ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

Master Thesis
Strategic Product Design
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In front of you is the graduation project report I completed in the past 100 days, which also means the end of my study in Delft. Even now that I am about to graduate, I can still feel the excitement when I came to study in the Netherlands from China two years ago. I was also surprised by the improvements I could get in design, strategy, and communication in this short period of time.

At the beginning of my work, the world was confronted with COVID19. The national health and economy of all countries have been severely hit by highly contagious viruses. Life is stalled due to regulations of work from home, the closure of public places, and the cancellation of gathering activities, which undoubtedly also brought great difficulties to my project. Fortunately, under such circumstances, medical staff and scientific researchers were working hard to fight the virus, the supervisor team and college students also gave me great help academically and psychologically. My graduation project could not be completed without their help.

In the first place, I want to thanks my supervisory team from TU Delft – Ruth and Esther - for the feedback and the support given throughout the project. Although our communication was through video conferencing, I could still get inspired and motivated through frequent coaching. The help I received is not limited to design, you have given me advice and encouragement on communication and tolerance of cultural difference. Thank you for your practical support.

I would like to thank Jeroen and Edwin, the company mentors, for giving me this opportunity to do an interesting and challenging graduation project. Thank you for your support during weekly coaching, actively helping me contact people for interviews, and the tolerance and encouragement of my design. At the same time, I would also like to thank the KPN employees, interns, and customers who I interview during the whole project. Thanks for the input.

Also, fellow design students from the faculty, thank you for the mutual help during this special period. It is a pleasure to exchange inspirations and share mood with you during the quarantine time.

Finally, I want to say thank you to my friends and family that give me support along the way. Thank you for you accompany.

As of this writing, I have returned to my hometown, Xiamen, and spent an unforgettable 25th birthday in the hotel due to regulations of quarantine. My journey at Delft University of Technology is coming to an end, but my journey as a strategic designer is just begin. I believe that with my ability and confidence I can face new challenges bravely.

Chenjing Liu
06-07-2020
Many responsible companies are committed to promoting sustainability and circularity, but suffer from not being able to communicate these concepts and efforts to their users and influence them. KPN is one of these companies. This project aims to find effective approaches to communicate with customers so that they can engage more deeply in the KPN’s circular supply chain. Taking into account time constraints and customer expectations, the scope of the project is narrowed down to KPN in-home services and products in 2C market.

Literature review on circular economy and sustainability and green marketing is further conducted, which further proves the value that sustainability communication can bring to the company.

The existing research of KPN shows that customer’s perception of sustainability is relatively low when experiencing KPN services and products. To better understand the context and the reason behind this research result, desk research and customer journey analysis are conducted. Various findings lead to that the main problem in the current situation is sustainable information asymmetry, and the design should focus on installation, daily use and maintenance phases where customers have highest opportunities to reach sustainability information.

This thesis adopts the 10 principles for providing product sustainability information from United Nations Environment Programme (UNEP) and International Trade Centre (ITC) as the design guideline. These principles are further developed to detailed design requirements and desires, which lay a foundation for the latter ideation.

Design iteration was carried out between multiple creative sessions, employee validation and customer interviews. In the end, a solution that consists of six elements proposed to solve the design challenge. Through ways like communicating in personified tone, clearly displaying useful or interesting information and nudging customers to take sustainable action, customers can perceive the high sustainability of KPN while having an optimized user experience. A roadmap with three horizons provides a possible implementation plan for KPN.

Although in this report, the researches and designs are related to KPN in-home product, the results of the project are of interest to companies that are also facing low customer-perceived sustainability.
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APPENDIX
This chapter consists of three parts. The first part gives a brief introduction to KPN – the client company for this research. The challenge it’s facing now is illustrated in the second part briefly to guide audience get an overview of the research and design background. The last part of this chapter defined the project scope and explain why it’s narrowed down.
1. INTRODUCTION

1.1 COMPANY INTRODUCTION

Worldwide, the Netherlands is one of the frontrunners in digitalization. Telecommunications companies play an important role in facilitating ongoing technological transformation and digitalization. ("Introduction - KPN Jaarverslag (en-US)", 2020) KPN is one of the companies that boost the prosperity of the Dutch telecommunications market.

KPN (in full Koninklijke KPN N.V., also Royal KPN N.V.) ("Koninklijke KPN", 2020) is the client of this graduation project. KPN is a leading provider of telecommunication and information technology in the Netherlands. With fixed and mobile networks for telephony, KPN provides service of data and television to customers at home and abroad.

1.1.1 CORE BUSINESS

KPN focuses on both private customers and business users, from small to large. The main services provided include fixed and mobile telephony and internet. In addition, KPN offers telecom providers access to its widespread networks. ("KPN at a glance", 2020)

1.1.2 BUSINESS VALUE

"KPN means Connecting." ("Our values", 2020) KPN connects people with the rest of the world. KPN believes that this is the way to make life freer, easier and more interesting. With a concise and explicit offer for every customer, KPN's services and products are technological gems, but user-friendliness is always the first consideration.

"Connection" also reflects KPN's relationships with stakeholders, including customers, suppliers, partners and employees, KPN believes that they are the keys to the success of the organization.

Over the past decade, KPN positioned itself as one of the world's greenest telecom companies. ("Introduction - KPN Jaarverslag (en-US)", 2020) KPN see itself as the green connector: KPN not only building the digital highway of the future in the Netherlands, but also want to lead the way in sustainability. ("KPN at a glance", 2020) KPN's “cradle to cradle” strategy is in line with this position. ("Vision on sustainability", 2020) However, at present, the circular design performance of KPN is facing the challenge of information asymmetric. Although KPN has taken a number of actions in the organization or partnerships, the current circular concepts of KPN have not been well communicated to customers.

One of the crucial stakeholders of the circular supply chain are customers, without their efforts, the circle cannot be closed. KPN expects to involve customers at a higher level in their circular design scenario, and with their help to further enhance circularity. To achieve this, improvements can be started by letting customers know, understand and support what KPN does.

Based on this situation, the main research question of this project is formulated as follows:

How to design effective approaches to communicate with customers so that they can engage more deeply in the KPN's circular supply chain?

This graduation project aims to solve the practical challenges of KPN, but its design results and conclusion can have wider applicability. For those companies with a similar business model or committed to sustainability and circularity, this report can serve as the inspiration and reference.
1.3 PROJECT SCOPE

Taking into account of the timing issues, company's intentions as well as personal expertise and interests, to ensure the depth of research and accuracy of design, the scope of this project is further narrowed and defined as follow:

Fixed services and products in 2C market

1.3.1 Why 2C market?

KPN's domain of business covers both B2B and B2C markets. The individual customer services on offer include fixed and mobile telephony, mobile data, internet and T.V., while business customer services cover from fixed and mobile telephony and internet to diverse end-to-end solutions. (“KPN at a glance”, 2020)

In both domains, the circularity strategy has been applied, but more relevant actions have been taken in the consumer-facing services and products. In addition, the huge individual customer base reflects that the 2C market is still the primary target of KPN. Therefore, it makes sense to focus the research on this customer group that has a certain foundation and great potential regarding circularity development.

1.3.2 Why fixed services and products

The customer-oriented business consists of mobile and fixed services. In terms of products that services carried by, the former related to smartphones whereas the latter related to in-home products such as modems, set-top boxes and remote controls.

Compare to these in-home products, customers have experienced more frequent usage and stronger product association with their mobile phones. At present, there’re many existing studies on circular economy about mobile phones already. Furthermore, from KPN’s perspective, selling mobile phones of other brands is not its primary focus but an add-on to their services with telephony and data, which may restrain the design and implementation due to practical issues.

In contrast, in-home products from fixed services are designed and owned by KPN, thus there are more possibility and space for further design improvement.

Under such circumstance, this project chooses fixed services and products as its scope to develop a further research and design.

Apart from this, the author’s research interests and experiences are more in line with 2C products, services and strategies. Compared with the 2B business where economic benefits play a crucial role, the 2C business market is usually related to various thoughts, attitudes and value deep within the consumers, which is more challenging and explorative for me. I believe that this kind of enthusiasm and related experience can support me to deep dive into their thoughts, experience and desire, so as to complete the project smoothly and efficiently.

MAIN TAKEAWAYS

Project client KPN – telecom service provider from the Netherlands

Problem KPN did a lot to promote circularity, but customers hardly know

Challenge How can we design effective approaches to communicate with customers so that they can engage more deeply in the KPN’s circular supply chain?

Project scope Fixed services and products in 2C market
As mentioned above, customers know very little about the connection between sustainability or circularity and KPN due to lack of communication. This chapter zooms in three main customer journeys, illustrates touchpoints of sustainable or circular performance and communication, and discussed why the communication is not effective.
2.1 KPN: CIRCULAR AMBITIONS AND STRATEGY

Over the past decade, KPN positioned itself as one of the world’s greenest telecom companies driven by the belief that sustainable business is better business. To maintain this position, KPN sets far-reaching goals by continually reducing its impact on the environment. (“Introduction - KPN Jaarverslag (en-US)”, 2020)

KPN is committed to the principles of a circular economy. To achieve the ambition of becoming close to 100% circular in 2025, KPN sets concrete targets and uses a roadmap to track the progress of circular economy (“Introduction - KPN Jaarverslag (en-US)”, 2020).

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Regarding the operations to achieve the goals, KPN’s circularity approaches can be divided into four different levels: reduce, extend, recycle and energy efficiency. Typical measures of each level can be seen in figure 3, and the specific actions will be analyzed in the next section.

Now that the focus of this project is the in-home products of KPN’s brand, materials impact is essential in developing circularity since they are indispensable elements in product manufacturing. Circularity of the inflow is crucial to obtain circularity outflow. In the levels of approaches above, “reduce” and “extend” refer to the inflow of product or material while “recycle” involves outflow. Though “energy efficiency” seems not included in the product lifecycle, the efforts to reduce energy are aligned with the circular goal of using fewer materials, (“Introduction - KPN Jaarverslag (en-US)”, 2020) for this reason, it’s also regarded as a practical approach to reach the circularity goal.
2. CONTEXT EXPLORATION

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2.2 KPN: CIRCULARITY EFFORTS

2.2.1 Partnership

Collaboration with suppliers

By the end of 2019, 18 major suppliers who support KPN ambition signed the KPN Circular Manifesto. This represents more than 70% of spend on materials. ("Introduction - KPN Jaarverslag (en-US)", 2020) These companies involve network and hardware equipment manufacturers, network infrastructure providers, logistics service providers, and refurbishing specialists. ("KPN and major suppliers aim for circular operation by 2025", 2020) ("KPN expands cooperation with suppliers for circular operations in 2025", 2020)

The KPN Circular Manifesto outlines KPN's goal of minimizing its CO2 and environmental footprint as much as possible even as the volume of data traffic is expected to continue to grow exponentially. In addition to the manifesto, KPN has signed individual agreements with each of the suppliers, outlining the focus areas of collaboration between companies and KPN. ("KPN expands cooperation with suppliers for circular operations in 2025", 2020)

KPN has initially focused on the redesign of a minimum of 15 typical KPN/telco products in our efforts to achieve circular design. ("Introduction - KPN Jaarverslag (en-US)", 2020) Among them, in-home products including TV box, modem, remote control, Wi-Fi-repeater, and wireless connecting devices. Their functions and features are illustrated in figure 4.

2.2.2 Product design

KPN is working on substituting more sustainable materials in the product design. ("Introduction - KPN Jaarverslag (en-US)", 2020) For example, new TV boxes and remote controls adopt recycle plastics in their shell material.

KPN reduces the amount of material for each product by designing products in smaller sizes. For example, the shape of the new TV box is more than twice smaller than its predecessor.

KPN analyzes product improvement via product passports. ("Introduction - KPN Jaarverslag (en-US)", 2020) Product passport indicates the eco-cost of equipment and provides opportunities and recommendations to improve the level of circularity by lower eco-cost from different angles.
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2.3 CUSTOMER: PERCEPTION OF SUSTAINABILITY AND CIRCULARITY

2.3.1 Low perceived sustainability

In contrast to what KPN has contributed to circular economy, a surprising reality is that customers know almost nothing about these efforts. In the answer to the question “to what extent do you see [your own provider] as a sustainable organization?”, more than half of the customers “don’t know” while 22% chose “neutral”; less than 20% of customers affirmed the sustainability of KPN. (KPN, 2019)

However, approx. two-fifths say that sustainability plays a role in the choice of telecom products, services or a provider. 5% even say it is decisive. For another 14%, it depends on what matters. Though it is not possible to say in advance whether sustainability will really be taken into account in practice, what we can deem is that at least many customers are sensitive to sustainability. (KPN, 2019)

KPN does promote performance about circular supply chain through newsletters and websites, but the effect is limited; For customer-related efforts, most customers may not be aware of that they’re contributing to the environment with the help of KPN. The specific actions and corresponding customer perceived sustainability in the customer journey will be explained in the next chapter.

[Interviewee 1]
“I don’t have a feeling whether that’s sustainable or something... But I think they are sustainable because of the color they use. They use green and white. I would grade maybe seven or eight.”

[Interview insight]
“I have no idea what KPN does or contributes to sustainability. I hope you are sustainable.”

2.3.2 Customer’s attitude toward sustainability

According to many of our customers, the telecom industry can make a greater contribution to making society more sustainable. For most of them, sustainability evokes a positive feeling.

[Figure 5: To what extent do you see [your own provider] as a sustainable organization? (KPN, 2019)]

Simyo and Telfort are subsidiaries of KPN. More than half of customers don’t know if KPN (and its subsidiaries) is a sustainable service provider.

[Figure 6: Can you indicate in a report to what extent you think that the telecom industry contributes sufficiently to a sustainable society? (KPN, 2019)]

The answers mainly spread over 6-9.

[Figure 7: What is your general feeling about the term ‘sustainability’? (KPN, 2019)]

48% chose the answer of “good” while 16% chose “very good”, which shows that sustainability evokes a positive feeling.
However, approx. two-fifths say that sustainability plays a role in the choice of telecom products, services or a provider. 5% even say it is decisive. For another 14%, it depends on what matters.

In daily life, customers’ attention to sustainability varies. Though most of them think sustainability is important to both environment and individuals, some care more about sustainability features of products when purchase or use, while others are less likely to pay extra efforts. Nevertheless, they all agree that it’s important to lower the barrier to behave sustainably.

[Interviewee 5]

“I want to buy, want to pay to help environment get better... I would do research in advance. I think it makes sense. I also hope that more people will do this, but I know sometimes they’re lazy to do, so I will recommend friends or tell them simple and convenient ways, which are not so difficult to do but very helpful.”

**2.3.3 The wording of communication**

In customer-oriented materials, the term “circularity” is hardly mentioned; instead, phrases such as “sustainability” “environment” “energy” “green” appear more frequently.

Currently, KPN communicates with customers about the concepts of sustainability, but not mentioning circularity specifically. KPN believes that it is of high significance to communicate with customers in a reasonable way. (e.g. using phrases that customers are more familiar with)

Considering the above current situation, sustainability will be involved in the following study as well.

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**Figure 8:** To what extent do you generally find sustainability important when choosing telecom products, services or a provider? (KPN, 2019)

Approx. two-fifths say that sustainability plays a role in the choice of telecom products, services or a provider. 5% even say it is decisive. For another 14%, it depends on what matters.

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**Figure 9:** Terms used in cooperation website

These are screenshots taken from the cooperation websites. The language is relatively easy to understand: phrases such as “sustainability” “environment” “energy” “green” appear frequently.

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**MAIN TAKEAWAYS**

According to the research findings, the main problem in the current situation is sustainable information asymmetry. KPN’s sustainable and circular efforts focus on partnership and product design, but there’s not exhaustive communication of these features in customer-oriented materials. From customer’s perspective, they don’t know what’s the relationship between KPN and sustainability, but their attitude toward sustainability is positive.

Based on the research, in terms of sustainability and circularity, KPN and customers want to achieve the following goals respectively:

**Goal of KPN**

Increase customer loyalty and satisfaction by increase customer’s perception of sustainability

**Goal of Customer**

Be sustainable without much extra effort and sacrifice of service quality
In this chapter, the value and significance of communicating circularity and sustainability are analyzed by literature studies on green marketing. Findings show that communication affects customer attitude and then may lead to behavior change. The attitude here can refer to the perception of sustainability or circularity, or the impression on the brand.
3. LITERATURE REVIEW

3.1 CIRCULAR ECONOMY AND SUSTAINABILITY

Throughout evolution and diversification, our industrial economy has never moved beyond one fundamental characteristic established in the early days of industrialization: a linear model of resource consumption that follows a ‘take-make-dispose’ pattern. (“Circular Economy Report - Towards the Circular Economy Vol. 1,” 2013) This production and consumption mode brings an extra burden to users, manufacturers, sellers and the environment.

To decouple economic growth and environmental impacts, the concept of Circular Economy is increasingly promoted as a solution. (Wiprächtiger, Haupt, Heeren, Waser & Hellweg, 2020) Circular Economy (C.E.) was defined in different ways in prior academic studies, one of the most employed definition is “C.E.] an industrial system that is restorative or regenerative by intention and design. It replaces the ‘end-of-life’ concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models.” (Kirchherr, Reike & Hekkert, 2017)

C.E. offers important opportunities to regain value from used products and to stimulate a shift towards a more sustainable consumption model in which valuable resources are reused and less waste is created. (“Circular Economy Report - Towards the Circular Economy Vol. 1”, 2013) In the loop of C.E., both companies and the environment can gain values by higher energy and resource efficiency, and the flexibility that arises can create more value and the easier recovery of value for consumers, (“Circular Economy Report - Towards the Circular Economy Vol. 1”, 2013)

Much of the literature focuses on business and revenue model development, and implications for supply chains and product-service development, but how these circular companies seek to influence their customers’ behavior or influence the relationship they have with them through marketing and communications practices, remains mostly undisussed; (Chamberlin & Boks, 2018) Among those about communication, most concerned more with the acceptance of potential customers rather than the satisfaction of existing customers. Therefore, the literature review of this project investigates the domain of green marketing and satisfaction and how they add value to the brand. Besides the circular economy, related concepts like sustainability are also explored to gain a holistic overview.

Figure 10: outline of a circular economy. (“Circular Economy Report - Towards the Circular Economy Vol. 1”, 2013) How technological and biological nutrient-based products and materials cycle through the economic system are illustrated. (“Circular Economy Report - Towards the Circular Economy Vol. 1”, 2013) Materials and parts can be reused to different degrees in different stages of the cycle.
3. LITERATURE REVIEW

3.2.1 Product-service system

Based on the content that delivers value, Arnold Tukker came up with eight types of product-service system in 2004, which is widely adopted by the later scholars and designers. (Tukker, 2004) KPN’s fixed services rely on its products; this means that the subscription delivers values in the form of product-service system (PSS).

In terms of business model, KPN’s fixed services follow the form of 3. product leasing. Here, the product (in-home equipment) does not shift in ownership. The provider (KPN) has ownership, and is also responsible for maintenance, repair and control. (Tukker, 2004) Subscription includes access to equipment, e.g., when subscribing to internet services, a modem can be obtained. Usually, customers do not need to pay extra for the rented product when it’s necessary for the service. But for customers who pursue a higher quality of use, they may pay extra for additional equipment; in this case, the ownership of the product belongs to themselves.

However, in-home equipment is neither the core of subscription nor the business focus of KPN. In-home equipment is just the carrier of intangible services which customer and companies care about most. From this perspective, KPN’s fixed services have the characteristics of 8. functional result. As long as the network or TV service is well used, customers won’t pay too much attention to the products.

In Fogg Behavior Model (FBM), behavior is a product of three factors: motivation, ability, and triggers. The FBM asserts that for a person to perform a target behavior, he or she must (1) be sufficiently motivated, (2) have the ability to perform the behavior, and (3) be triggered to perform the behavior. (*Fogg Behavior Model*, 2020) If more than one element is missing, it is likely to cause an attitude-behavior gap.

Existing studies about the communication of PSS are more concerned with the acceptance of potential customers. Communication to lower consumer adoption barriers is important during consideration of purchase, especially for new business models such as PSS. (Tukker, 2004) Despite consumers declared interest, bookings of sustainable or circular-design products may not be customers’ final choice, because that may involve behavior changes that customer don’t want to take actions on. The phenomenon of the deviation between purchase attitudes and actual buying behavior of responsible consumers is called the attitude-behavior gap. (Terlau & Hirsch, 2015) A major problem in the attitude-behavior gap is ineffective sustainability communication. (Chamberlin, L., & Boks, 2018) Studies pointed out that improving communication of quality attributes of products can be effective to close the attitude-behavior gap. Besides, suggestions such as raising awareness of the consumers and citizens, create more transparency and trust by unified, nudging can also involve communication. (Terlau & Hirsch, 2015)

Due to the in-home equipment’s functional result that customer pay attention to, KPN’s product-service system is not the barrier for customers when considering new service subscription; therefore, the attitude-behavior gap does not exist in the purchase decision making phase. But during their usage, if KPN want to make a greater change than just raising awareness by simply informing customers, behavior change is needed and how to fill in the attitude-behavior gap need extra effort.
The concept of green marketing is closest to the communication discussed in this article. The definition can be described as follow: green marketing consists of actions directed to all consumers, and incorporates a broad range of marketing activities (e.g., price, planning, process, production, promotion, and people) designed to demonstrate the firm’s goal of minimizing the environmental impact of its products and services. (Groening, Sarkis & Zhu, 2018) Besides, companies can adopt the concept of green marketing to implement green differentiation strategies to satisfy customers’ environmental needs or desires. The field provides valuable insight into the development of new markets for products and services with lower environmental impacts or higher sustainability credentials (Groening, Sarkis & Zhu, 2018). Considering communication is not just related to purchasing intention, some studies use customer perceived sustainability to measure communication effectiveness. For example, Vafaei and Azmoon (2019) have proved that perceived sustainable marketing policies have a positive impact on green customer satisfaction. (Vafaei, Azmoon, & Fekete-Farkas, 2019)

During the purchase phase, green marketing affects customers’ green perceived value, which associated closely with purchase intention (or acceptance in terms of the circular economy). Green perceived value can be defined as “a consumer’s overall appraisal of the net benefit of a product or service between what is received and what is given based on the consumer’s environmental desires, sustainable expectations, and green needs.” (Chen & Chang, 2012) Considering communication is not just related to purchasing intention, some studies use customer perceived sustainability to measure communication effectiveness. For example, Vafaei and Azmoon (2019) have proved that perceived sustainable marketing policies have a positive impact on green customer satisfaction. (Vafaei, Azmoon, & Fekete-Farkas, 2019)

In addition to green satisfaction and overall satisfaction, studies also show that green marketing positively associated with green image, green trust and green loyalty. (Chrisjatmiko, 2018) It is evident that the green market brings many significant and valuable effects for the brands by strengthening their relationships with customers. For these reasons, communication is meaningful in enhancing the circularity of KPN by engaging customers.

These findings can explain why KPN wants to do this project to communicate with customers. KPN already has a large customer base, circularity may not be a feature that attracts new customers and increase sales, but can be a reason that customers loyally stay in KPN with high satisfaction and trust.
As mentioned in chapter 4, customers know very little about the connection between sustainability or circularity and KPN due to lack of communication. This chapter zooms in to three main customer journeys, illustrates touchpoints of sustainable or circular performance and communication, and discussed why the communication is not effective.
4. CUSTOMER JOURNEY ANALYSIS

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4.1 OVERALL CUSTOMER JOURNEY

The importance of communicating with customers at right time is obvious. This section investigates the whole customer journey as well as the corresponding backstage operation of KPN, points out the performances and communication of circularity or sustainability, and proposes opportunities regarding communication time and tools.

The whole customer journey of KPN products and services can be complicated; therefore, they are divided into ten main scenarios and customers usually go through seven stages from the start to the end of the subscription. The summary of their phases and connections can be seen in figure 15.

Every customer should go through the Start stage, followed by the Use stage regarding daily use of the service and products in the whole subscription. The unexpected problems that occur in daily use are known as Support stage. Stage of Subscription describes the process that customers become more loyal to KPN, which may involve receiving new products or services. Stage of My Life refers to the movement of addresses, which may lead to renewal or cancelation of subscription. In addition, the stage of Development involves some inevitable changes that customers have to accept. Customers’ dissatisfaction can lead them to the Departure stage and end the journey.

Five prominent scenarios in the customer journey are evaluated from the circular and sustainable design and communication perspective. To ensure the clarity of the research structure, some customer journeys are combined with KPN backstage operations into service blueprints (“Service Blueprints: Definition”, 2020), and is analyzed from four aspects: customer journey and service blueprints, current communication of circular or sustainable performances, evaluation and opportunities.
4.2 BECOMING A CUSTOMER

The scenario of becoming a customer describes the process of newcomers who have never used KPN services or products before. In this report, it especially refers to those who have not used in-home services and thus the service blueprint considers the process of installing devices.
4. CUSTOMER JOURNEY ANALYSIS

4.2.1 Current communication of circular or sustainable performances

Step: Get need, compare, order
Tool/channel: webpage of order

In the Orient and Discover phases, customers can browse the order page where some unique selling points of KPN are displayed. Last year, sustainability became one of the five selling points in this page: “Why KPN?” “Most sustainable provider from the Netherlands”.

At these steps, users are passive recipients of sustainable information. On the one hand, they have not seen or used KPN services and products, which leads to their weak psychological connection with products and low sensitivity to sustainability information. On the other hand, since sustainability or circularity are not KPN’s main selling points, short contact and unobtrusive publicity cannot give a long-lasting impression.

Step: Package received
Tool/channel: packaging of installation box

In-home services are usually carried by certain devices. Compare to previous steps, customers are rather excited when receiving installation packages. Given that receiving the installation package is a significant time point that represents the start of usage, the packaging information can deliver initial images and feelings of the brand.

Figure 17 and 18 illustrate some packaging of the installation box. The overall design is clean and the information conveyed is clear. One side of the package shows “greener” that conveys the brand’s sustainable concept. These designs can give package recipients an impression of sustainability. Compared to the Discover and Orient phases, sustainable information here is more accessible and more relevant to customers.

4.2.3 Evaluation and opportunities

It can be seen from the customer journey that the touchpoints of sustainable actions and sustainable communication hardly overlap. The former is mainly in the second half of the customer journey from receiving the package to the completion of the installation, while the latter focuses on the purchase decision-making process in the early stage.

The problem caused by this situation is that without sustainability or circularity practice (for example, seeing or using the products and services), communication in the early stage cannot give the customers a sense of realism and conviction. Therefore, combining sustainability communication along with actions can be a design opportunity because it increases both relevance and accessibility of sustainability information. During the customer journey, many sustainability performances are gathered in the device installation process; at the same time, various touchpoints such as apps, packaging of installation boxes, mechanics are used here and can provide opportunities for communication channels.

At this moment, customers look forward to the functions of new products and services with an excited and curious mood. Moreover, customers may be in the “mood for change”, in other words, disruption of existing habits may open a window of opportunity for more change, and may thus render interventions more effective. (Verplanken & Wood, 2006) If the purpose of communication in the later design is to influence customers’ sustainable behavior and habits, then the communication at this moment can be meaningful.

However, communication at this time has its unavoidable shortcomings. Because customers are new to KPN and haven’t used its services or products, later phases of the stage of “I become a customer” means an introduction phase for them, especially during the installation and set-up period. They learn to operate, register or sign in, and optimize usage, so they are often overwhelmed by too much information. In contrast, the characteristics of sustainability can be negligible; therefore, the design of the communication form needs further consideration.
4.3 DAILY USE, MALFUNCTIONS OCCURRENCE

The scenario of using the products and services describes how customers experience products or services they subscribed to in their daily life. Many steps of daily usage are not carried out according to the time flow, so it is impossible to present each step in the form of arrows like other customer journeys. Besides, this customer journey has no clear beginning point and end point either. Considering that customers’ daily usage doesn’t involve interaction with KPN’s employees much, there is no need to analyze the backend of service blueprint here.

Nevertheless, in daily use, there is a situation that requires KPN’s intervention and interaction, namely maintenance. KPN strives to solve malfunctions and problems that customers are facing. This part is discussed separately to daily use and explained in another customer journey together with its service blueprint.
4. CUSTOMER JOURNEY ANALYSIS

ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

Figure 21: customer journey and service blueprint of experiencing the malfunctions.
4. CUSTOMER JOURNEY ANALYSIS

4.3.1 Evaluation and opportunities

Surprisingly, there is little communication related to sustainability or circularity throughout the use process or maintenance phases. However, this does not mean that neither of these two phases is not suitable for conveying the concepts of sustainability or circularity to customers. On the contrary, the touchpoints and performances during use and maintenance can provide support to meet four principles. When customers use in-home products or services, the feeling of association with the product is the highest in the entire customer journey compared to the moments that they cannot see or use products. At this moment, the information that conveys the sustainability of the product (especially the information related to usage or maintenance) is undoubtedly relevant to users. Each subscription can last for a long time, which provides opportunities for more frequent access to sustainability information in a long period, thereby strengthening customers’ awareness and impression.

The customer journey of maintenance is similar to installation, especially the problem-solving part where customers can choose between onsite or remote maintenance service. Considering that product failures rarely happen, this communication opportunity is sporadic and short-lived compared to opportunities in daily use. However, while searching or waiting for the KPN’s support, customers are actually eager for more details about the maintenance status. Information that tells KPN’s sustainability efforts to customers at this time can be effective and accessible. Yet it is still necessary to consider the relevance of content to avoid annoying customers in need.

In the following service blueprint of moving, three types of moving customers are addressed: existing moving customers, KPN customers who move with their in-home equipment; new moving customers, new customers who choose KPN during their movement (also customers with KPN mobile); churning customers, all KPN customers who leave KPN during their movement (both advised or voluntary).

4.4 MOVEMENTS OF ADDRESSES, CANCELLATION OF SUBSCRIPTION

Movements of addresses and cancellation of subscriptions are discussed together because moving is a primary reason that accounts for customer churn. In many cases, customers have to terminate the contract with KPN because there already has network access from other providers in the new home, or the new home address is not in the area served by KPN.
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

4. CUSTOMER JOURNEY ANALYSIS

Figure 22: customer journey and service blueprint of moving to a new address
4.4.2 Current communication of circular or sustainable performances

Step: moving into a new or temporary home Tool/channel: return boxes

The churn customers are asked to send back the rented devices with the return box which would be mailed to customers’ addresses. It’s a simple card box; the information on it describes the return process but not the sustainability feature. According to research, the return process is experienced as easy to most churning customers. However, some customers complain that the return box is actually inconvenient and not environmentally friendly because any card box that carried the return devices are accepted. Uncertainty during the move process confuses customers that they are not sure whether they should ask KPN to send the return box to the new or old address.

Paradoxically, returning the devices is one of the most meaningful points in the circular supply chain, but most customers only go through this when they’re about to leave KPN. Communicating at this moment won’t bring any long-term impact. This may explain why KPN does not communicate the sustainable value to customers during this phase: it’s too late to let them realize at this moment.

Moving to a new address is always considered as a troublesome process. Expect there is nothing to worry about during their moving, and KPN strives to reduce customers’ hassle.

The customer journey of moving includes three types of customers, thus sustainability actions and communication they experience are different. The journey of new moving customers is more or less the same as the journey of becoming new customers. For churning customers who are about to leave KPN, it’s still valuable to communicate the circularity efforts to them. On the one hand, some of them are still KPN mobile users and not fully say goodbye to KPN; on the other hand, customers cancel subscription due to force majeure, but subsequent follow-ups can still improve the company’s green image and customer NPS. For existing moving customers, since they will experience the installation process again in a brand-new environment, both the actions and moods are very similar to the new customers. The latter design that introduces product sustainability for new users during the installation phase is also applicable to existing moving customers.

Similar to the customer journey of becoming a new customer, the sustainability performance of this customer journey is also gathered in the second half of the whole process where customers are in frequent contact with equipment. Communication at these touchpoints can increase information accessibility and relevance to customers.
5.5 Touchpoints evaluation and design opportunities

By studying the main customer journeys and extracting the sustainability performance and communication touchpoints, I have an in-depth understanding of the right time and content of communicating sustainability and circularity. To sum up, three periods of communication with the customers are summarized, which provide opportunities for subsequent design: installation, maintenance, and daily use. Actions related to sustainability or contact with circular-designed products are gathered in these periods, and how to inform or remind users will be discussed in the next chapter.

Figure 24: the overview of communication touchpoints in a simplified customer journey

MAIN TAKEAWAYS

Current problem in customer journey
Sustainability communication and actions do not appear at the same time

Opportunities in customer journey
Communication time:
Installation, daily use, maintenance,
Communication content:
Product lifecycle, energy saving

In addition to the customer journey, many elements in life also affect customers' attitudes and actions. Therefore, in the subsequent idea generation section, expanding the scope beyond the customer journey can help increase the breadth and diversity of the design.
To tackle the problems raised in previous chapter, effectively communicating KPN's sustainability or circularity features to customers is significant. A design guideline of providing sustainability information is discussed in this chapter. The guideline helps to make effective, trustworthy claims to consumers by five fundamental principles and five aspirational principles. Combined with the current status of KPN, a list of design requirements is formulated as a reference for design development.
5. DESIGN GUIDELINES AND REQUIREMENTS

5.1 THE GUIDELINES FOR PROVIDING PRODUCT SUSTAINABILITY INFORMATION

In order to provide design and evaluation standards for the later design phases, this article adopts the guideline for providing product sustainability information from United Nations Environment Programme (UNEP) and International Trade Centre (ITC). The Guidelines for Providing Product Sustainability Information (short the Guidelines) aim to provide value chain and public sector professionals with clear guidance on how to make effective, trustworthy claims to consumers, on product-related sustainability information. ("Guidelines for Providing Product Sustainability Information", 2017) Figure 25 lists five fundamental principles and five aspirational principles that addressed in this guideline and they’re considered as characteristics that effective communication may have.

The reason for choosing this guide is that it has certain authority and universality. The Guidelines are the result of an international, multi-stakeholder process, led by UN Environment and the International Trade Centre through a working group of the UN’s 10YFP Consumer Information Programme. ("Guidelines for Providing Product Sustainability Information", 2017) The guide is also used when promoting sustainability features in various industries, hence compared with other academic frameworks, it is more helpful to this project.

Gaining consumers’ trust is a prerequisite for ensuring that they purchase and use products in a more sustainable manner. Telling consumers the truth is fundamental to gaining their trust. Therefore, claims need to be based on substantiated evidence. Consumers can then be sure that their action contributes to a wider good, something they are increasingly looking for. ("Guidelines for Providing Product Sustainability Information", 2017)

What does this mean for KPN?

One of the core values of KPN is "reliable connectivity". Building trust with customers is always what KPN attaches great importance to. Trustworthy is especially crucial in terms of circularity, since only if they trust the authenticity of information can they truly recognize and support KPN’s circular actions. KPN can improve its credible brand image by disclosing detailed sustainable evidence and making promises and guarantees.
According to the guideline, relevance means talking about major improvements in areas that matter. The sustainability claim must provide information on the relevant aspects (e.g., processes, materials used in production; or impacts linked to the intended use of the product), which, according to the selected scope of the underlying study and the applied methods, contribute significantly to the sustainability profile of the product, i.e., the sustainability hotspots. At the same time, the claim must not enhance one aspect where the product is performing poorly (or has improved) while masking other aspects where the product is performing poorly (or has deteriorated).

(“Guidelines for Providing Product Sustainability Information”, 2017)

What does this mean for KPN?

When receiving a device, customers expect to get information related to the product they get. It is worth considering how to transform the communication from providing product-related information to providing a wider range of content such as circularity concept, brand strategy, and ambitions.

KPN adopts recycle materials in some parts of their devices. This may be something that customers want to know more. In addition to understanding what it means to devices, they also want to know how it affects their usage and experience.

Clarity is what sustainability communication content must achieve. Consumers want clear messages and language to inform their purchasing decisions, to know how to use the product responsibly and what to do at the end of its life (e.g. reuse, recycling, responsible disposal). (“Guidelines for Providing Product Sustainability Information”, 2017) It is worth noting that the concept of clarity and relevance are overlapped and seem similar. The difference is, unlike relevance, clarity refers to the degree of correlation of the information to customer’s action, and correlation refers to the degree of relevance of the information to products.

What does it mean for KPN?

As a service provider, it is not difficult to clearly describe the contribution and ambitions in the field of sustainability or circularity, but not all companies can make information useful to customers. If only talking about performances that are not relevant to the customers at all, the quality of information receiving and the perceived reliability of information may greatly reduce. Therefore, clarity does not only mean that the information should be clear and easy to understand, but also that the information should be closely related to users, for example, provide simple guidance to their follow-up actions or interpret the benefits or limitations for customers.

The consumer must be able to trace how the sustainability claim was generated. Consumers expect sufficient information to be available so that they have the option to evaluate the basis for the sustainability claim, should they wish. Information providers therefore need to strike a balance between providing too much information initially (e.g. on the product or at point of sale), and providing sufficient information elsewhere for consumers to research and make decisions (e.g. on the company website). ("Guidelines for Providing Product Sustainability Information", 2020)

What does this mean for KPN?

KPN wants customers to understand the sustainability message we describe in as little time as possible since occupying them too much effort on being sustainable may be contrary to the original intention of improving customer satisfaction. But this can cause that in the design, we may tend to impress customers with brief words and visuals, which will lose a lot of details. The benefits and definition of circularity or the origins and manufacture of recycled components can’t be explained clearly in few words, then the clues and evidence should be provided somewhere to support the claims for customers who are interested or want to verify.

“Let the information get to the consumer, not the other way around.” This is a clear explanation of the information accessibility. The more accessible the information, the more likely the consumer will take notice. (“Guidelines for Providing Product Sustainability Information”, 2017) To enhance accessibility of sustainable information, effective ways include making the claim clearly visible for consumers (e.g. front of pack, appropriate font size, graphics/logo), providing the information when and where the consumer needs it, avoiding any barriers (e.g. technical) and using several communication methods, so that different information seeking habits are respected and satisfied and so on. (“Guidelines for Providing Product Sustainability Information”, 2017)

What does it mean for KPN?

In this project, accessibility related to the communication time and channels; it can be concluded in the customer journey that the information must be provided at the right communication time and channels where customers need or are willing to receive it. That is, when they come into contact with circular designed products or take sustainable actions, relevant information should be available near the actions.
Three dimensions refer to social, environmental and economic dimension of sustainable information. All three dimensions of sustainability should be taken into account for the provision of information, albeit with a particular focus on the most relevant aspects/hotspots for a given product. Consumers require comprehensive and balanced information, which ensures that no burden shifting occurs from one sustainability dimension to another. (“Guidelines for Providing Product Sustainability Information”, 2017)

What does it mean for KPN?

In these three dimensions, the economic dimension connected to the value that customers may concern most with, while social and environmental dimensions are their responsible contribution to the world. People may be reluctant to admit that they choose to be sustainable for money-saving reasons, but if KPN emphasizes social and environmental contributions, customers will be proud of their own choices with a feeling of participation.

Sustainability communication should go beyond simply informing consumers, to actively encouraging them to adopt more sustainable consumption patterns. A claim should define what the consumer can do to reduce negative sustainability impacts through purchase, use, re-use or disposal. (“Guidelines for Providing Product Sustainability Information”, 2017)

For the change of behavior to be sustained and not only be adopted short-term or for a one-time decision, a longer-term relationship should be built with the consumer to embed new consumption behavior. The success and impact of behavior change should be monitored, and the product sustainability information should be adapted according to the results. The sustainability information should support the education of consumers for them to better understand and act on sustainability issues. (“Guidelines for Providing Product Sustainability Information”, 2017)

What does it mean for KPN?

Customers often subscribe to KPN's fixed service for more than one year, which means the single communication of sustainability or circularity can happen multiple times during the whole subscription. This long duration actually provides opportunities to influence customers gradually to shape their sustainable behavior.

Consumers are faced with a plethora of information when making product purchase, usage and end-of-life decisions. Further, patterns of consumer information and product purchase are shifting away from traditional ways towards web-based e-commerce and information platforms. To get consumers' attention in the first place and to do so in the right place/situation, using a single/stand-alone communication channel may not be enough to elicit behavior change. Therefore, the sustainability claim should be provided using a multi-media approach, addressing consumers through different and innovative communication channels in different situations. The information should be complementary and not redundant, and should not overload the consumer. And, where feasible, the information should be entertaining to raise attention. (“Guidelines for Providing Product Sustainability Information”, 2017)

What does it mean for KPN?

Currently, available channels for communicating sustainable information are as follows. In addition to online apps, emails, web pages, and offline stores and mechanics, products, and packaging themselves are also helpful tools that convey information.
Compare to multi-channel communication, omnichannel communication is considered more suitable for KPN’s context. Omnichannel is a cross-channel content strategy that organizations use to improve their user experience and drive better relationships with their audience across points of contact. Rather than working in parallel, communication channels and their supporting resources are designed and orchestrated to cooperate. Omnichannel implies integration and orchestration of channels such that the experience of engagement across all the channels someone chooses to use is as, or even more, efficient or pleasant than using single channels in isolation. This means that the same sustainable information do not need to be presented in different channels repeatedly, but these channels must be connected seamlessly to each other and provide good user experience to ensure customers receive sufficient and useful information. This is also in line with KPN’s converged service strategy.

KPN adopts the converged service strategy targets the existing customers who only use one service, and aims to let them use converged services, make them more loyal customers by further up-sell or cross-sell them other KPN services. KPN realizes this by increasing the customer experience of converged service where different functions switch and connect seamlessly.

Collaborative approaches can increase acceptance and credibility of product sustainability information among consumers and other stakeholders. Multi-stakeholder consultations should be an integral part of the development of sustainability information. The development process should be open and inclusive. The opportunities for stakeholder involvement should be clearly communicated. In particular, consumers themselves should be invited and encouraged to feel part of a joint effort. (“Guidelines for Providing Product Sustainability Information”, 2017)

What does it mean for KPN?

Customers do not realize when they make some sustainable actions. If KPN can take the opportunity to communicate and inform customers of their efforts in the sustainable supply chain, customers will be engaged in a higher level in the collaboration.

In addition, KPN’s a bridge between customers and suppliers. KPN should take advantage of this identity and effectively communicate the needs and desires of both parties, to let both parties know each other better and increase their trust and satisfaction with KPN.

To compare similar products based on their sustainability performance and communicate this to consumers is a complex issue and not necessarily feasible for all product categories. Product comparison is suggested only where it really helps the consumer to make sustainable choices. However, product comparison can also be a powerful tool for consumers to make more sustainable choices.

What does it mean for KPN?

People often want to hear how much money sustainable products have saved them compare to other products, but promoting this is contrary to our original intention and may not be as effective as we thought. Although it may be inappropriate to compare with competitors, KPN can still compare the current circular-designed products with those of previous generations so as to show the progress KPN has made. Showing the progress is also a way of comparison.
5. DESIGN GUIDELINES AND REQUIREMENTS

5.2 List of requirements and desires

Based on the above introduction and application of the principles and goals in chapter 4, a list of requirements is generated to serve as a design guideline to the latter ideation.

Customers

Goal
Want to be sustainable without much extra effort and sacrifice of service quality

List of requirements and desires

- The design increases customer’s feeling of participation in the circular supply chain.
- The design lets customers realize their personal impacts to the environment.
- The design raises customers’ sustainable awareness.
- The design ensures the performance and quality of products and services.
- The design increases customer-product attachment.
- The design clearly guides customers on what to do to be sustainable.

KPN

Goal
Want to increase customer loyalty and satisfaction by increase customer’s perception of sustainability

List of requirements and desires

- The design introduces basic knowledge of sustainability and circularity.
- The design provides convincing information about KPN’s circularity efforts and vision (including customer’s personal efforts with the help of KPN).
- The design is in line with KPN’s core value: reliable connectivity.
- The design communicates through omnichannel to ensure customers receive information with optimized user experience.
- The design itself brings lowest environmental impact.
- The design is easy to implement and feasible already for KPN to do the pilot.
- The design starts with fixed products and services but is also applicable to other KPN service portfolio.

MAIN TAKEAWAYS

This chapter summarizes the list of design requirements and desires based on the guideline of providing sustainable information.

Five fundamental principle:
Reliability, relevance, clarity, transparency, accessibility

Five aspirational principles:
Three dimensions of sustainability, behavior change and long-term impact, multi-channel and innovative approach, collaboration, comparability
DESIGN DEVELOPMENT
CO-CREATION WITH STAKEHOLDERS

With the design requirements of the previous chapter as a basis, the development of design became clearer and more directional. This chapter shows how the design ideas obtained through creative sessions with designers and interns were further deepened under the inspiration of case study. Concept testing was then conducted with KPN customers and company employees, and finally eight elaborated design solutions were presented. At the end of this chapter, each concept is mapped in the impact and effort matrix for further evaluation and implementation plan.
In the preliminary ideation phase, in order to generate abundant wild ideas from different perspectives, I invited designers who did not know this project background and interns from the same department who have the non-design background to participate in two co-creation sessions respectively. A certain strangeness to the company context or design method may stimulate the creativity of the participants. A series of design ideas are shaped with the help of co-creation outcome.

In addition to the most obvious KPN Energie & Milieu board (the client’s department) and KPN users, the project also involves stakeholders such as product managers, customer researchers, and information analysts that contribute to this project from different aspects. Most of them are non-designers; to avoid being caught in the KPN framework and unable to divert their thinking, I didn’t arrange them in the earlier ideation session. On the contrary, their critical evaluation based on working experience can provide valuable feedback to the initial ideas.

Through the analysis and integration of ideation results and evaluation insights, ideas are optimized into more mature design solutions and further validated with customers. Here the qualitative research is adopted to obtain customers’ real insights and feedback. The qualitative research is designed more interactively and creatively to engage interviewees deeper under the current situation where only online interviews are possible.

The entire design development is an iterative process. During the interview or creative sessions, a sentence or a post-it can become my source of inspiration. New ideas were born during this process and put into the next round of testing.

### OVERALL PLAN

#### Design opportunities
- **Ideation**
  - with designers
  - with KPN interns

#### Idea development
- **Validation**
  - with KPN employees
- **Idea testing**
  - with KPN customers
- **Conceptualization**

#### Actions & outcomes
- Principles of sustainability communication
- Communication tool
- Changes in the context
- Design idea
- Principles in the context
- Design idea

#### Tool
- **Figure 27: co-creation plan**

### CREATIVE SESSION

The creative session focused on inspiration. This session with designers gathered five students from industrial design engineering faculty and lasted for 1.5 hours. The participants were briefly briefed on the context, followed by the main ideation session divided into two parts. The first half of the session focused on what is the effective sustainability communication, participants were asked to come up with features that they think are essential in providing sustainability information. In the latter half of the session, they are encouraged to come up with ideas based on the previous principles and project context.

#### Topic
How can we make sustainability communication effective?

#### Aim
- To explore the core principles that effective sustainability communication should meet
- To gain innovative ideas about effective sustainability communication
- To gain innovative ideas about introducing the concept of circularity

#### Tool
Because of the current epidemic period, the session was held online. The tools we used included an online collaborative whiteboard platform (Miro) and video conferencing program (Zoom).
6.2.1 Methods and Procedure

**Brainstorming: What is ...?**

What are the core features that effective communication of sustainability should have?

** Ideation: How to ...?**

How can we make sustainability communication meet these principles?

**Procedure**

Participants proposed what effective and sustainable communication should look like and wrote down the features on the sticky notes. During this phase, they didn't have to consider the project context; the answers can be general and applicable to other cases.

After this, 10 principles of providing sustainable information was introduced. The features participants came up with in the brainstorming phase can somehow associate with these principles. Participants were asked to move them to the principles they related to.

After reposting all the post-its, each participant can vote for the three principles they consider most important. At this stage, they need take the project scope and context into consideration.

In the session with designers, they proposed ideas that try to solve these two design questions: How to communicate the concept of sustainability to customers by following these principles? How to introduce the concept of “circularity” to customers? These ideas were applicable to three period of customer journey that defined in previous research, and

In the session with interns, they came up with ideas that better convey these two messages to customers: recycled materials and power saving mode of KPN in-home equipment. Similarly, the ideas need to meet the three most important principles that were voted on in the previous stage.

6.2.2 Summary of Results

Both groups of participants have voted for principles they thought most important to the project context. Some insights on post-its and vote results are shown in the figure. The analyze is based on the votes result of two groups because the second session only involve two participants, and looking at their voting result separately won't be representative.

Principles with highest votes are:

1. Clarity
   "Express in languages that everyone can understand."
   “I have no obligation to understand these. If I spend time on it and don’t know what it’s talking about or what it means to me, then I will leave and no longer pay attention... Don’t waste my time."

2. Accessibility
   “I want a real-time interaction, but don’t want to see template-style responses without follow-ups. ”
   “Most companies... just write and print posters and say, yes, we are green, but there's nothing behind these... When I see information related to sustainability, then I'm skeptical and want to know more.”

3. Transparency
   “you can only create reliability if you’re transparent”

4. Relevance
   “Not every product have power saving mode...When I saw such a message, I expected my products to have this mode.”

The two most important principles derived from the voting results agree with the previous analysis. However, some participants said that many principles in this guideline can exist in parallel or are overlapped, and they found it difficult to choose when voting. Therefore, the voting result does not affect the conclusions of three main design principles drawn above, but only serves as a warm-up for the participants to prepare for ideation. The specific voting results and insights are detailed in the appendix.
The generated ideas and insights cover the aspects of:

**Curiosity**
Information such as material origins and characters is not so relevant and interesting to customers, but they are the core of sustainability communication. To avoid “parenting feelings” in traditional informing ways and increase customer willingness to accept this information, a hook is needed. Participants propose that arousing customers curiosity by innovative design can be a good way to deliver sustainability information, and even introduce new concepts.

**Personification**
The idea is to give the product a personality and enable interaction and communication with people, thereby enhance emotional connection between in-home equipment and customers. Participants illustrated that such the appealing design can be found in smart appliances such as Siri and Alexa, which may also help to raise curiosity.

**Well-trained employees**
Participants agreed that employees should be at the same page in terms of company’s sustainability efforts and strategy. On participant mentioned the bad experience caused by sale personnel’s lack of sustainability knowledge, which affect her impression on the reliability of the brand. In addition, some participants indicated that the installers’ words can be a design opportunity, because they’re often perceived as reliable people, and their recommendation words sounds more based on personal experience than template.

**Incentivization**
Goal setting was mentioned as a way to cultivate customer's sustainable using habits. Participants raised concerns about customers’ information reception and suggest a step-by-step communication with the help of virtual rewards. In addition, emphasizing the benefits of using the circular-designed products (such as mentioning that more money can be saved through power-saving mode when compared with the previous generation product) was also suggested as a design opportunity.

**Splash screens**
The idea of communication though splash screens can be applied in both app and TV usage. Participants felt that put sustainability information next to usage can effectively increase its accessibility.

**Branding**
In addition to the above-mentioned design directions in different phases of the customer journey, branding and marketing campaigns are also proposed as innovative methods to raise awareness and keep freshness regarding sustainability communication. KPN is regarded as a traditional telecom company; promoting sustainability through marketing campaigns with consistent but innovative branding strategy will undoubtedly be an impressive highlight that make it stand out from other brands.
6.3 CONCEPTUALIZATION

This section introduces the design concepts based on the ideas from creative session and case studies. The concepts focus on three different aims, including increasing perception of sustainability, behavior change and redirection. Some designs aim to increase perceived sustainability by providing information or through nudging with indirect communication, while some concepts design new functions or actions that require customer's behavior change. Besides, there are also concepts of redirection that do not involve any sustainable actions or information, but allow customer to be exposed to the above two concepts.

The concepts were also tested with eight customers by interview and discussed with KPN employees from different departments to gain feedbacks for latter iteration and strategic design. Interview guides, process and results details can be found in the appendix. In the end, the concepts are evaluated from the perspectives of impact and effort.

Eight design concepts are mapped in the following customer journey:

- **Concept 1**: Little notes from the device
  - 1.1 Greeting note
  - 1.2 Thank-you note

- **Concept 2**: Chat box
  - Concept 2.1 Greeting and introduction
  - Concept 2.2 Praise and reward

- **Concept 3**: Product component performance and source panel
  - Concept 3.1 Exploded view and component origins
  - Concept 3.2 Fault self-detection

- **Concept 4**: Monthly sustainable effort report

- **Concept 5**: Customization of power saving mode settings
  - Concept 5.2 Power saving mode synchronized with living habit
  - Concept 5.3 One integrated switch that control power saving mode of all devices

- **Concept 6**: Power saving indicator light on the devices

- **Concept 7**: Innovative reuse of package
  - Concept 7.1 Installation box that can be transformed into a device container
  - Concept 7.2 Installation box that can be transformed into the shell of device

- **Concept 8**: Exhibition of the used product and its memories
  - Concept 8.1: Offline exhibition
  - Concept 8.2: Online exhibition
Concept 1  Little Notes From the Device

Context
The moment when receiving new devices means a start for customers to use a new service. Customers are “in a mood for change”, and at the same time willing to accept information about the introduction or usage of products or services. Sustainability may not be their primary concern at this moment, even though they expect this information is available somewhere. Therefore, an interesting “hook” to trigger customer’s curiosity to know more is needed to guide them to the channels that provide details.

In the latest version of KPN’s TV receiver, a QR code for the app is pasted on the bottom of the device. KPN hopes that users can install the device themselves, and provide relevant installation guides on the app. Although in the daily use, whether download the app or not won’t affect usage of the basic services, KPN still hopes more download of the app and plan to integrate more useful functions and information in this platform.

The return box that support customers send back the devices is also an opportunity of communication; although it’s the time that customers say goodbye to their devices (or KPN), customers are okay with information that is useful or interesting for them.

How it works
Concept 1.1 Greeting note
A little note of first-person narration with handwritten fonts is affixed to a prominent place of the installation package or devices. An interesting text is printed in the note to trigger customers’ curiosity that they can scan the QR code to know more in the app. For example, the text could be: “Guess what? You are not my first master! Scan the QR code to talk to me! – your TV receiver”

Considering that the QR code is already in the device, the little note is hollow in the middle. At the same time, the other side of the little note can show more formal content that guide customers to complete installation with the help of the app.

Concept 1.2 Thank-you note
The idea of little note is also applicable when customers are asked to return their used or broken devices. The little note is placed in the return box that is mailed to customers. It expresses thanks to customers and gives a QR code to track where the used device will go in the future. The text could be: “thank you for your accompany! Do you want to know where I’m going?”

Stakeholder Feedback
Overall, customers have very positive emotion to this idea. They liked the form and tone of this personal contact, and felt curious about what the text means.

Figure 29: key words about customers’ feeling of the little note
Overall, the interviewees’ first impression to the little note is positive.
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

[Interviewee 2]
“It’s very surprising for me that it’s a secondhand used product, or it seems like that. It’s, it’s very positive for me, because when you buy a product you automatically think that is a new product, and for a lot of products, it’s not important if it’s a second hand one. So, it’s really positively surprises me.”

[Interviewee 3]
“I think this small note makes it more personal. You don’t feel like a number, not one of many, but you feel like a customer.”

[Chenjing]
“Do you think it’s the positive old school or...?”

[Interviewee 3]
“I think it’s positive.”

After introducing this concept, most customers realized that this is not a brand-new product when they see the notes. This is not what they expect and it actually triggers curiosity to figure out by scanning the QR code. In the interview, all eight participants express their willingness to scan the QR code. (Currently, new customers still get brand new devices from KPN. The refurbished devices are provided to those who need replacement of used or broken devices.)

KPN’s employees considered this is a promising concept because of two reasons. On the one hand, this design is not hard to implement. On the other hand, the design improves the user experience by innovative approaches. According to customer interview insights, the little note is subtle and interesting that effectively facilitate the user experience and change traditional impression of telecom companies.

[Minyou, CX design expert, strategy & planning]
“...It’s all about fixing the basics. And we often do not come to improve the real experience and I think these kind of little things is really in the experience, so I love that. And it’s some things are maybe also not that hard to implement, you know, it’s not big technical changes or something like this.”

However, someone has pointed out that the concept itself is not sustainable since it requires extra usage of paper. KPN tries to reduce unnecessary paper documents as much as possible; Though this little note can easily be realized by email, both the emotional connection that customers perceive and the information accessibility are much lower compared to the hard copy. The landing page that the QR code brings customers to also affects customer experience. Although some customers are keen to use the app to control all functions, the step of downloading the app may become an obstacle for people to continue to experience other services. After scanning the QR code, customers hope to have a dialogue with the “device” instead of the download page of app store. How to make sure they don’t leave at this time is a point that can be improved.

Reflection

Due to the aim of redirection, the concept only meets the following design requirement:

- The design clearly guides customers on what to do (to be sustainable).
  - scan the QR code

  The design doesn't require much effort from customers, otherwise needs to be appealing enough to attract customers to spend time and effort on it
  - the design is both easy to take action on and appealing to customers

  The design is easy to implement and feasible already for the pilot
  - Only require QR code and printed notes
The concept itself doesn't provide any sustainability or circularity information, but still highly appreciated by customers and employees.

For customers, this indirect communication has higher customer acceptance than telling them the value straight forward. According to B=MAT model in the chapter 3, by establishing the emotional connection, the little notes trigger customers curiosity and raise customer's motivation to scan the QR code and switch the communication from offline to online.

For KPN, in addition to the feasibility, this design provides opportunities to the connection of different channels and messages. At the same time, the form of hollow design and the usage of QR code increase the flexibility of the design, make it easier for update or change of landing page content.

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How it works?

After the customers install the device and optimize the settings through the guidance of the app, they will find a chat box in the app to have a conversation with the personified “device”. The conversation in this chat box covers the aspect of:

Concept 2.1 Greeting and introduction

1. Greeting
When the customers open the chat box for the first time, the “device” greets them warmly with self-introduction.

2. Explanation of the little note
The “device” explains why it says “you’re not my first master”: customer actually received a refurbished device rather than a brand new one.

3. Introduction of KPN’s circularity efforts
The “device” explains why and how KPN send customers refurbished products by introducing the concept and value of circular economy and how KPN realize this

Concept 2.2 Praise and reward

4. Praise users for making the right choice
The “device” praises users for making the right choice and gives customers a feeling of reaffirmation of choosing responsible providers. A new app icon can be send to customers as a sustainable reward after they have studied the above information.

The tone how the personified “device” chat is friendly and clear. Some Gifs with auxiliary explanations will be sent to customers as stickers. Customers can choose among several reply contents to interact with “devices”, and have deeper understanding of the concept of circularity.

Stakeholder Feedback

Some customers feel the chat box is a good way to raise sustainability awareness because it’s informative and interesting. It educates customers on the basic knowledge of circular economy in an interactive way to deepen customers’ understanding of the concept. The way of reply is appreciated by customers that they just need to select rather than type things, and it also makes sure that customers with little knowledge of sustainability or circularity also have nice user experience here.

[Interviewee 6]
“It’s good. It’s creating the awareness for customers that what they’re doing at the moment, that you are creating sustainability, you have a device it is already used, you’re their new parent.”

[Interviewee 4]
“I think, showing these options is good because not everybody has a deep knowledge about sustainability.”

However, even though more than half of the interviewees were quite happy with this concept, some people expressed their thought to leave the dialogue at this moment. Two reasons account for this result. On the one hand, the content seems to be irrelevant and won’t make any differences to them; on the other hand, the conversation here seems to lead them to somewhere that takes a long time.

In concept 2.2, the app icon will be changed after customers go through the previous introduction. The new icon is introduced as a “present” that “device” sends to customers, which gave them very high expectations. When they realized it’s only an icon rather than financial incentives, they were not surprised but felt a little gap to expectation, though they still like the idea.

From the perspective of feasibility, it is not difficult to build such a chat box based on the existing app, so it can be realized in a short time.

[Interviewee 3]
“I liked that one, but it wouldn’t make a difference to me. “

[Interviewee 5]
“when it takes a lot of time it’s annoying… I will say, on the internet instead of in the app, because I think the app has to be…based on time management, you know.”

[Chenjing] “And do you feel that the process I described has been too long or has already taken a lot of time, or is it because you don’t know how long it will take next, or both?”

[Interviewee 5] “I think it will take a lot of time because there’s different bubbles I can catch on.”

[Interviewee 3] “Haha, that’s so funny… I’m a women, so I like this idea…”

[Interviewee 4] “...And I can tell you here, that people really like what is different, new time, new products, new things…”

“I mean you feel it is worthy to do it, you know, to follow the steps, when you see this icon.”
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When you told me in the previous picture, I was very surprised, what the presents they should be? So in the next picture I see that there're leaves on my app icon. I think okay for me it's not a surprise. It's just a funny thing, so I should advice that you don’t mention it is a surprise but ... a sustainability rewards.

...because I did a good job to use a refurbished device, I think all they're sending me like a month free of the plus package or a month extra MB for my mobile phone or something like that, or discount, you know, something you can really fill in your wallet.

This design concept meets the following requirements and desires:

- The design raises customers' sustainable awareness.
  - Addressed in the message sent by personified equipment
- The design increases customer-product attachment.
  - Personify the equipment
- The design introduces basic knowledge of sustainability and circularity.
  - Addressed in the message sent by personified equipment
- The design is easy to implement and feasible already for the pilot.
  - Only require app development

The design clearly guides customers on what to do (to be sustainable).
- E.g. tell what the circularity definition means to customers

The design increases customer's feeling of participation in the circular supply chain.
- Addressed in the message sent by personified equipment

The design lets customers realize their personal impacts to the environment.
- Addressed in the message sent by personified equipment

The design raises customers' sustainable awareness.
- Addressed in the message sent by personified equipment

The design clearly guides customers on what to do (to be sustainable).
- E.g. tell what the circularity definition means to customers

Effectively raise awareness
Raise customer's personalized feeling

Pros & Cons

Collaboration

Behavior change and long term impact

Multi-channels and innovative approaches

Relevance

Three dimensions of sustainability

Behavior change and long term impact

Transparency

Relevance

Three dimensions of sustainability

Reflection

This design concept meets the following requirements and desires:

This concept is informative due to the rich interaction and communication that happened in the chat; furthermore, the concept seems effective to increase the customers perception of sustainability. Nevertheless, the concept also has a downside: customers may leave because of too much information it provided, as they feel it (will take) too much time and effort. Although in the design I tried to lower the barrier of interaction, the overall process is still too much for customers. Besides, the content such as concept of circular economy is understood by a large perception of people, making it the first part of dialog to some extent lower customers’ motivation.

It's obvious that KPN hasn't tried this new form of communication before. In addition to the perceived sustainability it raises, the customer's emotional connection with devices – or even with KPN – can be increased as well, and customer's impression of KPN's functional brand image may change accordingly.

As a result, the form of personification can be kept in the design. To improve this concept, the communication content should be more concise and clearer to customers and meet the following requirement:

The design doesn't require much effort from customers, otherwise needs to be appealing enough to attract customers to spend time and effort on it.
- Select instead of type the reply to reduce the customers effort
- X The process is perceived as long and irrelevant
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

### Concept 3: Product component performance and source panel

- **Aim**
  - **Inform**
  - The concept gives information about parts of the device, performance status score as well as other detailed information of each part.
  - **Redirect**
  - Concept 3.1 can bring customers to channels that convey introduction of sustainable supplier or materials. Idea 3.2 can add a portal to contact customer service.

- **Channel**
  - **Apps**

- **Time**
  - 3.1 After installation
  - 3.2 Encounter malfunctions

- **Frequency**
  - Middle

### Context

#### Sustainability or circularity information on the website

Green pressure has become a trend. When sustainable alternatives are widespread, affordable and just as good or better than the legacy option, then eco-consumption becomes less about the status of opting in, and more about the shame of opting out. (*5 Trends for 2020*, 2020)

So are the companies. Corporations are feeling the pressure to go green, and that’s a really good thing for the environment. In the last year, 25 percent more companies have touted the environmental and social benefits of their products, and 40 percent of all companies now say they’ve taken action to improve the eco-friendliness of what they offer. (Caldwell, 2020)

To reflect their efforts in this regard, companies have provided information on sustainability or circularity operations in their websites or newsletters. Especially for larger companies, their websites are often well-made with open and transparent information. Visitors can find a page that specifically describes the company’s sustainability details if they want. KPN is not an exception. In the KPN’s cooperation website, customers can find its effort, strategy and collaboration related to sustainability or circularity.

For large companies, sustainability links are not usually placed in a prominent position on the website. The accessibility of information on the website is low because customers rarely spend time and effort in searching for this information in their daily life. Customers become passive information receivers when browse the information.
Waste in returning “malfunction” devices
Although KPN’s devices have good quality and maintenance is therefore hardly happen, sometimes the devices can encounter malfunctions; in this situation, KPN always actively solve the problem for customers. Usually after simple guidance with remote customer services, if the devices don’t work still, KPN will ask customers to return used equipment, after that they will receive a new one.

This is an efficient way to satisfy customers, as it avoids tedious on-site maintenance and minimizes the inconvenience on customers’ usage of services. The problem is, sometimes the equipment received by KPN is actually usable; remote assistance did not troubleshoot the cause of the failure, resulting in a series of unnecessary process. Jeroen, the [fix me] of KPN, once mentioned an interesting case: customers sometimes ask for a new TV remote control, not because their remote control has broken, but because they lost the battery cover part on it.

How it works
Concept 3.1 Exploded view and component origins
The product component performance and source panel presents an exploded view of all components of the equipment as well as the performance status score of each part. A score of 10 indicates that the component is brand new. Some parts of refurbished products are recycled so don’t have full score, but KPN will make sure that there will be no component with low scores that affect the service quality.

Customers can click the parts to see details. The name, age, origins of components are shown in the detail page. The button of suppliers and materials will take customers to the pages that provide corresponding sustainability or circularity information.

Concept 3.2 Fault self-detection
On the basis of 3.1, customers can see which components have failed when encounter malfunctions by checking the score of performance on this panel, and then report the information to the maintenance personnel.

Stakeholder Feedback
In customer interview, this idea was highly rated as it provides useful information to customers. Customers admit that they are a bit worried when they learned that the product is not new, but this idea completely dispels their concerns by reliable and transparent information. In general, customers trust KPN and believe that the score really reflects the quality, yet one interviewee would like to know the standard that KPN scores the performance.

[Interviewee 3]
“...the other thing is, which is a positive thing. I know that if something happens to those through to their equipment KPN will make sure that it’s working again within no time either you get like a new piece of what’s not working or otherwise.”

[Interviewee 7]
“How do you measure your performance?”

Despite the relevance and transparency of information, some interviewers feel the information is not interesting or too much for them. For example, when talking about the birthday of component, some feel it’s a cute and personal way that paraphrases the lifetime while others think this goes too far. But for performance status scores and information about part names, origins, sustainable suppliers and materials, customers find them rather useful.

Employees feedback is basically about the implementation of this idea. In their opinion, idea 3.1 is feasible since the core of implementation is collecting and presenting data. But idea 3.2 involves more technical challenge that need more efforts, for instance, the sensors may be needed to detect the status of each component in real time and connect the component with the app.

[Interviewee 4]
“I mean it’s a good idea though it has too much information... I would, yes, reduce the information, put the most important ...for example supplier, material, recycle plastics which is really important... I’ll get tired to read everything.”
Reflection

This concept delivers information not only about sustainability but also product transparency. Here are the design requirements or desires it meets:

- Performance status score
- Check performance and quality, support maintenance
- Performance status score, information about sustainable material and supplier

The design ensures the performance and quality of products and services.

The design brings additional benefits to customers
- Performance status score

The design provides convincing information about KPN’s circularity efforts and vision (including customer’s personal efforts with the help of KPN)
- Performance status score, information about sustainable material and supplier

The reason why customers gave very positive feedbacks on this concept can be two folds: the communication is on the right time and tell the right information: in concept 3.1, customers reach the product component performance and source panel just after they are informed that the products are refurbished, and the detailed product information in the panel just effectively reassures customers by being honest and transparent.

What concept 3.2 emphasize is not the sustainability or circularity features but the convenience of maintenance. Despite that it doesn’t improve customers’ sustainable awareness or behaviors, this concept is still valuable: on the one hand, it brings additional benefits to customers; on the other hand, it’s based on concept 3.1 thus the functions can be developed step by step and the concept 3.2 requires less effort to realize compare to a new concept.

Pros & Cons

- Highly appreciated by customers
- Gives suppliers the opportunity to be known by customers
- Also support product maintenance
- Difficult to implement

Concept 4: Monthly sustainable effort report

Aim

Inform

This sustainable effort report involves information about:

1. The use time of power saving mode this month
2. The sustainability ranking among all KPN customers
3. Money and energy saved through power saving mode

The report shows the total time and the specific daily usage of power saving mode through the chart

The report calculates the amount of money or energy customer saved compared to normal use

Redirect

At the end of this report, customers can find the link to channels that convey introduction of power saving mode and settings of power saving mode

Channel

Apps, emails

Time

Daily use, checking monthly invoice

Frequency

Middle

Context

Some communication happens shortly before or after sustainable actions. The former usually affects the customers’ actions through nudging, while the latter is to inform the customers of the impact and benefits of what he has done afterward.
Ant Forest is a good example of communication after sustainable actions. Alipay Ant Forest encourages people to live a greener lifestyle by integrating a range of low-carbon activities into daily life—such as paying utility bills and purchasing tickets online via a mobile device and walking to work instead of driving. These behaviors are recorded and converted into “virtual green energy” on the Alipay Ant Forest platform. Once a user’s virtual tree has fully grown, Alipay and its philanthropic NGO partners plant a real tree in Northwest China or commit to protect a particular conservation area. (“Chinese initiative Ant Forest wins UN Champions of the Earth award.”, 2020) Ant Forest also has fun features to engage users, such as like leader boards or the ability for friends to water trees for, or “steal” energy from, each other. (“How Alipay Users Planted 100M Trees in China | Alizila.com”, 2020) This greatly enhances the feeling of participation.

In daily life, people are not aware of the benefits that their sustainable actions can bring to the environment and society. Quantifying customer’s contribution and send it to customers with subtle reminders and encouragement can be helpful to promote their motivation to behave more sustainable.

Figure 33: Ant Forest

In these interfaces of the Ant Forest, green energy is displayed in the form of green bubbles. They are the result of your sustainable actions throughout the day. When your virtual small tree has collected enough ant energy to grow into a large tree, you will obtain a virtual certificate.

Stakeholder Feedback

Generally speaking, customers like this concept and all indicated the willingness to have a look at this report. Some interviewees even said the content of report can affect their use behaviors. At the same time, the report gives clear instructions about what to do to become more sustainable, which is what they find useful.

[Interviewee 1]
“Because when I get this, it is clear to me what it does and what you can take action on.”

[Interviewee 2]
“So, if I use a lot this month, I would be shocked about it. I would be considering thinking of customization on the power saving.”

Customers felt the calculation and recommendation in this report is a reflection of KPN’s serious implementation of sustainability and circularity. In their opinion, the report also indicates that KPN is considering energy saving and money saving for customers.

[Interviewee 4]
“It would be a shared responsibility.”

[Interviewee 5]
“It’s really good, because you can see they’re thinking with you. KPN isn’t thinking with me now it but it’s okay, but they want to stay with me for saving money, save my money.”

According to Ruud, a commercial product manager that is responsible for the hardware of TV and product refurbishment, they are working on showing the time and saved money by power saving mode to customers on the TV splash screen. He also affirmed the feasibility of the technology that whether the power saving mode is turned on can be detected.

Although employees recognized the impact and feasibility of this idea, it’s worth notice that the feeling of freshness can fade out after customers receive this report several times. The interviewee who was shocked by the data may find this report helpful the first month; but after he adjusts the settings and behaves sustainably for a period of time accordingly, the data in this report will be stable and won’t change much every month. At this point, it makes no sense to read such a report with nearly the same content.
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6. DESIGN DEVELOPMENT

[Eric, Commercial Product Manager]

"...But in practice, I don't think your graph would look like this, it would almost be a straight line ...if after the third month it's still a straight line, you know every month it's the same, then you won't look at it anymore."

Reflection

This concept is one of the most appreciated concepts in the customer interview as it meets most of the design requirements and desires:

- The design increases customer's feeling of participation in the circular supply chain.
- The design lets customers realize their personal impacts to the environment.
- The design raises customers' sustainable awareness.
- The design clearly guides customers on what to do.
- The design doesn't require much effort from customers, otherwise needs to be appealing enough to attract customers to spend time and effort on it.
- The design fosters customer's sustainable habits.
- The design provides convincing information about KPN's circularity efforts and vision (including customer's personal efforts with the help of KPN).
- The design communicates through omnichannel to ensure customers receive information with optimized user experience.

KPN is already considering showing the power saving time in the TV screen when customers turn it on or off. This plan is consistent with the concept and can be the first step for the pilot test. But it's worth notice that power saving mode time is detected by specific product design and components, therefore the time and effort to implement the concept need to be taken into account. Besides, it's also important to let customers know that only they know the information and their privacy is well protected.

Making the monthly report different and attractive should be the focus of improvement from a long run, otherwise customers' motivation to check it will get lower and lower. To enhance the motivation, the following ways may be helpful: gamification at the end of report to raise curiosity, goal-setting to let customers see the progress and goal, financial incentivizes as the reward, etc.

Pros & Cons

- Highly appreciated by customers
- Little change between monthly report
- Collecting time information may involve privacy issues
6. DESIGN DEVELOPMENT

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Concept 5 Customization of power saving mode settings

Aim
behavior change
The concept aims to customize the use time of power saving mode according to living habits and encourage them to use power saving mode more.

Channel
Apps

Time
Daily use

Frequency
High

Context
In recent years, KPN has introduced power-saving mode in the latest version TV receivers. This is actually one of the unique selling points that differentiate KPN from other competitors.

Customer’s attitude toward sustainable behaviors are positive, but according to interview insights, sometimes they just too lazy to conduct. People understand the benefits of using power saving mode, how to lower the barrier to use it is a design challenge here.

How it works

Concept 5.1 Default settings of power saving mode
In the default setting, power saving mode is automatically turn on for 5 hours in the middle of the night (from 1am-6am). Customers can personalize the time it turns on in the setting page, or manually switch it on and off according to living habit.

Concept 5.2 Power saving mode synchronized with living habit
By connecting to other in-home or wearable devices, the power saving mode can be turned on when users are sleeping. When customers check their sleep time, they can also see how long these devices have been “sleeping” with them. Same idea can also be applied to traveling. When no one is at home, the app sends a notification to remind customers to turn on power saving mode; customers can change the settings to let it turned on automatically by detecting location of customer’s mobile phone or connected to the camera at home.

Concept 1 One integrated switch that control power saving mode of all devices
In addition to KPN’s in-home devices, other household appliances also include power saving mode in product design. The integrated switch can be connected to all equipment at home and control the on and off of their power saving mode with simply one click.

Stakeholder Feedback

Customers reaction on customization of power saving mode varies. Some customers liked the idea of sending reminders and indicated that they often forget and need such notification. Some customers say that they think power saving mode is great but so many customized settings and reminders are not necessary, because simply pressing a switch to control is not troublesome. There were also customers who are passionate about smart home design of idea 5.3, they expected the design to be smarter that is able to learn their behavior pattern and adapt the settings to it.

[Interviewee 3]
“I’m not sure if I want to have so many options. Well, for example, I don’t really need it to be switched on when I’m traveling because if there is this option I would turn it off to power saving mode before I leave my house.”

[Interviewee 6]
“It’s like a Google home... I like things like that, it gives you reminders...”

[Interviewee 8]
“I will be a bit reluctant to that you need to turn on some kind of indicator at home, because we never know if the stimulation comes to the wrong hands.... but it would be nice if the machine itself... discover a pattern based on self-learning.”
Both employees and customers mentioned the privacy issue of this concept. Although some customers had full trust in KPN's access to their own sleep or location information, some people expressed concern about this idea. In addition to security considerations, there are also comments on the necessity of using information about personal lifestyle in the settings modems and TV receivers.

[Interviewee 2]
“In basic, I think it's, it's perfect that the device learns about your own habits, sleeping, times and that kind of stuff. But on the other way, I think it can be difficult because it with privacy stuff.”

[Sjie-pilot test insights]
“Why does a modem need to understand my living habit? It knows too much.”

In terms of product design, this concept needs the support of IOT technology to achieve remote control of power saving. The implementation requires product iteration over a period of time, but the technical difficulty is acceptable.

Reflection
The concept mainly meets the design requirements and desires of use behaviors and habits:

- Customize power saving mode
- Power saving mode synchronized with living habit
- Power saving mode synchronized with living habit
- Power saving mode synchronized with living habit

The design clearly guides customers on what to do (to be sustainable).

The design starts with fixed products and services but is also applicable to other KPN service portfolio.

According to both customers and employees, this concept is very controversial due to the privacy issue. Admittedly, smart home system makes people’s smarter and easier, yet it’s not widely accepted by market at the moment. But we can still see it as a trends and future vision; and at that time, privacy won't be an issue anymore: in the future, it will be protected by more sophisticated regulations and more advanced technology. Meanwhile, customers can trust KPN’s responsible brand image; they provide the data as they believe it would be only used for improving better life.

In terms of feasibility, this concept needs the support of IOT technology to achieve remote control of power saving. The implementation requires hardware redesign and product iteration over a period of time. Concept 5.3 may also involve partnership with more household appliance companies or energy companies to enhance viability. Taking these into account, the whole concept is more suitable to be considered from a long run.
Concept: **Power saving indicator light on the devices**

**Aim**

**Nudging**
The indirect communication through lighting indicates the energy consumption.

**Behavior change**
This idea guides customers to turn on the power saving mode when they don't use the services.

**Channel**
Device itself

**Time**
Daily use

**Frequency**
High

**Context**
Customers can be overwhelmed by too much information on text or graph, hence it’s also possible that they miss this kind of information because they don't want to or too lazy to access the channels.

Although the modems are often hidden in the cabinets, the TV receiver and the remote control are still visible in the prominent space in customer’s home. This provide opportunities for communication subtly with customers through product design language.

Nudging to communicate the sustainability or circularity is common in the field of physical products. The Flower Lamp is an example. It builds on an increasingly prevalent technology – remote energy metering – to visualize electricity used in the household as a whole. It visualizes the energy consumption by adapting its form. Similar designs include Power-Aware Cord from Static!. It’s an electrical strip with a cable embedded with wires that emit light relative to how much electricity is being drawn from the grid. The more current, the brighter and faster the blue light spirals ("Eco-Visualization: Aesthetics for Sustainability | Urban Omnibus", 2020).

These communications can make the invisible energy visible and nudge customers to change unsustainable power using habits.

**How it works**
The lights on the device will change its color according to the energy consumption this month. As the power saving mode turn on, its flashing speed will be slower and the brightness will decrease.

**Reflection**
The design raises customers’ sustainable awareness.
- Tell energy consumption by changing indicator light
- Lights prompt users to reduce energy use

The design clearly guides customers on what to do (to be sustainable).
- Can be adopted by almost every device with power saving mode in the future

Figure 34: The Flower Lamp
With a decrease in household electrical use, the Flower Lamp slowly opens up and appears to ‘bloom’. On the other hand, energy consumption increases, the lamp closes into a more contracted form, which also affects the quality of light emitted ("Flower Lamp", 2020).

Figure 35: The Power-Aware Cord
The Power-Aware Cord embeds wires around a cable that pulse light in relation to how much electricity is being drawn off the grid. The more current, the brighter and faster the blue light spirals. ("Eco-Visualization: Aesthetics for Sustainability | Urban Omnibus", 2020)
This concept has the most frequent communication with customers. At the same time, considering that the carrier of information is the product itself, the availability of information is relatively high.

The difficulty in realizing the concept lies in the product design it involves. It takes much time and effort to invest from defining the lighting design requirements to cooperate with manufacturers to introduce a new generation of equipment. Does the design that requires such effort brings equivalent benefits? Will this design become useless after customers develop good use habits? The answer may be no. One reason is that they’re already lights on the devices that indicate the status of the operation, and the information they deliver is more useful for customers. Multiple lights make the devices look more complicated and may confuse customers. The other reason is the accessibility of information. The frequent communication we envision may be theoretical only as customers won’t pay much attention to the lights on the devices that they hardly pay attention to in the daily use. Just like concept 3, customers may be curious at the beginning but when they get used to it the trigger it brings becomes less attractive and effective. If the design is to be extended to devices like modems that have less contact with customers, there will be less effective communication.

**Pros & Cons**

- Frequent communication and nudging
- The effect decreases after users get used to it
- Easy to be confused with other indicator lights

**Context**

On the one hand, cardboard packaging itself is often perceived as an unsustainable design. On the other hand, packaging has the opportunity to leave a deep first impression on customers. As mentioned earlier, although circularity is of great significance to KPN, it is not their main selling point. Therefore, publicity this feature largely in the packaging is not realistic. But if KPN make environmental-friendly and innovative use of packaging as well, its sustainability image must be more impressive to customers.

**Concept 7 Innovative reuse of package**

**Aim**

Inform

The infographic inside the original package introduce the circularity

Nudging

This idea increases customer-product attachment by ask them to DIY build the something that related to their device

Behavior change

Although the idea involves the action of building container or shell for devices, it can also encourage customers to DIY install the device without the on-site services.

**Channel**

packaging

**Time**

Receive installation package - Installation

**Frequency**

Low
One precedent that reuse packaging materials in a fun and practical way is Nintendo Labo. Build-Play-Discover. The Japanese console and video games producer, Nintendo has introduced Nintendo Labo, a creative and unique innovation which uses corrugated cardboard as a fundamental component of the console. Nintendo Labo combines the TV-console Nintendo Switch with pre-punched corrugated cardboard sheets which can quickly and easily be transformed into interactive gaming elements. With the Toy-Cons made from corrugated cardboard, Nintendo Labo is demonstrating that the environmentally-friendly packaging material is not only used for traditional packaging and displays, but can also become a fundamental component of the finished product. (“Nintendo Labo - Function meets Design.”, 2020)

How it works

Concept 7.1 Installation box that can be transformed into a device container

By cutting, folding and splicing pre-punched corrugated cardboard of equipment packaging, customers can reuse it to build a container for devices. This can be in the form of a shelf or a dust cover.

In order to ensure the cleanliness of device container, the inside of the original packaging will become the outside of the container. The info-graphic that introducing circularity of KPN is printed on the cardboard to make the final container more attractive.

Figure 36: Nintendo Labo

Nintendo Labo is a set of kits allowing DIY-inclined gamers to construct their own cardboard controllers for the company’s grab-and-go Switch console. Called Toy-Cons, the Labo controllers range from a 13-key piano to a robot suit to a steering wheel. Once built and joined with a standard Switch controller, Toy-Cons can be used for a variety of minigames, like fishing or racing. (“Helping Gamers Create Their Own Fun: The 50 Best Inventions of 2018”, 2020).

Concept 7.2 Installation box that can be transformed into the shell of device

Similar to idea 7.1, the cardboard packaging can be reused for new functions. In this idea, customers receive the core component of the equipment in their package and they are asked to build the shell of equipment by using pre-punched corrugated cardboard of equipment packaging.

Figure 37, 38: the wrapping paper of Tony’s Chocolonely

The graphic design of it illustrates the mission of “make chocolate 100% slave free”
6. DESIGN DEVELOPMENT

ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

Reflection

The design raises customers’ sustainable awareness.
- Reuse the package

The design increases customer-product attachment.
- DIY installation of the cover or the shelf

The design clearly guides customers on what to do (to be sustainable).
- Reuse the package

The design doesn’t require much effort from customers, otherwise needs to be appealing enough to attract customers to spend time and effort on it.
- DIY installation of the cover or the shelf requires extra effort from customers but is also fun

The design brings additional benefits to customers
- DIY installation of the cover or the shelf

The main purpose of this concept is to increase customer-product attachment by ask them to build the shell or container of devices. In this way, customers may care more about the circular or sustainable features of the devices while caring more about their device.

Many people are very enthusiastic about Nintendo Labo, not only because of the interesting game experience it brings, but also the experience of handwork. It can be deemed that this idea may also appreciate this idea. But it is worth noting that this idea may only attract some customers that are young, curious and like hand-made stuff, and it’s not appropriate to promote it on a large scale.

However, this concept is hard to raise customers motivation to build the casing or container of the device. Customers don’t get enough incentivization to do so, and most of them want to get their devices ready as soon as possible. Therefore, this concept may only attract some customers that are young, curious and like hand-made stuff, which is not suitable for large scale promotion.

In addition, this design has nothing to do with KPN’s current contribution to sustainability and circularity. In the long run, this concept lacks consistency with other designs. If KPN wants to implement a concept like 7.2 that involves product development, then cost is not proportional to the return as customers acceptance is relatively low.

Pros & Cons

- Interesting interaction with customers
- Make sustainable use of packaging
- Only be appreciated by a small group of customers
- 7.2: require product development

Aim

Inform
In addition to the stories behind the exhibits, the exhibition also conveyed KPN’s circularity concept and effort to the audiences.

Nudging
Customers who buy products at the exhibition may be attracted by the stories behind the products, so the customer-product attachment is higher than common case.

Behavior change
The exhibition reflects the unique selling points of KPN, which become one of the reasons for customers to subscribe.

Channel
Online: website, app
Offline: gallery, store

Time
Purchase decision making, visit the museum

Frequency
Low

Context

When asked about whether they feel KPN is sustainable, customers tend to first recall the publicity on commercial, social media and other branding channels rather than customer journey they experienced. Facts have proved that promotion and branding that beyond usage are important to affect the customer’s impression.

KPN did promote its sustainability in TV and video ads. But this is not enough. The traditional nature of media has prevented information from impressing customers. Some more interesting promotional methods or marketing activities are needed to attract customer’s attention to sustainability and circularity. Although the touchpoint here is shorter and narrower than commercials with a large audience, the fresh impact that innovative activities leave on customers can be stronger.

Pokemon Go Earth Day Cleanup was a successful example. Niantic (“Pokémon Go” developer) teamed up with Mission Blue, Playmob and local NGOs to inspire its users worldwide to pick up trash in a green initiative. They gamified a 48-hour cleanup window where players could earn exclusive unlocks and in-game rewards for engaging with the trash pick-up initiative. (“9 Eco-Friendly Experiential Marketing Campaigns | Eventeem”, 2020) Thousands of players participated across the globe, helping to keep the oceans and planet clean for all the real-world inspirations for Pokemon out there.
Figure 39: A website lists a series of worldwide events where players can come together to clean up entire areas. The more trash that they pick up, the more in-game rewards that the entire group will receive!

How it works
When customers return used devices, KPN encourages customers to share memories with their devices. The question can be like this: “This device has been with you for 2 years. In the past two years, which moment of your life was the most memorable?”

These stories along with the devices are displayed at the exhibition. The visitors or new customers can select stories they like most and choose to give the device a second life in the subscription.

The exhibition can be held both online or offline.

Concept 8.1: offline exhibition
Considering that KPN has technical support on audio guides for some galleries or museums, offline exhibitions can be held in these organizations that KPN has collaborated with. Another place for holding an offline exhibition is the offline store. Offline stores hold smaller-scale exhibitions; if users want to learn more, they can visit online exhibitions by scanning QR codes and other methods.

Concept 8.3: online exhibition
The online exhibition is based on the website, but customers can access it through channels like apps and social media. In addition to promoting sustainability and circularity, this exhibition can also become a new trend of socialization that in line with “connectivity”.

Stakeholder Feedback
Customers felt the image of devices get lively and personal with the help of the corresponding stories of previous owner. Some customers mentioned that memories related to routers or set-top boxes are hard to think about and not so appealing to display.

[Pilot test - Yaying]
“I don’t think I can share any stories with my modem.”

Reflection
The design increases customer’s feeling of participation in the circular supply chain.
• customers experience the return process and can choose to use refurbished devices

The design raises customers’ sustainable awareness.
• exhibition (including exhibits) introduces the sustainability and circularity

The design increases customer-product attachment.
• customers recall/visitors read the product-related stories

The design clearly guides customers on what to do (to be sustainable).
• share stories/choose refurbished devices

The design doesn’t require much effort from customers, otherwise needs to be appealing enough to attract customers to spend time and effort on it.
• the exhibition is innovative and interesting

The design communicates through omnichannel to ensure customers receive information with optimized user experience.
• online and offline exhibition

Unlike the previous concepts, this concept opens up new communication channels and enables customer engagement in a higher level. Although this concept does not occur in the three phases (installation, daily use and maintenance) that defined earlier, it connects the end and begin of customer journey, which emphasize circularity to customers in a meaningful way.

Because user generated content makes up most of the exhibition, it is important to encourage them to share valuable content. One opportunity is to ask customers to share stories that are not limited to “device-related memories”. The stories they shared can be the benefits of sustainability, goodbye to the device, or other tips to be sustainable, etc.
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

6.3 CONCEPT EVALUATION

The eight concepts, including some sub-concepts, are compared, analysis and evaluated with the help of impact effort matrix. By mapping ideas in this matrix, the result is a visual representation of where best to assign time and resources. Activities fall into one of four categories:

Quick wins
Give the best return based on the effort.

Major projects
Provide long term returns but may be more complex to execute.

Fill ins
Don’t require a lot of effort but neither do they offer many benefits.

Time wasters
Time-consuming activities with low impact that should be avoided, (“Impact Effort Matrix Template, Action Priority Matrix - GroupMap”,2020) To measure the impact of the concepts, I took customer’s feedback into consideration. In addition to the opinions and feelings they expressed in the interview, their answers to the following three questions were also included in the evaluation:

1. Which ideas do you like most?
2. At which steps (in the ideas) do you feel that KPN has contributed to sustainability?
3. At which steps (in the ideas) do you feel that KPN has contributed to sustainability?

The results of the question are discussed in 9.1.2 Evaluation of perceived sustainability and appendix.

In general, the higher customer perceived sustainability or circularity is, the greater the impact will be. However, the above ideas may bring extra benefits to KPN, Such as the increase in sales. These benefits are also be used as an assessment reference.

The impact of the ideas is measured according to employees’ view on feasibility. Time, resources, manpower and technology are all considered in the assessment.

The evaluation result is illustrated in the following impact effort matrix.

Figure 40: Ideas mapped on the impact effort matrix
Through further concept screening and design optimization, I came up with the final design solution. The final concept integrates the valuable elements and insights from previous chapters. This chapter describes how a customer experiences the ideal customer journey in the future in the form of storyboard, and then introduces each concept in depth by showing improvement and prototypes.
7. FINAL CONCEPT

7.1 IDEAL CUSTOMER JOURNEY

Figure 41 on the left presents a simplified version of the ideal customer journey. Customers can experience the six concepts mentioned earlier in the purchase, installation, daily use, maintenance and departure phases.

However, despite the interconnected elements, introducing them separately does not clearly present the final design picture. Therefore, the following story depicts the ideal customer journey of a KPN customer - Cheryl - in the form of storyboard. In this story, all elements are well-implemented and help customers create a convenient and easy life from a sustainable and circular perspective.

Name: Cheryl
Age: 24
Job: Product manager
Residence Status: Live alone
Sustainable awareness: ● ● ● ○
Sustainable habits: ● ● ○ ○ ●

*Figure 41: Sustainability communication touchpoints of design in different phases of overall ideal customer journey*
The following storyboard describes the ideal customer journey of the main character Cheryl, from discovering service provider to returning used devices. The elements and corresponding touchpoints are highlighted and further explained in the next section.

**Element 1:**
**Little note from your devices**

**Touchpoint**
Little note from your devices (new customers)

**Element 6:**
**“Circular Memories” exhibition**

**Touchpoint**
Online “Circular Memories” exhibition

---

**Set-top box... It’s old but still usable... wait, will new provider give a new one? ... I don’t know.**

**Well, just throw it away...!**

---

**Little note from your devices (new customers)**

---

**“Circular Memories” Exhibition**

---

**“Circular Memories” exhibition**

---

**Let me take a look at this “Circular Memories” exhibition...**

---

**KPN... the quality of service seems to be good... wow! Does it even offer refurbished devices?**

---

**Ah, this sentence touched me so much.**

---

This accompanied me through college time in Delft. Now I’m leaving here, I hope its life can continue with you.

–Chenjing Liu

---

**2 DAYS LATER**

---

**Thank you!**

---

**Hey, you got a package!**

---

**Looks good... hey, what is this little note?**

---

**Google**

---

**I’d like to first subscribe for the interactive TV...**

---

**Let me do some research on the service providers.**

---

**Finally arrived at my new home!**

---

**Hey... how should we deal with your set-top box?**

---

**Old Apartment**
7. FINAL CONCEPT

ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

**Element 1:**
Little note from your devices (new customers)

**Element 2:**
Chatbox

**Element 3:**
Product component performance and source panel

**Element 4:**
Integrated power saving switch

---

It's like a small note written by my device...
That's cute!

Let me scan this QR code to install and chat with “device”.

Done!

There is really a chatbox with my set-top box in this APP!

I can feel the emotional connection with my set-top box... KPN is really caring about my use experience.

KPN even shows the detailed quality and origins of the parts so transparently!

I like how KPN put efforts on sustainability!

1 DAY LATER

---

**Touchpoint**
Little note from your devices (new customers)

**Touchpoint**
Chatbox (app)

**Touchpoint**
Product component performance and source panel

**Touchpoint**
Integrated power saving switch
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

Element 4: Power saving mode synchronized with living habit

**Touchpoint**
Power saving mode synchronized with living habit

Element 5: Monthly sustainable effort report

**Touchpoint**
Monthly sustainable effort report

Element 6: “Circular Memories” Exhibition

**Touchpoint**
Little note (return devices)

Element 3: Product component performance and source panel

**Fault self-check system**

Element 5: Monthly sustainable effort report

**Touchpoint**
I saved so much money through power saving mode.

Am I more sustainable than 50% of KPN customers?

**Touchpoint**
I think I can be more sustainable. Let me customize the setting.

There is a monthly sustainable effort report at the end of the payment invoice.

**Touchpoint**
I believe this device still has the value. I remember that few years ago, I also chose refurbished set-top box...

**Touchpoint**
Parts that have been used for many years seem to be malfunctioning.

**Touchpoint**
Planting this little note made of seed paper is also a very green thing.

Welcome home, Cheryl! Power saving mode is turned off, off.

**Touchpoint**
Hello, Alexa.
7. FINAL CONCEPT

Due to space limitations, the service blueprints are not discussed in this chapter, see Appendix F for details.

Element 1: Little note from your devices

Original idea

Figure 42: Mockup of a small note attached to the device

The little note has a hollow in it so that even if people throw it away or use it to grow plants, they can still easily find the QR code when they need it in the future.

Figure 43: Seed paper, photographed after 6 days of watering

The little note has a hollow in it so that even if people throw it away or use it to grow plants, they can still easily find the QR code when they need it in the future.

Improvement

Optimize: Material of the little note

Dring the concept testing, a number of people suggested that although the idea of little note is novel, using paper to carry information actually caused additional waste. This waste violates the original intention of the design.

In the latter design iteration stage, a more sustainable and interesting material was selected through research: seed paper (also known as growing paper). Seed paper is a type of handmade paper that includes any number of different plant seeds. The seeds themselves can still germinate after the papermaking process and they can sprout when the paper is planted in soil. (“Seed Paper”, 2020) After scanning the QR code, customers may not throw away the small pieces of paper but grow and raise the seeds into a plant.

Optimize: Process

The element solves the problem of the order in which installation and chatbox appear. Customers are clear that this QR code is for downloading the app that provides a guideline for installation. After scanning the QR code, the download page will be automatically open on the phone. If customers have the app on their phone already or decide to download it, the chatbox will be introduced after they complete the installation with the help of the app. If customers don’t want to download the app now, they can still view the instructions and experience the chatbox in the web browser so they won’t miss out the information.
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

Optimize: Different little notes for different usage

Figure 44 illustrates three different little notes. Customers receive corresponding little notes with different communication content at different stages.

Little note in the installation box:

Customers who receive little notes in the installation box here include those who have obtained the replacement device after returning the old/broken device in addition to those who have newly subscribe to the refurbished devices.

For the former, most customers (inclusing some existing customers) do not know that the equipment they received would be the refurbished one, so the content of the little note will tell this. Example of the text could be:

**Guess what? You’re not my first master! Scan the QR code to talk to me.**

For the latter, customers have chosen the refurbished devices, thus the communication can emphasize gratitude:

**Thank you for giving me a second life! Scan the QR code to talk to me.**

Little note in the return box:

Customers who receive this little note are asked to send their devices back to KPN for recycling. At this time, they will bid farewell to the existing equipment. Example of the text could be:

**I’ll miss you! Do you want to know where I’ll go? Scan the QR code to share your sustainability memories!**

---

Figure 44: The front and back of the little note

The prototype presents the text and design of the little note.

Three notes with different hand writing content are provided in the installation box or return box.
**Element 2: Chatbox**

**Original idea**

**Idea 2 Chat box**

**Idea 2.1 Greeting and introduction**

**Idea 2.2 Praise and reward**

**Improvement**

**Remove: Redundant circularity concept introduction**

Dimension 2 of concept 2.1 is perceived as boring and irrelevant information for customers. The emergence of this introduction has lowered the customer's mood in the customer journey. Therefore, this part is removed in the final concept. Instead, circularity is described in a simple and clear sentence which is easier for customers to understand.

Besides, the refurbishment is clearly stated in the chatbox and this can also deepen customer's understanding of circularity.

**Remove: New icon as a sustainable reward**

Concept 2.2 involved the change of icon as a sustainable reward, which received a polarized review from interviewees. This part was also eliminated in the final concept.

The element of chatbox almost runs through the customer journey, hence focusing more on practicality than psychological value is more meaningful.

---

**Figure 46: App prototype of chat box concept**

The chatbox is shown as a floating action button in the app. Customers can communicate with the personified devices in this chatbox and interact by selecting the given reply content.

**Figure 47: Connection with other concepts**
Element 3:

Product component and source panel
+ Fault self-detection system

Original idea

Idea 3
Product component performance and source panel

Idea 3.1 Exploded view and component origins
Idea 3.2 Fault self-detection

Improvement

Optimize: Fault notification

In order to make the design better serve customers, when sensors detect faults of the components, the push message will be sent to customers so that they can handle and maintain malfunctions in time. Problems such as damage to the cover of the device are difficult to be detected by the sensor, in which case the customers can choose to manually submit a replacement application. After KPN staff receives the request, the available equipment or parts will be sent to customers if necessary.

Add: Performance status score criteria

Through adding criteria, the scores are more transparent and reliable. If customers wonder how KPN measures the performance, they can get access to the criteria webpage.

Add: AR-assisted self-service maintenance

Through AR technology, customers can understand the appearance and location of damaged parts, so as to successfully complete repairs according to instruction. This function is helpful for relatively minor problems, since it saves unnecessary waste caused by on-site maintenance or return process.

Figure 48: App prototype of product component and source panel and fault self-check system

The access of component performance status panel is in the service page of the app. Here, customers can find details about their hardware, including sustainability information about the component.
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

Element 4:
MONTHLY SUSTAINABLE EFFORT REPORT
+ POWER SAVING MODE CUSTOMIZED SCHEDULER

Original idea

MONTHLY SUSTAINABLE EFFORT REPORT

Improvement

Add: Sustainability goal setting mechanism

To ensure that the reports received by users will not be the same every time, so as to ensure the information reading rate, this improvement has been made. At the beginning of the year, KPN will announce the annual sustainability goal. It includes the sub-goal that they want to achieve with customer engagement. The specific content can be the amount of electricity that they hope customers can save by using the power-saving mode. In this way, customers can see the progress bar approaching the final goal gradually and have a feeling of involvement.
Element 5: Circular memories exhibition

Original idea

Idea 5: Customization of power saving mode settings
- Idea 5.2 Power saving mode synchronized with living habit
- Idea 5.3 One integrated switch that control power saving mode of all devices

Improvement

Optimize: devices learn from customers

As customers use power saving mode more frequently, the devices learn people’s life patterns and automatically adjusts power saving modes through technologies such as AI and machine learning. At the same time, cooperation with the intelligent voice control industry such as Alexa, Google home, etc. make the usage more convenient, meanwhile, the privacy issues that most customers are concerning can be guaranteed.

Figure 52: The integrated power saving switch

With the KPN Smart Life app, customers can easily switch power saving mode on and off as it connects to all household appliances with power saving mode.

Original idea

Idea 8: Exhibition of the used product and its memories
- Idea 8.1: Offline exhibition
- Idea 8.2: Online exhibition

Improvement

Add: Exhibition on print ads
Remove: collaboration with galleries or museums

According to the analysis of the idea testing results, the purpose of the exhibition should be to attract potential customers while enhancing KPN’s green brand image. The content of the exhibition, that is, the words about old equipment, is not so attractive to most people. This means that the probability of users that take initiatives to visit offline museums and galleries to see these exhibitions is very small. The partnership with third-party organizations, exhibition arrangements, and exhibition publicity will require a lot of time and manpower investment, the result that the offline exhibition in the museums bring may not be satisfying in comparison.

In this exhibition, user-generated contents are the most important points compare to the devices. If only the customers’ quotes are presented, then one plane is sufficient as an exhibit carrier. Therefore, the improvement considers the advertisement in the billboard and stations where a large flow of people are passing by every day. This is an easy-to-operate design that can nudge customers and improve brand green image subtly.

Optimize: name of the exhibition

The name of the exhibition is “circular memories”.

Figure 54: Examples of exhibition on print ads

The poster above extracts the customers’ original sentences as the main content of the advertisement. Different versions can adopt different text. The poster below highlights the name and access of the exhibition.
ENHANCING CIRCULARITY OF KPN IN-HOME PRODUCTS BY CUSTOMER ENGAGEMENT

7. FINAL CONCEPT

Figure 55, 56: App and website prototype of online exhibition concept

Customers can share stories and memories by chatting with personified devices. Their stories will be displayed in the online exhibition.

Optimize: the entrance on the online exhibition

Customers can access this online exhibition on the order page of subscription. At the same time, the refurbished equipment will become a default option, and its prominent location on the webpage as well as its interesting graphics and words attract potential customers to click.

Besides, this concept still leaves space for customers to make a choice rather than force them to accept refurbished products. Customers are still the one who is in charge and have a feeling of control.

These examples are what users may share:

The sustainability of KPN seems to have a magic power that made my life simpler, easier and more convenient in the past three years. I hope this magic will continue in your hands!

Believe it or not, I can use the money saved by the power-saving mode in the past three years to buy a new TV. You must try it.

This set-top box accompanied me through college time in Delft. Now I leave here, I hope its life can continue here with you.

MAIN TAKEAWAYS

This chapter further screens and improves the concepts in the previous chapter. Finally six concepts are selected and optimized and presents the ideal user journey in the form of a comic. How these six concepts are connected are shown as follow:
In this chapter, the detailed implementation of each design concept is illustrated in the design roadmap. A five-year plan has been divided into three stages with different horizons. A concept may have functions implemented at different stages to make sure KPN reach the future vision step by step.
## 8. IMPLEMENTATION

### 8.1 DESIGN ROADMAP

<table>
<thead>
<tr>
<th>Channels</th>
<th>Technology &amp; Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little note for existing customers</td>
<td>Data: - Stories from customers who return devices - Information of sustainable materials and suppliers</td>
</tr>
<tr>
<td>Little note for new customers</td>
<td>New device: - Sensors detect power saving time (IoT) - Power saving mode scheduler (IoT)</td>
</tr>
<tr>
<td>Little note for customers who need to return the devices</td>
<td>New device: - Sensors check fault of the components (IoT) App: - One integrated app for all KPN services</td>
</tr>
<tr>
<td>Chatbox on website (right after installation)</td>
<td>Partnership: - KPN Smart Home business - Energy companies - Alexa, Google homes...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HORIZON 1</th>
<th>HORIZON 2</th>
<th>HORIZON 3</th>
<th>FUTURE VISION</th>
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<tr>
<td>KPN</td>
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<td>KPN</td>
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**Sustainability Awareness**
- Increase customers awareness and perception of sustainability
- Be sustainable without much extra effort and sacrifice of service quality

**Sustainable Behaviors**
- Shape customer’s sustainable behavior and together contribute to circularity
- Be sustainable without much extra effort and sacrifice of service quality

**Additional Benefits**
- Let sustainable behavior better benefits customers
- Live sustainably as easy and natural as possible

**Effortless Sustainable Lifestyle**
- Achieve 100% circularity by deep customer engagement
- Live sustainably as easy and natural as possible

### Vision in different stage

- **NOW**
  - KPN
  - Increase customers awareness and perception of sustainability
  - Be sustainable without much extra effort and sacrifice of service quality

- **2021**
  - KPN
  - Shape customer’s sustainable behavior and together contribute to circularity
  - Be sustainable without much extra effort and sacrifice of service quality

- **2023**
  - KPN
  - Let sustainable behavior better benefits customers
  - Live sustainably as easy and natural as possible

- **2025**
  - KPN
  - Achieve 100% circularity by deep customer engagement
  - Live sustainably as easy and natural as possible

### Horizon 1

- **Product & Service**
  - Channels: Little note for existing customers, Little note for new customers, Little note for customers who need to return the devices, Chatbox on website (right after installation)
  - Technology & Resources: Data: - Stories from customers who return devices - Information of sustainable materials and suppliers

- **Technology & Resources**
  - Data: - Power saving time (IoT) - Exhibition: - Advertising - Curation and planning of exhibition

### Horizon 2

- **Product & Service**
  - Channels: Chatbox on the app (right after installation, daily use), Product component performance and source panel on website, Offline pop-up exhibition in stores or on billboards
  - Technology & Resources: Data: - Power saving time (IoT) - Exhibition: - Advertising - Curation and planning of exhibition

- **Technology & Resources**
  - Data: - Customers’ living habits (phone location, camera)

### Horizon 3

- **Product & Service**
  - Channels: Chatbox on the app (right after installation, daily use), Product component performance and source panel on the app, Monthly sustainable effort report, Power saving mode customized scheduler
  - Technology & Resources: Data: - Power saving mode synchronized with living habit - Integrated power saving switch

- **Technology & Resources**
  - Data: - Auto switch of power saving mode (AI)

### Future Vision

- **Product & Service**
  - Channels: Chatbox, Online exhibition on website, Monthly circularity effort report, Integrated power saving switch
  - Technology & Resources: Data: - Stories from customers who return the devices - Information of sustainable materials and suppliers

- **Technology & Resources**
  - Data: - Power saving time (IoT) - Exhibition: - Advertising - Curation and planning of exhibition

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Figure 57: Roadmap of design implementation
8.1.1 Why this order?

The next five years are divided into three stages: horizon 1, sustainability awareness; horizon 2, sustainable behaviors; horizon 3, additional benefits. The future vision describes the horizon after 5 years: effortless sustainable lifestyle.

The definition and order of horizons take into account the following aspects:

Company strategies
UX level: According to KPN, it is working on merging apps for different services into one app that provides integrated customer experience.

Products level: The updates of devices happen every 2-3 years.

Investment
Overall, elements are implemented at different stages within five years according to the difficulty of implementation (technology, resources, manpower, time, etc.). The easy-to-implement elements that only need to collect or provide information are on H1 or H2. The elements that require more investment at the technical and cooperation levels were put into practice in the middle and late stages. Some elements that require greater investment will be presented in a simpler form in the early stage, for example, implement the minimum viable product in a webpage before developing app functions.

Sustainable behavior change strategies
In addition to the difficulty of execution, the order of horizons in the roadmap is also supported by academic research on sustainable behavior change design strategies. According to Coskun, Zimmerman and Erbug, at the early stages, when users are learning a desired behavior, informational strategies can be preferred to attract users’ attention. Once they perform the behavior, strategies like affordances and intelligent products can be preferred to transform the new behavior from a self-directed stage to a habitual stage. This transition to habitual behavior is very important for design, since when they incorporated a behavior into their daily routines, people can repeatedly take the action without giving too much attention, which in turn leads to a sustained behavior change. To facilitate this transition, we need to focus on developing ‘unremarkable’ products, (Tolmie, Pycock, Diggins, MacLean & Karsenty, 2002) which are successfully immersed into people’s daily routines in such a way that they are perceived as invisible in everyday life yet functional and visible when people need them. (Coskun, Zimmerman, & Erbug, 2015).

8.1.2 Horizons

Horizon 1 covers the next year. Most of the design elements are implemented at this stage as the pilots.

Some elements adopt an easy way as the starting steps, for example, the chatbox as well as the product component performance and status panel will be presented in the form of a webpage. Building the element on the app may take too much time and effort at first, thus channels such as websites or emails are easier to implement by UX designers and engineers. The user feedback collected at this stage can be used for later app design improvement.

Some new customer-oriented elements are starting to be communicated with existing customers, for example, the little notes will be sent to existing customers as well in addition to new customers. KPN has a strong customer base, hence it’s meaningful to let them try out this new design and inform them of the sustainability and circularity efforts. To avoid extra waste, the QR code and little notes for existing customers will be the digital ones that sent via emails. Elements such as little notes for customers who need to return the devices and power saving mode customized scheduler mainly aim for data collection. They may not directly benefit customers in the short term but build a foundation for elements in the latter stages.

Horizon 1 focuses on changing customer’s attitudes toward sustainability and circularity. At the moment when most customers are not yet sustainable, changing from psychological aspects is the first step towards sustainable behavior change. Only by letting them understand the value and meaning of sustainability can they agree and take action to enhance. Therefore, the designs at this stage emphasize improving the communication of sustainability or circularity attributes of products and their impact and importance. Elements highlighted at this stage, such as chatbox and component performance and source panel, are designed to tell customers the sustainability and circularity information in a novel, interesting, and transparent manner.

The previous user tests and evaluations verified that communication in these concepts effectively increases customers’ perception of sustainability. According to the literature review on green marketing, green satisfaction, green image, green trust, and green loyalty will therewith increase. (Vafaei, Azmoon, & Fekete-Farkas, 2019; Chrisjatmiko, 2018) This is not only about the customer's impression on the devices or services, but also closely related to the user's satisfaction with the brand. Elements deepen customer's minds about KPN's sustainable and circular brand image by changing users' attitudes.
8. IMPLEMENTATION

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Horizon 2 transforms customer’s sustainability awareness at the first horizon to behavior change.

At this stage, the communication not only contribute to sustainability awareness but also call upon customers to take actions to be sustainable. The monthly sustainable effort report, for instance, summarizes the sustainable result and additional benefits of customer’s usage of the devices while teaching them to improve the status quo by customizing the power saving settings. Besides, the exhibition will be taken place in the offline store to attract new customers, which also leads to sustainable consumption by filling-in the attitude-behavior gap.

According to the decision-making model of sustainable consumption by Balderjahn (Terlau & Hirsch, 2015) in the literature review, the exhibition affects the situational factors of intension, thus triggers the purchase.

The communication at this stage will be more mature compare to horizon 1 after a one-year pilot on the websites. Chatbox, component performance and source panel are further developed in the app at this stage. Customers can access the chatbox not only after the installation but during the whole usage process. Meanwhile, chatbox serves as an important bridge that connects different elements in the app, such as component performance and source panel and monthly sustainable effort report.

KPN will release the new generation of devices at this stage, which provides new functions including power saving mode scheduler and sensors that detect power saving time. These technology updates support the implementation of monthly sustainable effort report and customization of power saving time.

The behavior changes at horizon 2 have additional impacts on KPN as well. The interview results indicated that the sustainable effort report increases customer’s green satisfaction as they feel “KPN is thinking for me”. The exhibition actually turns sustainability and circularity into one unique selling point which may lead to more sales while promoting KPN’s green brand image.

On the basis of establishing customers’ sustainable awareness and guiding the customers to make sustainable behavior, in horizon 3, KPN strives to make sustainability better benefits customers in their daily life.

Fault self-detection system of the product component performance and source panel will be released at this stage. With the basis for collecting and tracking the data of different parts before, the realization of this function is more focused on the product design level. Customers may not perceive high sustainability through this idea, but they find it easier to tackle the malfunctions.

Although the elements in horizon 1 and 2 intentionally minimize the effort and time required by the customers, they still need to pay some effort to be sustainable. But with the development of technology and database, the devices at this stage are able to learn from customer’s living patterns and adjust the power saving mode accordingly. At the same time, with the help of partnerships with smart home companies (e.g. Google Home, Alexa) and improvement of the privacy policy, customer’s acceptance of this concept will be higher.

Two design elements that implemented at this stage optimize customer’s sustainable life and hence increase their satisfaction and loyalty.

In the future, sustainability and circularity will not be limited to just a few KPN in-home products. The same design can be applied to all household appliances. At that time, all appliances will be connected; their power saving mode will be controlled by one integrated switch, and learn the customers’ lifestyle to help them live more sustainable.
9 REFLECTION
9.1 EVALUATION

9.1.1 Evaluation of 10 Principles and Design Requirements and Desires

The evaluation is carried out throughout the whole process of design development, because, in this project, design is continuously iterated and tested. According to the above analysis, although the six elements have different focuses, the final integrated concept fully fulfill the design requirements and desires as well as ten principles.

<table>
<thead>
<tr>
<th>Element</th>
<th>Design requirements and principles</th>
<th>Design principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Element 1</td>
<td>Little note from your devices</td>
<td></td>
</tr>
<tr>
<td>2. Element 2</td>
<td>Chatbox</td>
<td></td>
</tr>
<tr>
<td>3. Element 3</td>
<td>Product component performance and source panel</td>
<td></td>
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<tr>
<td>4. Element 4</td>
<td>Monthly sustainable effort report</td>
<td></td>
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<tr>
<td>5. Element 5</td>
<td>Power saving mode synchronized with living habit</td>
<td></td>
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<tr>
<td>6. Element 6</td>
<td>Circular memories exhibition</td>
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<thead>
<tr>
<th>Element</th>
<th>Design requirements and principles</th>
<th>Design principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The design increases customer’s feeling of participation in the circular supply chain.</td>
<td>Collaboration</td>
<td></td>
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<tr>
<td>2. The design lets customers realize their personal impacts to the environment.</td>
<td>Three dimensions of sustainability</td>
<td></td>
</tr>
<tr>
<td>3. The design raises customers’ sustainable awareness.</td>
<td>Behavior change and long term impact</td>
<td></td>
</tr>
<tr>
<td>4. The design ensures the performance and quality of products and services.</td>
<td>Transparency, Relevance</td>
<td></td>
</tr>
<tr>
<td>5. The design increases customer-product attachment.</td>
<td>Clarity</td>
<td></td>
</tr>
<tr>
<td>6. The design clearly guides customers on what to do to be sustainable.</td>
<td>Relevance</td>
<td></td>
</tr>
</tbody>
</table>
9.1.2 Evaluation of perceived sustainability

The perceived sustainability is evaluated with customers through interviews. After introducing design concept and the steps customers will experience, I asked customers to answer the following questions:

1. Which 3 concepts do you like most?
2. At which 3 steps do you feel that you’re contributing to sustainability?
3. At which 3 steps do you feel that KPN has contributed to sustainability?

For question 1, the concepts that won highest votes are product component performance and source panel and monthly sustainable effort report. Among these two concepts, there’s one step in each concept where participants perceive highest degree of sustainable contribution. See appendix for more information about user test process and results.

However, many participants said that questions 2 and 3 are difficult to answer, because they believe that in all the concepts, they can feel the sustainability or circularity information conveyed by KPN, thus the number of answers is much more than three. Although they finally gave the answer as requested, which may reflect the improper question setting, it can be deemed that the perceived sustainability of these concepts is relatively high according to their feedback.

9.1.3 Evaluation of strategy consistency

In interviews with KPN colleagues, I asked them if they thought the design concepts was in line with the current strategy, and the answers I received were relatively positive.

UX strategy
KPN is working on integrating decentralized services into one app and providing integrated services, which is exactly what KPN has always been committed to. In this project, the final design adopts omnichannel communication and make the app a central platform for providing integrated services. The integrated power saving switch that involves more products line and cooperation are also consistent with this strategy.

Since during prototyping, my design is based on the current graphic style of KPN Thuis app, it may not match the new app design in terms of interface style. However, their attitude towards functional design of my concept is positive.

Branding strategy:
KPN colleagues believe that the final concept bring innovation to the existing brand. Although they emphasized that, for the consumer market, sustainability is not a unique selling point, but they are very happy to see that I communicate this feature in a way that is not overwhelming.

But some of them pointed out that from the perspective of brand identity, my design feels too soft, whether from the visual design or the humor of communication aspects. There is no doubt that someone will like this design, but for a telecom company, whether this is a breakthrough or mismatch remains to be discussed.

9.2 Recommendation and limitation

The final concept, together with the implementation plan, are further evaluated with KPN colleagues from different departments and students with design backgrounds. The method for evaluation with colleagues was still an interview. KPN colleagues were asked to give feedback on the design after concept presentation, but the discussion is rather open compare to user test. A co-reflection session was held to together evaluate the design with fellow industrial design students.

In this session, each participant needs to play one of these four roles as: a new customer, an existing customer, a KPN executive, and a supplier. They were asked to stand in the perspective of their roles to think about the design and give feedback. The process and results are detailed in the Appendix D.

Summarizing the results of co-reflection, the recommendations are proposed as follow:

Energy-efficiency VS durability of equipment
In horizon 1, existing customers will receive the digital little notes to inform them that their existing equipment is circular-designed. This is not a difficult concept, but it is worth noting that currently, only the latest version equipment is circular-designed and with power saving mode. That is, customers who use older devices will not receive the note.

This fact actually brings out one of KPN’s existing dilemmas: KPN’s efforts in prolonging product lifespan potentially conflict with efforts to enhance energy efficiency as this involves replacing equipment with newer, more energy-efficient equipment. To tackle this challenge, KPN should consider the old devices on the basis of this design, especially in the beginning years. It’s important for KPN to consider phasing out the older generation of equipment that some customers are still using. Devices can be collected through a trade-in strategy to enhance circularity. Promoting the economic and environmental benefits of new circular-design devices would be a good way to appeal to customers.

More possibilities for chatbox
Chatbox has always been a well-received element throughout the design, as it clearly delivers sustainability information to customers. However, designers point out that the form of the chatbox may also bring too high expectations to customers. Customers may expect it to be more intelligent and even solve more problems related to usage. Chatbox that only used as a tool to promote sustainability is somewhat overkill.

UX designer Renee expressed the possibility to connect the chatbox in the final concept to existing chatbox for customer services. KPN UX team is now integrating all KPN services into the one app, where customers can chat with customer service personnel online or find solutions based on automatic replies. In order to retain the first-person tone, it is recommended not to merge the two completely but to set chat entrances of “device” and customer service closer.
Open and transparent integrated information

The goal of some elements that provide information is to tell the sustainability and circularity in interesting or useful ways. For most customers, although they may not spend too much time viewing these pages, it is enough to convince them of KPN’s green image. But for those who pay great attention to sustainable consumption, they are more inclined to trace and verify sustainability-related information than stay on the surface. Therefore, it is recommended that KPN provide detailed, clear, and traceable information to support the transparency and reliability of brand while implementing concepts. It is recommended to put this information on the KPN website and link it with related concepts.

The detailed information is recommended to be presented in a hierarchy. For example, in the product component performance and source panel, the explosion view of devices and status scores leave an overall impression on most customers at first place; some customer will click to learn about sustainable materials and suppliers adopted by KPN; a smaller number of customers will click on specific sustainable information to learn more. The information advances layer by layer to ensure that customers with different susceptibility to sustainability have good user experiences.

Further partnerships with suppliers

Some elements require suppliers to provide information about materials and sources of equipment parts. Although in theory, this data is not difficult to collect, it involves more complicated cooperation compare to the current relationship with suppliers. What benefits can suppliers get from this design? If it is just a more sustainable image in the minds of customers, then the workload of collecting sustainability information seems too much in comparison to the effect. On the one hand, it is not clear whether users can make an impression on the suppliers; after all, a device can be manufactured by multiple suppliers; on the other hand, it is likely that only the customers satisfaction and loyalty on KPN increases as the supplier is too far away from them.

Unfortunately, due to time constraints, I didn’t communicate further with suppliers to verify the above assumption. However, how to convince the suppliers can benefit from further collaboration is definitely something that KPN needs to consider before implementation.

Incentivizes

During the interview, many users believed that “If I did something sustainable, KPN should reward me.” This feeling is especially obvious in the phases of user purchase and equipment return. At the beginning of the concept’s introduction to the market, it’s advised to have more incentivization mechanisms to make users more motivated to take sustainable actions (or feel reaffirmation afterward).

Admittedly, financial or physical rewards may be more difficult to achieve for concepts that have just started, then intangible rewards such as encouragement text or the virtual medal on the app can be an option at this moment.

User test

It happened that Covid-19 swept across the world during my graduation project. Due to the quarantine time, the solution could only be presented through the video meeting by displaying design in the screen with oral interpretation. Besides, it’s also a pity that I cannot test the little note offline. The lack of interactive testing could affect the experimental results.

It is recommended to conduct another offline user test to obtain more effective feedback before introducing the design to the market.

Throughout the various industries and companies on the market, being sustainable has slowly switched from a highlight to a trend. Business strategies that promote sustainability without taking corresponding actions have been criticized by consumers and industry as greenwash, but many companies nowadays are facing the problem that they do sustainable things but don’t how to tell public.

This graduation thesis takes KPN as an example, and proposes an innovative solution that allows users to not only feel and appreciate company’s sustainability and circularity effort, but also have a sustainable lifestyle with the help of the company. For companies facing the same challenge, the innovative points of this project, such as arousing user curiosity through personifying products, presenting product information clearly and transparently, and holding exhibitions of user-generated content, are all worthy of reference.

In China, larger companies such as Alipay and Wechat use various innovative methods on their platforms to increase user stickiness and promote sustainable behaviors such as mobile payment. Smart home companies such as Xiaomi have their own complete ecological chain to provide users with integrated and sustainable services. Such examples are countless in the world. It is important for a company to do sustainable things, but it is also important to say it loud, because these communications can impress more people and engage them to work together to make our planet greener.


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