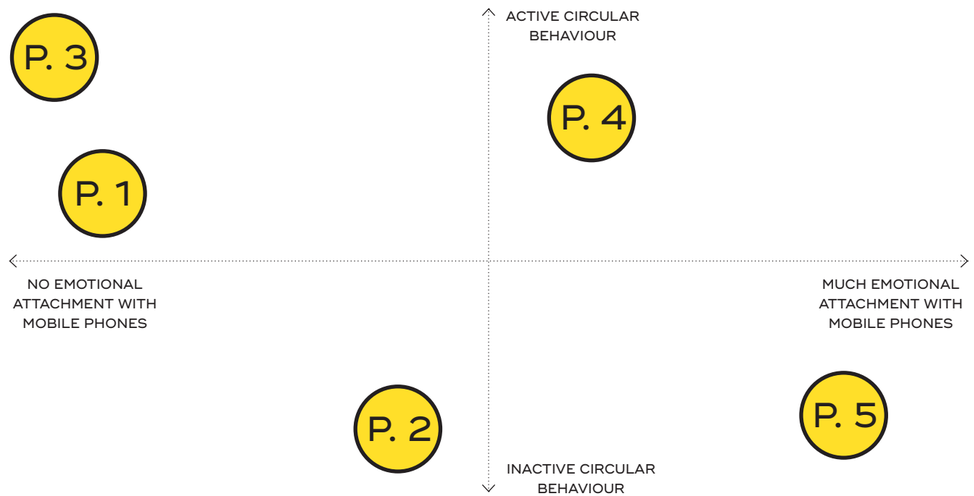
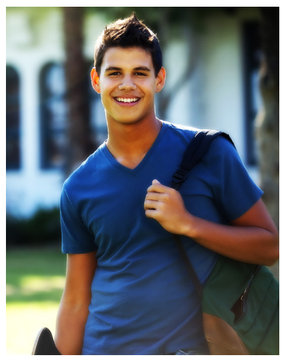


Figure 3.1 Persona quadrant diagram

P. 1 HANDYPERSON

Anderson | Android user | 25 years old | Delft



Brand loyalty:

Circular behaviour level:

Frequency of changing device:

Number of EOU phones: 5

Relation with mobile phones: practical and distant

Anderson is a student from TUDelft, and he gives electronic devices and clothes at kringloopwinkels for reuse. When it comes to mobile phones, he does not have a strong emotional attachment to his mobile phones. He had 5 Android phones from different brands. He sees his mobile phone only as an entertaining social device, what is inside the phone matters more. During his leisure time, Anderson likes to explore other features of Android phones, like rooting them.

When the phone's performance is lower than usual or has some hardware malfunctions, Anderson proactively takes some actions. He either sells the phone for reuse or fixes it. If repairing it does not work, he tries to trade it in. Sometimes, the mobile phone trade-in service does not take his phone because of various reasons. When buying a new device, Anderson prefers the online shop because it looks legitimate, and he compares different devices and prices.

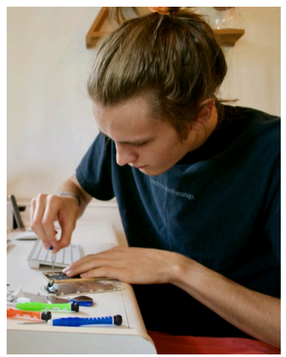
Quotes:

"Not anything special, as I said, for me the phone could be replaced by another one and at this point I don't care other than a few key features I want."

"Last time I tried (to trade in my phone), they didn't accept that particular phone, or they didn't want one that didn't fully function."

P. 2 GEEKER

Bob | Android user | 22 years old | Rotterdam



Brand loyalty:

Circular behaviour level:

Frequency of changing device:

Number of EOU phones: 3

Relation with mobile phones: pragmatic, dependent, unhealthy and playful

Bob lives in Rotterdam, and he rarely uses other recycling services. He sees his phone as nothing more than just a tool. He is a crazy Android fan, and let's say, he hates Apple devices because the closed ecosystem does not give him much space to play around. However, his newly bought Samsung Galaxy S6 enables him to make VR apps.

Bob is heavily dependent on his phone, and he sometimes senses the non-existing phone vibrations (Phantom Vibration Syndrome). When his Android phone gets slow, which is the main problem with the Android OS, Bob checks out new phones online or tries them out in shops like MediaMarkt. After he buys a new phone, he does not recycle or trade in the old phone. Alternatively, he keeps it and explores other possibilities with the components.

Quote:

"I rooted my Samsung phone in order to make use of NFC/ RFID communication as receivers for different frequencies, other parts such as my mini speaker for Spotify. I also converted them into home automation interfacing devices."

P. 3 PRAGMATIST

Eva | Apple user | 27 years old | Den Haag

Brand loyalty:

Circular behaviour level:

Frequency of changing device:

Number of EOU phones: 2

Relation with mobile phones: practical, functional and neutral

Eva lives in Den Haag. She cares about the environment, and she has used various recycling services. She quite enjoys doing so, namely, the feeling of accomplishment as well as the coupon she could get.

When it comes to mobile phones, Eva is a loyal customer of Apple. However, she does not experience a profound and unique relationship with it, mainly a practical and functional object for daily use.

When her phone broke, she approached different channels to make a comparison of the prices. Unlike some of her other belongings, Eva never recycled or traded in a mobile phone. Surprisingly, current recycling possibilities are not noticeable for her.

Quotes:

"I have a smartphone for practical reasons, the data inside gives meaning to it, nothing to do with the phone itself."

"I don't know where I can do the recycling, there is no shop nearby to do it, so I just forget about it."

P. 4 NORMAL USER

Antoni | Apple user | 28 years old | Amsterdam

Brand loyalty:

Circular behaviour level:

Frequency of changing device:

Number of EOU phones: 2

Relation with mobile phones: close, attached and replaceable

Antoni cares a lot about making the earth greener, so he recycles clothes, batteries, bottles and plastic. He feels happy about accomplishing a mission.

Antoni is attracted by the minimalistic design, consistency, and fluency of Apple devices. He treasures and takes good care of his phone, and relies on it like it was his assistant or right hand. When his phone gets broken or slows down, Antoni feels sad and emotional, but soon he accepts it, and he becomes careless and longing for a new phone.

As to the old phone, Antoni keeps it as a backup device in the drawer. He does not know if there is an existing recycling or trade-in service nor how it works. He also has some privacy concerns. On the question of getting a new phone, he uses online or physical shops. Either way, he always goes for an iPhone.

Quotes:

"I felt sorry, but rest in peace, my friend (phone)."

"I have no clue what to do with it, whether to keep it or dispose of it, recycle? I didn't really know I could do it and where to do it, and I have to make time to find it out."

P. 5

EMOTIONAL HOARDER

Alice | Apple user | 31 years old | Amsterdam

Brand loyalty:

Circular behaviour level:

Frequency of changing device:

Number of EOU phones: 3

Relation with mobile phones: addicted, symbiotic and mirrored

Alice likes Apple devices. When she opens the iPhone box, she immediately falls in crazy love with it. The unboxing moment of the iPhone is beautiful; it is like opening a photo book containing scenic pictures, she can instantly feel the emotional attachment with her phone.

She feels like her phone is her partner, her love and even her affair. Moreover, it is like her external body and another herself. She feels very frustrated and sad when she realised her phone was going to break down, and it is like a former partner, she has to say goodbye. She never sent her old phones back for recycling or trade-in because that contains her memories. She would rather keep them as a collection. As for other recycling services, Alice rarely uses them.

Quotes:

"Married couple, we like each other."

"My phone is like another me!"

"I never send it back, I like to collect devices. They used to be part of my life, I like to keep them with me."

3.2 CUSTOMER JOURNEY MAP

After synthesising the findings from the user research phase, the customer journey map was developed in the lens of target users. The map concluded their goals, interactions, thoughts, emotions and potential design opportunities. It can be read in chronological order from left to right.

Since 'trade-in' is the core of the project, the customer journey has two main stages, 'before trade-in' and 'trade-in' which can be further divided into steps of 'awareness', 'pre-purchase', 'purchase', 'after-purchase' 'trade-in preparation' and 'trade-in'.

Through a desktop walkthrough, imagine the five different personas are walking on the customer journey map.

P1 will be likely to get stuck at point A.

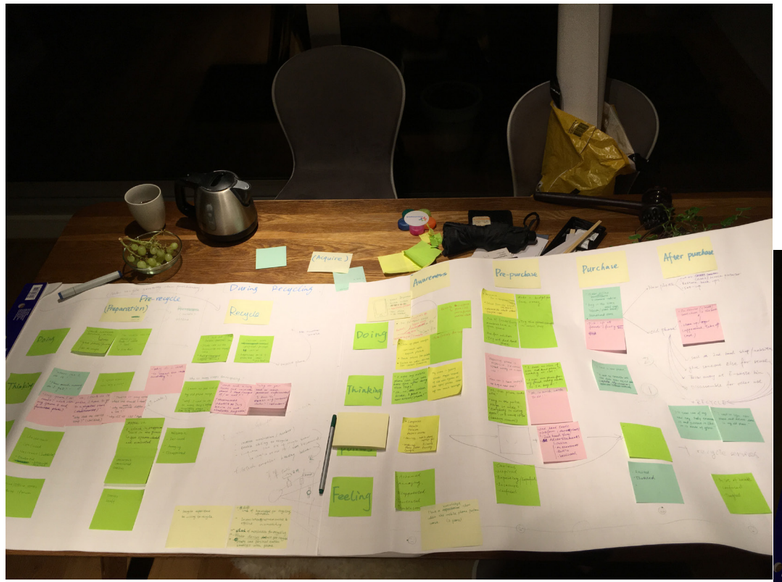
P2 will be likely to get stuck at point B.

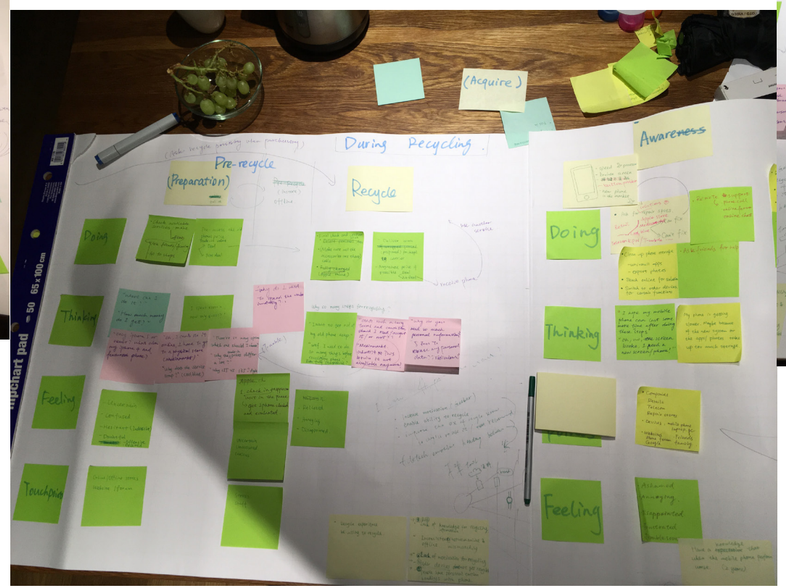
P3 will be likely to get stuck on point C.

P4 will be likely to get stuck at point D.

P5 will be likely to get stuck at point E.

This is in line with the trade-in service safari result (Section 2.2.5). The current customer journey is not smooth but rather problematic.


Pre-recycle
(Preparation)
Recycle
During Recycling
Awareness
Pre-purchase
Purchase
After purchase
Doing
Thinking
Feeling


(Acquire)
Pre-recycle
(Preparation)
During Recycling
Recycle
Awareness
Doing
Thinking
Feeling
Touchpoint


(Acquire)
Recycling
Awareness
Pre-purchase
Purchase
After purchase
Doing
Thinking
Feeling

3.3 DESIGN OPPORTUNITIES

Therefore, the design opportunities came up which lie in lifting up the lower points of the customer journey, aiming at helping the target user overcome the difficulties in finishing their tasks during a customer journey with a pleasant closure experience. They are:

- **Opportunity 1**. To create user awareness of the device's condition as well as other information that is relevant to the decision of trading in EOU devices, such as battery life and estimated lifespan.
- **Opportunity 2**. To increase the exposure of the service to the users who would like to trade in EOU devices but do not know the possibility.
- **Opportunity 3**. To make sure as many iPhone types as possible can be accepted and traded in so that people with old EOU devices are also the service users.
- **Opportunity 4**. To create a pleasant trade-in experience at the service touchpoints for those who trade in EOU devices.
- **Opportunity 5**. To motivate user type 2 (Persona 2, geeker) and user type 5 (Persona 5, emotional hoarder) to trade in their EOU devices.

Because of the limited project time span, a decision has to be made in order to find a focus for the project. After evaluating the listed opportunities with the supervisory team, the author optioned to go along with 'opportunity 1' and 'opportunity 4'.

Through 'opportunity 1', it is possible to start making people aware of their device condition and potential trade-in possibilities through the device itself, getting them emotionally ready to take the step and off board it. 'Opportunity 4' is to lower the trade-in barriers and make sure the experiences in the trade-in itself are smooth.

'Opportunity 2' and 'opportunity 3' are sub opportunities which could be explored while designing for opportunity 1 and 4. Thus, they were merged. Since user research shows that user type 2 (Persona 2) and user type 5 (Persona 5) are not the majority users, the touchpoints with these two type of users (Opportunity 5) were left out of the project scope.

3.4 A NEW DESIGN BRIEF

The objective of the design brief is to have a clear starting point for the next development phase. It is made up of three parts, the design goal, visions and physical product qualities.

3.4.1 Design goal

The main problem derived from the research phase is:

Apple does not have an official in-house trade-in service for its users so to provide them with an off-boarding experience that is consistent with its on-boarding and usage experiences.

This leads to some sub problems such as the current trade-in services that are not known and trusted by the users and results in the rather lousy user experiences as it is discussed in previous sections. Thus, the goal of the new design is:

To create an effortless iPhone trade-in service within Apple ecosystem so as to enable iPhone users to have a consistent Apple experience at off-boarding phase. As a result, the users will effectively return their EOU devices to close the loop for the CE.

3.4.2 Visions

While conducting this project, the author developed a few visions at different layers. The first layer is about people's behaviours and awareness towards consumerism from a broader perspective. In a contemporary society, influenced by the 'buy more', 'buy new things' slogans as seen in advertisements, we tend to ignore the ending as an important part of the consumption. The author strongly thinks that there should be a mindset change if we need to transform the economic model into a CE effectively. Therefore, the author's vision of product consumption is:

The take-back phase should not be isolated to other phases, take-back should be a part of consumption, which means that take-back and usage should be connected more tightly and people should have a subconscious awareness to take things back while using, or even during buying.

One layer deeper, in the mobile phone industry, companies spend years on building their brand images in which durability is a crucial keyword. However, planned obsolescence is still secretly being conducted. The latest example is the Apple battery and throttling scandal. As a matter of fact, each mobile device has a fixed lifespan from purchase to the moment it loses its functionality. The author believes that mobile phone companies should:

Proactively share and acknowledge endings with the consumers, and be more transparent about the product lifespan and ending information.

Since mobile phone companies have rich information about their devices and consumers, another layer deeper into the trade-in service, the author thinks that in the future,

The trade-in possibility should not be passively provided to the consumers only after the device is considered 'EOU' by them. Trade-in and usage should be intertwined. The trade-in intervention can be one step upfront on the condition that it does not give the consumers a negative feeling.

Meanwhile, an interaction vision was developed to define what the design should act, and it serves as the guideline for the ideation and design phase. The interaction with a trade-in service should feel like:

"Tapping down a series of delicate dominoes pre-constructed by other people."

It is **SUPPORTIVE** because all the dominoes were already placed in the right sequence beforehand.

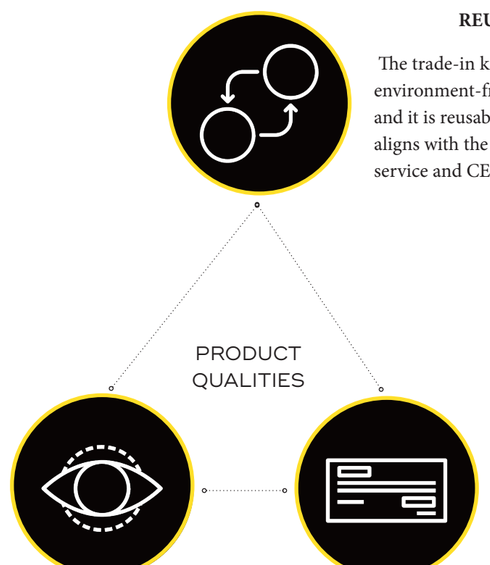
It is **EFFORTLESS**, merely tapping into the first domino with one finger is needed to make the rest happen.

It is **SEAMLESS** because that is how dominoes are placed, at a steady distance from each other and a constant falling pace, just like the service sequencing.

After the first domino is tapped on, the person might feel somehow nervous during the process, yet is **CONFIDENT** that the result will just be as expected.

3.4.3 Physical product qualities and guidelines

The physical product of this project is the trade-in kit. It is a kit sent by the service provider containing some instructions, a pre-paid return postage label and a box to put in the EOU iPhone safely. It's designed for the users to send their trade-in iPhone back to the service provider. By analysing the 'kits' from Apple, Ziggo, Ace & Tate, the author summarised three product qualities and a few design guidelines.



REUSABLE

The trade-in kit will be made of environment-friendly materials, and it is reusable. Therefore, it aligns with the context of trade-in service and CE.

CLEAR

The use cues should be clear enough to avoid confusion.

CLEAN

In order to give the users a consistent Apple experience, the trade-in kit should have a clean Apple look, like other Apple products and packages.

Design guidelines:

- The size should be between 38 x 26.5 x 3.2 cm (length x width x height) and 14 x 9 cm with a maximum weight of 2 kg to fit into the letterbox (https://www.postnl.com/mail/mail-delivery-netherlands/letterbox-sized-packet/). This means the trade-in kit can be conveniently delivered to the target users' letterbox.
- No extra exterior package or envelope is needed for this trade-in kit. Material-wise, it reduces material usage. Experience-wise, this extra step and opening a package to get another empty trade-in kit do not contribute to enhancing the experience.
- When an Apple product box is being opened vertically, the first thing you see is the Apple device. This unboxing moment was designed by Apple to amaze its users. However, there is no Apple product pre-placed in a trade-in kit when the users receive it. Therefore, the same interaction should not be used in the off-boarding phase, namely, on the design of the trade-in kit to avoid the possibilities that the service users associate it with the unboxing moment at on-boarding phase.
- 'Putting the EOU iPhone in the kit' interaction can be similar to some disposal or inserting interactions such as postbox, garbage bin and coin box so that the target users can associate the use cues with it.
- The trade-in kit will be designed to be reused. Hence, some unchangeable elements (the trade-in kit instruction) should be permanent on the box itself instead of giving an extra piece of paper along each time with the trade-in kit.

04
DEVELOP

The author started to generate ideas for the final concept based on the research results and the design brief. The concept development started with a co-creation and self-ideation sessions; afterwards, several iterations were made, based on the feedback gained from the preliminary evaluation with the supervisory team and intermediate evaluation with the target users. The final concept was developed at the end of this phase.

04
DEVELOP

4.1 Ideation 68

4.1.1 Co-creation on the service 69

4.1.2 Self-ideation on the trade-in kit 69

4.2 Preliminary concepts 70

4.3 Preliminary evaluations with the supervisory team 70

4.4 Intermediate concept 71

4.4.1 Trade-in service 70

4.4.2 Trade-in kit 70

4.5 Intermediate evaluation with target users 70

4.6 Iteration based on the intermediate evaluation results 70

4.7 Final evaluation 70

4.1 IDEATION

After exploring the current situation and defining the desired design effects, it is time to start designing. The first step was ideation. In service design, ideas represent one point or usually several points in an evolutionary process (Stickdorn, Hormess, Lawrence & Schneider, 2018). In this project, several touchpoints identified from the previous phase were selected as the 'points' to ideate.

4.1.1 Co-creation on the service

Approach

To generate ideas in a diverging way on the 'trade-in' service, 'co-creation' was selected as the main method, which incorporates brainstorming and brainwriting. Five participants joined this session including the author himself. Besides coming up with ideas just like other participants, the author was also the moderator of the session. The detailed timetable and schedule of the session is in Appendix C.

COMMENT

Postphoned is a company in the Netherlands that collects used mobile phones.

Participants

Ferhat, from Postphoned.

Arvin, from Postphoned.

Jingwei, the author, design for interaction master student.

Bob, artisan and UX designer.

Natalie, industrial designer at Accenture.

Structure of the session

Pre-ideation

The author posed a statement of the current situation which is:

"Used phones mostly stay in the drawer but not in the recycle loop".

The other participants were then asked to brainstorm the possible reasons around the statement verbally, the author (moderator) wrote down all of them, and eventually, all participants voted for the top 5 reasons. Furthermore, the author (moderator) presented some key findings gained from the research phase to the participants. The pre-ideation part was done to immerse the participants in the context of the challenges. It also helps them find a mutual starting point, get to grips with the theme and put everybody 'on the same page', as well as boosting them to get more creative.

Idea generation

The following 6 how-to questions were formulated within the selected design opportunities (section 3.3), each participant picked a random question and started brainwriting ideas around it. The participants were also asked to apply the idea of 'criminal content' while doing brainwriting. The goal was to generate as many ideas as possible by writing or drawing on paper, go 'wild' and go for quantity.

Six how to questions:

How to create the awareness of recycling (trade-in) in general?

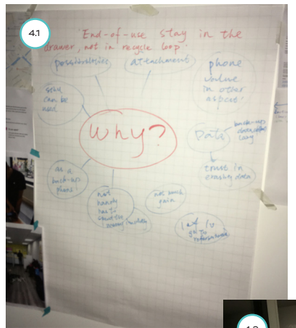
How to make the recycling (trade-in) effortless?

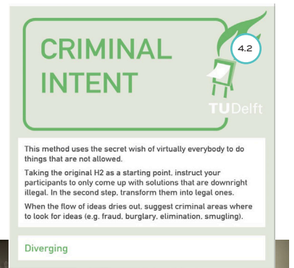
How to build up the trust in a recycle (trade-in) service?

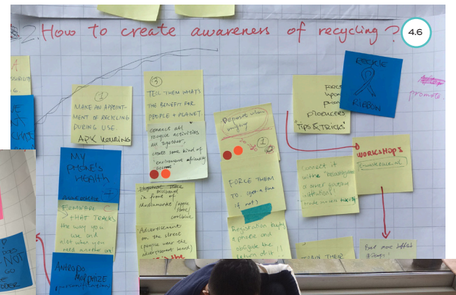
Recycle (trade-in) mobile phone is a low-frequency activity, how to make this service more frequently used by people?

Old phones have little value for refurbishment, how to attract these phone users to use the service?

How to make people recycle (trade in) their mobile phones earlier?







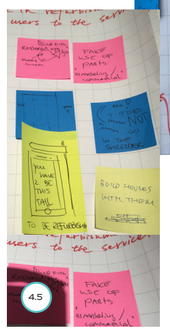


Figure 4.1 Pre-ideation brainstorm sheet

Figure 4.2 Criminal content method

Figure 4.3 Individual brainwriting by the participants

Figure 4.4 The participants were building upon others' ideas

Figure 4.5 Some idea examples

Figure 4.6 One idea sheet after voting

Figure 4.7 Ideas are being clustered by the author

Figure 4.8 The sheet of clustered idea stickers

Adding depth and diversity

Each participant was asked to work on one how-to question for five minutes on a given sheet with sticker notes. The participants were then asked to swap their sheets between each other, which allowed them to come up with ideas of the new question and build upon previous ideas from other participants. (Figure 4.4).

Idea selection and clustering

Thirty minutes timed up, the participants were asked to explain their ideas after they had all worked on six different how-to questions. All participants then worked together to cluster the ideas. The last task of the session was to vote for the five best ideas with given sticker dots. The ideas which are closer to the centre are the more relevant ones. (Figure 4.8).

4.1.2 Self-ideation on the physical product

Recap from section 3.4.3:

Product qualities: clean, clear and reusable

Design guidelines:

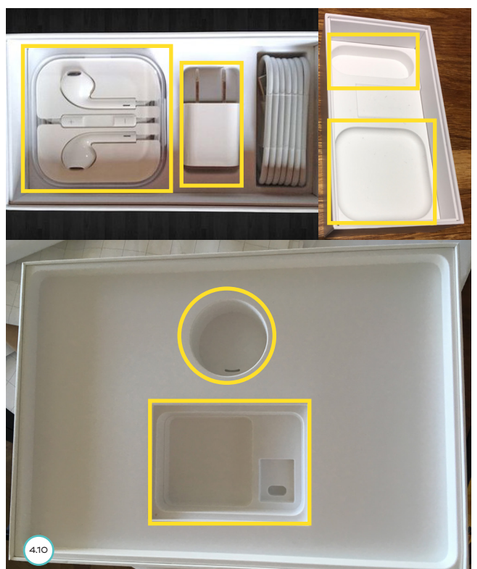
- The size should be between 38 x 26.5 x 3.2 cm (length x width x height) and 14 x 9 cm with a maximum weight of 2 kg to fit into the letterbox (https://www.postnl.com/mail/mail-delivery-netherlands/letterbox-sized-packet/). This means the trade-in kit can be conveniently delivered to the target users' letterbox.
- No extra exterior package or envelope is needed for this 'trade-in kit'. Material-wise, it reduces material usage. Experience-wise, this extra step and opening a package to get another empty 'trade-in kit' do not contribute in enhancing the experience.
- When an Apple product box is being opened vertically, the first thing you see is the Apple device. This unboxing moment was designed by Apple to amaze its users. However, there is no Apple product pre-placed in a trade-in kit when the users receive it. Therefore, the same interaction should not be used in the off-boarding phase, namely, on the design of the trade-in kit to avoid the possibilities that the service users associate it with the unboxing moment at on-boarding phase.
- 'Putting the EOU iPhone in the kit' interaction can be similar to some disposal or inserting interactions such as postbox, garbage bin and coin box, so that the target users can associate the use cues with it.
- The 'trade-in' kit will be designed to be reused, hence, some unchangeable elements (the trade-in kit instruction) should be permanent on the box itself instead of giving an extra piece of paper along each time with the 'trade-in kit'.

Based on the product qualities and design guidelines that were defined at the earlier phase, the author did some exploration on the physical product design.

Figure 4.9 is a collage of inspirational images. These products contain the inserting or disposal interaction, which is used in the design of the physical product.

Figure 4.10 shows some examples of Apple packages, in order to provide a consistent Apple feeling, some elements of the form were borrowed, such as the groove to store accessories. The author used the same form language in the physical product.

Using these images as inspirations, the author did some sketching explorations as figure 4.11 shows



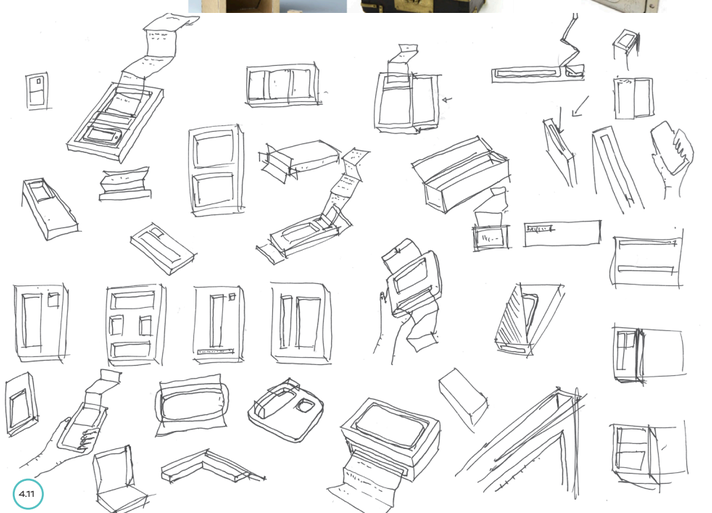


Figure 4.9 A collage of inspirational images

Figure 4.10 The grooves to place accessories in Apple boxes

Figure 4.11 Sketching exploration of the form and interaction

4.2 PRELIMINARY CONCEPT OF THE SERVICE

After the co-creation session, the preliminary concept of the service was developed independently by the author. The selected touchpoint of the service is 'iPhone app', simply because compared to the desktop websites, apps are more seamlessly connected with the iPhone usage phase. The preliminary concept has a few building blocks including 'communication', 'self device check-up and timely suggestion', 'actual trade-in' and 'credit system'. These building blocks are explained with short explanations, as well as storyboards and interface screens.

Communication between the service provider and service users

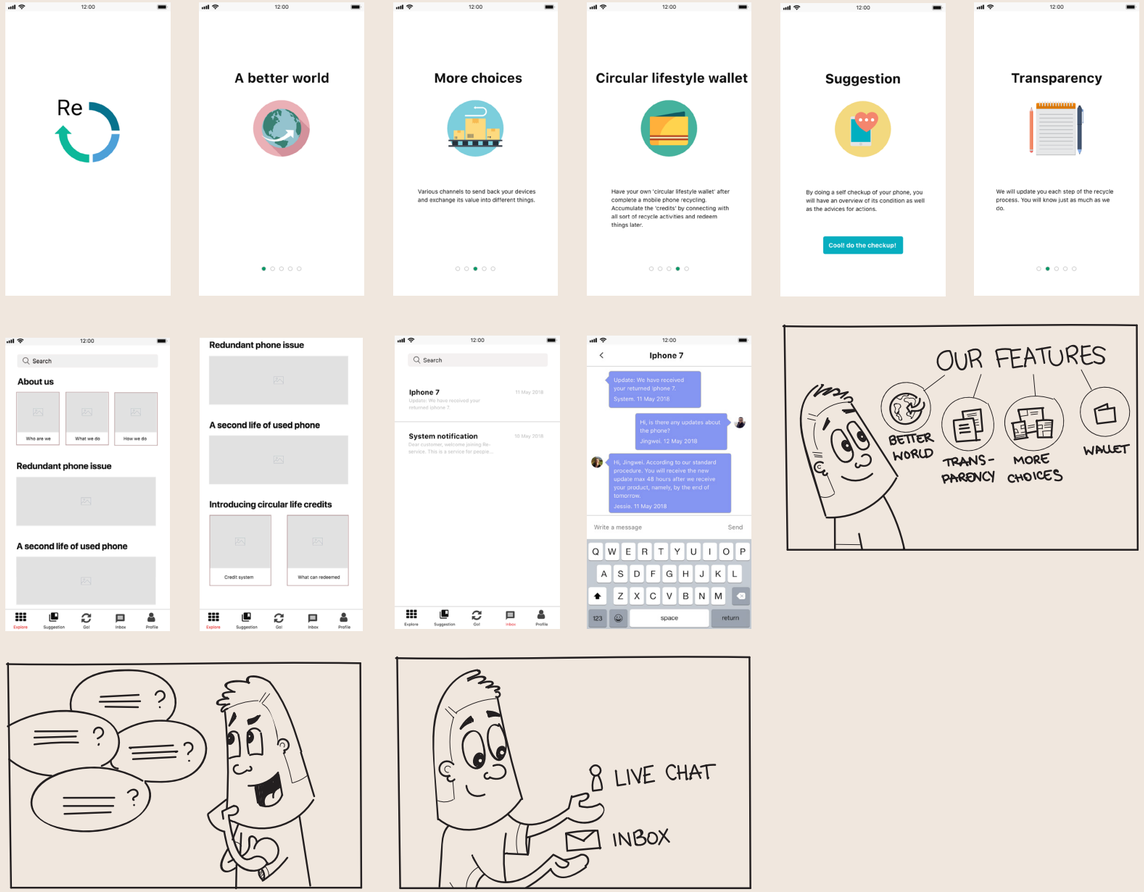
Lack of transparency and communication is one major issue detected in the user research which has two different layers. One layer is the communication between service providers and users about the service values and feature. For instance, the users may have questions such as "how severe is the EOU mobile device issue?", 'Where do they take my phone and how do they recycle it?" "Do they do it in an environmentally friendly way?" Knowing the answers to these questions will create more trust. From the service provider's perspective, it serves a function of storytelling and better onboard users to this service.

The other layer of communication is when users have practical questions towards using the service itself. As many other customer services do, a real chat function will be in the concept.

> The users can track their trade-in process in 'inbox'. When users have practical questions towards using the service and trade-in itself, they can have a live chat with the service

The users will have an idea of the main functionalities and features of the service after four welcome pages.

What's behind the scenes can be found here, a more transparent service.



4.3 PRELIMINARY EVALUATION OF THE SERVICE WITH SUPERVISORY TEAM

With the preliminary concept developed, several evaluations with the supervisory team as well as the PhD student, Flora Poppelaars were conducted during a few regular and additional graduation meetings.

Mockingbot.

The prototype for these evaluations were created at medium fidelity in the balance of project timespan and intended evaluation effect. Therefore the interactions and experiences of the service could be tested during the evaluations, while the fidelity level of the prototype should not have noticeable negative effects on the evaluation. During the evaluation sessions, the author presented the concept by clicking on the digital prototype following the scenarios in storyboards (section 4.2).

Some discussions were done during the evaluation sessions when the concept was unclear or confusing. The sessions were audio recorded, these audio records were relistened, analysed, and categorized as the follow key feedbacks.

COMMENT

Mockingbot is a simple drag and drop tool to make clickable prototypes.

Aim

This evaluation aimed to see if the concept direction is on the right track, as in if it is in line with the design brief and reflect the research insights. It also aimed at checking the viability and feasibility of the service and the usability of the digital app which is designed to be the main touchpoint of the service. The feedback gained from this evaluation were used as primary inputs for iterating the concept into an intermediate concept.

Approach

Evolved from the ideas selected at the co-creation session (section 4.1.1). The building blocks of the preliminary service concept described in section 4.2 were firstly made into some paper wireframes (Figure 4.16) , and later they were prototyped in the form of interactive click-model using

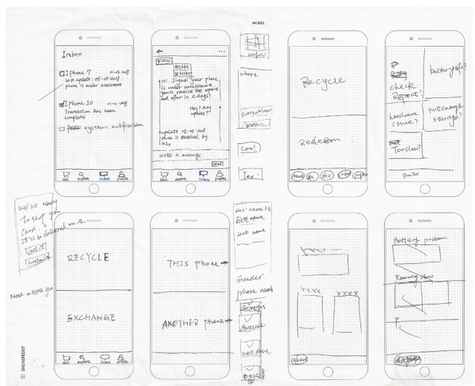


Figure 4.16 Paper wireframe examples

> "As a designer, you have a whole system in your head but people will be like, I have no idea what you are talking about, so keep it simple, simple and simple."
> Conny at an evaluation meeting

KEY FEEDBACKS

In general, the preliminary concept has some good elements, such as 'the best timing to trade-in current iPhone' is a good intervention from the users' perspective since then the trade-in timing is not limited to the moment after EOU. The idea to use images at appearance condition check step is also better than using texts, less confusing.

However, the evaluation was more for detecting the concept flaws. The feedbacks were clustered into the following seven areas in which the preliminary concept needs to be iterated on towards an intermediate concept which has a better user experience. They are:

01 Some wording need to be taken care to not cause confusion to better convey service features and functionalities, such as 'recycle', 'trade-in'.

02 One question to consider is: Is the designed app to be a third party one or an Apple one? If it's a third-party one, giving the device check-up information during trade-in to another party will have a risk of information leakage. Experience-wise, the users will have a trust issue.

03 The more automated, the better. Keep challenging yourself to see what can be skipped.

04 Keep simplified the process. The self check-up function can still be more functional so to decrease the manual check steps. The app should be able to automatically check more things.

05 The credit system is nice to give the users more choices, however, the XP system is too complicated.

06 The anxiety many people have towards losing data and privacy when trade-in their devices, a better way to cope with data loss and data safety should be incorporated in the concept.

07 There are many old iPhone in the drawer, and they may be broken, or do not support the latest iOS system to install this trade-in app, how to trade-in these devices with the designed service?

4.4 INTERMEDIATE CONCEPT

The intermediate concept of the trade-in service has two parts. A digital app called iTrade in and an additional physical trade-in kit.

4.4.1 Trade-in service and iTrade in app

Fully taken the feedbacks regarding trade-in service from the supervisory team evaluation sessions into account as well as using the author's own creativity. The author developed an intermediate concept of the trade-in service. The digital touchpoint remains to be an App. The intermediate concept aimed at making the trade-in more effortless.

The following contents depict how the feedbacks were tackled, resulting in lighter but more concrete and stronger building blocks of the concept.

FEEDBACK 1

The wording needs to be taken care of not to cause confusion to better convey service features and functionalities, such as 'recycle', 'trade-in'.

- Some texts in the app were improvied to keep a consistent and accurate word usage.

  Another iteration is the name of the service as well as the app. It evolved from 'iRecycle' to 'iCircular' to 'iTrade in.' 'Recycle' is a limited and misleading name for the users because the collected phones have other endings than being recycled, and 'iCircular' is too terminological, not a well-known term for normal users.

  'iTrade in' has a letter 'i' which keeps the consistency with other Apple product names such as 'iTunes', 'iMovie' and 'iBooks'. It also indicates as 'I want to trade in...'. Moreover, 'tradein' reflects the core activity of the service itself, which is 'TRADE in EOU iPhone and get its value in other forms'.

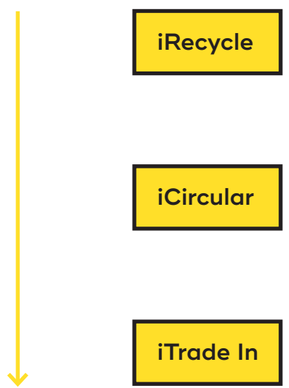


Figure 4.17 Iterations of theservice and app name

FEEDBACK 2

One question to consider is: Is the designed app to be a third party one or an Apple one? If it's a third-party one, giving the device check-up information during trade-in to another party will have a risk of information leakage. Experience-wise, the users will have a trust issue.

- In the intermediate concept, the author decided that for creating a better user experience, the trade-in service should be provided by Apple itself instead of a collaborated third-party service provider, that is to say, the iTrade in app should be official Apple app. At the moment, the users need to download it from AppStore (Figure 4.18), but iTrade in app will be integrated in the next published iOS update and pre-installed in the future produces iPhone like other Apple apps (Figure 4.20).

  With the rich hardware information and permissions that an Apple app could get. As figure 4.21 shows, this app will be able to check all hardware conditions automatically, diagnose potential defects and give the user a timely notification, which means all the manual 'self check-up' steps described in figure 4.13 are not needed anymore.

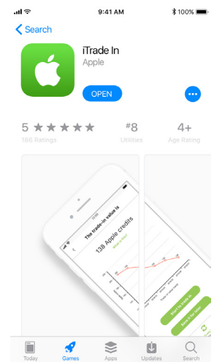


Figure 4.19 ITrade in app in the App store

Figure 4.18 ITrade in app logo

Figure 4.20 ITrade in app pre-installed in the iOS update and new iPhones

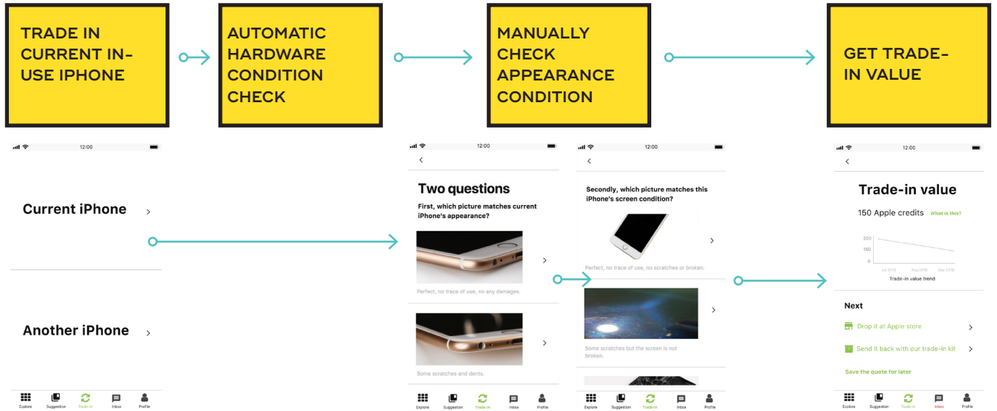


Figure 4.21 Simplified check-up process

FEEDBACK 3

The wording needs to be taken care of not to cause confusion to better convey service features and functionalities, such as 'recycle', 'trade-in'.

FEEDBACK 4

Keep simplified the process. The self checkup function can still be more functional so to decrease the manual check steps. The app should be able to automatically check more things.

As an answer to feedback 3 and 4, these improvements significantly simplify the trade-in phase, make it more automated. Nevertheless, due to current technical feasibilities, the conditions of the back, case and screen parts still require a manual check, and it is the only check step the users have to do before getting a trade-in quote. However, there is a potential that these steps could also be cut down partially or entirely in the future.

One example is that Apple has developed a patent to check if there are scratches on the screen (Figure 4.22). Imagine a similar patent for case/back scratch check.

Another benefit to make it an official Apple app is that by linking to the logged in iCloud account, it will eliminate all the registration and verification steps described in user research finding section, in a word, a more simple and trustworthy experience.

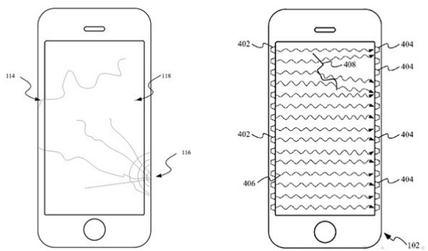


Figure 4.22 Apple patent allows the iPhone to detect screen scratches

FEEDBACK 5

The credit system is nice, however the XP system is too complicated.

The author decided to leave the XP system out of the intermediate concept because it may cause confusions to the users. However, comparing to the preliminary concept, the credit system in the intermediate concept has much more possibilities as the trade-in app is going to be an official Apple app, which has a better integration with other Apple services in Apple ecosystem. That is to say, the credits gained from trading in iPhone can be used at all Apple services, this will create a closed looped and seamless user experience as Apple always envisions.

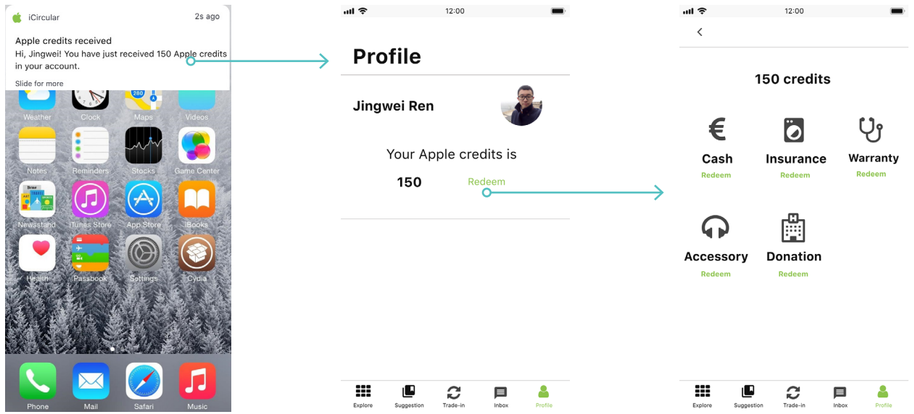


Figure 4.23 Screens of the obtain and redeem credits

Leave the door collection option out of the concept

One more decision made in the intermediate concept is that comparing to the preliminary concept in which the users have three ways to return the EOU devices, namely, 'door collect', 'drop it at Apple' 'send it back with our kit'. The 'door collect' option will not be further considered in this project scope.

If a third party does the door collection, for instance, DHL, UPS or other collection companies. There are too many uncontrollable uncertainties from the logistic companies that may lead to a bad experience and impression towards the trade-in service itself, such as postman being late/now showing up, long waiting time, etc.

However, the door collection can also be done by Apple itself. Then a whole service system needs to be created and verified which won't be realistic in terms of completion within the graduation project timespan. The author just did not choose this direction to continue working. However, it is strongly advised to conduct research and design in this direction.

Figure 4.24 One less return channels

FEEDBACK 6

The anxiety many people have towards losing data and privacy when trade-in their devices, a better way to cope with data loss and data safety should be incorporated in the concept.

The data backup and erase step is incorporated in the intermediate concept. It is a step before the users bring their devices to Apple store or send them back with trade-in kit. The users can finish the data backup on their iPhone and safely erase the data with the instructions in the app. They could also bring their iPhones to Apple store if they encounter difficulties at this step, which connects the offline touch point of the service, Apple store.

The 'Goodbye' screen is designed to create a counterpoint to the 'Hello' screen (Figure 4.25) of the on-boarding phase, as well as a feeling of completion.

Figure 4.25 The hello screen on current iPhones

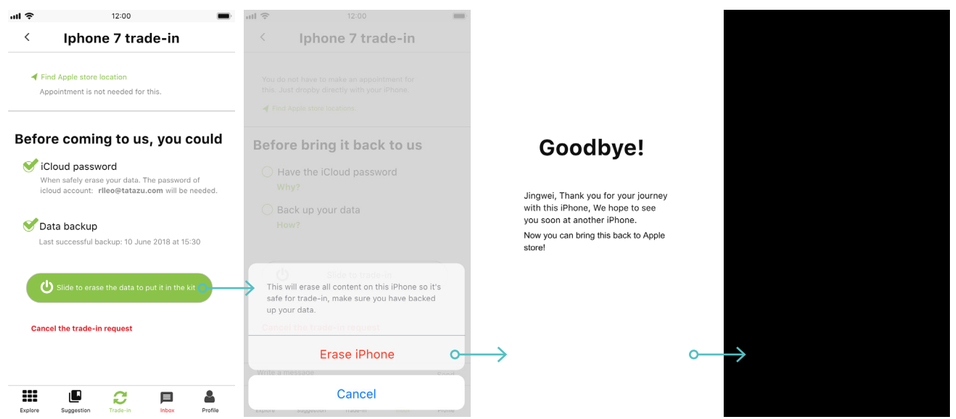


Figure 4.26 Data backup, data erase and goodbye screens

FEEDBACK 7

There are many old iPhone in the drawer, and they may be broken, or do not support the latest iOS system to install this trade-in App, how to trade-in these devices with the designed service?

When the users click the 'trade-in' button on the navigation bar. There will be an option to 'trade-in' another iPhone. The question may already arise, 'How to check another iPhone's condition with this iPhone then so to have a trade-in value?"

The solution is to use 'image identification technology'. After selecting 'another iPhone'. The users will be asked to hold the EOU device in front of the back camera following some on-screen instructions. Step one is to show the backside, and step two is to show the front side with the screen on if it is still functioning (Figure 4.28). Apple will be able to get the practical information they need from the images and the IC or IMEI number identified from the back (Figure 4.25) , and the different appearance looks. Apple could also check its appearance conditions by the 'image identification technology.'

Eventually, a trade-in value could be calculated, the following steps is as same as trading-in current iPhone

As it is described in previous sections, the tradein app will be a pre-installed App in future iPhone. And the future trade-in will be like:

"The trade-in possibility should not be passively provided to the consumers only after the device is considered 'EOU' by them. 'Trade-in' and 'usage' should be intertwined. The trade-in intervention can be one step upfront on the premise that it doesn't give the consumers a negative feeling. "

Therefore, this 'trade in another iPhone' function is just a temporary solution at this transitory stage to collect old EOU iPhone. It will no longer exist in the service in the long term.

Figure 4.25 iPhone6 backside

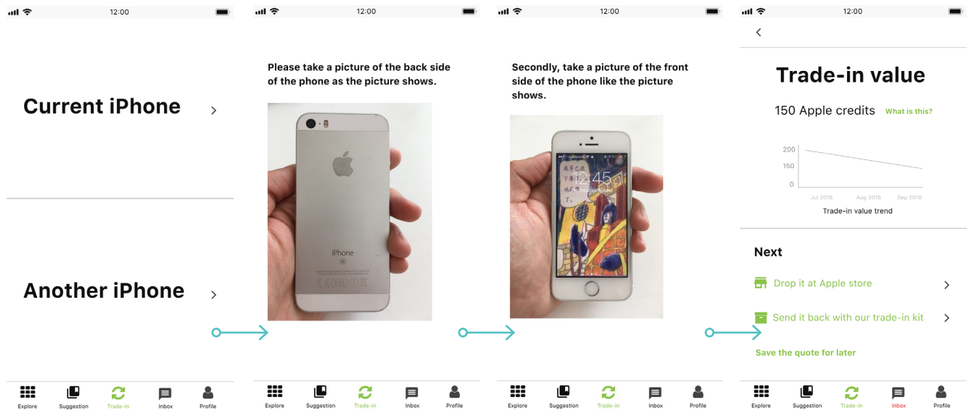


Figure 4.26 Trade in another iPhone screens

Figure 4.26 Trade in another iPhone screens

4.4.1 Trade-in kit

In order to create a complete customer journey for target service users, the author decided to incorporate the physical touchpoint to this project, which is the trade-in kit.

A trade-in kit is a physical object that the user receives for sending their EOU device back to Apple. It is designed to be reused. With clear use cues, and minimal material use. The figure below shows an example of the flow of one trade-in kit

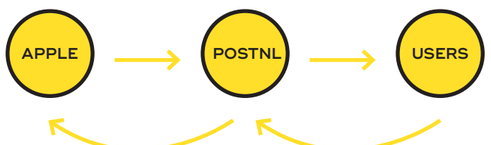


Figure 4.XX Apple patent allows the iPhone to detect screen scratches

The size of the trade-in kit is XX*XX*XX . The trade-in externally fits in the letterbox package requirement (section 3.4.3), which means the users don't need to wait at home to sign the receipt for the package. Internally, it fits all iPhone types (from iPhone 4 to iPhone X).

After selected the ideas from the self-ideation session (section 4.1.2), the author was able to make a prototype of the concept with cardboard and sticker paper at a medium fidelity level so to test the desired interactions during the intermediate evaluation (section 4.5). The concept is explained with a storyboard and screenshots from a video that was taken for communicating the concept design with the supervisory team.

https://vimeo.com/276325076

4.5 INTERMEDIATE EVALUATION WITH TARGET USERS

After the preliminary concept was developed, an intermediate evaluation with five participant were conducted in order to get opinions from the perspectives of the target users.

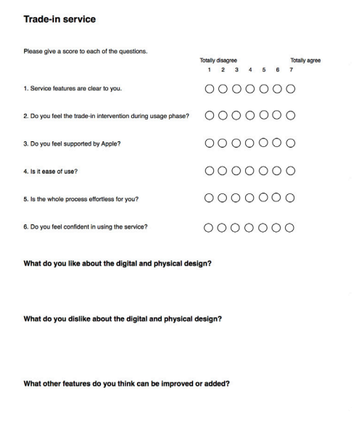
Aim

This evaluation aimed to evaluate how do target users experience the service and to test the usability of the iTrade in app as well as the trade-in kit.

Approach

Five people recruited from the online questionnaire participated in this user evaluation. Each evaluation lasts about 45 minutes, including a short introduction of the project and evaluating of the concept. The participants were asked to perform the scenarios of the concept prepared by the author and think aloud meanwhile. The evaluation was both video and audio recorded. The camera behind the participants was used to capture close-up videos of participants clicking on the screen for the analysis later on if it's needed.. The author took the notes when the participants had questions and confusions so he could ask about it during the chat later.

After that, the participants were asked to evaluate the concepts on the scale and open questions on the evaluation forms. The evaluation form (Figure XX) used a 7-point scale, and the filled-in forms can be found in Appendix D. The evaluation ended up with a chat between author and participant about relevant comments on the concept and the three open questions.



Trade-in service

Please give a score to each of the questions.

	Totally disagree 1	2	3	4	5	6	Totally agree 7
1. Service features are clear to you.	○	○	○	○	○	○	○
2. Do you feel the trade-in intervention during usage phase?	○	○	○	○	○	○	○
3. Do you feel supported by Apple?	○	○	○	○	○	○	○
4. Is it ease of use?	○	○	○	○	○	○	○
5. Is the whole process effortless for you?	○	○	○	○	○	○	○
6. Do you feel confident in using the service?	○	○	○	○	○	○	○

What do you like about the digital and physical design?

What do you dislike about the digital and physical design?

What other features do you think can be improved or added?

05
DELIVER

This chapter demonstrates the final design of the service Apple TradeIn, by explaining its service features and added value to other stakeholders. It also explains the digital and physical products, service touchpoints and the usage scenario. The technical feasibility to implement the service in the short-term was also discussed. In the end, some recommendations were made for further research and design exploration.

05
DELIVERY

5.1 Service features **68**

5.2 Service values 69

5.3 Final design 69

5.3.1 Service blueprint **70**

5.3.2 Service touchpoints **70**

5.3.3 Usage scenario **71**

5.3.4 iTrade-in app 70

5.3.5 Trade-in kit 70

5.4 Technical feasibility .....

5.5 Conclusion **70**

5.6 Recommendation **70**

70

5.1 SERVICE FEATURES

The design activities in the previous chapters led to the final concept. The concept called Apple TradeIn is an official trade-in service provided by Apple.

The concept Apple TradeIn consists of a mobile app called iTrade In as well as a physical trade-in kit provided by Apple when the service users would like to send back their devices to Apple.

The goal of Apple TradeIn is to create a pleasant off-boarding experience to iPhone users so as to have a consistent Apple experience at all lifecycle phases, namely, the on-boarding phase, the usage phase and the off-boarding phase. As a result, the iPhone users will effectively trade in their EOU iPhones.

The service features are summarised below.

01

Supportive and safe

Based on the iPhone conditions, Apple can provide the service users with timely suggestions including the trade-in option, and help them in finding the best trade-in timing. Since it is an official service provided by Apple, the data safety and privacy are ensured.

02

Effortless, as easy as buying

By adopting approaches such as an automated hardware self-check and image recognition in the iTrade In app, as well as other clear instructions in both iTrade In app and trade-in kit, the service could create an effortless feeling to the users, just like buying a new iPhone from Apple.

03

Omnichannel, more options, seamlessly connected

From online to offline, the service gives a seamless connection. Besides, the Apple credits gained from trading in iPhone can be used to redeem more things than cash only, the Apple credit system is a bridge to seamlessly connect all Apple services to keep the service users within the Apple ecosystem.

04

Transparent and confident

The service is transparent to the service users about the trade-in process and the relevant procedures by giving them more information. Providing the service users with the information as well as other essential feedbacks and explanations in the trade-in ensure them to be confident in using the service.

5.2 SERVICE VALUES

The implementation of the Apple TradeIn service would create added values for various stakeholders in different forms. Here is a brief analysis of the service values.

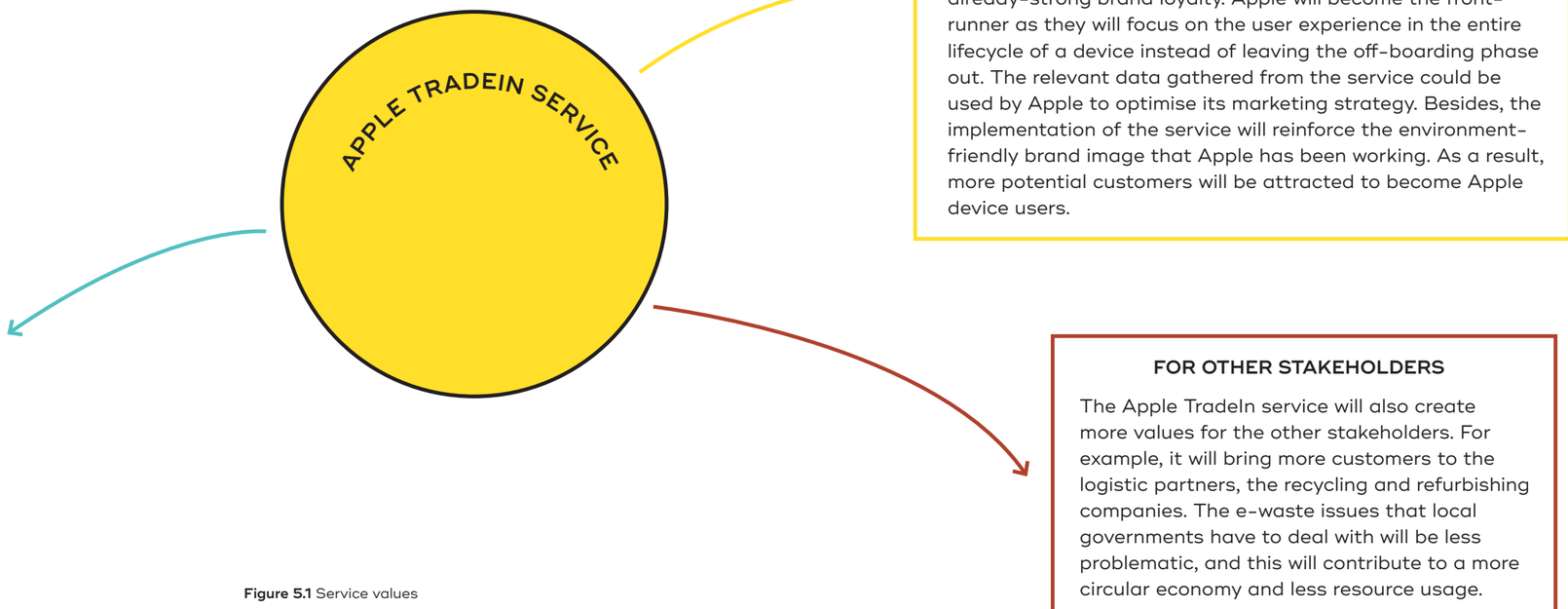
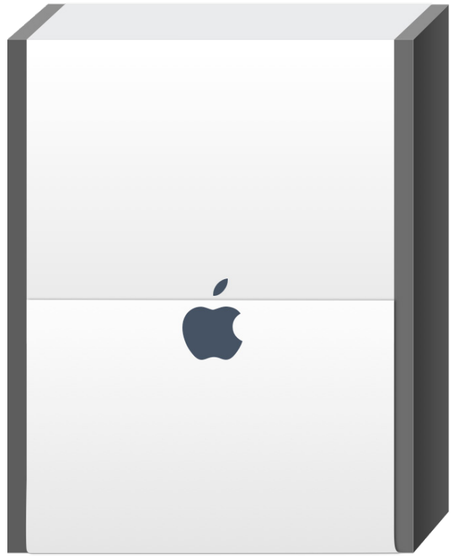


Figure 5.1 Service values

5.3 FINAL DESIGN



5.4 TECHNICAL FEASIBILITY

Technology is the backbone of innovation. It is crucial to take the technical feasibilities into consideration while delivering the service design. However, as it might come across after reading the previous chapters, Apple TradeIn is not a service that aims at providing a pleasant user experience through the use of high technologies.

As for the digital part of the concept, namely, the iTrade In app, there will not be any technical barriers in both the frontend and the backend, since similar technologies have been used in other Apple apps. For example, the remote diagnostics technology adopted in checking the current in-use iPhone condition is already used by Apple in checking devices' condition at Apple store or remotely.

Besides, using the camera to check another iPhone's condition only requires image and video recognition technology, that is to say, it is technically feasible as the FaceID technology used on iPhone X even requires biometric recognition. Besides, the image recognition technology has already been incorporated in some mobile apps.

Another potential technical barrier would be finding the reusable and environment-friendly material for the trade-in kit. However, it can be found from the Apple environmental responsibility report and Apple's paper and packaging strategy report that Apple is cutting the plastic usage in packaging, and aiming at using only recycled or renewable materials (Figure 5XX). With the work Apple has already done, the author believes that there won't be any technical barrier for the trade-in kit.

In conclusion, all the functions in the service design are currently feasible. The only concern may arise concerning the trade-in kit, which is to find a balance between its reusable character and the manufacturing cost regarding the material.

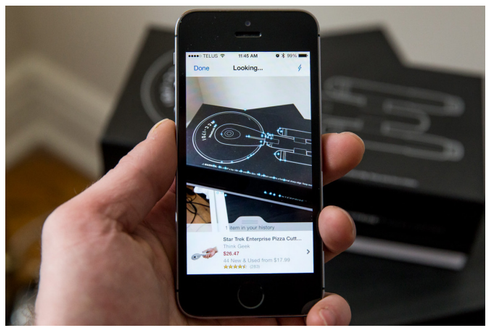


Figure 5.XX Image recognition technology in Amazon app

Paper. We've successfully created a closed-loop supply chain for paper. That means that 100 percent of the wood fibers in our packaging is either recycled or comes from sustainably managed forests or controlled wood sources. And we have protected or created enough sustainably managed forests to cover all the wood fiber we use in our packaging.

Plastics. Wherever possible, we're moving to recycled or bio-based plastics, and in some cases, like for our packaging, we're working to eliminate the need for plastics altogether. We've reduced the amount of plastics in our product packaging by 29 percent compared to 2016. For the remaining plastics, we're looking for bio-based or recycled alternatives to petroleum-based plastics. We're using these alternatives in a number of components—for example, the speaker, keyboard, and trackpad enclosures of iMac Pro are made with 60 percent recycled plastic. And the fan assembly is made with 26 percent bio-based plastic.

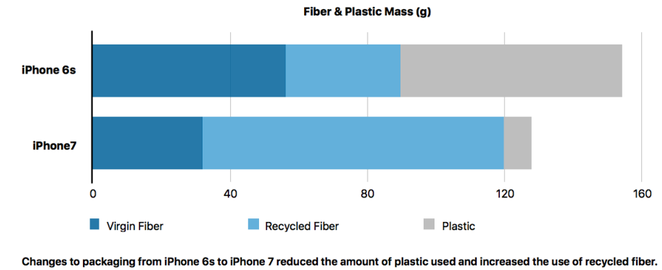


Figure 5.XX Screenshots of the content in Apple report regarding packaging

07
REFERENCES

— Ghisellini, P., Cialani, C. and Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production, 114, pp.11-32.

— Andrews, D. (2015). The circular economy, design thinking and education for sustainability. Local Economy, 30(3), 305-315.

— Dutt, N., & King, A. (2014). The Judgment of Garbage: End-of-Pipe Treatment and Waste Reduction. Management Science, 60(7), 1812-1828.

— Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) Text with EEA relevance. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0019

— Techopedia.https://www.techopedia.com/definition/30051/end-of-life-product-eol-product

— CIA World Economic Factbook. (2011). https://www.cia.gov/library/publications/download/download-2011/

— Ellen MacArthur Foundation. (2012). https://www.ellenmacarthurfoundation.org/circular-economy/interactive-diagram/in-depth-mobile-phones

— Joe Macleod. (2017). Ends.: Why We Overlook Endings for Humans, Products, Services and Digital. and Why We Shouldn't.

— The Design Process: What is the Double Diamond? (2015). https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond

— Boeijen, A., Daalhuizen, J., Zijlstra, J., Schoor-Rombouts, R., Zijlstra, Y. and Kuntonen, J. (2014). Delft design guide.

— Stickdorn, M., & Schneider, J. (2017). This is service design thinking (7th ed.).

— Stickdorn, M., Hormess, M., Lawrence, A., & Schneider, J. (2018). This is service design doing (3rd ed.).

— Dawes, John (2008), "Do Data Characteristics Change According to the number of scale points used? An experiment using 5-point, 7-point and 10-point scales," International Journal of Market Research, 50 (1), 61-77.

— Apple's Paper and Packaging Strategy. (2017) https://images.apple.com/environment/pdf/Packaging_and_Forestry_September_2017.pdf

— Apple Environmental Responsibility Report. (2017) https://www.apple.com/environment/pdf/Apple_Environmental_Responsibility_Report_2018.pdf

08
APPENDICES

APPENDIX A PILOT QUESTIONNAIRE

It's important to test the questionnaire using a pilot test to see whether all the questions are comprehensible if there are any ambiguities, and if there are any technical and logic problems of the online platform. The chosen platform is 'typeform'. It's an online platform which has many great features. It also provides a visual way of analyzing the gathered information.

Questionnaire version one:

Four participants participated in the pilot test. They are one DfI student, one former IDE student, one former IDE student and a UX designer.

Some key feedbacks are:

1. The order of some questions should be adjusted a bit so the participant will be more into the context after answering some previous questions.

2. Giving a metaphor should not be obligatory, could be optional.

3. People have different ways of dealing different devices; thus, that question (question number) ought to be multi-answers.

4. Some questions type should change from 'short text' to 'long text' to enable a new paragraph.

5. The difference between 'end-of-life' and 'EOU' is not that distinguishing. Should make it clearer.

6. some logic problems of questions

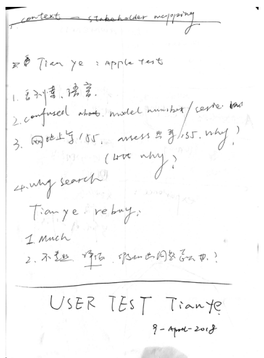
7. ask about the experiences of other recycling services

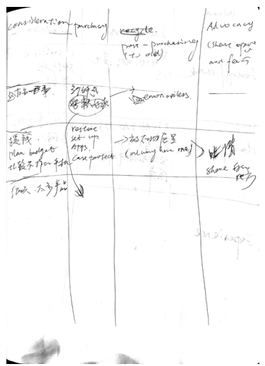
Based on these feedbacks, a second questionnaire was made.

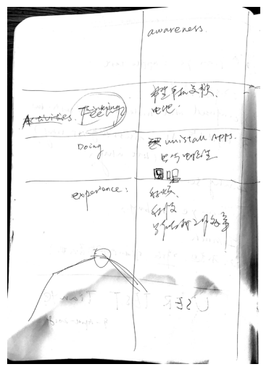
Questionnaire version 1: https://renjingwei.typeform.com/to/LyFtZa

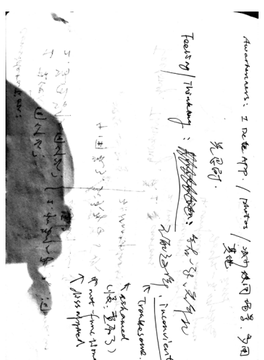
Questionnaire final version: https://renjingwei.typeform.com/to/BGRvO5

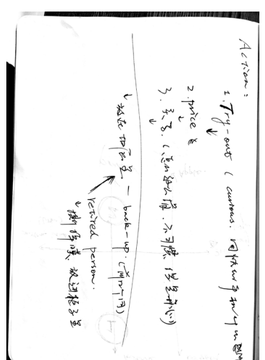
APPENDIX B INTERVIEW NOTES

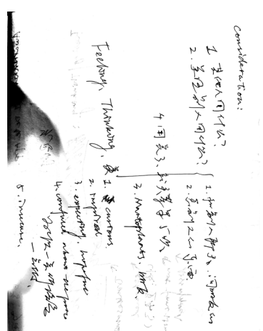












APPENDIX C CO-CREATION SCHEDULE

Time: 19:45-21:45. Location: home

Participants: Ferhat, from Postphoned. Alvin, from Postphoned. Natalie. IPD graduate. Rosanne, DfI graduate. Bob, DfI graduate. Andreas, DfI graduate. Jingwei, graduation student.

Materials: stickers, pens, fruit, drinks, snacks, coffee, tea, soda, legos.

Try not to think about utility, importance, feasibility and the like, and do not make critical remarks, this rule should lead to many and unexpected associations. You can express any ideas you think of, the wilder, the better.

1+1=3 come up with better ideas by building upon the ideas of others

6-5-3 method: 6 participants take 5 minutes to generate 3 ideas and pass them around.

6*3*5=90 ideas in 25 mins

Withhold judgement, encourage “wild” ideas, quantity not quality and build on other ideas. During the session, different

0. Ice breaker. Self-introduction and an energizer game. 5mins

1. Understand the background information, initial statement is ‘used phones mostly stay in the drawer but not in recycle loop”.

-What are the first reason that you can think of?
7mins

-Cluster the stickers on the wall
5 mins

-Vote on top 5 reasons
5 mins

2. Introduce other background information
10 mins

Personas, service safaris, customer journey and conclusions.

3. How-to questions:

3.1 How to create the awareness of recycling(trade-in) in general?

5 mins

5 mins criminal intent

5 mins

4 mins

3.2 How to make the recycling(trade-in) effortless?

4 mins

4 mins criminal intent

4 mins

4 mins

3.3 How to build up the trust in a recycle(trade-in) service?

4 mins

4 mins criminal intent

4 mins

4 mins

3.4 Recycle(trade-in) mobile phone is a low-frequency activity, how to make this service more frequently used by people?

5 mins

5 mins

5 mins

5 mins

3.5 Old phones have little value for refurbishment, how to attract these phone users to user the service?

4 mins

4 mins criminal intent

4 mins

4 mins

3.6 How to make people recycle(trade-in) their mobile phones earlier?

4 mins

4 mins criminal intent

4 mins

4 mins

APPENDIX D INTERMEDIATE EVALUATION

Scanned evaluation form