

Design a digital experience that delivers value to smart home users.

Master thesis

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hombli
A SMART
HOME FOR
EVERYONE



Design a digital experience that delivers value to smart home users.
Graduation report

Master thesis

Strategic Product Design
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Preface

This report is the end result of my graduation project. This is a combined graduation project of the masters Strategic Product Design (SPD) and Design for Interaction (Dfi), both at the Delft University of Technology. Both masters focus on creating new products and services, but from a different angle. The master SPD has the focus on the business and markets while Dfi focuses on the interaction between products and people. Because I like solutions that not only improve people's lives but also fit the strategy of a company, I combined the two angles of these masters into one project.

During my study I created a special interest in digital solutions. Many interactions between people and products are digital nowadays. Making this digital interface more user friendly will have great impact on the overall user experience of the product and overall customer satisfaction.

This project is done in collaboration with Hombli, a Dutch brand that sells smart home devices such as smart bulbs, sockets and camera's that are controlled via a smartphone. As with so many devices, the digital interface is at the center of the user experience. While bulbs from most smart home brands are remarkably similar, the way in which they are controlled vary greatly.

Hombli provided me with the perfect opportunity for my graduation project. This report shows a new strategy for the app of Hombli. This new app will set Hombli apart from other smart home brands and improve the wellbeing of Hombli's customers.

Corné van den Brink
May 2021

Executive summary

A smart home can be defined as a system of connected devices that are controlled remotely from one central place. Smart home solutions used to be for early adopters who like the novel and fun part of this new technology. Currently the smart Home market is moving to mainstream users. Hombli is a smart home brand established in 2019 in the Netherlands. The initial goal of Hombli is to address this mainstream market. They want to make smart home accessible to everyone, by offering a simple and affordable smart home solution.

An analysis of the smart home market show that most smart home brands claim to offer a simple solution. Most brands also have another special focus in which they set their brand apart from the rest. The strong competition in the smart home market requires a stronger brand position for Hombli to stand out from the other brands. The new focus on the wellbeing of the user by providing "a carefree live with Hombli" is a promising new direction for Hombli. It is a unique direction in the smart home market and fits the current product portfolio.

Users can create this carefree life by automating their Hombli devices using smart scenarios. However, a survey filled in by 149 current Hombli users show that only 23% say that creating scenarios is easy. Of these people 39% do not use scenarios at all. Besides these current Hombli users, also people without experience with smart home devices were analyzed using sensitizing booklets with daily assignments. The participants described their routines and used smart Hombli devices. This experiment showed that it is hard to come up with ideas for smart scenarios and that the process of adding new scenarios is difficult for some people.

To make the new mission of Hombli possible, all users should be able to create scenarios that can improve their wellbeing. Therefore, the design goal for this project is to help Hombli users with little technical experience, to feel guided and in control when they add smart scenarios, so they can automate their routines.

Three concepts are developed to explore different ways to create scenarios. These concepts are turned into prototypes and evaluated. The results of these user-tests can be summarized in three aspects:

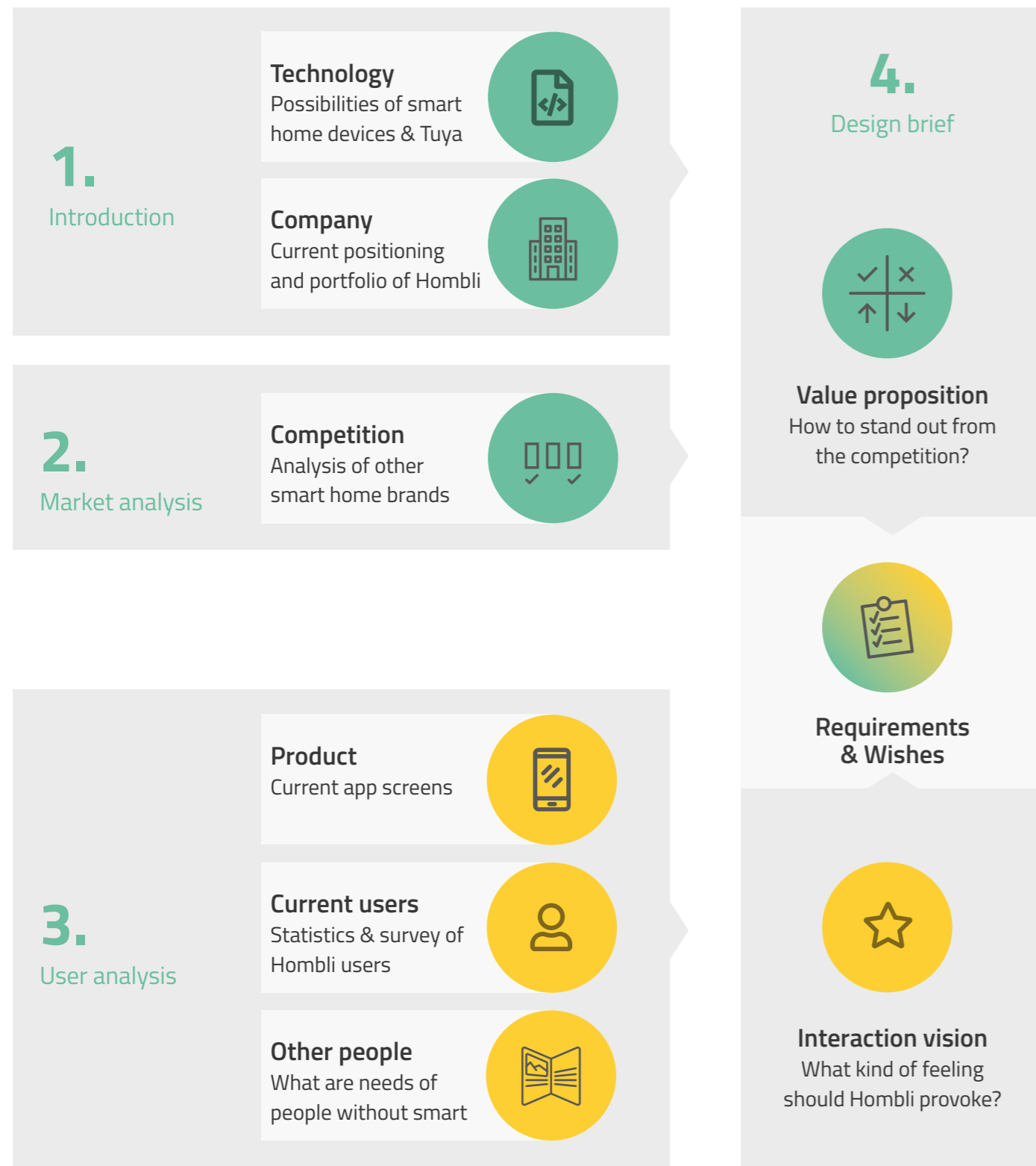
- **Control:** The user should have a clear overview of the scenarios, be able to control important settings in an easy way and scenarios should be visible at the device page.
- **Comfort:** The design of the app should be calm, the user should feel guided through the different steps and should be able to get help when it does not understand something.
- **Convenience:** The app should provide example scenarios which offer clear benefits to the wellbeing can be added conveniently to the app of the user.

The final design combines these three requirements in one single experience. User tests of this final design show that people get inspired by the example scenario in the app and start thinking of different ways to automate their smart home devices. With this new app, Hombli can set itself apart as a brand that not just sells connected devices but cares about the wellbeing of their customers.

Besides validation with users, the new app is also validated on feasibility for the company. Because developing a brand-new app from scratch requires a big investment, a better strategy is needed. The current app is based on the Tuya platform. Talks with Tuya developers explain the possibilities in changing the current app to create quick first steps in improving the experience in the current app by adding an extra section in the app with example scenarios. In a later stage, device panels can be improved to match the panels of the final design concept. After these short-term steps, Hombli should invest in developing their own services to create added functionalities to adapt to the evolving smart home market. New communication standards are in development that will make it possible to control smart devices from different brands using the same standard. The long-term strategy ensures Hombli will deliver a unique experience to users that value wellbeing by offering a carefree life with smart automations for every connected device at home.

Reading guide

This graduation project is a combination of the masters Strategic Product Design (SPD) and Design for Interaction (Dfi). Therefore, this report contains parts of both masters. This page visualizes how the different chapters of this report are structured and lead to the final design with a strategic roadmap.



Tip: click on a section to navigate through the report



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Introduction

An introduction to the goal, company and context of this project.

This chapter gives an introduction to the company Avanca International which has different brands, one of them will be the focus of this project: Hombli. The vision and different products of Hombli will be explained. The use and technical details of the app will be explained in detail, because the goal of this project is to improve the digital experience of the smart devices of Hombli.

Besides Hombli and the platform on which Hombli devices are based, this chapter will also compare different protocols and smart home trends.

← Contents

1.1 Product description

1.2 Company

1.3 Current app

1.4 Smart home

Goal: Define the opportunities and the possibilities for this project.

1.1 Project description

1.1.1 Problem

Smart home, or domotics, is a way to automate devices at home using devices are connected to each other and can be controlled from one single point. The market of smart home products has not yet been defined, it is still uncertain what kind of technology or company will become the dominant one (Modor Intelligence, 2019). Which means that there is a lot of competition, but also a huge potential for the companies that find the right 'recipe' for success.

Because smart home is still an early market, innovators and early adopters are the main consumers of these products. (ING, 2019) Hombli is a smart home brand founded in 2019. The goal of Hombli, is to make smart home accessible to everyone. To accomplish this, the products should be ready for the mainstream market. This is visualized in Figure 1, based on the technology adoption model (Bohlen & Beal, 1957). In order to move from early market to mainstream market, Hombli

needs to 'cross the chasm'. (Moore, 2014) Just having a novel, cool product is not enough for the mainstream market, the products should offer a clear benefit instead. For the current, early market the added value of smart home is having an innovative and fun device, while the mainstream market wants a true benefit such as security or efficiency. This gap between needs of the early and mainstream market if further widened by barriers like privacy concerns, complexity and loss of autonomy. (GFK, 2021)

Smart home products are controlled digitally, usually with an app on the smartphone of the user. The experience of the products is mostly determined by the interaction and functionalities of this app. A digital experience that delivers value for home products can be decisive for the mainstream market to invest in these products. It can also offer a clear differentiation from the crowded market.

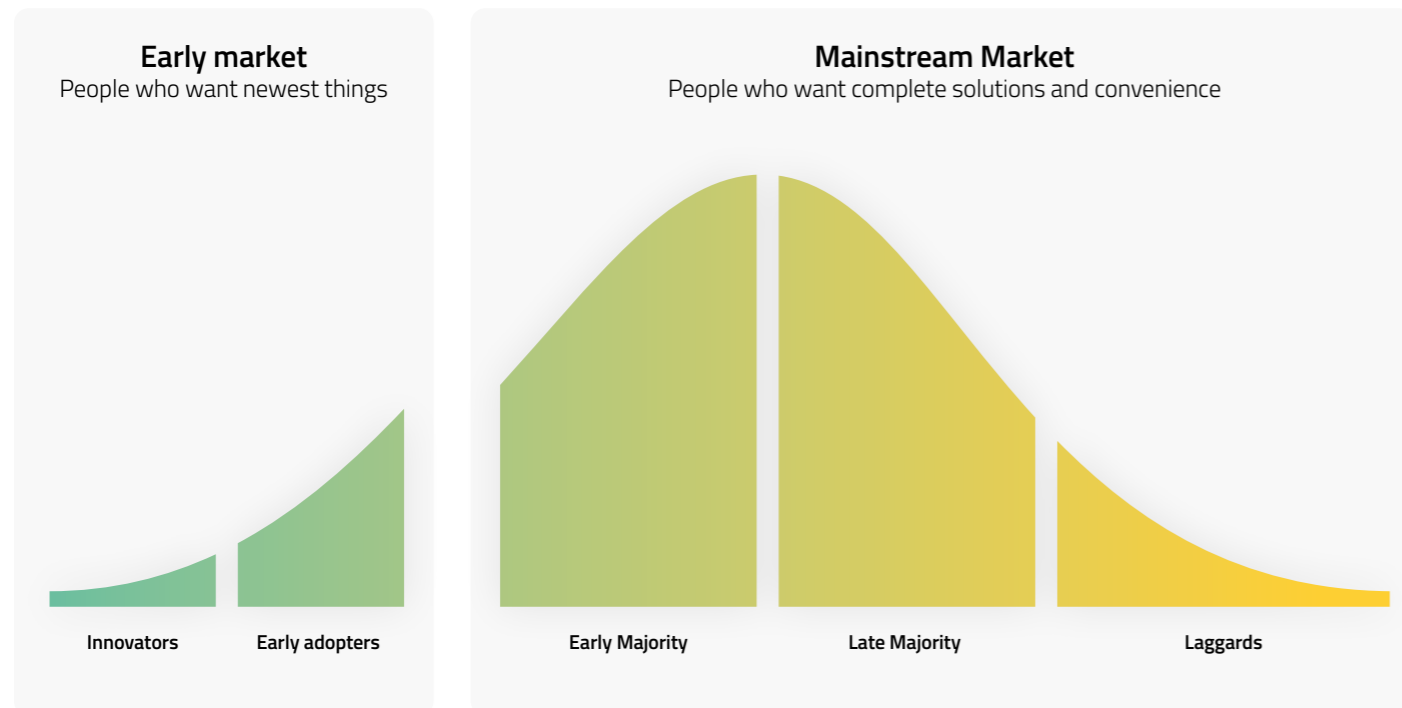


Figure 1 Crossing the chasm (Moore, G. A., 2014)

1.1.2 Goal

The goal of this project is to make the digital experience of Hombli add value to the end-user. The new experience should differentiate Hombli as a unique brand that solves a special user need, filling a gap in the smart home market. It should also fit the current vision and possibilities of Hombli. Understanding user needs can be used to develop novel solutions to make the lives of users better and pursue potential customers to buy smart home products.

Design a new app experience of Hombli that: 1) fit the brand and target market, 2) offer a clear differentiation from the competition, 3) is easy to understand and use by everyone, 4) work with technical possibilities of Hombli. The outcome of the project will consist of:

- **Product analysis**
An overview of the different technical solutions for smart-home devices and apps to control them.
- **User Analysis**
An overview of different (latent) user needs that smart home products can solve.
- **Value proposition**
A strategic direction for the App based on a competition analysis and a user need that the new functionality solves. The value proposition is formulated to fulfill a latent user need with an interaction vision for the app. Also, the branding, positioning and identity of the app will be defined.
- **Design proposal**
Digital prototypes that show the interaction with the new functionality. Each having an overview of the technologies and steps needed to implement the direction.
- **Roadmap**
A strategic product roadmap for further development the App of Hombli.

1.2 Company

1.2.1 Avanca International

Avanca international is a Dutch company founded in 2008. It operates under several different brands with their own unique proposition. The strength of Avanca international is their good relationship with suppliers in China and a broad distribution network in Europe.



Avanca

Avanca has developed several innovative products with a unique design. These products offer a high-end appearance, but for a lower price than the competition. The products and packaging are designed in-house in close collaboration with the manufacturers in China. Some products are launched on crowdfunding, and others are launched directly via distributors.



Sinji

The brand Sinji stands for Sales Is Not Just Innovation. With this brand Avanca International sells a wide range of products: from smartphone cables to thermometers and alarm clocks. These products are sold through different sales channels and to vendors such as supermarkets and discounters. The portfolio is diverse and changes according to the needs in the market. Due to the good connection with the Chinese manufacturers, Sinji can adopt quickly and deliver with a competitive price.



Ockel

The Sirius A & B minicomputers are sold under the Ockel brand. This brand is launched in 2015 with a crowdfunding project. The small computer has won several design awards and is currently used in diverse settings from enthusiasts to professional organizations.

1.2.2 Hombli

In 2019 Avanca International launched a new brand: Hombli. The goal of Hombli is to provide a complete smart home experience that is accessible for everyone.

1.2.3 Product portfolio

Hombli started with a range of products that are needed to start a complete smart home experience. They are planning to add several sensors to their portfolio to expand the possibilities of the scenario's.

1.2.4 Tuya platform

The products of Hombli are provided by Tuya. This is a huge Chinese company that offers smart-products, parts, and a cloud solution. The products can be changed to match the brand. They even offer companies their own custom app to control the smart home products.

This helps Hombli to launch new products without high development costs. It also means that all products of Tuya, launched by varied brands are compatible with each other. In the Netherlands brands smart products like: LSC(Action), HEMA and CALEX all run on the Tuya Cloud.

Besides standard packages, Tuya also offers tools to develop new products and software based on their technologies using their WiFi chips and cloud infrastructure using well documented API's.



Figure 2 Hombli logo with tagline



Figure 3 Tuya Logo



Figure 4 Current product portfolio of Hombli

1.3 Current app

Tuya offers different ways to control Tuya supported devices:

- The standard Smart Life app.
- A customized OEM app based on the Smart Life app.
- An SDK to develop an app.
- API's to control Tuya devices with other (web)applications.

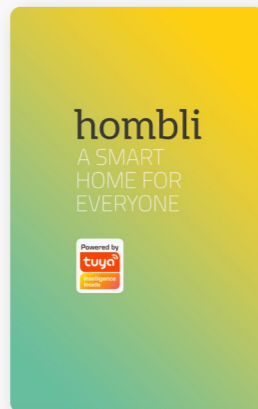
Currently, Hombli uses the OEM option with customized colors, text, and icons. The app consists of two parts: The main Hombli app and device panels per product.

1.3.1 Main OEM app

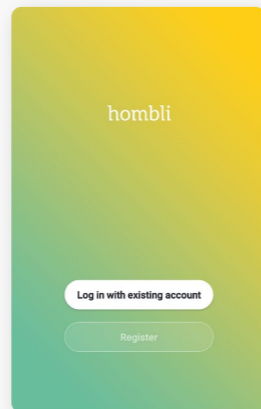
The main OEM app of Hombli can manage all smart Tuya devices. The first time the user starts the Android or iOS app, it will get the choice to make an account or log in with an existing account. Then the user can add devices by automatically scan for available devices nearby, or manually select the wanted device in the list.

After adding devices, the user can control the devices and create rooms or scenarios.

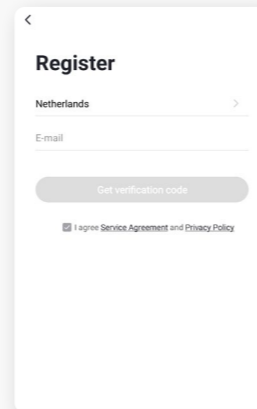
Log in



Load-screen

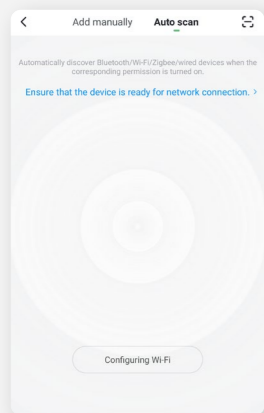


Log-in/register

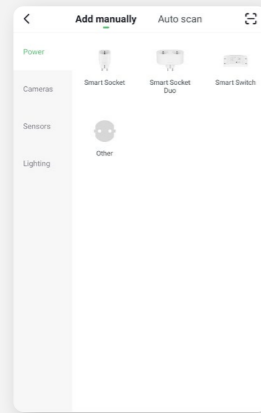


Create account

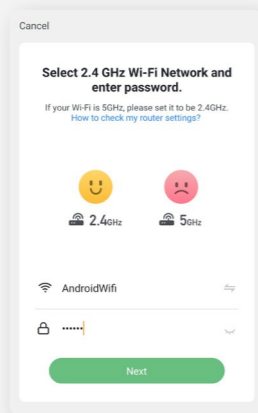
Add devices



Search automatically



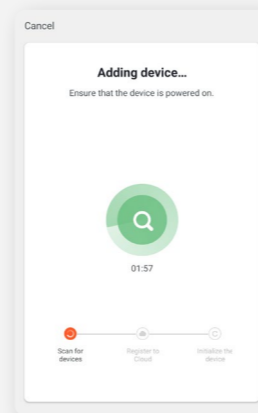
Manual select and add device



Add WiFi credentials



Make sure device is in pairing mode

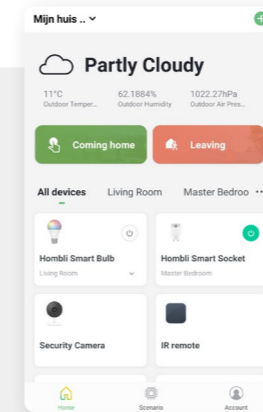


Wait for device connection

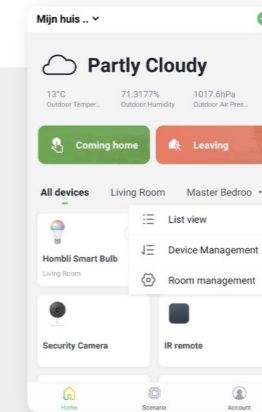


Home

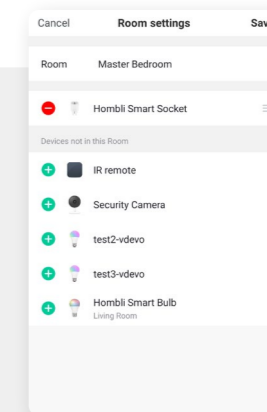
Overview of all devices and quick access to activate scenario's.



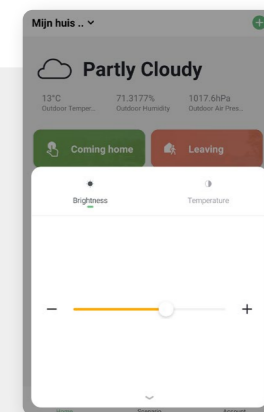
Dashboard



Change view



Add devices to rooms

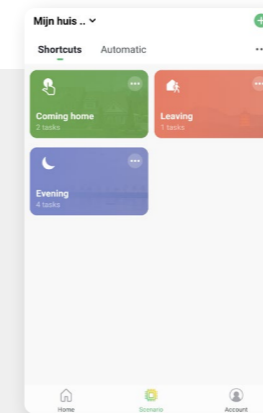


Quickly change devices

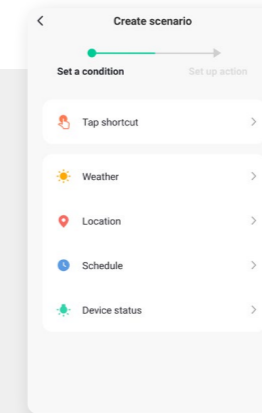


Scenario

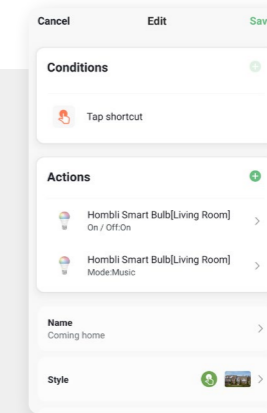
Create scenario's based on triggers to activate devices automatically.



Overview of all scenario's



Select trigger to create scenario

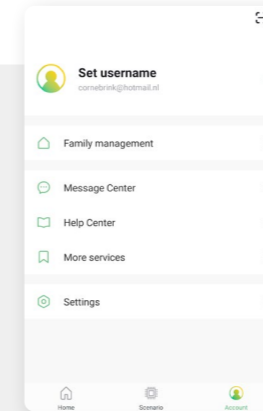


Add action, name and icon to scenario

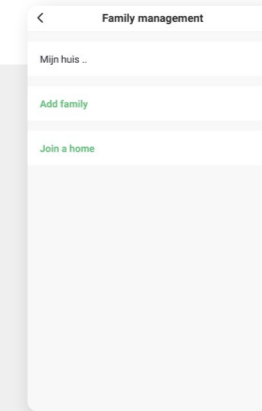


Account

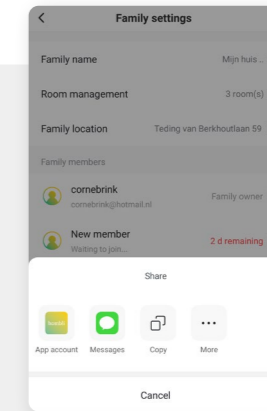
Manage account, share devices with family and get support.



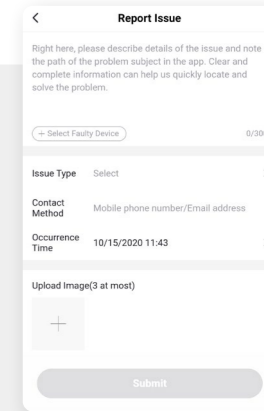
Account overview



Manage homes and add families



Invite new family users



Contact support for questions or errors

1.3.2 Device panels

This part of the app is configured per device, these screens will be the same across all Tuya-based apps. On these screens the user can control the connected device. Hombli has no control on how devices from other brands will be displayed on these screens.

There are also different options to develop a device panel for a product:

Visualized DIY Panel

Tuya developed a drag-and-drop system in the Tuya dashboard, where different elements of the panel can be designed.

Public panels

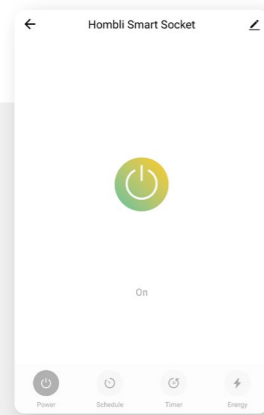
These panels are comparable with the OEM app of Hombli: the Tuya SmartLife app were colors, icons and images can be changed.

Panel SDK

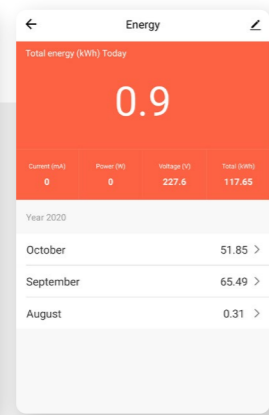
A set of standard packages and documentation to develop a personalized app-panel.

Tuya's Customized Panel

A paid service from Tuya, where they develop a customized app panel based on the wishes of the brand.



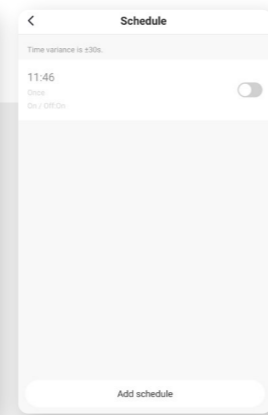
Toggle socket on/off



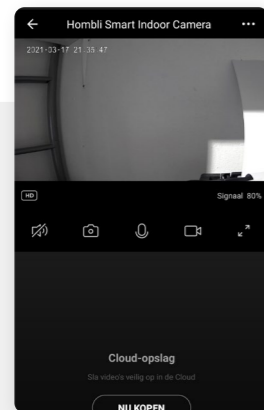
View energy usage



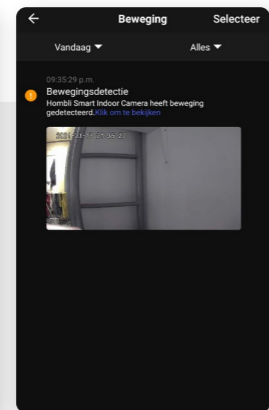
View energy usage of one month



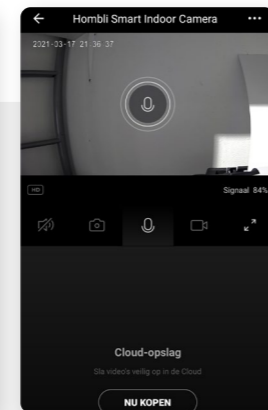
Schedule when socket will turn on/off



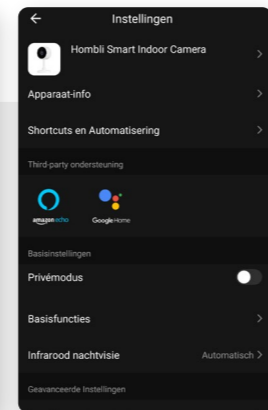
Live camera view



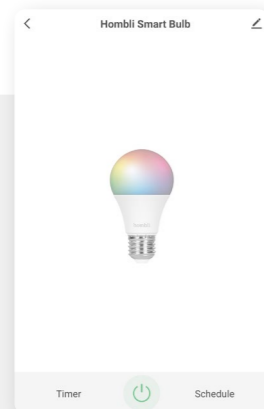
Log of recorded movements



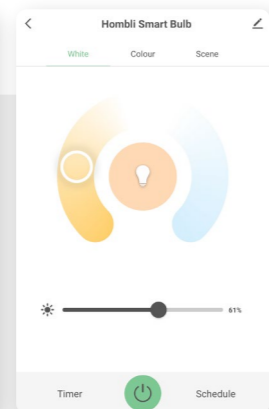
Speak through the camera



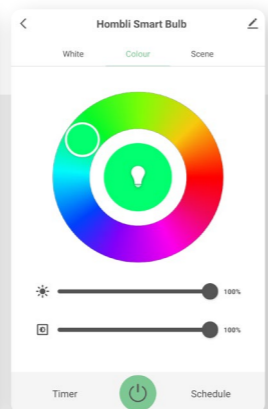
Settings for the camera



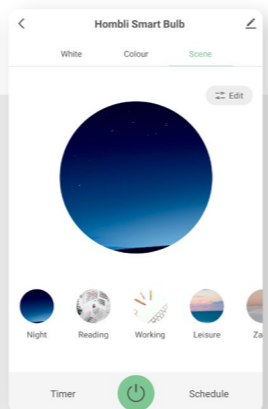
Turn light on



Change light temperature



Change color



Switch to scene's

1.3.3 Technology

Hombli devices need to connect to the local network (WiFi) to communicate with the server of Tuya to work properly. Because there is no interface on the devices to configure this connection, this is done via the interface in the app. The app will send the WiFi SSID and passwords and the Tuya login credentials (Tuya, 2020). There are several ways to accomplish this:

1.3.3.1 QR-Code (Camera)

For cameras and doorbells, the app can make a QR-code with the data the device needs to connect. In the connecting process, the user is asked to hold the camera in front of the device. The camera or doorbell reads the QR-code and connects to the WiFi network and the Tuya Cloud.

1.3.3.2 EZ-Mode (Quick connection)

In this mode, the app sends out the login credentials via a special frequency in the WiFi band that is specially designated for this mode. The smart device is looking for this in the connecting-mode and when it got the information, the app stops sending. The device can connect to the cloud and from that on works via the secure connection. Theoretically, a hacker could intervene the credentials in the connecting phase. But he needs to be at the location during the connecting process.

1.3.3.3 AP-Mode (Hotspot)

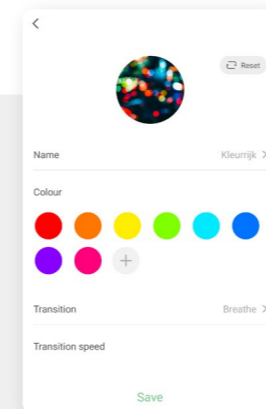
Also known as hotspot mode, the cell phone connects the smart device's hotspot. The two parties establish a Socket connection to exchange data through the agreed port.

1.3.3.4 Bluetooth

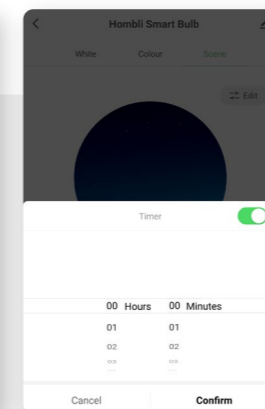
Some Tuya products are equipped with WiFi and Bluetooth. This makes it possible to connect the device easily with the smartphone and send the WiFi and Tuya credentials to the device. After this, the device will use only WiFi to connect to the cloud.

1.3.3.5 Other protocols

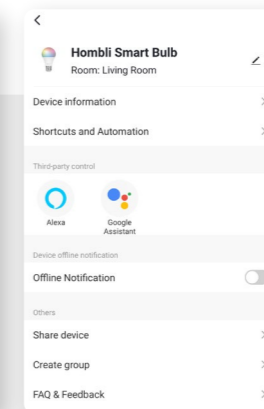
These ways to connect smart-home products are only for smart home products that work with WiFi. Other protocols often communicate via a separate hub. The differences between those protocols will be explained next.



Edit scene



Add timer to turn on/off



Edit name & view details

1.4 Smart home

1.4.1 Protocols

Smart home devices use different kinds of ways to transfer data. Each protocol has its own benefits. For customers this can be complicated because smart products do not always work together because they use different standards (Phan LA, 2020). Because this is an emerging market, there is not one standard that dominates the complete market (Hackbarth, n.d.). New standards are also developed constantly which makes it harder for a consumer to choose the right products that also will work with new products in the future. (Vivek S, 2018) An optimal protocol is compatible with existing devices, consumes little power and can support many connected devices in one network.

1.4.1.1 Compatibility

Most connected devices can only connect to devices with the same protocol. Not only the physical differences in frequency, but also the network languages are completely different between these protocols. (S. A. Al-Qaseemi, 2016) To connect these devices to the internet or a smartphone, the user needs to buy a special hub which bridges the gap between those two protocols.

An advantage of IP-based protocols such as WiFi and Bluetooth is that they share the same language, and many consumer products are already integrated with antennas to connect directly to smart products without the need of a hub. Devices with WiFi are connected to the internet, so these devices can also be controlled without being connected to the local network.

1.4.1.2 Power

A disadvantage of fast protocols like WiFi and Bluetooth is that they consume a lot of power, which is no problem for laptops and smartphones. But it does not work for many smart-home products, especially battery powered sensors. Therefore, new protocols are developed that focus on low energy consumption.

1.4.1.3 Amount of devices

Another weakness of common protocols like Bluetooth and WiFi is the limited number of devices that can be used in one network. Traditionally this would not be a problem because only a few laptops and smartphones would be connected to one router, but when adding several lamps and sockets to the network the network will become crowded quickly.

Newer protocols like ZigBee and Z-wave work with a mesh network. This means that all devices in the network communicate to each other, so the access point sends out a command and all devices will repeat

the message until it reaches the destination. This reduces the load of the router, and results in a better coverage when adding more devices to the system. Thread and Bluetooth Low Energy go one step further by eliminating the central access point that manages all communication, instead all devices in the system can function as a router. (Sandre, 2018) This makes the network more reliable and stable, because if one device goes down the rest of the network will still work fine.

1.4.1.4 Combination of protocols

There are also brands that combine several protocols enhance reliability or make the connection process easier. Insteon, for example, has smart products that also communicate via Universal Powerline Bus (UPB). All products connected to a power line in the home can communicate to each other. So, when adding new devices to a power line at home, it will automatically be recognized. (Coppock, 2017).

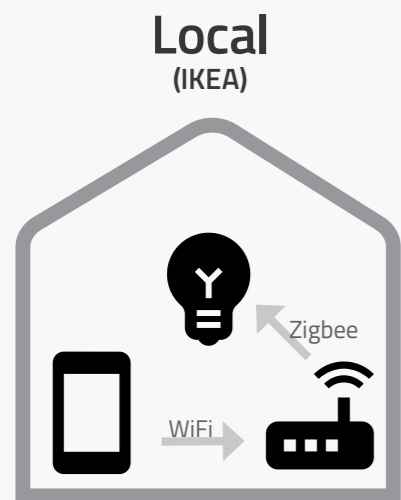
Current use													
Application	M2	Analog	Z-wave	Dect	Zigbee	CHIP / HTTP / TLS	Binary						
	Dash7	433				TCP / UDP	UPB	IR					
Network					Thread	6LoWPAN (IPv6)	IPv6 / IPv4						
Frequency	25 kHz / 200kHz	433 MHz	868 MHz	1900 MHz			2.4 GHz	5GHz	> 8 GHz	Wired		IR	
Devices	-	-	232	6-12	5600	No limit	65536	7	20-250	-	-	250	-
Power	Low	Low	Low	Moderate	Low	Low	Low	High	High	High	Low	Low	Low
Range	0-10 km	100m	100m	50m	100m	100m	50m	50m	100m	20km	-	-	-
Data	200 kbps	10 kbps	100 kbps	32 kbps	250 kbps	250 kbps	100 kbps	2-3 Mbps	240 Mbps	225 Mbps	10 Gbps	240 bps	120 bps
Type	Star 	One-way 	Mesh 	Star 	Mesh 	Mesh+ 	Mesh flood 	Star 	Star 	Star 	Cable 	Cable 	One-way

1.4.2 Platforms

Besides protocols, there are also many different platforms that can be used to control smart home products.

1.4.2.1 Local / cloud

There are two ways to control smart devices: via 'the cloud' and in a local network. Hombli are directly connected to the internet and controlled by a server from AWS in Germany. (TuYa, 2020) Smart products that use protocols like ZigBee need a hub to connect the smart products to the internet to control these devices via the cloud. But these devices can often also be controlled with a local hub or remote that are not connected to the internet. The advantage is that the user is not dependent on the server to control their devices, but it is not possible to control the devices when the user is not connected to the same network as the smart devices.



Only at home

Works only with devices on the same local network.

No data is stored

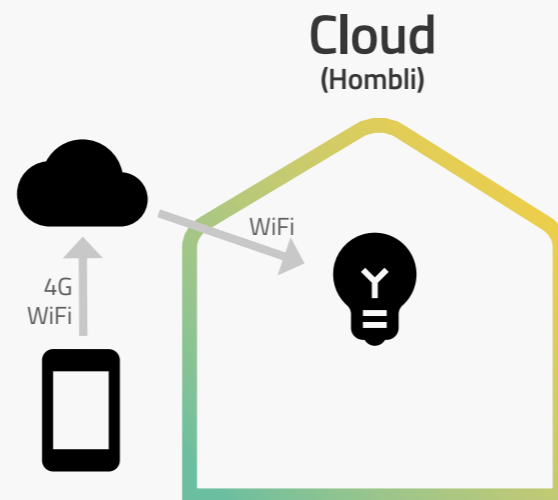
All data stays in local home network.

Own network

No dependency on future existence of the cloud provider.

Hub

To connect to other devices or applications, the user needs to buy a hub that bridges the different protocols.



Control everywhere

Works also when not at home or on the same network.

Data in the cloud (Frankfurt)

All information stays safely in a data-center in Frankfurt.

Other cloud services

Services such as Google, Alexa can be added easily.

Secured by AWS network

The data is constantly managed and updated with the latest security measures.

1.4.2.2 Product-apps

Most smart brands have a default app that is developed by the manufacturer to control the smart device. This is usually the easiest to set-up and usually needed to connect the product to the cloud. After it is connected it can be controlled via the internet.

1.4.2.3 Domotics

Home automation exists for a longer time in houses of hobbyists with self built systems and in luxurious houses. These smart home systems usually exist of a central hub that controls all devices in the house and are compatible with different brands and protocols.

1.4.2.4 Voice assistants

Voice assistants are slowly getting more used by more people. The big software companies all have a well known and supported voice assistant: Google assistant, Alexa, Siri, and Cortana. These assistants can be used to control smart home devices. Google, Amazon (Alexa) and Apple (Siri), also have their own app to control a smart home and set-up automations.

1.4.2.5 Webservice

Most manufacturers of smart devices publish an application programming interface (API), this makes it possible for programmers to control the devices through other applications. This has led to several webservices that extend the capabilities of a smart home. Websites like IFTTT and Olisto, make it possible to create automations based on triggers from other web-applications. For example, blink the lights if you get a retweet, or send an email if the energy-usage of a socket is above a certain amount.

1.4.2.6 Open source

The API's are also used by open-source programmers to create independent systems to control smart homes. They often focus on privacy and running smart devices on a local server or Raspberry Pi to eliminate the need of a cloud. Most brands, including Hombli, need some hacking before they can operate without the TuYa cloud.



Figure 5 Central control screen from LifeSmart



Figure 6 Amazon Alexa and Google Assistant speakers



Figure 7 Connect many apps to Olisto

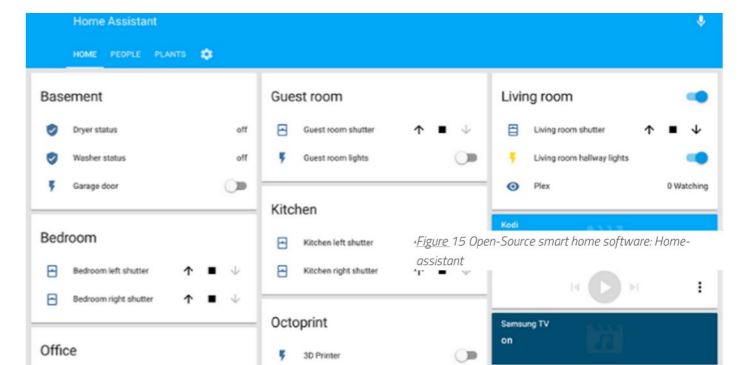


Figure 8 Open-Source smart home software: Home-assistant

1.4 Trends

1.4.1 Smart by default

More devices will have smart technology built in by default. High-end home devices such as washing machines and kitchen appliances, but also cars and bicycles, are already connected to the internet. It is expected that this trend will continue as technology becomes cheaper and users getting more used to controlling and monitoring devices remotely.

1.4.2 One language

Currently, smart home products work best together when all devices are working on the same platform. Even within the ZigBee platform, it is not guaranteed that devices from other manufactures will work together. When choosing for a product you often choose to stay on that platform and buy future products that are also compatible. This becomes difficult when more devices become smart that you ideally want to control in multiple ways together with all other smart devices.

In the future it is expected that the vast majority of products communicate in one common language to each other. The same way as how internet-devices work nowadays, over an ip-based network through WiFi, Ethernet or cellular data. To accomplish this, Amazon, Apple, Google, and the Zigbee Alliance are working together on project CHIP: Connected Home over IP (Zigbee alliance, 2020). This will develop a common language for all smart home devices, making it possible to easily control devices that support this, no matter the protocol they use.

This new trend was confirmed by Tuya, which is also a member of the new alliance. They will launch future products using this new protocol. However, they mentioned that current products will not support CHIP.

1.4.3 Artificial intelligence

Currently Artificial intelligence (AI) is mostly used for complicated tasks and algorithms of big platforms. An AI needs a lot of data, more data means a better AI. (KIGER, 2019) As more data is gathered in and around the house by all sorts of smart devices, AI algorithms can be optimized greatly. This can be interesting for companies like Google, Facebook and Amazon who earn money by understanding user behavior to optimize their (advertising) platforms.

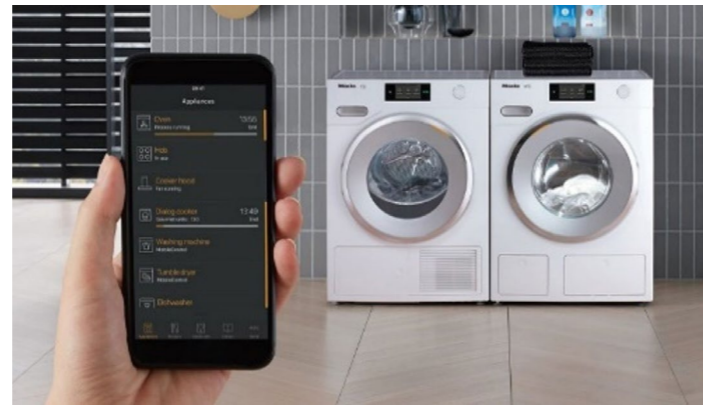


Figure 9 Smart washing machine by Miele



Figure 10 Companies involved in Project CHIP

(Tech Advisor, 2019) According to a report by Jabil, one quarter of Smart Home manufacturers sell the data gathered by their devices to other companies (Dimensional Research, 2018). This number can be expected to increase when more devices gather data in and around houses. Also, Tuya is positioning itself as a IOT+AI company, but currently they don't have any AI-services besides Chinese voice recognition (Tuya, 2020).

Besides revenue for companies, AI in smart home is also beneficial to the end-user. More advanced algorithms can predict user behavior and optimize devices to run more efficient and improve convenience for the user (Marr, 2020).

1.4.3 Service model

Many products and services that had a traditional 'buy one get one' business model, have moved to a subscription over the past years. (Haileyesus, 2020) Smart home products can be integrated in a new business model in several ways. (Coumau, 2017)

Instead of selling separate smart devices, a company could integrate smart devices in their business models. Examples are delivering energy (Eneco, 2020), telecom (Orange, 2020), security (Goodreau, 2020) or Care (Tuya, 2020).

1.4.5 Privacy

More people are opposing the growing data collection by big companies. The EU will monitor and update the legislation for privacy and data protection (Lowijs, 2020). But also, customers are paying more attention to their privacy. Therefore, new products and brands are also focusing on being a secure solution. (Apthorpe, 2017)

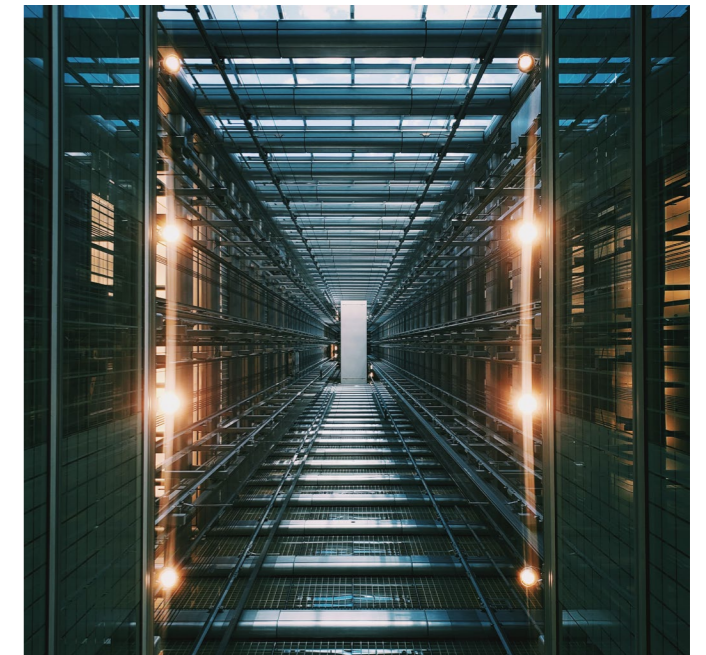


Figure 11 Big servers store data for AI



Figure 12 Swapfiets: an example of successful service model

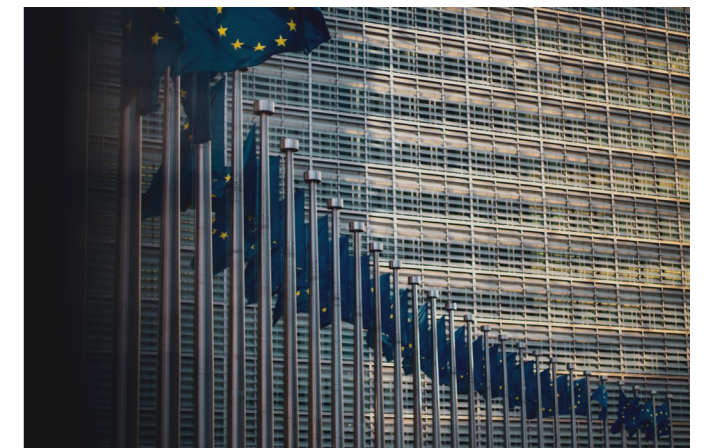


Figure 13 The EU develops strict privacy laws.

1.4.6 Not bound to home

Monitoring devices outside the home needs different kind of protocols that support greater distances. These protocols need antenna's that are monitored by providers. Protocols like LoRawan, Sigfox and Dash7 are developed to run on little energy, so a sensor could run for years on a single battery. (Singh, 2020) The coverage of these networks is already widely available. And used by big companies, agriculture, and cities to monitor and control all sorts of things. The development of 5G is also aimed at the increase of smart objects, so it can manage a bigger number of devices. (Boogert, 2020)



Figure 14 LoRa, currently mostly used by cities or corporations

It can be expected that these technologies will also come to regular users, so smart devices will not longer be bound to the local network. This requires a kind of service model to cover for the network-costs. So, it would be a great match together with smart home as a service which is another trend in the market.

1.4.3 Sustainability

An important area where people invest in improving their homes is sustainability. A research by Offerteadviseur shows that 63% of Dutch homeowners are thinking about making their house more sustainable. (OfferteAdviseur, 2019) Smart products can help people monitor and reduce energy use.



Figure 15 A sustainable house with solar panels

1.4.3 Flexible work environment

Flex working was a trend for a long time. But since it became mandatory for many people due to the COVID-19 restrictions, it is expected that more people will be used to working at home than ever before. According to research by the Dutch Ministry of infrastructure, a quarter of the people want to keep working from home, even after the lockdown (Kennisinstituut voor Mobiliteitsbeleid, 2020). Because people are living and working at home, they spend almost all their time in the same environment. The home should be suitable for these vastly different scenarios. Smart devices can help in adapting to these different activities.



Figure 16 Working at home because of Corona restrictions

Goal: Define the opportunities, scope and the possibilities for this project.

The findings in this chapter are summarized in the following SWOT-analysis.

	Positive	Negative
Internal	<p>Strengths</p> <ul style="list-style-type: none"> Good connection with distributors Competitive pricing No need for a hub Reliable Dutch brand Flexible small company Easy to expand product portfolio 	<p>Weaknesses</p> <ul style="list-style-type: none"> Dependent on Tuya, not easy to make drastic changes to products and services. Brand is not well known yet. There are many companies that deliver product with similar features and experiences.
External	<p>Opportunities</p> <ul style="list-style-type: none"> Growing market More products are smart by default: making smart home more interesting. Growing interest in energy saving Growing interest in automation Growing interest in security 	<p>Threats</p> <ul style="list-style-type: none"> Relatively easy to copy functionalities of all Tuya products are the same. A new standard can make current products obsolete. Big companies have the power to push the market in a certain direction. A lot of competition



2.0

Market analysis

How to strategically position Hombli

After the general introduction of Hombli and the technologies behind Smart home, this chapter will compare products from other brands to Hombli. A competitive analysis will show the strengths and weaknesses of Hombli.

The current goal of Hombli is to make a smart home for everyone, by offering a simple and friendly solution. Because the smart home market has evolved, many brand offer simple solutions for everyone. Therefore, Hombli will focus on wellbeing to create an unique brand position.

← Contents

2.1 Product categories

2.2 Competitive analysis

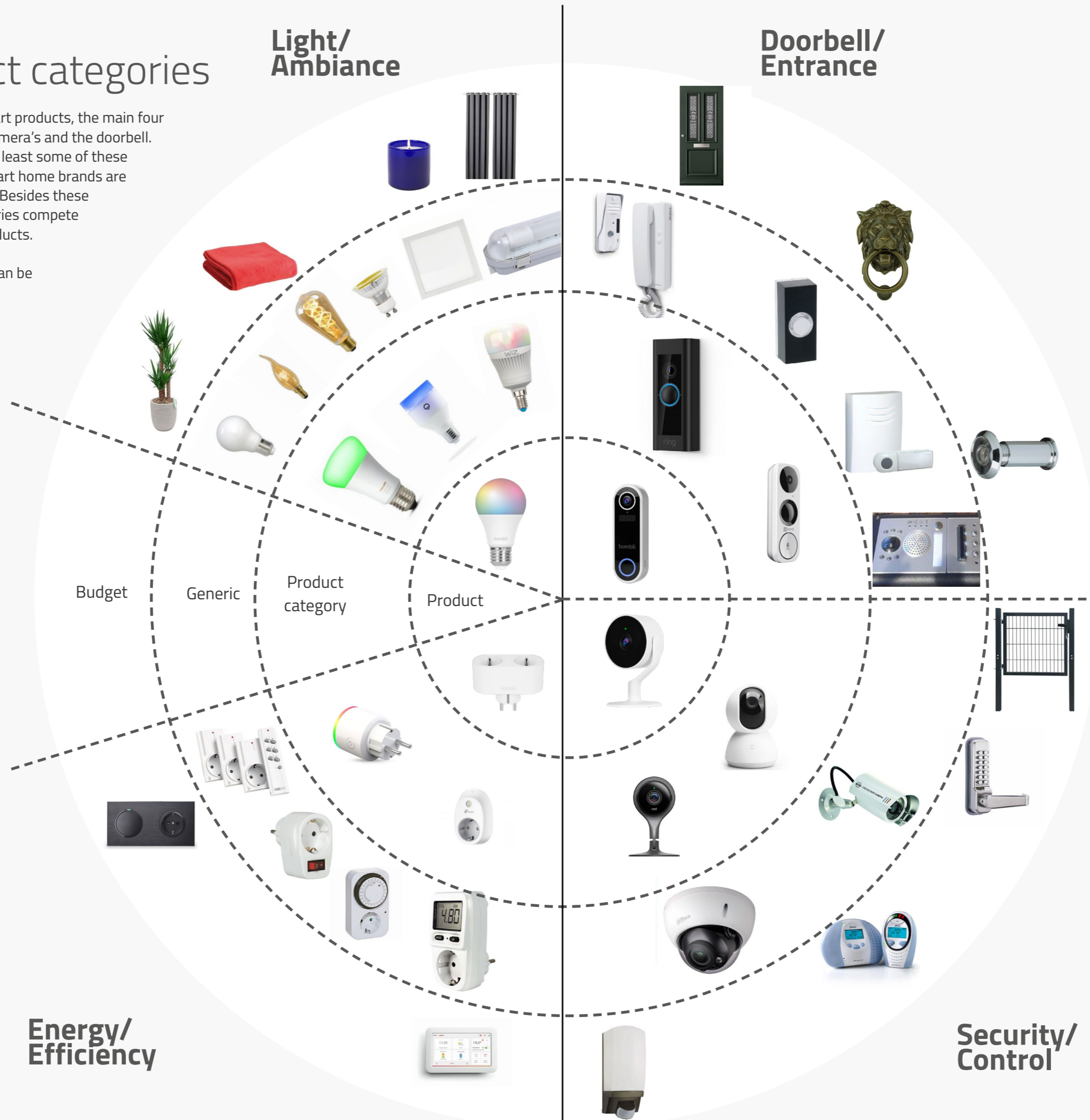
2.3 Brand positioning

Goal: Create a branding strategy to stand out from the competition.

2.1 Product categories

Hombli has different kinds of smart products, the main four categories are Lights, Sockets, Camera's and the doorbell. Most smart home brands offer at least some of these categories of products. These smart home brands are the main competition for Hombli. Besides these competitors, the different categories compete on different levels with other products.

An overview of this competition can be seen on this page.



2.2 Competitive analysis

2.2.1 Threat of new entrants

The smart home market is relatively new market with many different brands. There is currently not one settled brand that dominates this market. Small companies can easily launch comparable products to Hombli through the accessible platform of Tuya. There is no need for huge upfront investments, because there are many Chinese manufacturers that sell Tuya compatible products off-the-shelf. A clear strength of Hombli is their good contact and experience with Chinese manufacturers, which makes the quality of the Hombli products considerable better than cheaper Tuya brands such as LSC (Action). A downside is that this difference in quality is not directly clear to customers. For instance, different Tuya smart bulbs can be from different quality, but look the same. A strong, well-known brand perception of Hombli could create a loyal customer base and makes it harder for new entrants to compete directly with Hombli.

2.2.2 Threat of substitutes

Because the smart home market is still in development, new technologies can come available that drastically change the possibilities. An example of this are new protocols like Thread or CHIP, which make it easier to control smart home products via an open standard. If companies like Apple or Google implement these new communication standards in their products, the Tuya platform or Hombli app may not be compatible or needed to control smart homes.

2.2.3 Bargaining power of customers

Hombli sells its products directly through platforms like Bol.com, Amazon and their websites. Besides this, it has several distributors like Mediamarkt, Coolblue and Think who sell Hombli products. These companies can have strong bargaining power and influence about which brands they push to their products. If a company like Mediamarkt really wants to sell Hombli they can put it on a more prominent place on their website and in their stores. This would greatly increase the number of sales. However, this situation creates huge dependence of Hombli on these distributors.

Buyers of Hombli products can choose from a vast array of different smart home brands. Many of these

brands compete on very low prices (LSC, IKEA, Wyze), while others have a premium brand which people are willing to pay for (Hue, Orvibo, Netatmo).

If customers already own smart home products, it is likely that they will buy new devices from the same brand to make sure they will all work together in a consistent way. This is especially true for brands that have a very closed system or rely on a hub to control all devices. These switching costs do not apply for people that own smart home products that rely on the Tuya platform, because they can easily expand their smart home with products from different brands. This can also be a threat for Hombli, as it makes it easier for customers to expand their, high quality, Hombli products with cheaper alternatives.

2.2.4 Bargaining power of suppliers

Hombli has several different Chinese manufacturers for their different products. This gives them great bargaining power, because if one manufacturer underdelivers they can threaten to switch the order to another manufacturer.

For the hardware suppliers, Hombli has fairly strong bargaining power. However, they fully rely on Tuya for the software side. If Tuya changes its policy or changes the platform, Hombli cannot do anything.

2.2.5 Competitive rivalry

There are many different players in this market that offer similar products. The overall smart home market is growing at a rapid pace (Multiscope, 2021), even small brands can grow despite the strong competition. This does not take away the fact that there is a strong rivalry amongst the smart home brands. Many companies offer their products for very competitive prices and place a lot of advertisements.

Threat of new entrants

- + Dutch brand
- Easy to copy with Tuya

Bargaining power of customers

- Variety of channels +
- Power of distributors -



Competitive rivalry



Bargaining power of suppliers

- + Contact with different manufacturers
- Software controlled by Tuya

Threat of substitutes

- Low costs of change +
- New technologies -

2.3 Brand positioning

Hombli has the goal to make smart home accessible for everyone and positions itself as a friendly, simple and safe brand.

This are good requirements of smart home products. However, competing brands all meet these requirements in some or another way. See Figure 19 for a visualization of the most important brands, which all have a clear unique focus besides being simple, safe and secure. It is hard to stand out with terms that are becoming a requirement to succeed in this market.

One might argue over the level in which each brand succeeds in meeting these standards. It could be true that Hombli is the simplest smart home brand. But this is hard to communicate, a better strategy would be to find something absolute (Vorst, 2017). See Figure 18 for examples of absolute and gradual contradictions, which can be used to set brands apart.

See Appendix VIII (Page 103) for a comparison between more smart home brands.

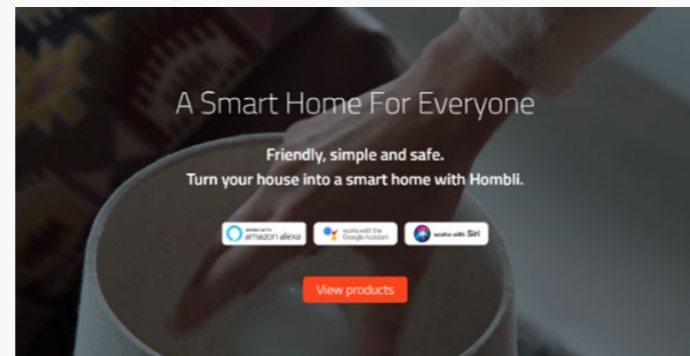


Figure 17 Slogan of Hombli on their website

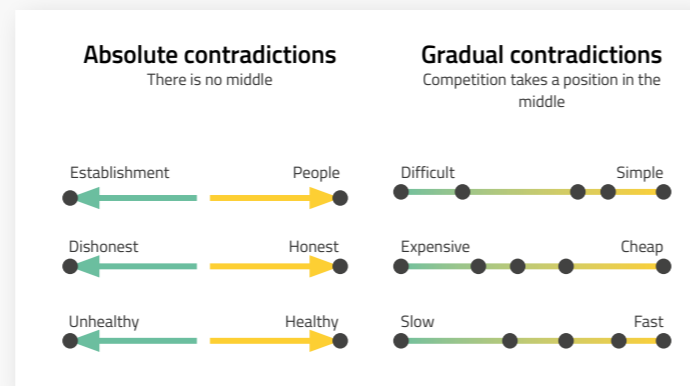


Figure 18 Absolute versus gradual contradictions

After internal brainstorms and trend analysis, Hombli has decided to focus especially on wellbeing in their product portfolio and communication. This is a more specific direction, which also should be part of the digital customer experience. The slogan "Live a carefree life" gives the company direction and delivers a statement which sets Hombli apart from other brands.

There are many different theories about what kind of factors influences the wellbeing of a person. Kaleido Insights had mapped 4 different categories for technology on wellbeing: Mind, Space, Body and Community. These four categories are (slightly altered) applicable to the devices from Hombli. Smart scenarios can be made in the app to accomplish the wellbeing-goals. The next pages show example scenarios per category. These scenarios can all be added in the current app, however users have to come up with the ideas and create them. Further user-research is needed to confirm how users are currently using the app and create these scenarios that can increase their wellbeing.

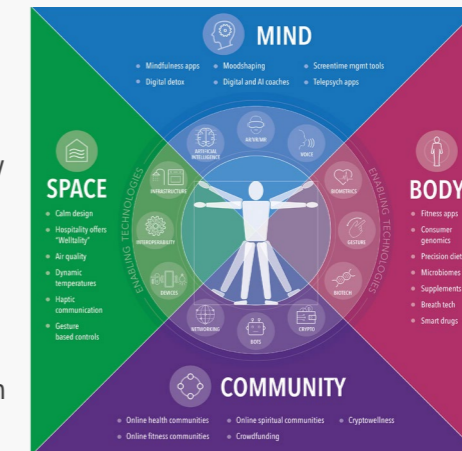


Figure 20 Four different categories of technology for wellbeing, by Kaleido Insights

Goal: Create a branding strategy to stand out from the competition

'Live a carefree life with Hombli' is a mission for Hombli in which is can differentiate from the competition.

It is a absolute statement. And it fits Hombli's portfolio because smart scenarios in the app can help users to improve their wellbeing.

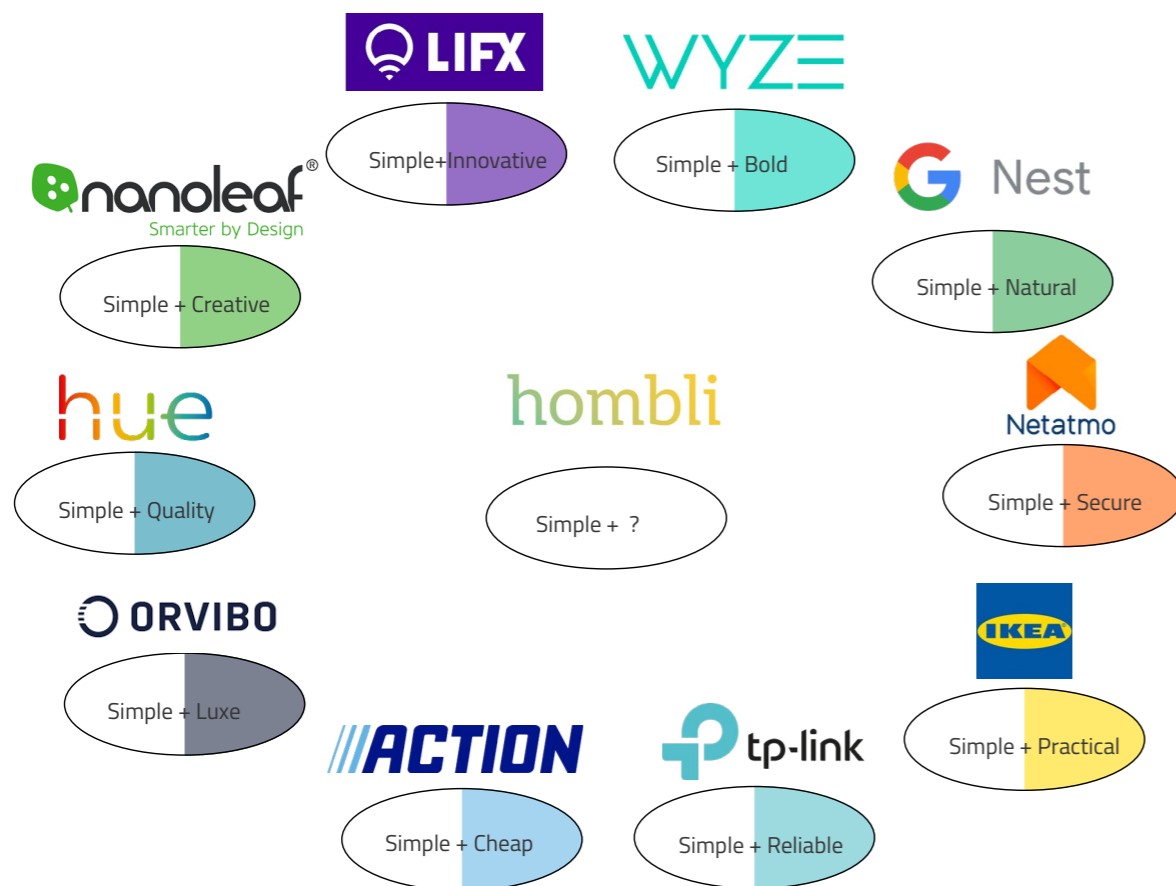


Figure 19 Focus areas of different brands: Simple has become a standard. Same can be said about Safe.

hombli
Live a carefree life



Body
Health



Family
Care



Mind
Safety



Space
Ambiance/
automation





Body

With smart automations, users of the Hombli app can improve their health. These automations can create a better environment and habits to live, work and sleep.



Family

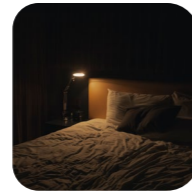
These scenarios help people to care about their loved ones such as kids, elderly (grand)parents or even their pets.



Natural light

A circadian cycle is the natural day rhythm which helps to get a good routine.

After sunrise ▶ Relax light



Go to bed

Going to be on time improves the sleep quality, dim the lights to remind yourself to go to bed.

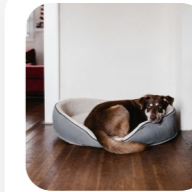
At 20:30 ▶ Dim light



Baby monitor

With this scenario you always know how your baby is doing, so you can give the best care.

Sound on camera ▶ Notification



Pet monitor

Pets can be very unpredictable, this scenario lets you know if anything happens.

Camera movement ▶ Notification



Wake-up light

Morning-light wakes you up in a natural way, so you get a good start of the day.

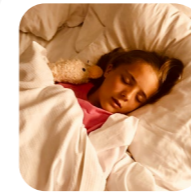
At 7:30 ▶ Soft light



TV-bedtime

Screens should be avoided an hour before going to bed, shut down the tv automatically.

At 20:30 ▶ IR remote



Bed time light

Explain to kids that they can come out the bed at a certain time by changing the lights.

19:00-7:00 ▶



Elderly care

When camera detects sound at night send a notification to the phone.

Sound on camera ▶ Notification



Coming home

Most homes contain high levels of particulates, filtering them creates a healthier environment.

Coming home ▶ Turn on



Night-air

Clean air is especially important at night to get a better sleep and wake-up fresh without headache.

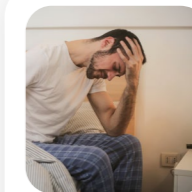
At 21:00 ▶ Turn on



Cat-door

Get to know how often your cat leaves the house so you know if he/she is doing alright.

Sound on camera ▶ Notification



Sleep-walking

The habit of sleepwalking can be very dangerous. Get notified if anyone is sleepwalking at night.

Camera movement ▶ Notification



Concentration mode

Colder light keeps you awake and improves concentration, change the ambiance for working at home.

9:00 - 17:00 ▶ Blue mode



Work-break

It is important to take regular brakes, create a special atmosphere by changing the light.

10:00,13:00,15:00 ▶ Relax mode



Party

Activate this scenario during a party and create a festive ambiance for all guests.

Camera movement ▶ Party mode



Welcome home

Ensure that your family members enter a welcome home when they enter the house.

Door opens ▶ Turn on



Mind

Having a ease of mind can be achieved by having good control and feeling secure and save at home. These scenarios help to improve the safety at home, or prevent damage.



Space

An environment that seamlessly adapts to the routines of the user and creates the best ambiance depending on the situation.



Doorbell

Get a notification when the doorbell is pressed and see who is in front of the door.

🔔 Press on doorbell ▶ 🔔 Notification



Holiday rhythm

Turn the lights regularly on when on holiday, so burglars think you are at home.

🕒 20:00-22:00 ▶ 💡 Lights on



Evening light

Prevent being in a uncomfortable dark room after sunset by turning the lights on automatically.

🌅 After sunset ▶ 💡 Relax light



Motion light

Everyone has to go to the toilet some nights, automatically turn the lights on by movement.

👁 Camera movement ▶ 💡 Dim light



Outdoor light

Burglars do not like light: turn lights in the garden of at night to secure the house.

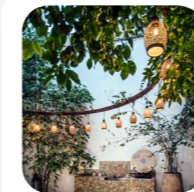
🌅 After sunset ▶ 💡 Dim light



Thunder

Secure valuable devices from lightning strikes by disconnecting them during thunderstorms.

⚡ Thunder ▶ 📱 Turn devices off



Garden lights

Create an inviting garden to enjoy summer-evenings with a nice soft light.

🕒 7:30 ▶ 💡 Soft light



Diner-time

Change the lights at the end of the afternoon, to create a nice ambiance to cook and relax.

🕒 At 17:00 ▶ 💡 Relax light



Storm check

An open window or door during a storm can create a lot of damage. Check if everything is closed with a contact sensor.

🌬 Wind+window open ▶ 🔔 Notification



Alarm-motion

Get a notification when the doorbell detects motion at night or if you are not at home.

🔔 Movement ▶ 🔔 Notification



Air-conditioning

The IR remote can turn on your Air-conditioning when it's hot, so your house keeps nice.

🌡 Above 25°C ▶ 📶 IR-airco



Heater

Plug your heater in a smart socket and turn it automatically on when it's cold.

🌡 Below 20 °C ▶ 📶 Turn on



Alarm-door/window

Get an alarm when a door or window is opened and turn all the lights on.

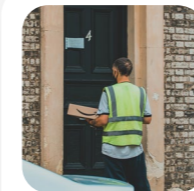
🔔 → Door/window open ▶ 🔔💡 Notification + light



Night mode

One dim light in every room warns burglars that they should skip this house.

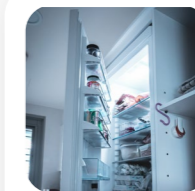
🕒 23:00-6:00 ▶ 💡 Dim light



Mailbox

Clearly see when there is mail by installing a contact-sensor and change the lights when post is in.

🔔 → Sensor opens ▶ 💡 Blue mode



Fridge sensor

Make your fridge smarter by placing a contact-sensor and adding a smart notification.

🔔 → Sensor opens ▶ 🔔 Notification



3.

User analysis

An investigation into needs of current and potential Hombli customers

To narrow the scope of this project down to a specific design-goal, the needs and problems of the current app will be investigated. Besides current users of Hombli devices, a qualitative research will be done with 10 people without experience with smart home devices.

The results of the analysis of current and potential Hombli users is summarized in a journey map. For many people it is difficult to create scenarios in the app. Hombli can make a truly smart home accessible for more people by making it easier to add scenarios.

← Contents

3.1 Goal

3.2 Current Hombli user

3.3 People without smart devices

3.4 Conclusion

Goal: Find what part of the app should be improved to create the biggest improvement in user experience.

3.1 Goal

Before choosing a direction and developing several concepts, the user needs that smart products can solve will be investigated. The main research question is:

HOW CAN A SMART HOME EXPERIENCE ADD VALUE FOR USERS?

To answer this research question, this user analysis will look at current users and people without smart home products. The user research will be done in two groups with different research questions (RQ's):

The current Hombli user

- Who is the current Hombli user?
- How and why do they use their smart devices?
- What are issues in the current experience?
- Which user needs do smart home products solve?

People without smart home products

- What are the values of people's homes?
- What do people expect of smart products?
- How would they use smart products?

3.2 Current Hombli user

To answer the research questions about the current Hombli users, data in the Tuya dashboard and website Analytics can be used. Besides this information about the demographics of the current Hombli user, a survey was sent to users of the Hombli app via a push notification. As an incentive to fill in the survey, a Hombli starter kit will be given to one of the participants.

The notification was sent to 3500 app-users, of which 195 opened the survey. A total of 149 people completely filled in the survey. The survey was available in both English and Dutch, as most users are from the Netherlands and Belgium (see Figure 26 on the next page).

At the end of the survey, participants are asked if they want to be contacted for future research and development of the Hombli products. 48 people want to be contacted for further research. This survey takes approximately 6 minutes and asks people to explain how they use their products, if they use other smart products, and what their goal is of a smart home.

See Appendix II (page 66) for all questions of the survey.

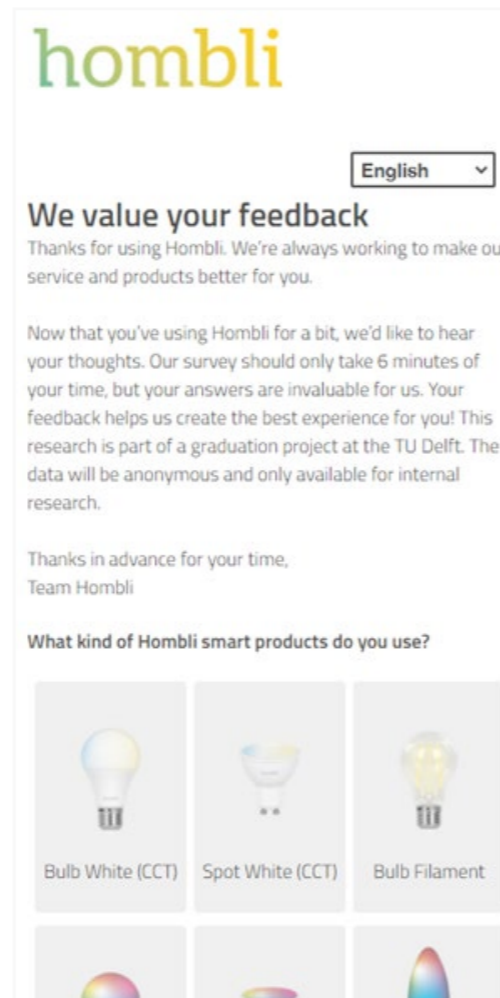


Figure 21 First question of the survey

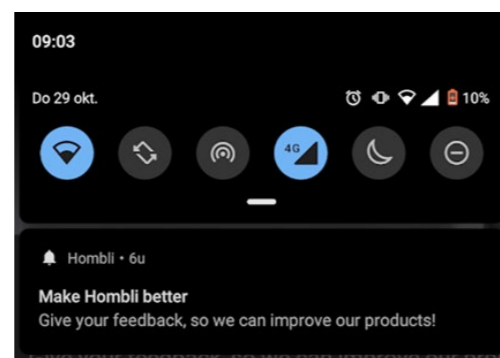


Figure 22 Push notification, asking people to give feedback using a survey

3.2.1 Who is the current Hombli user?

Currently the biggest target audience of Hombli is a 25-34-year-old male from the Netherlands. This seems to confirm the assumption of an early adopter market, where an enthusiast, young person buys the smart home products because he is interested in the novelty of the product.

However, the survey shows that people buy products that are proven instead of the latest cutting-edge technology (see Figure 27 What sentence matches most to you? Current Hombli users from the survey.). This implies that the Hombli user see themselves not as an early adapter of new technology, but part of the mainstream market.

The main reason people choose for Hombli instead of other brands is their competitive pricing (see Figure 28). Only 17% of people have 6 or more Hombli devices at home (see Figure 29).

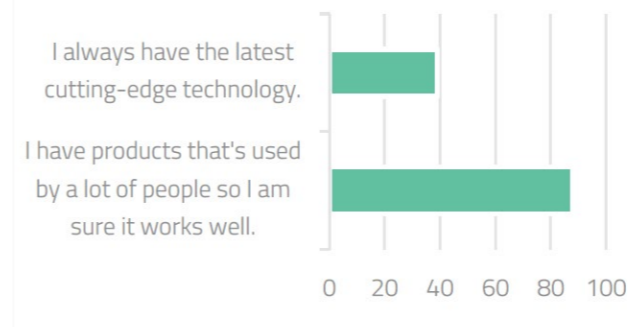


Figure 27 What sentence matches most to you? Current Hombli users from the survey.

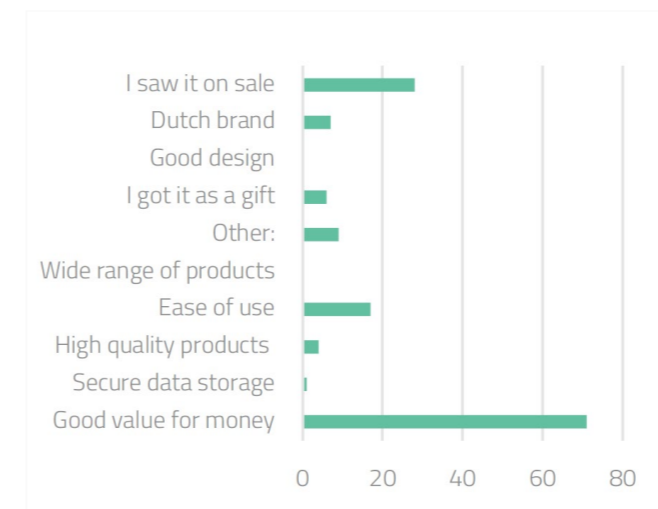


Figure 28 Why people choose for Hombli

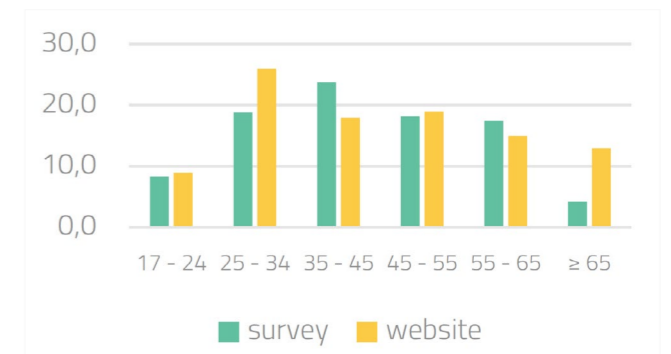


Figure 23 Age of the survey participants and website visitors.

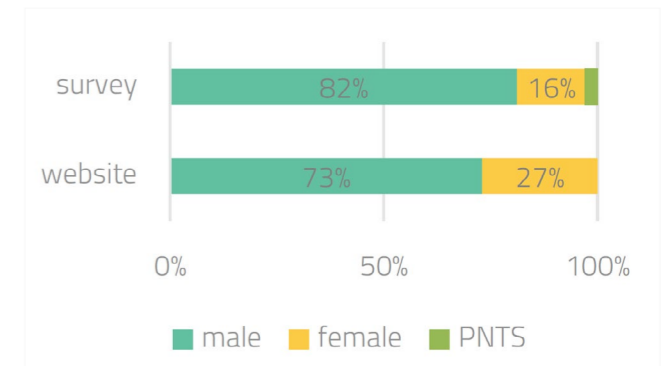


Figure 25 Percentage male versus female of survey and website visitors.

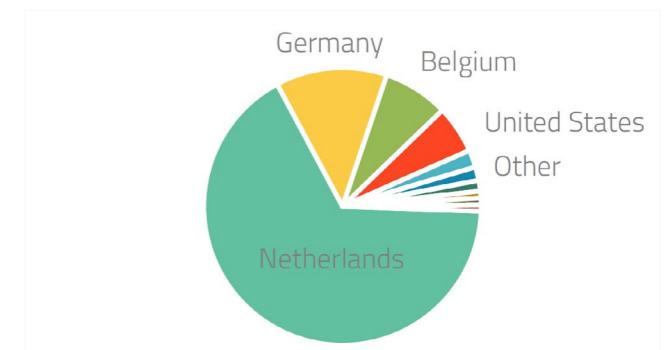


Figure 26 Visitors of the Hombli website.

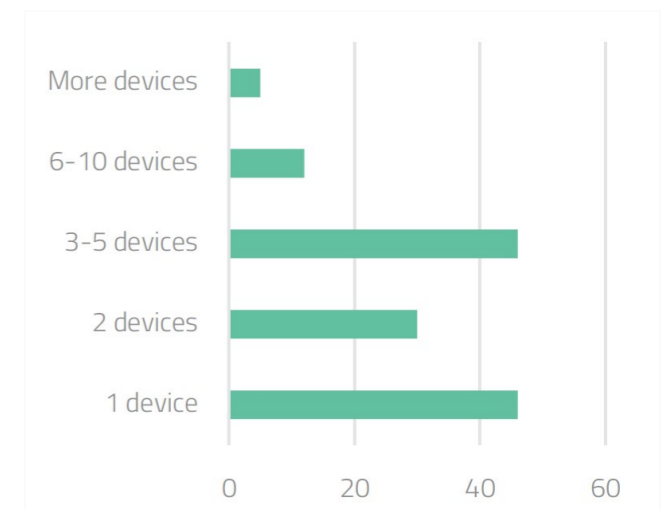


Figure 29 Total amount of Hombli devices per customer according to the survey.

3.2.2 How and why do people use their smart devices?

Hombli products can be controlled in several different ways. 50% of respondents only use the Hombli app, the other half uses either a combination or another way to control their devices. Other that people mentioned are for example Homey or a smart remote.

78% of respondents that use voice to control their devices do this daily. Some note that they only use the Hombli app for specific functionalities that they could not manage with voice control.

67% of respondents started a smart home to be able to remotely control their devices. Others also mention that they just like the idea or want to investigate the possibilities of home automation and that they like gadgets.

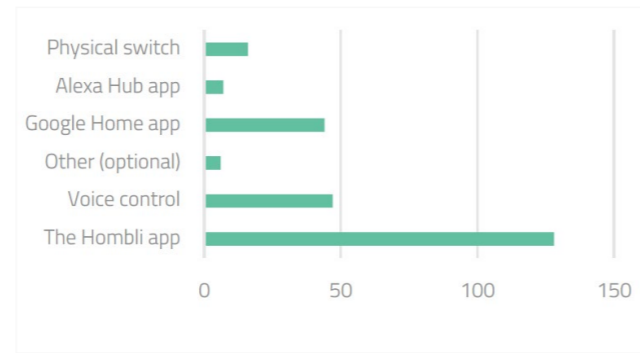


Figure 30 In what ways do you control Hombli devices?

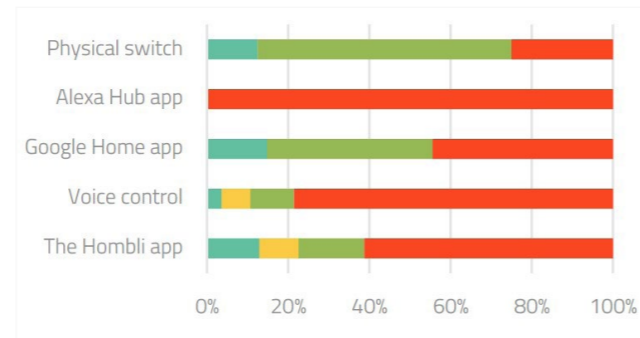


Figure 31 How often do people use methods to control smart devices?

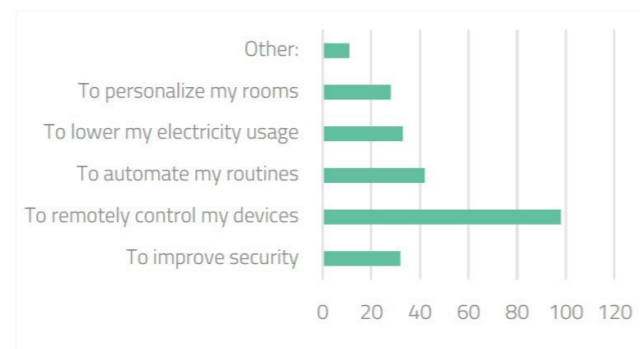


Figure 32 How often do people use methods to control smart devices?

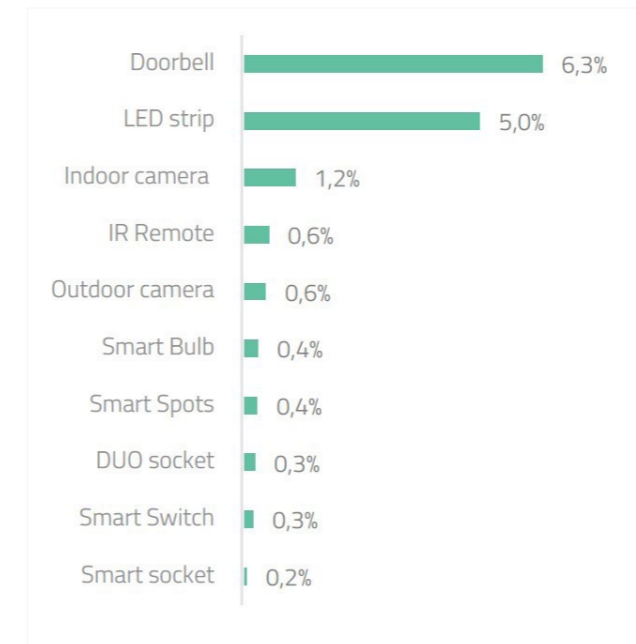


Figure 32 Percentage of customers contacting customer support.

3.2.3 What are issues in the current experience?

The overall app experience is rated an average of 7.8 by current Hombli users in the survey. Of the respondents 15% are unhappy and rate below 6, 56% Passive and give between 7-8 and 29% of respondents are enthusiast and give the app a 9 or 10. This gives a NPS-score of positive 14 (Qualtrics, 2020).

People with a doorbell give the lowest score with a NPS of negative 14. This is caused by several problems of the doorbell which are known by Hombli and can also be seen in the percentage of people contacting customer support (see Figure 32). A second version of the doorbell should eliminate most problems.

Some respondents of the survey also gave feedback or complaints about the experience, this feedback can be summarized in the following categories:

- **App (7):**
Not intuitive, energy overview limited, scenario is difficult.
- **Compatibility (6):**
Does not work with Google Home, Ziggo box, camera.
- **New idea's (6):**
iDeal, Without WiFi, Wake-up light setting, Web-app, wall-switch, sensors, dark mode.
- **Positive (4):**
Works fine, Hombli makes good stuffs!
- **Issues (3):**
Doorbell that quickly drowns battery, manuals that are not clear, malfunctioning products.
- **Connection (2):**
Difficult to set up and bad connection, slow reaction.

All data and feedback can be found in Appendix 3.

57% of respondents also have smart home products of other brands. Compatibility between those brands differ greatly, depending on what protocols and systems they use. Even people that use Google Home or voice assistants to control their smart homes complain about incompatibility. Some of these complaints explain that not all functions are available in the Google home. This requires them to use different apps to control all functionalities. But there are also respondents that note that the Hombli products do not work at all together with Google home, which is not the case.

The respondents of the survey note that most app-functionalities are very easy (see Figure 34). Besides the basic steps, like creating an account and adding devices, the functionalities are not used by a big group. This might be caused by the fact that a many people only have a few smart products, making features like scenarios, shortcuts and rooms not necessary. These people do not have a complete smart home experience, that can improve their wellbeing by automating their routines but rather a few products that they could control via their smartphones.



Figure 33 How well do the smart home devices of other brands work together with the smart devices from Hombli?

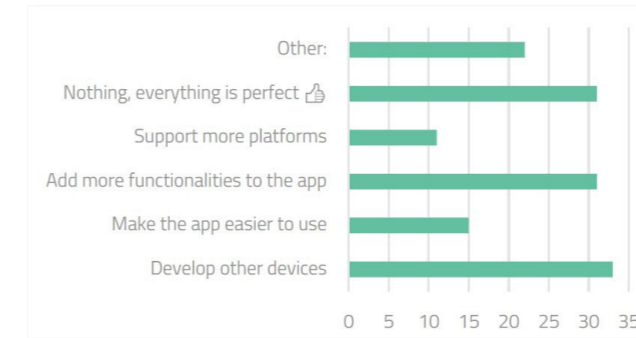


Figure 35 What should have our highest priority? According to respondents of the survey.

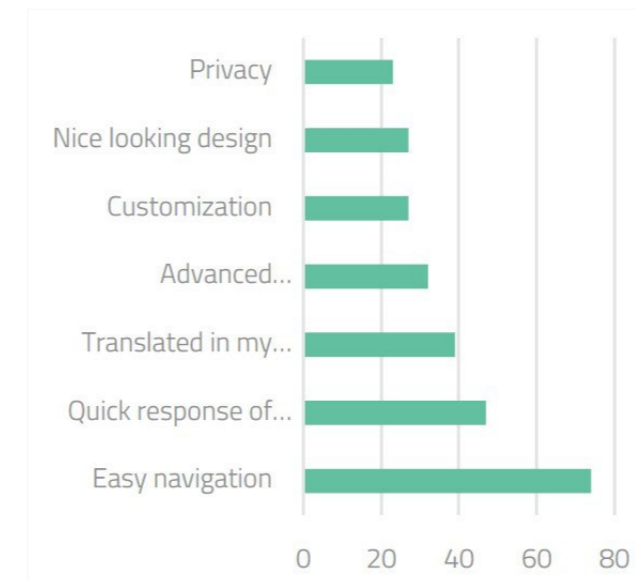


Figure 36 Which 2 aspects of the Hombli app are most valuable for you?

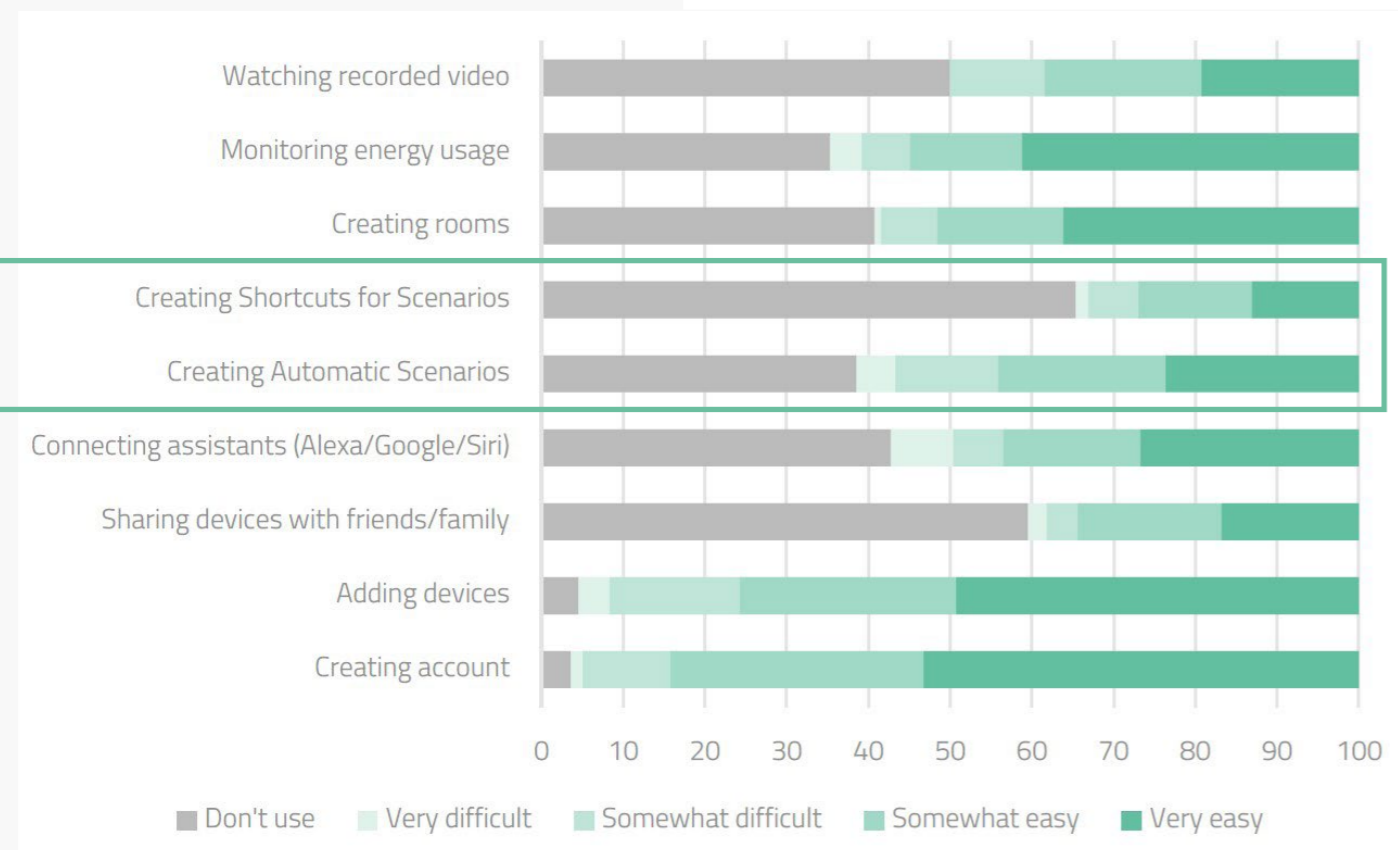


Figure 34 What is your experience with these features of the Hombli app? (%)

More than 22% are satisfied with the current Hombli experience and think there is nothing to improve. However, also 22% of respondents think that there are still missing functionalities in the app, and another 22% are missing devices in Hombli's portfolio that they want to improve their smart home.

3.2.4 What user needs can smart home products solve?

The most important aspects of the Hombli app according to the respondents of the survey are easy navigation, quick response of devices and translation in their own language.

To understand what user needs smart home devices can fulfill, the participants of the user survey were asked which words applies most to their goal of a smart home. These words were taken from a research by Accenture focusing on different types of smart home users. (Accenture, 2019) This research explains that technology-driven products focus on efficiency, security, or being a cool, fun product. And that people value convenience, control and comfort at home.

The data of this survey under current Hombli users validate this. They also value a smart home where they have convenience, control and comfort. So, the Hombli experience should focus on these aspects and help people get these feelings when using Hombli products.



Figure 37 Which words apply most to your goal of a smart home? (choose top 3)

3.3 People without smart devices

To design an experience that will attract people that are currently not interested in smart home products, the needs and expectations of these people will be investigated. What people say and think might be different than what they know or feel. As described in the Convivial Toolbox (Sanders, 2016), these latent and tacit needs of users can be researched using generative sessions (see Figure 38).

These generative sessions will be conducted using sensitizing booklets with daily assignments. During this period of 6 days, participants will describe their routines and expectations of smart home. They will also install and try a starter kit in their own environment. Because of this, they will reflect on the process in their own context. After this period, the participants will be interviewed about their experiences. Some participants will also be observed during the installation process.

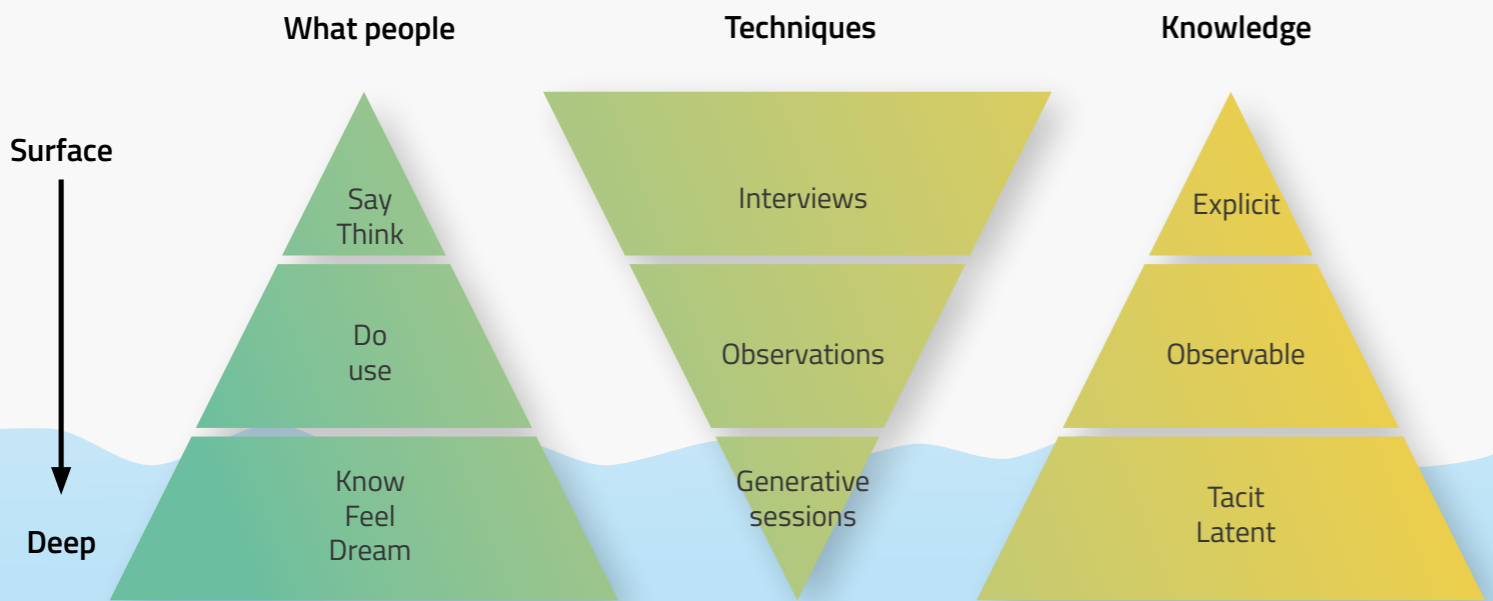


Figure 38 Research techniques to explore people's experiences (Sanders & Stappers, 2012)

3.3.1 Sensitizing package

The package consists of:

- Booklet with daily assignments
- Emoji sticker that can be used in some assignments.
- Info booklet from Hombli
- Pen
- The Starter kit with a sticker that this should be opened on day 4.

See Appendix V (page 114) of the contents of the booklet.

3.3.2 Participants

The target group will be people that have no experience with smart home products.

Hombli products are currently used by people between 25-65 years. This can be classified as a 'working'-person, so no students.

Currently, Hombli users are also mainly men. For this research, the ratio men versus women will be evenly distributed to also investigate the needs of women and see if there are any differences. This could help in making the experience suitable for everyone. Besides that, participants will be categorized in singles, families, and couples.

For practical reasons only people from the Netherlands, close to the city Delft are asked to participate in the research.

3.3.3 Results

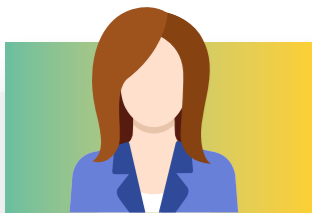
In total 10 people have participated in the experiment, filled in the booklet and were interviewed. Most of them were interviewed via Zoom because of the restriction due to the Corona Virus. A summary from each interview can be found on the next pages. The names of all participants shown in this report are changed to keep the identity of participants private.



Figure 39 Contents of the sensitizing package



Figure 40 The sensitizing packages



Marlies

Marlies never had the idea to buy smart home devices. However, after installing the Hombli products she was very enthusiastic about the possibilities of these products. "My lamps now turn on automatically when I am coming home. This gives me a feeling of safety. It's not necessarily that my house needs more security against burglary, but it just feels safer." "It is also difficult to choose which of these devices is the best, they become better together."

Age 35
Work Teacher (MBO)
Lives On her own in an apartment



Katja

The installation of the smart devices went not as planned for Katja. Because she has a shared WiFi network in her apartment it was complicated to check what was going wrong. The Bulb worked fine in the end. "Because I am working a lot at home it is nice that I can change the ambiance. I have a small house and I work and relax in the same room, now I the room can adapt to the situation. I use the scenarios to get more structure in the day, when the lights go on, I know I have to start working or take a lunch-break."

Age 26
Work Shipping firm
Lives On her own in an apartment

Romy

Before installing the Hombli devices, Romy already thought she might run into problems installing them. Luckily, she could install everything on her own. She did not start on the scenarios, because she really does not understand what she could do with that. "I tried it first, but I understand nothing of these scenario's, I just don't know what it means." After explaining the things that can be accomplished with these scenarios, she understood that they can make the smart devices much better. "I could never come up with these ideas you explain to me!"



Age 50
Work Domestic help
Lives With husband + 2 kids (28 & 30)

Rosa

Rosa is the oldest participant in the test-group. Her grandson has helped with installing the products. "A description of where I could use the devices with instructions how I can set up the scenarios would be easy for someone of my age" Rosa feels lucky that she got these devices and uses them often. The socket even helps with her daily training because it is hooked up to her treadmill.



Age 70
Work Retired
Lives Own apartment in Delft



Frits

Frits is a practical straight-forward person, his house is functional and there are no decorations or things to improve the ambiance. He also never considered smart home devices, "I think they are nice toys, but no something I really need". However, after using the new Hombli devices he discovers the convenience of these devices, especially with all the different scenarios. "It is amazing how many different scenarios you can create, it's also very easy!"

Age 40
Work Construction
Lives On his own in apartment



Rick

At first Rick could not get the Hombli devices working. It was unclear what was going wrong. When I went to Rick's house to help with installing, the installation was going very easily. "It's more uncertainty, that I think that I couldn't do it. At the end it was quite easy. More instructions or a simple video would make it easier for me." After the products were installed and the options were showed, Peter was impressed by how easy the smart products are.

Age 40
Work Cook
Lives With wife and 2 young kids

Ellen

Ellen is very happy with her house; she cannot think of anything negative of her house. She already two lamps that she can control with her smartphone. However, they are not connected to the cloud, so can only be controlled when she is at home. "It is nice that I can still control my devices when I'm not at home, sometimes I am not sure if I turned off the lamps. Now I can easily check it." To complete her smart home, Ellen immediately ordered 6 more Hombli spots. "I have not really searched for other brands; I know now that Hombli works great, so I do not have to look any further".



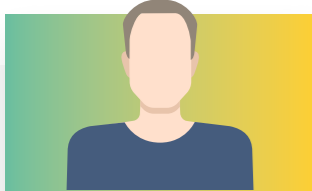
Age 32
Work Teacher (Primary)
Lives With Son (9)

Jessica

For Jessica, installation and adding scenarios was very clear. "First the devices didn't work because I typed the WiFi password incorrectly, it would be nice if the app could say that it's wrong, so I know why it's not working." All devices work great, and Jessica has added several scenarios to automate the light in her living room. The indoor camera is used in the hallway, but she has some privacy concerns for the camera. "When I come home, I unplug the camera so I cannot be watched"



Age 50
Work Telecom
Lives With two teenagers



Jos

"My experience is that I like it to play with these kinds of devices. The devices are well-build and can easily be controlled." The camera has some privacy issues for Jos, but he thinks that this something that most people wouldn't mind. He also doesn't really scenarios. "I tried to automate my coffee-machine with the socket, but that didn't really work because my coffee-machine has a button. I also like to control my lamps by myself, it's to much hassle for me to set everything up with these scenarios."

Age 28
Work Programmer
Lives On her own in an apartment

Lucas



Lucas explained that he had thought about buying smart devices before, but never made the decision. He was surprised how easy he could get these devices to working. "it works better that I thought!" The camera was a bit more difficult to install, but when everything was connected it worked all very easy. "It is nice how these devices work together, now I the lamp turns automatically on when the camera detects a movement."

Age 45
Work Online marketing
Lives with wife and daughter (14)

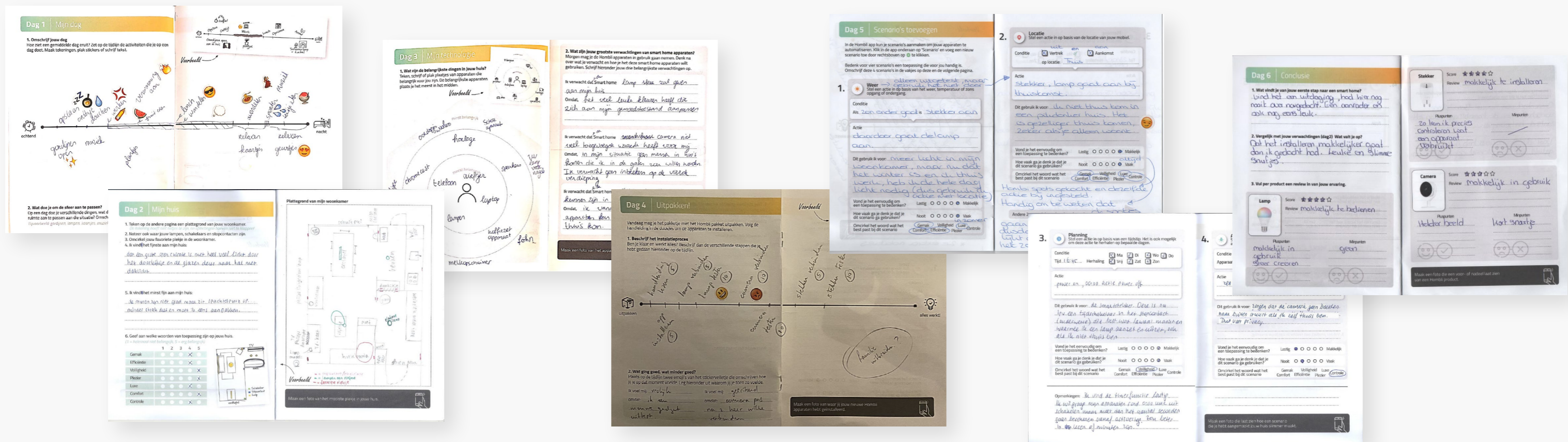
3.4 Conclusion

People are happy with their homes; the participants could come up with positive points easier than negative things about their houses. The things that they like to improve are often more space or insulation, so things that smart home devices cannot solve.

The participants thought that the scenarios were mostly convenient because things are going automatic. Surprisingly, they the word 'Luxe' was also mentioned many times, while this has the lowest score on people. The bulb was the most favorite device with all participants, it has many different use-cases and gives a pleasant light. However, people that added scenarios noted that it is hard to rate the devices because the overall experience is increased when multiple devices work together in scenarios.

	Convenience	Efficiency	Safety	Fun	Luxe	Comfort	Control
Which words apply to your home?	4,4	4,3	4,3	4,2	3,7	4,4	3,8
Words related to scenarios	19	9	7	4	10	6	8

Although the participants that added scenarios saw a clear benefit, others could not think of applications or did not understand how to setup the scenarios. After some examples of scenarios, they also understood the use of the scenarios. Because adding scenarios looks technical, they thought it is only for more power-users and not for them. The experience could be much improved by showing examples or guiding people through the process.



3.4.1 Journey map

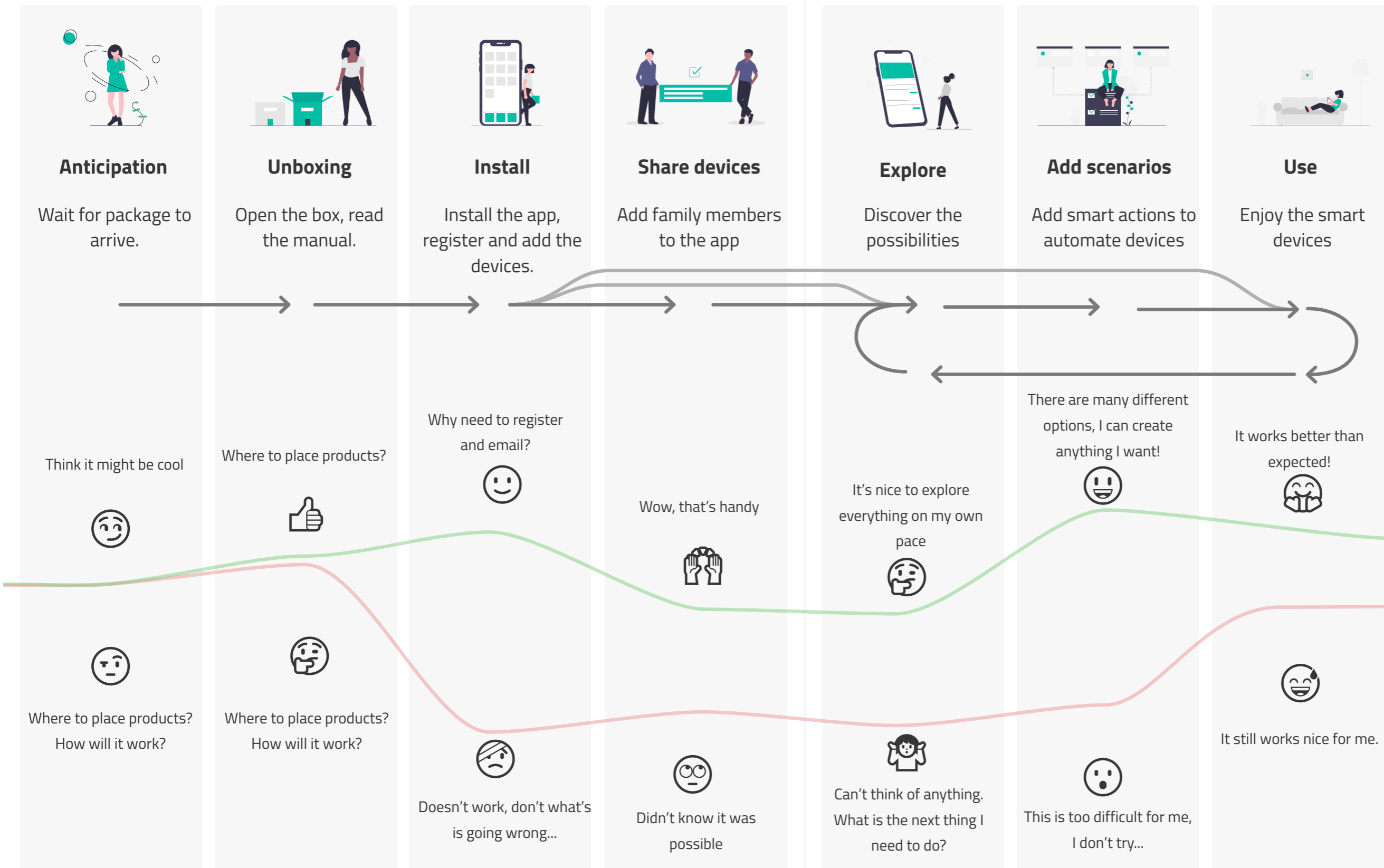
The results of the user analysis are summarized in a journey map (see Figure 38). This journey map of an average user can be defined in 7 different steps. Some of users skip the steps sharing and others even do not add scenarios. In most cases, users produce new ideas after they have used the products some time and continue to add or modify scenarios in the app.

The experience of the different steps for the end-user is also mapped in Figure 38. These emotions and quotes are based on the interviews from the participants of the sensitizing assignment and the survey. Because the experience of the steps can be different for every individual user, the two extremes are visualized.

The most interesting insight from this user journey is that for some people the installation and adding

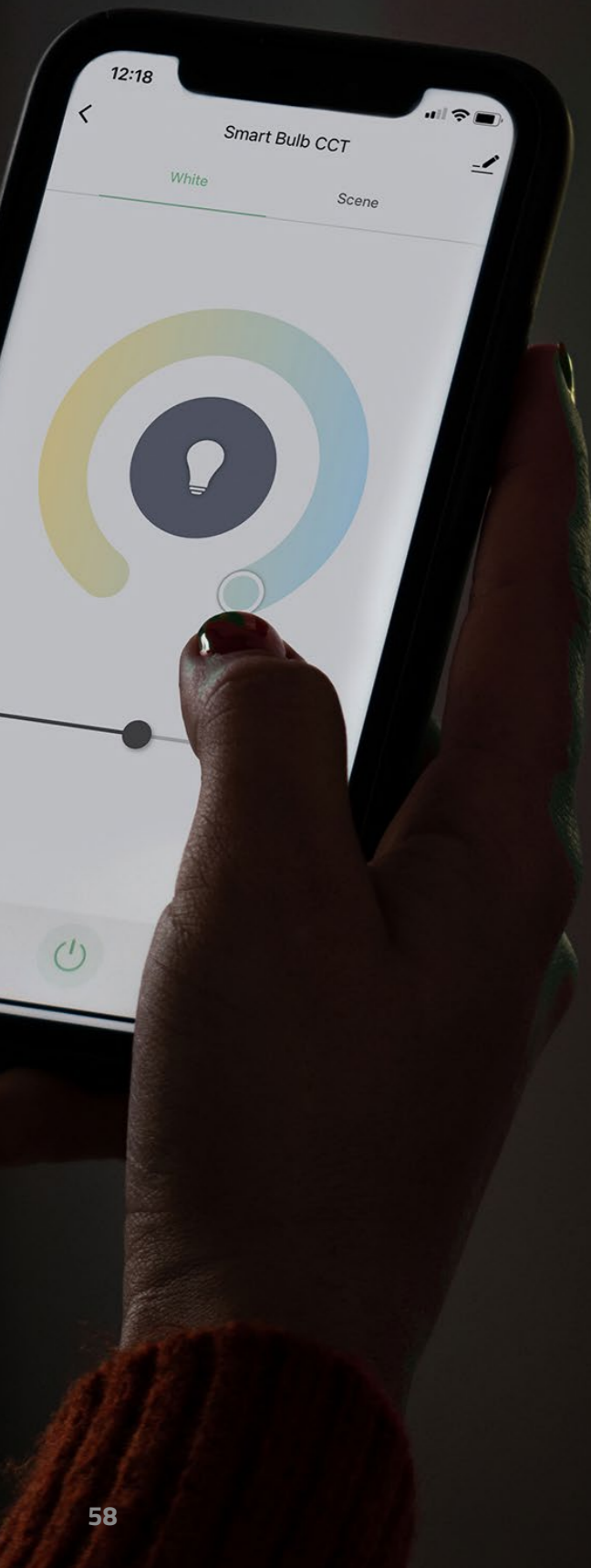
of scenarios are very ease, while others cannot get it to work. For these people it is often caused by the fact that they think they cannot do it, or they cannot think of an application for a scenario. After explaining or giving examples to these people, the steps were completed easily

Green: most positive reaction
Red: most negative reaction



Goal
Find what part of the app should be improved to create the biggest improvement in user experience.

Scenarios make it possible to automate Hombli devices, however people don't know what kind of scenario they want to add or do not understand the process. Better examples and an easier way to add scenarios is needed to improve the user experience.



4

Design brief

Goal, scope and target of the final design

The conclusions from the market analysis and user analysis are combined in this chapter into one design goal for the final design. As can be concluded from the user analysis, the design goal will be focusing on creating scenarios in the app of Hombli.

Besides a design goal, the final design should also meet a certain interaction vision which describes the feeling that should be evoked when using the app. Four different user profiles show Hombli's diverse target group with divergent needs, the final design should be optimized to serve all these audiences.

← Contents

- 4.1 Design goal**
- 4.2 Requirements**
- 4.3 Interaction vision**
- 4.4 Target group**

Goal: Define the goal and requirements for the final design.

4.1 Design goal

The main research question of this project is to find a way to “Design a digital experience that delivers value to smart home users”. For the redesign of the app, a more specific design goal is needed. From the market- and user analysis, many (small) improvements or new functionalities for the Hombli app were found. For this project however, we are aiming for a bigger improvement in the overall experience of the app.

The smart scenarios have the biggest impact on the experience and with these the user can create a ‘true’ smart home. Many users indicate that it is difficult to come up with ideas for scenario’s or that the steps look to difficult, they just use the app as a remote for their smart devices. By offering a better way to discover and create scenarios, Hombli can deliver a smart home experience that can be used by everyone.

The design goal is

To help Hombli users with **little technical experience**, to feel **guided** and in **control** when they add smart scenarios, so they can automate their routines and live a carefree life.

4.2 Requirements

The final design of the app should meet several requirements to reach the desired goal. These requirements are divided over the three categories that were found in the user analysis. Besides the goal of making it easier to create smart scenarios, these requirements focus on the strategic direction of wellbeing.

App should be

Why?



Control

Frictionless
Optional
Non-interruptive

User is in control,
feeling of
satisfaction and
accomplishment



Comfort

Guiding
Personal
Calm

Feeling of safety,
being guided and
cared for



Convenience

Inspiring
Fun
Accessible

Removes insecurity,
gives freedom to
choose anything

4.3 Interaction vision

The design goal can be accomplished in different ways. To get the right experience that fits Hombli, an interaction vision is created. This interaction is represented by an activity, the Hombli app should create the same feeling for the user as this activity.

This interaction vision is also closely related to the brand position. Therefore, some important smart home brands are compared in a matrix with self expressive benefits (Vorst, 2017), (Stichting Premisela, 2006). These self expressive values are terms that describe reasons for people to buy a specific brand. Horizontally the words are ordered from mastery (masculine/status) words to harmony (feminine/emotion). Vertically the words are ordered from Continuity (long-term/objective) to Vitality (in the moment/experience)

More details of these smart home brands can be found in Appendix VIII. The matrix is divided in 4 different categories (see page on the right).

Currently, Hombli is a brand for people that want to feel smart and price conscious. It has higher quality than cheap alternatives. However, it is not as luxurious or premium as Philips Hue or Orvibo. Because it is difficult to compete on price and quality, a better direction is preferred.

The quadrant 'Optimism' has the least amount of smart home brands and fits the new focus on well-being (see Chapter 3.3). This means that the interaction should be unworried, relaxed and fun. This can be compared to the emotions when someone chooses a nice recipe at home from a cookbook. This interaction is free, clear and inspiring at the same time. The user gets a clear, visual example of the desired outcome with instruction on how to achieve it. The interaction is also not forced on the user, but he or she will stay in control.



The interaction of the app should be like **choosing a nice recipe from a cookbook**

4.4 Target group

Hombli has the goal to offer smart home to everyone. To get a better understanding of the context and needs of these users, four different personas are created that together stand for a big part of the average Hombli users. They do not only focus on people with little

knowhow of technology, to make sure that the app can also be used by current Hombli users. These personas can be found on the next two pages. The four personas also each have one level of wellbeing that fits most to them.



The interaction of the app should be like

building a Lego masterpiece

Characters of interaction: Unbound, dynamic, creative

Affordances: Instructions(step-by-step), expandable, colorful

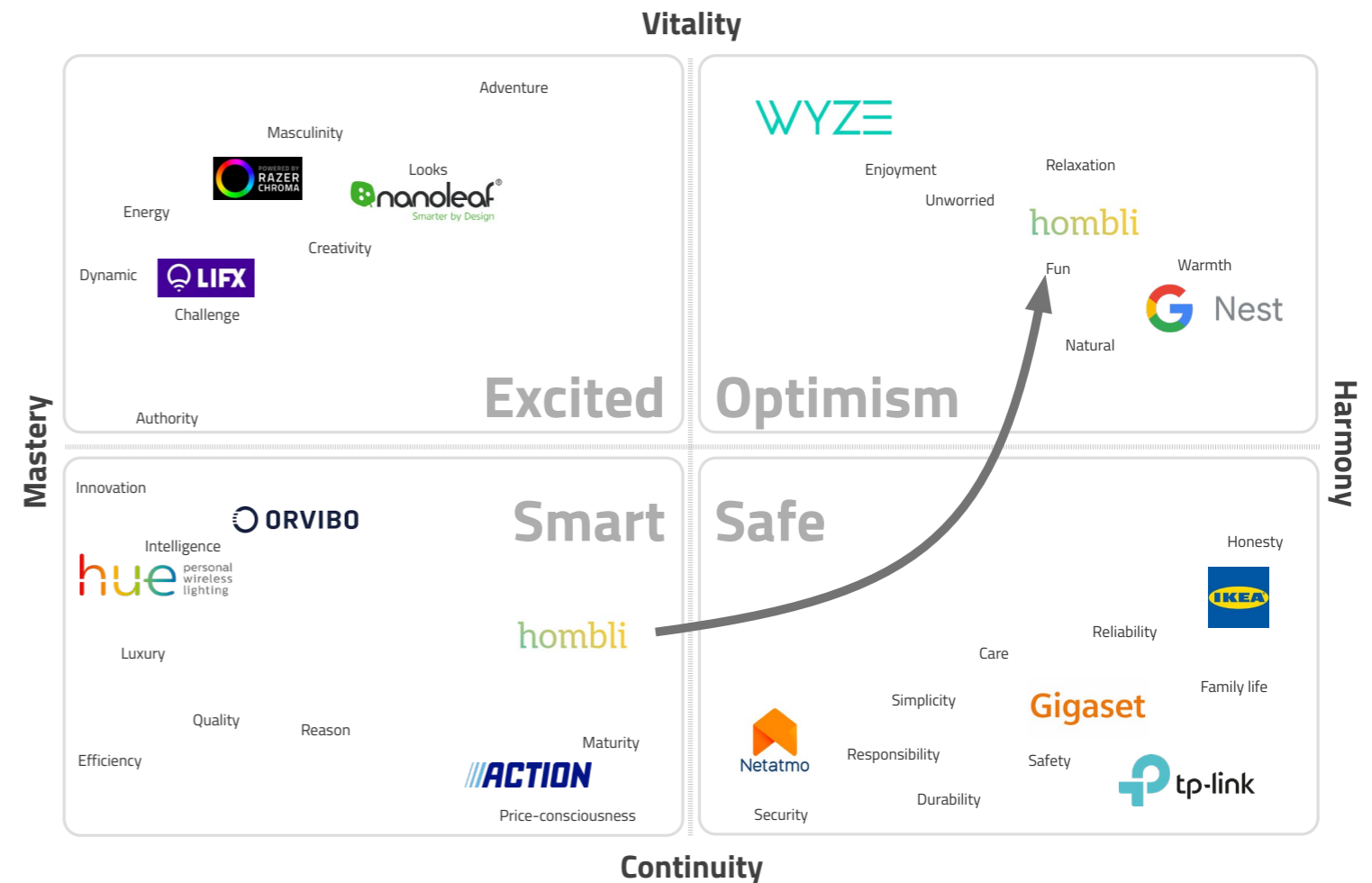


The interaction of the app should be like

choosing a nice recipe from a cookbook

Characters of interaction: Enjoyment, natural, powerful, inspiring

Affordances: Pictures, clear information, multiple options, extra tips and suggestions



The interaction of the app should be like

checking in to a (luxurious) hotel

Characters of interaction: Luxury, service, efficiency, quality

Affordances: Premium materials, professional clothing, personal service, business language



The interaction of the app should be like

reading a bedtime story to your child

Characters of interaction: Care, Comfort, responsibility

Affordances: Soft blanket, simple language, secure environment



Aaron

Personal trainer, 26



Annie

Floor manager & mother, 45



Health-seeker

This person tries to live a healthy life and be responsible to the environment.

"I want to live responsible and healthy, things should not be to complicated. I also don't use scenarios because I can easily control the devices using the app"



Family-person

This person wants the best for her kids by creating a secure and pleasant environment for the family. Technology should only offer benefits and not be at the forefront.

"It is very important for me to give my kids all the free time I have. "

Aaron wants to live healthy and responsible. He likes his city, Rotterdam, but also thinks the pollution in the city is bad for his health. To clean up the air in his apartment, he bought the Hombli purifier. This was the cheapest purifier he could find. He also bought several sockets to measure how much energy different devices use, because he wants to reduce his carbon footprint. He noticed that he has several old lamps that consume a lot of electricity. The Hombli smart Bulbs use little energy. As a bonus he discovered that he could easily change the temperature and brightness of the lights to match the natural daylight.

Motivations

- ✓ Good value for money
- ✓ Works together with Google Home

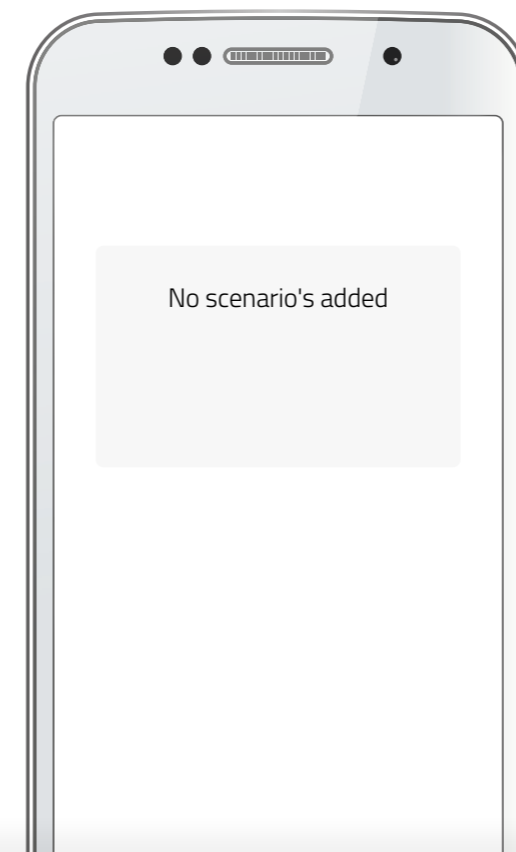
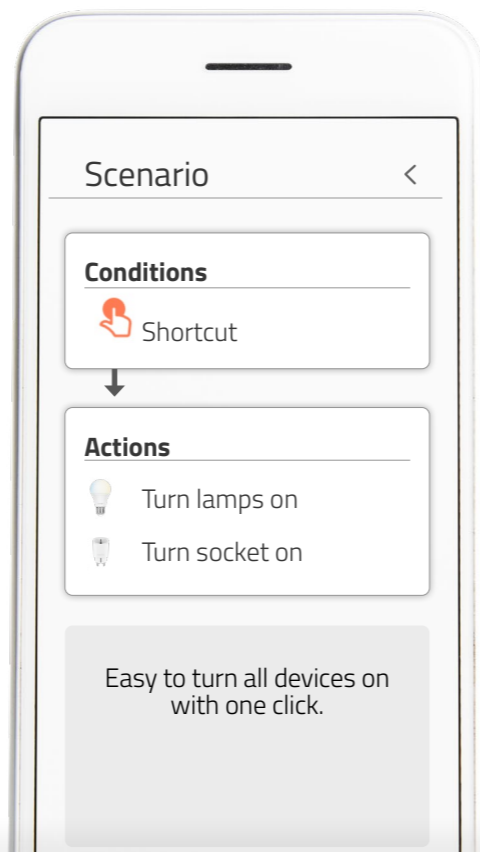
Frustrations

- ✗ Want to use less technology
- ✗ Uncertain about privacy with these products

Survey data

38% do not use scenarios.
33% bought smart devices to lower energy use

Brands		Apps		
Nike	Northface	Fitbit	Spotify	Twitter



Annie noticed several other people using a smart doorbell and when seeing the Hombli doorbell on sale, she decided to try this product. She tried to install the product herself, but it was not working. Luckily, a friend was willing to help her. He also advised her to look at other Hombli products. Because the doorbell was working great for her, she also bought a camera and socket. These products make her life easier, because they can be controlled remotely using the Hombli app. The friend that helped her install the products also pointed out that she could add automations, but this sounds too difficult to her.

Motivations

- ✓ Feeling of safety
- ✓ Can control hard to reach socket remotely

Frustrations

- ✗ Difficult to install and sign in
- ✗ Always need my phone to control the devices

Survey data

70% choose Hombli because of it's price
32% bought smart products to improve security

Brands		Apps		
Toyota	IKEA	Buienradar	Appie	Facebook



Improves the air quality in my room



These sockets are ideal to measure my energy consumption



I use these lamps to easily adjust the brightness and temperature



Turn on my lamp behind the couch which is hard to reach



Super handy for all packages delivered at home



Check if my kids asleep



Louise Sales manager, 28



Eric Front-end developer, 33



Organized person

This wants everything to work good and secure, she wants to be in control at all times.

"My house should look nice and clean"



Tech-enthusiast

This person likes technology and want to live in a modern environment that adapts to his routines.

"I only use the Hombli app for the installation of the devices, after that I never opened it again because I can control everything using Google home."

Louise lives together with her boyfriend in a nice apartment in Amsterdam. She likes a clean and luxe environment. In her free time she likes to go shopping or post pictures on Instagram. She first saw smart lights at a house of a friend and really liked how the ambiance can change with changing the lights. When buying the smart bulbs, she noticed that Hombli also offers cameras, which might be very handy to check on her cat when she is away from home. Recently, Louise also bought a purifier, because she wants to live in a clean environment. She only automated the purifier, because she only changes the settings of the lights when she wants to.

Motivations

- ✓ Create a fresh environment
- ✓ I want a modern luxurious apartment

Frustrations

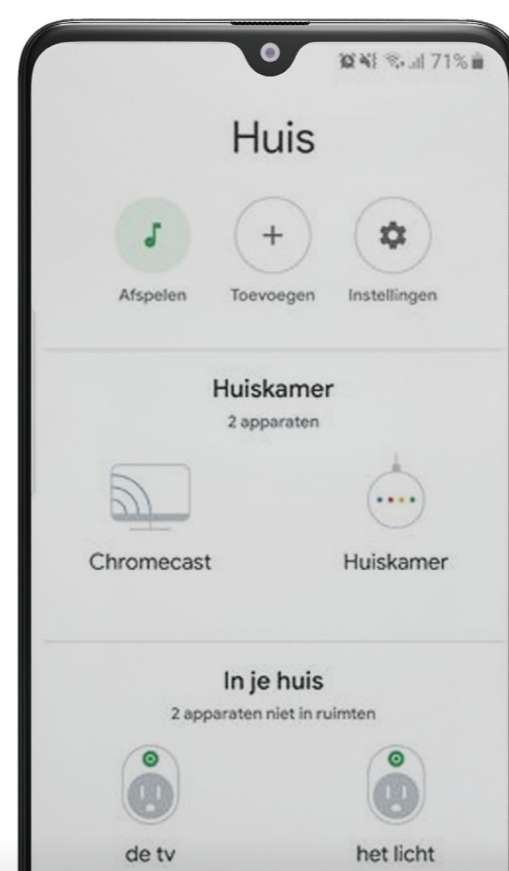
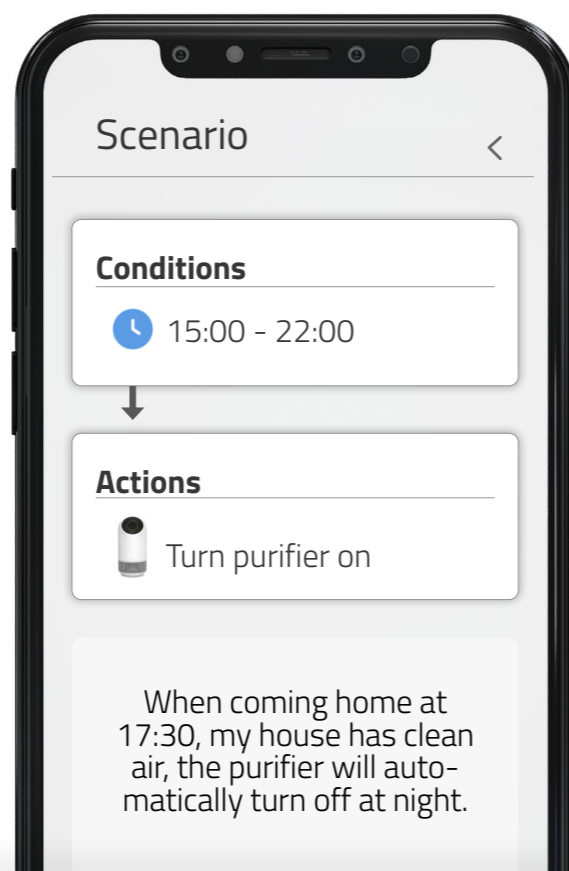
- ✗ Not enough products
- ✗ Does not work the same as Apple products

Survey data

23% want more devices in the lineup
70% buy products that are used by many others

Brands

Apps



Eric is a freelance front-end developer that work a lot from home. He likes to work efficiently and therefore automates everything in his house. Because he works a lot with technology, he has no problem with installing the devices. When coming home the right lamps automatically turn on. He also uses Google assistant to change the settings and start smart scenarios. Hombli offers different devices that Eric can use to control most devices in his home. However, he is also always looking for other things that could be automated, so would always like to see new functionalities and products.

Motivations

- ✓ Good value for money
- ✓ Works together with Google Home

Frustrations

- ✗ No support of IFTTT
- ✗ Limited functionalities and products

Survey data

30% want the latest, cutting-edge technology.
40% use voice control.

Brands

Apps



I can watch my cat when I'm not at home



Easy to change the ambiance in my house



This keeps my room fresh and healthy



These lamps are very versatile, I have more that 10 different scenarios



This is the easiest way to control my aircno and amplifier



I can still automate my old lamps with this socket



5.

Conceptualization

Several directions for the digital experience

Before one final design proposal can be created, several different directions will be explored and tested. This starts in this chapter with seven basic ideas. User tests with these concepts confirm that people like to have more guidance and tips to automate their smart devices.

Three totally different concepts that aim at adding scenarios are turned into working prototypes and tested with 8 people. These tests show different preferences, which indicates that the app should not focus on one type of user, but accommodate different use-cases. The final design will combine the aspects of these different concepts to create a solution where the user can get inspiration for automating a smart devices in a convenient way, while keeping control over every setting.

← Contents

- 5.1 Ideation
- 5.2 Scenarios
- 5.3 Concepts
- 5.4 User tests
- 5.5 Conclusion

Goal: Define how create a smart home app that helps and guides people to automate their homes.

5.1 Ideation

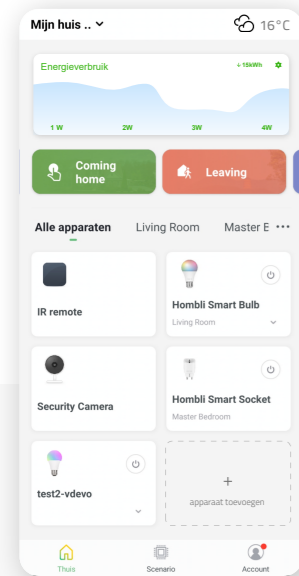
The participants of the sensitizing experiment (Chapter 2.3.3) were asked what they would like to see improved in the app. Some of them had things that did not go as expected or liked other functionalities. But most of the participants were fully satisfied with the current app experience. To help these participants think about new directions for the app, some examples were created and discussed.

5.1.1 Initial ideas

The concept-ideas used in the interviews were created based on an analysis from different smart home apps. See appendix X (page 117) for an overview of the functionalities of different smart home apps.

5.1.2 Conclusion

These ideation interviews confirm the need for a better way to explain the possibilities of scenarios. The new options should be clear, but also optional for people that do not want extra functionalities or help.

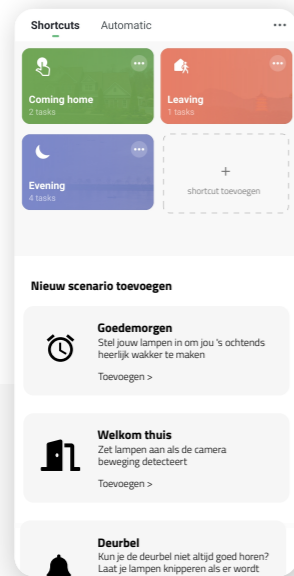


Energy usage

An overview on the homepage of the app of the total energy usage. This gives the user insights when there is a high energy usage, which can help reduce the energy usage.

✓ "I would really use this if I had a bigger house with solar panels, currently I already use very little energy." (Jos)

✗ "I don't really care about energy saving" (Marlies)

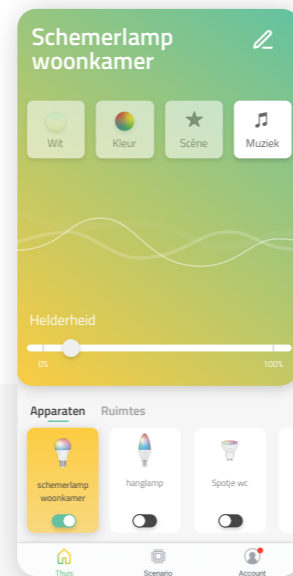


Automatic scenario's

The app shows some examples of scenarios to make it easier to understand the possibilities and quicker to apply those standard scenarios.

✓ "Those descriptions of what the devices and scenarios could do would really help me a lot." (Rosa)

✗ "Adding scenario's is already very intuitive, but might be good for inspiration" (Jessica)



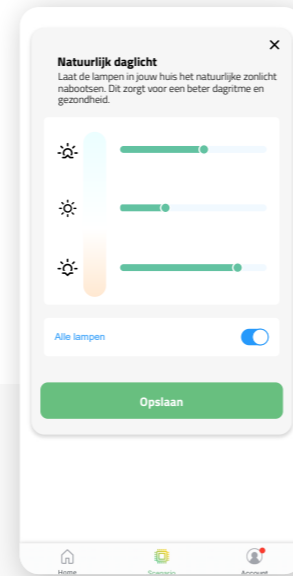
Music sync

With this function, the lamps could be synchronized with the music, so it flashes on the beat of the music.

✓ "It is fun, especially to show it to others" (Frits)

✓ "I would use this, for example before going to a party when doing my hair etc" (Marlies)

✗ "I would never use some-thing like this in my house, it might be something for someone else" (Jos)

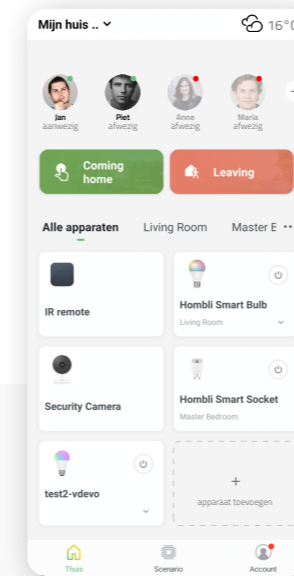


Natural daylight

Automatically change all lamps in the house based on the natural daylight cycle. So, when turning on a lamp in the morning, it will be cold light and, in the evening, warm light.

✓ "I have been waiting for this my whole life!" (Marlies)

✗ "I think it would be good for everyone to have natural light, it should be optional though, because can be personal" (Jessica)

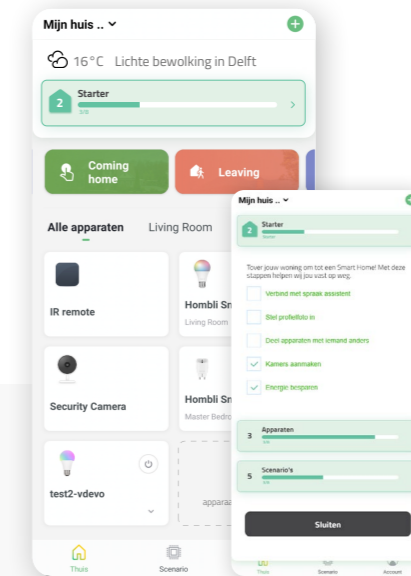


Family sharing

Easily share access to family members. The home screen now shows all added family members with an indication if they are currently at home. A user can now decide to switch lamps and devices on or off depending on the availability of the other family members.

✓ "I even did not know that it was possible to share the house with others, the option to see who is at home would be great for me because my friend also has my housekey" (Ellen)

✗ "If you live alone it is not so useful" (Katja)

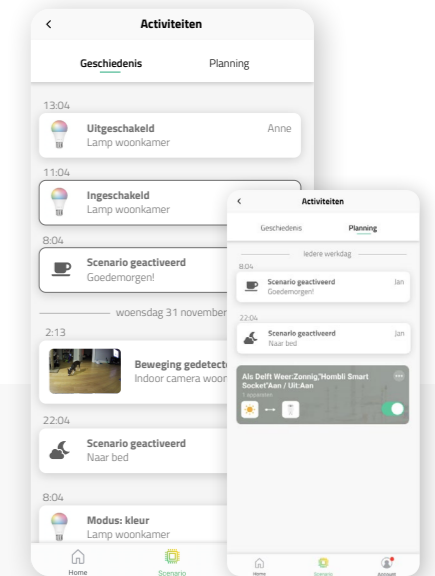


Guide steps

The app shows a rating of the 'smart house' with tips on how to make improvements. This stimulates the user to create scenario's, rooms, add family members etcetera. These are things that a user might not think of on its own, but when set-up can be a good improvement on the experience.

✓ "When it's done right, this would really help me to complete all levels, it is almost like a game it would really motivate" (Rick)

✗ "I am allergic to these kinds of progress bars or notifications; it has to go away" (Ellen)



Timeline

A timeline shows the history of activities in the house, and who triggered them. Besides this, also the planned activities can be viewed.

✓ "This can be really convenient to watch back, especially for the camera" (Romy)

✗ "Might be good added value for an outdoor camera, but there would be no interesting things in my timeline" (Marlies)

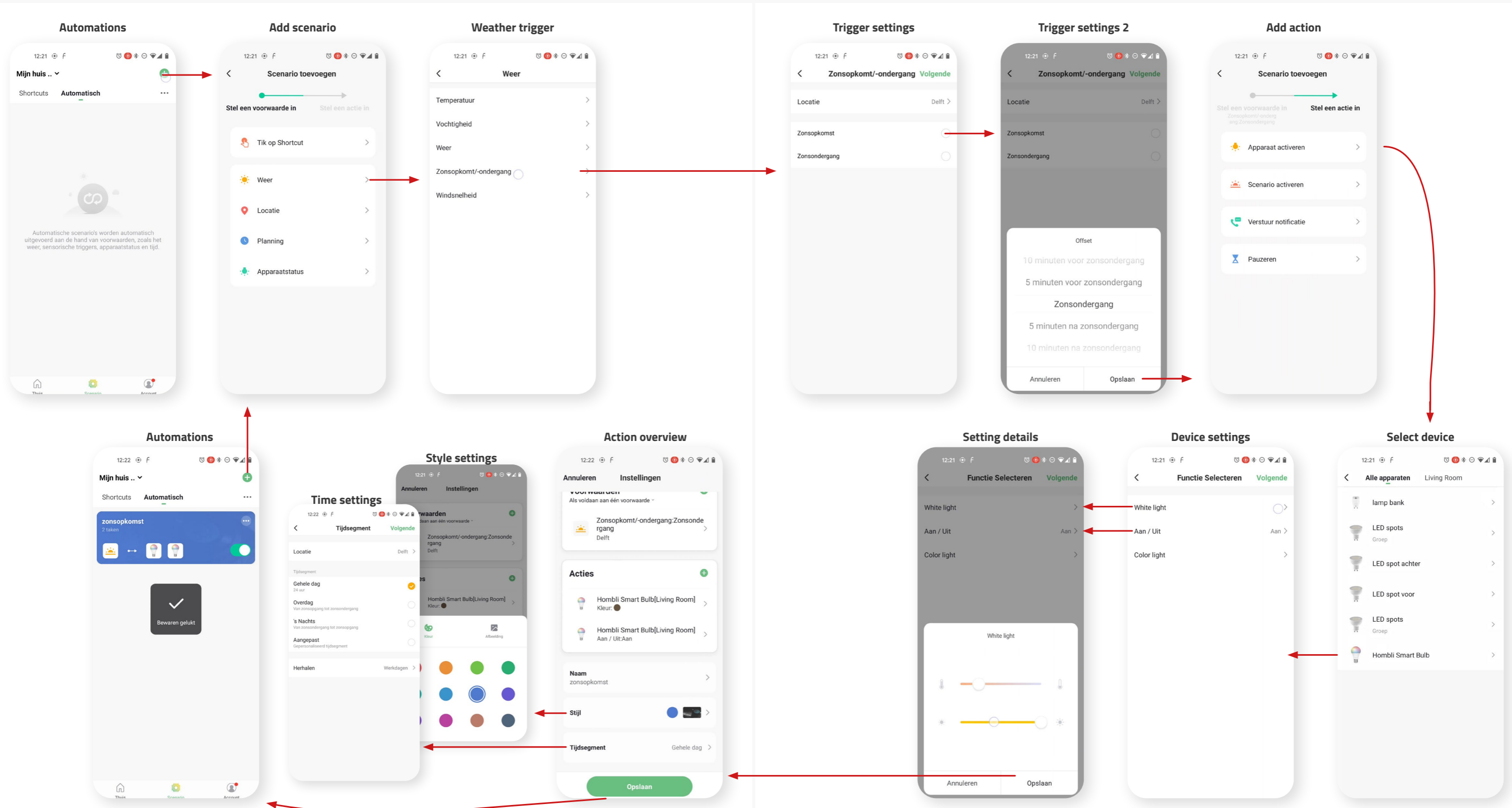
5.2 Scenarios

5.2.1 Current app

Before designing concepts for guiding and inspiring users to add scenarios, an more extensive analysis of the current Hombli app is needed. The current Hombli app has many different options and

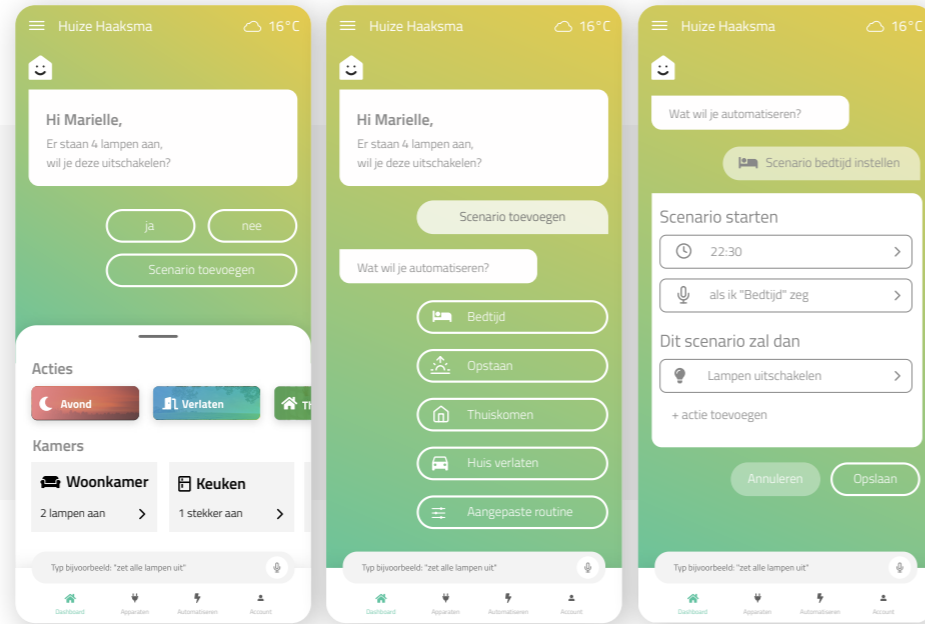
functionalities for adding scenarios. Figure 45 shows the different steps the user must go through in order to create a new scenario. It can be overwhelming to go through so many different steps, especially

because there is no overview during the process about what has be done and how many more steps are coming.



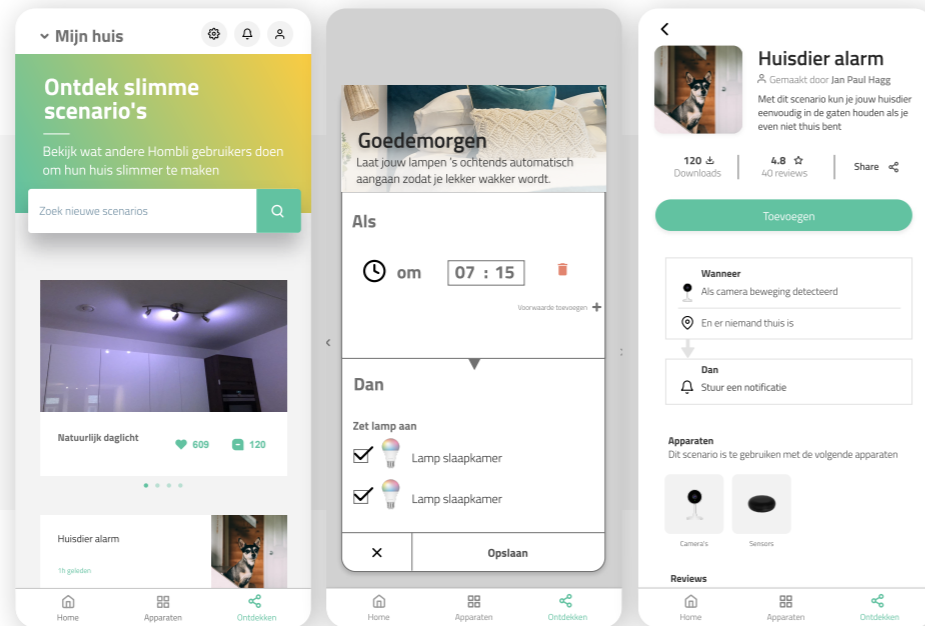
Personal assistant

A personal assistant that guides the user through the app.



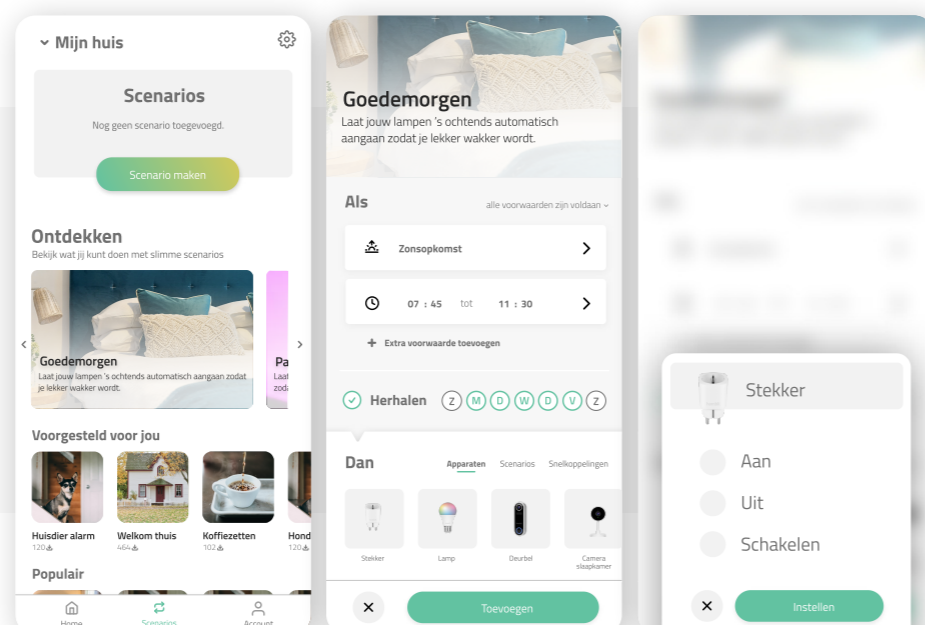
Social share

User of the app can share their scenario's. In this way they can inspire each other. They also vote on the best scenarios, every month Hombli will give a price to the best, most original scenario.



Store

A list of ideas, people can see what products they need for these scenarios and easily install them.



5.2.2 Directions

First concepts were designed to explore different ways to add scenarios in the app. See the page on the left for these three early concepts with two screenshots of the prototype.

Although these concepts have different aspects, new scenarios are added in the same way in the social share and store concepts. In order to get meaningful insights, it is better to have concepts that are more different from each other in the way a user adds new scenarios.

To clearly distinguish the new concepts from each other, they will all focus on one of the three main requirements created in chapter 4.2 (page 40).

These three different concept-directions all have different ways to add new scenarios to the app. An overview of the different screens and an explanation of the design choices can be seen on the next pages.



Concept 1 Control

The app should give the user control to easily set up a scenario on its own feeling in control and satisfied with the result.



Concept 2 Comfort

The app should guide the user through the process of adding a scenario in a personal and comfortable way.



Concept 3 Convenience

The app should offer the user to conveniently choose the right scenario and feel inspired to add new scenarios.



1. Control

Frictionless
Optional
Non-interruptive

In this concept, an overview of all devices is in one dashboard. On the device-screen, the user can see all automations for that device, with some example scenarios. All these options can be accessed quickly so the user can easily access the settings to change scenarios.

Home

On the home screen, the user has a clear overview and control of all connected devices.

Besides temperature, this block also shows the current live-feed of a camera, so the user can check if everything is ok at home.

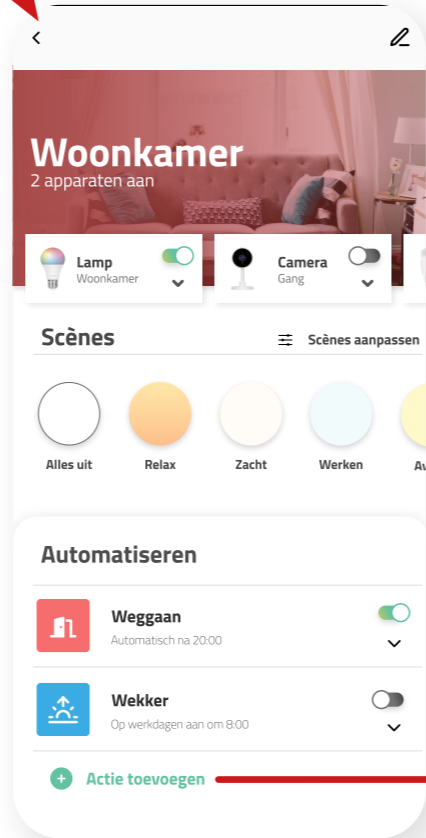
Shortcuts have a play-sign, indicating that the button starts a predefined action.

Switch shows if the devices are on or off. And gives the user quick control to these devices.

Arrow indicated that the user can access more information when they click the box.

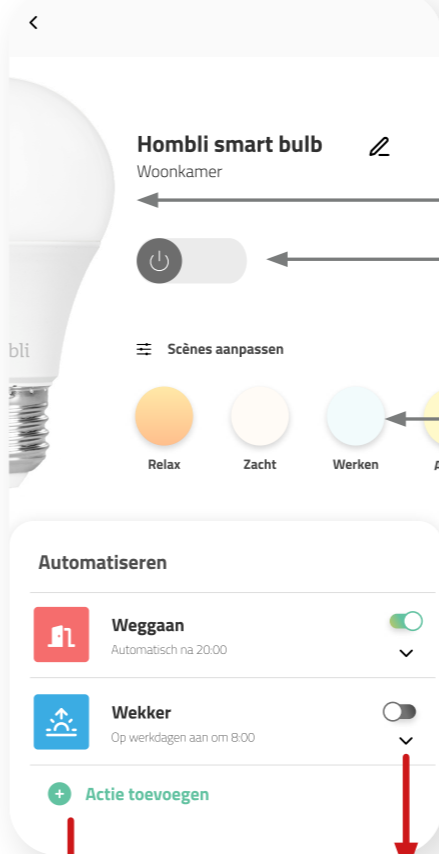
Rooms

Devices can be grouped in different rooms, so a user can control and automate several devices at the same time.



Device (Bulb)

The device screen shows all related settings to the device, even the automations that are possible.



Lamp changes color and brightness depending, so the user can clearly see the current status of the device to have control over the device.

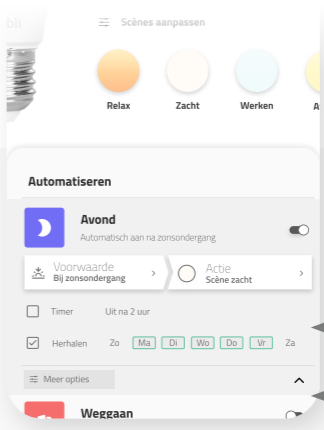
A large switch shows if the device is on or off. It is positioned at the top of the screen, so the user is motivated to use the, easier reachable, automations at the bottom of the screen.

Predefined scenes makes it convenient to change the ambiance of the light. The Scenes can be changed and saved for later.

Switch indicates if the scenario is on or off.

Edit scenario

The scenarios are always visible on the device-screen, so the user can easily see what scenarios are activated. The most important settings can be changed in this same screen by opening the tab to give the user easy access to these automations.

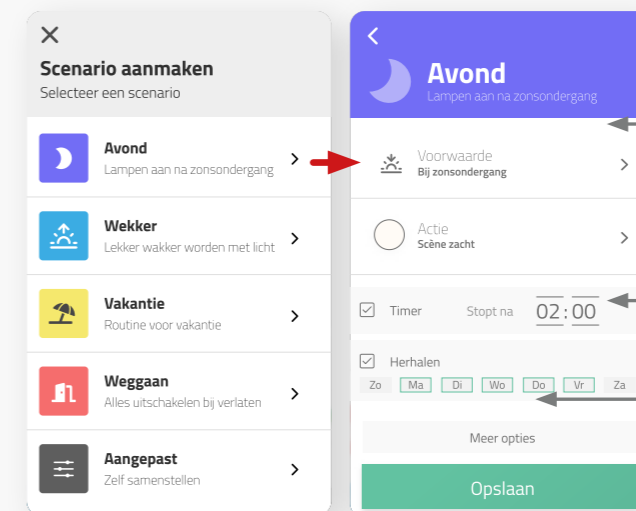


Arrow shows the relation between the trigger and the action.

Days will only appear when checked to keep interface clear and show that it is disabled.

More advanced options are accessible in another screen to keep this interface clear.

Add new scenario



Arrow shows the relation between the trigger and the action.

Days will only appear when checked to keep interface clear and show that it is disabled.

More advanced options are accessible in another screen to keep this interface clear.



2. Comfort

Guiding Personal Calm

This concept comes with an assistant that guides the user through the different steps and gives tips based on the devices and behavior of the user. All different options are still accessible through the assistant but are hidden by default, which gives the user a calm and clear interface. Other settings are also hidden to force the user to use the assistant because they might want to skip the assistant and choose to do it manually. In this way the user will always use the assistant and get used to this way to control and manage the smart Hombli devices.

Start
The startscreen has little information to keep it clean and force the user to interact with the assistant.

Annotations for the Start screen:

- Menu for more settings (points to the top-left menu icon)
- Answers from assistant points to the left, similar to talking in a messaging-app. (points to the text bubbles)
- Recommended actions are placed at the bottom so they are easy reachable. (points to the 'Apparaten', 'Ruimtes', and 'Automatiseren' buttons)
- Example message to show user the possibilities. (points to the text input field)

Annotations for the 'Automatiseren' screen and scenario list:

1. Points to the 'Automatiseren' button.
2. Points to the 'Weggaan' scenario card.
3. Points to the 'Wekker' scenario card.
4. Points to the 'Scenario toevoegen' button.

The scenario list includes: Zonsondergang, Bedtijd, Opstaan, Thuiskomen, and Aangepast.

Different elements will animate after each other to mimic a natural conversation and guide the user through the different elements on the screen.

Custom scenario

Annotations for the Custom scenario flow:

- Trigger:** Selects a trigger from categories like 'Weer' and 'Locatie'.
- Action:** Selects actions like 'Lamp' and 'Camera'.
- Save:** Saves the scenario with a name and trigger.

The first step is to select a trigger, these are grouped in 4 categories which can be expanded and collapsed, so the user can easily browse through the different triggers to discover the possibilities.

Devices can be activated with a single switch, more settings can be changed by expanding the box.

Previous commands are shown as text-bubble, so the user has an overview of the process.

Important actions are summarized with a icon, so the user can easily scan the messages.

Predefined scenario

After selecting a predefined scenario, the user will see an overview of that scenario and give the option to make changes.

Annotations for the Predefined scenario flow:

- Edit:** Shows the scenario details and allows for adjustments.
- Saved:** Confirms the scenario is saved and provides options to edit or add more.



3. Convenience

Inspiring
Fun
Accessible

This concept moves the devices to the second screen and places the scenarios dominantly on the home-screen. This gives the user a clear overview of what's going on. The user can also discover new scenarios in the third page of the app. In this discover area, users can also share their own scenarios or react on existing scenarios to give tips. This gives the user a possibility to interact and gain trust because they see that other people also use the same scenarios.

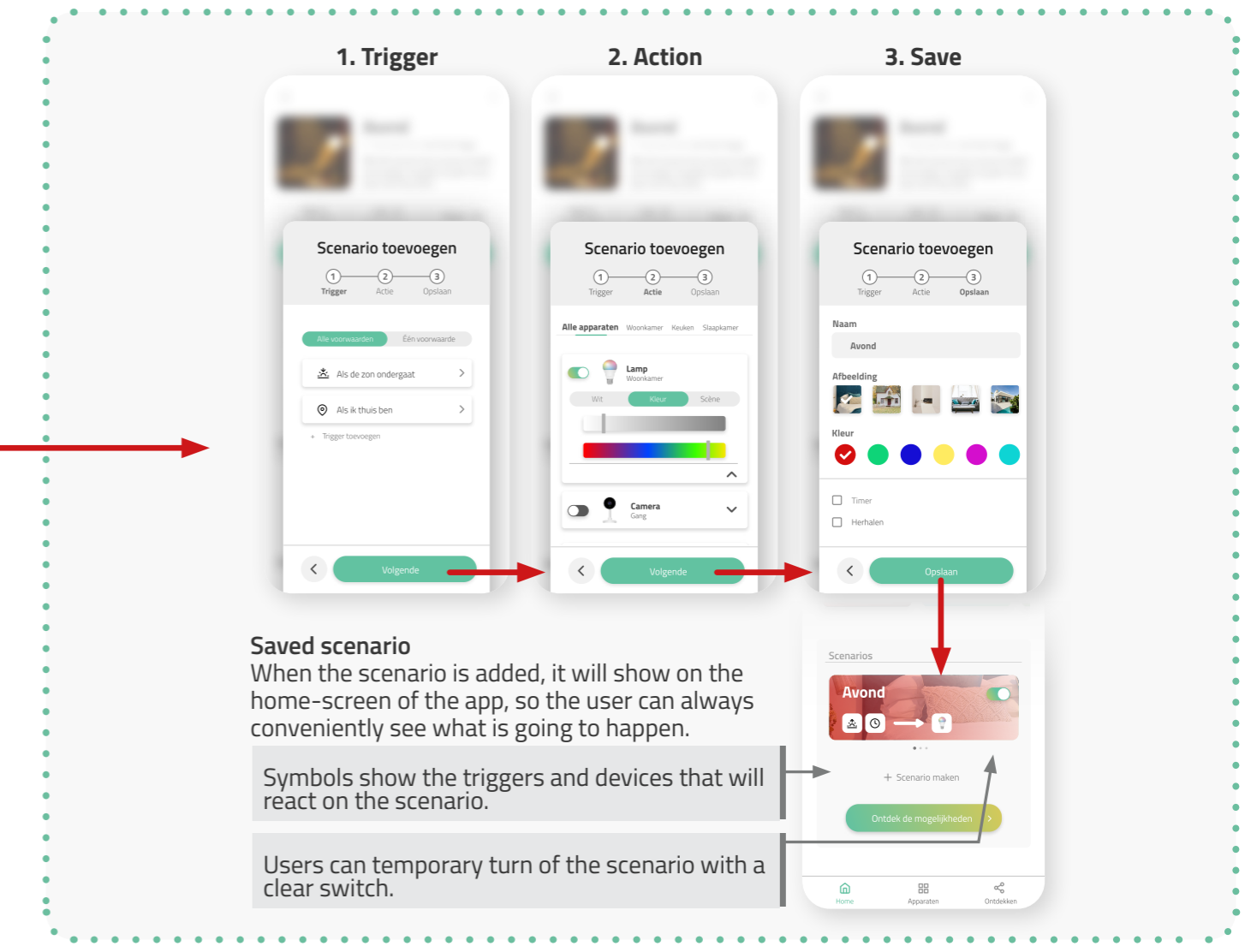
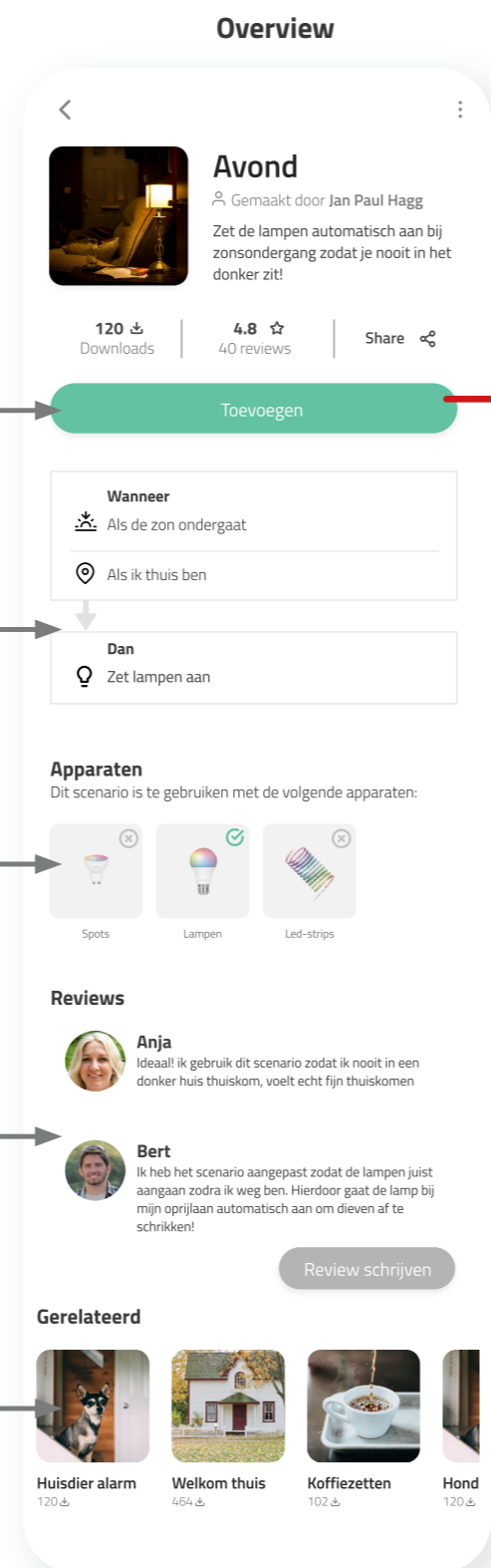
With a big green button, a user can add the scenario, making it convenient and clear to add new scenarios.

A visualization shows how the scenario works.

An overview of the devices required for this scenario. With the green check, the user can see directly if the scenario will work.

Reviews can give more inspiration or gain trust that it adds value.

When the user is not convinced about the scenarios there are more options at the bottom to navigate further.



Saved scenario
When the scenario is added, it will show on the home-screen of the app, so the user can always conveniently see what is going to happen.

Symbols show the triggers and devices that will react on the scenario.

Users can temporary turn of the scenario with a clear switch.

When the user has no scenarios, a banner will show some benefits of adding scenarios.

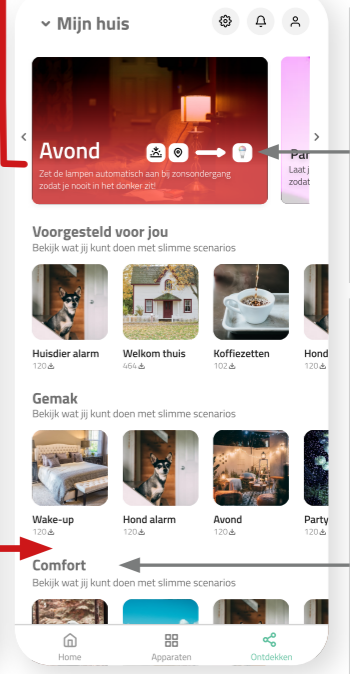
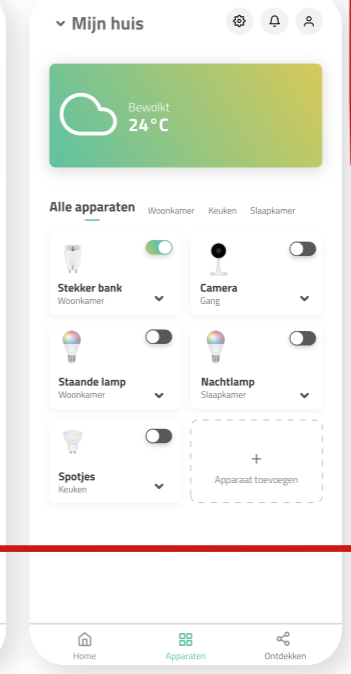
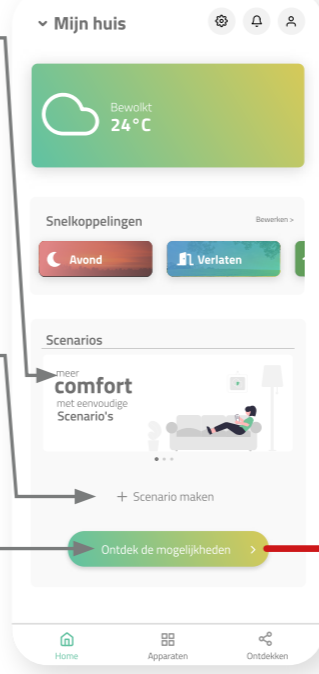
Option to add custom scenario has a smaller button to show the user that this is a more advanced option.

Big button prompting the user to discover new possibilities to improve the smart home experience.

Home
Shows shortcuts and scenarios, so users don't need to go to navigate to a different page to view the scenarios.

Devices
The second screen shows an overview of all devices, users also add new devices on this screen.

Discover
Recommended scenarios are shown at the discover page.



Symbols show the triggers and devices that will react on the scenario.

Scenarios are categorized in topics that describe the different reasons for smart home.

5.4 User tests

5.4.1 Setup

Participants

The 3 concepts were evaluated with end users of Hombli that also participated in the sensitizing experiment. Not all of these participants were available though. Because of the restrictions due to the corona virus it was not possible to visit everyone. The people that were familiar with video-calling were interviewed via Zoom. Besides these participants, also some employees from Hombli evaluated the concepts to get more insights of how different kinds of the opinions of different kinds of people. In total 8 people tried the prototypes and were interviewed.

Current app

The participants were first asked to watch a video that shows how to add a scenario in the current app. This ensures that everyone has the same knowledge level about the possibilities of scenarios in the current app. People that were interviewed in real-life were also shown directly how it works using the Hombli app. After this, they were asked what they think about the current way to add scenarios and what they are missing.

Test the prototypes

After this introduction, the participant was asked to make a scenario to turn the light on when the sun is going down for each prototype. Participants that were interviewed in person could test the prototype on a phone with screen recording so the footage was saved for later review. The participants that were interviewed using Zoom were asked to open the prototype using a link and share their screen. When the participants were testing, they were asked to think aloud to explain the reasoning behind choices they made. The order of the concepts were randomized to create even results.

Interview

After each test, the participant was asked what he liked and disliked in this scenario. After the 3 tests, the user was asked to pick the favorite concept. Besides this, a list of 7 words was shown, the participant was asked for each word which concept fits that word the most.

The complete interview guide can be seen in Appendix XI.

5.4.2 Results

The concept 1 (where scenario are created on the device page) was the most easy to understand for most participants. Some people were confused at first with this concept because they were searching for the scenarios screen of the current app. But when they found out that it could be done on the device panel, they could add and edit scenarios easily.

Interestingly, all man (3 of the 8) found rated the concept 3 (with the example scenarios) as favorite. The participants liked the idea of getting inspiration from different ideas and create a own scenario from those ideas. But because it has more steps, others found this the most difficult concept.

With concept 2 (the assistant) everyone could very quickly add the desired scenario. Although it went quickly, most participants were missing the control and would like to still have the option to see an overview of devices and scenarios instead of asking the assistant to this. They would like to have this option as an extra in the app to quickly change or add things to the app without the need to dive into every setting.

The next pages show a more in depth evaluation of the three concepts.

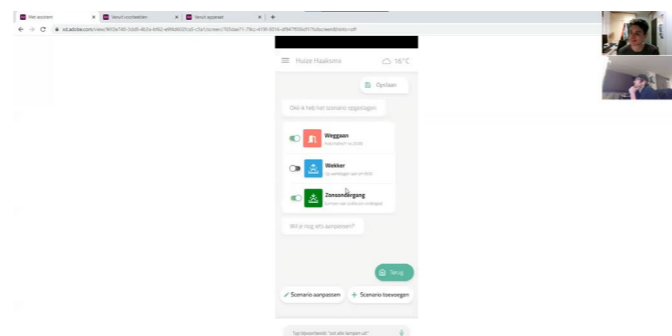
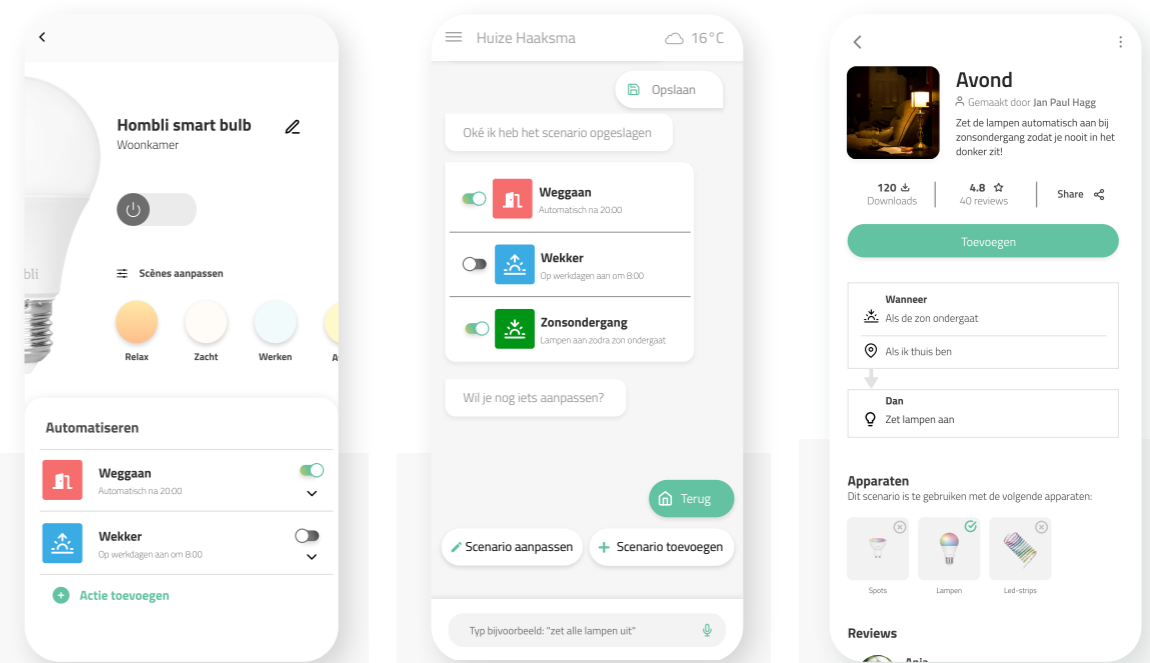


Figure 4.2: Participant sharing screen while testing a prototype.



1. Control (Scenarios from device)

2. Comfort (Assistant)

3. Convenience (Example scenarios)

Favorite	☆☆☆☆	☆	☆☆☆
Inspiring	3	1	4
Personal	2	4	1
Clear	5	1	3
Nice	3	2	2
Efficient	4	1	3
Easy	3	4	1
Advanced	1	3	4

✓ "This works very intuitive for me, I don't need to go to another page" (Romy)

✓ "This is surprisingly fast, I like the idea of an assistant!" (Thera)

✓ "It is a very nice way to discover new ideas and modify it how I want it" (Frits)

✗ "It is nice to see it here, but there are also scenarios which are not possible in this way" (Teunis)

✗ "I like to keep control, it might be a good extra besides a normal app for people that have questions" (Ewoud)

✗ "It is the concept with the most steps, I need first need to find out how it works, I don't like that" (Marlies)

Names are fictional to ensure privacy of the participants.

5.5 Evaluation

5.5.1 Control

This concept was the preferred concept of most participants. Because if people want to automate a bulb, they would instinctively go to the page of that device instead of a separate part of the app for all the automations.

Although this scenario is quick and easy, it does not fulfill the design goal. Instead of the feeling of 'choosing a nice recipe', it is more like 'warming up a microwave meal'; quick and easy, but limited in the functionalities. Making it not possible to get creative with automating the devices.

The background makes this concept too busy, the layout should be more calm.

People like to have a clear overview of the current status of all devices.

A menu at the bottom gives a better overview of the functionalities.

Great that it is directly visible that the lamp is turned on or off.

Predefined colors make it quicker to set the right mood.

People liked the option to add automations directly on the device page.

Too much information with small font.

The grouped devices are a good way to create scenarios for multiple devices, but it is unclear how it works with different types of devices.

People like the short explanation of the example scenarios, although the amount of examples is limited.

Nice that actions and conditions can be changed quickly, but more advanced scenarios with multiple conditions are not possible

Scenario aanmaken
Selecteer een scenario

- Avond: Lampen aan na zonsondergang
- Wekker: Lekker wakker worden met licht
- Vakantie: Routine voor vakantie
- Weggaan: Alles uitschakelen bij verlaten
- Aangepast: Zelf samenstellen

Avond
Lampen aan na zonsondergang

Voorwaarde: Bij zonsondergang

Actie: Scène zacht

Timer: Stopt na 02:00

Herhalen: Zo Ma Di Wo Do Vr Za

Meer opties

Opslaan

5.5.2 Comfort

Although this concept was the quickest in adding a new scenario, most people did not like it. They missed the control and a clear overview of the current automations and devices. It is possible to ask this to the assistant, but it would be better to just see it directly.

This concept does also not align with the design goal. The user does not feel in control and has to rely on the assistant for everything. It is more like going to a restaurant and let the cook manage everything, instead of choosing and creating the meal by yourself.

All people missed the overview of a dashboard-like homescreen.

People like the personal message "welcome home"

"Automate" is a better description in this case instead of "add scenario".

Animations show what is going on.

Unclear what happens with these toggles.

The brightness and color sliders are complicated and unclear.

The term "Trigger" is too technical for some people

This is a clear overview of the scenarios that are added, however it is better when it is directly visible.

The layout is clean, but there is little contrast between different elements, so the user does not clearly know which part is most important.

The buttons with suggested options help to show the possibilities, but some options were unclear and need more explanation.

Huize Haaksma 16°C

Je hebt twee scenario's, wat wil je doen?

Scenario toevoegen

Wat wil je automatiseren?

- Weggaan: Automatisch na 20:00
- Wekker: Op werkdagen aan om 8:00
- Zonsondergang: Lampen aan zodra zon ondergaat

Wij je nog iets aanpassen?

Scenario aanpassen + Scenario toevoegen

Typ bijvoorbeeld: "zet alle lampen uit"

Weggaan
Automatisch na 20:00

Dit scenario zal starten als:

- De zon ondergaat en jij thuis bent

Dan zal ik:

- Alle lampen inschakelen

Wat wil je aanpassen?

Meer opties

Naam Trigger Actie

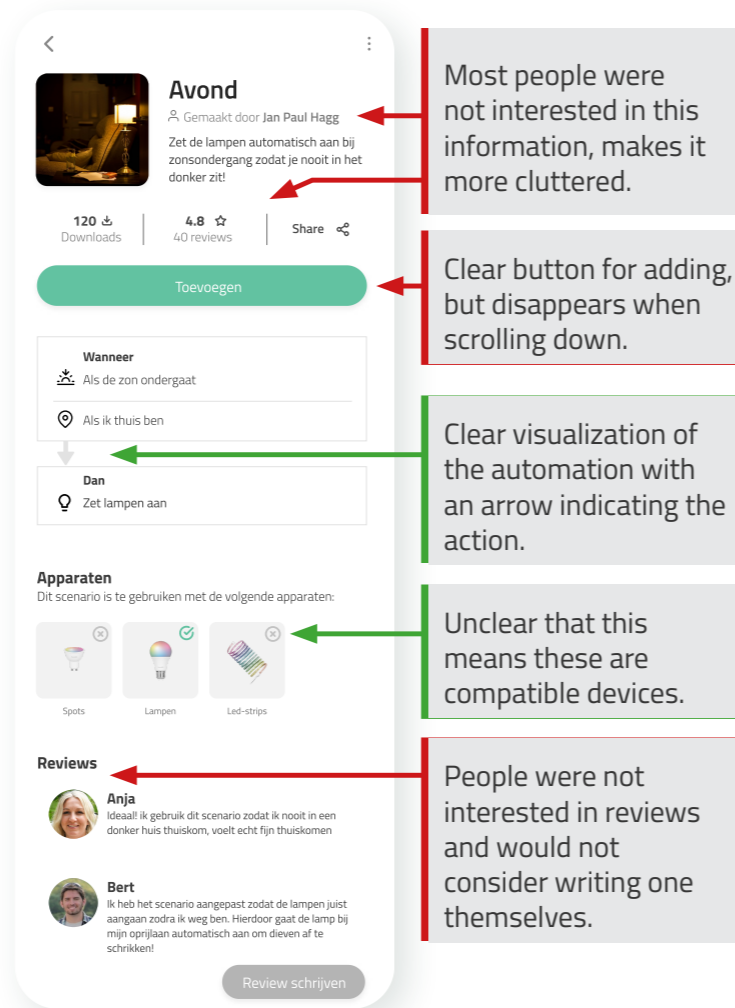
Typ bijvoorbeeld: "zet alle lampen uit"

5.5.3 Convenience

This concept comes closest to the interaction vision defined with the design goal. The user has freedom to choose from a varied list of example scenarios and it is possible to make changes, so the user is still completely in control. Just like choosing a nice recipe from a cookbook.

But this concept is also perceived as the most difficult of the three scenarios by the participants. Which does not match the goal of helping people with little technical experience to add smart scenarios.

When opening the app for the first time it is also unclear what is going on because there is no sign of the smart devices. Some parts like the sharing and review-part is making it look more difficult and adding not so much to the experience. People said they just want examples to get inspired and see what is possible, it is not important to them who has added the scenario or what other people think about the scenario.

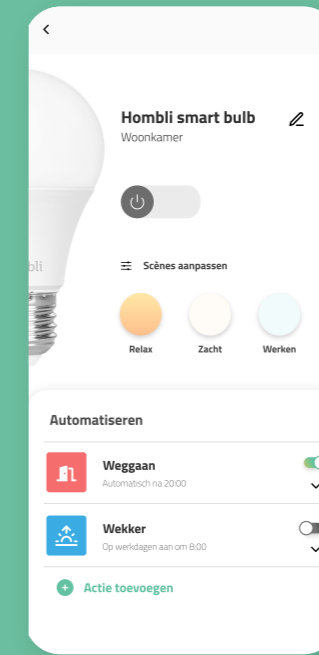


Goal

Define how create a smart home app that helps and guides people to automate their homes.

This chapter has investigated several ways to make it easier to create scenarios in a smart home app. Tests show that a combination of the three different concepts from this chapter. The most important parts of each concept is summarized in the visualization on the right.

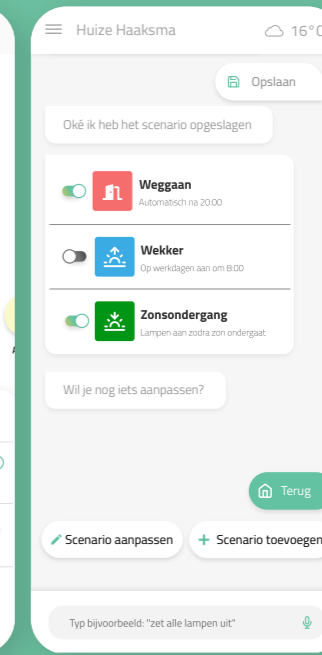
1. Control



Scenarios visible at device page

Overview of all devices on homepage

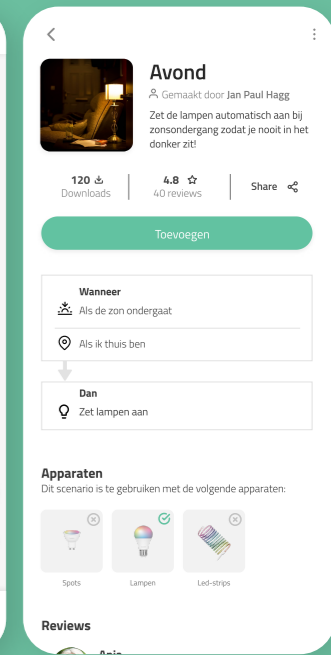
2. Comfort



Optional assistant for quick settings

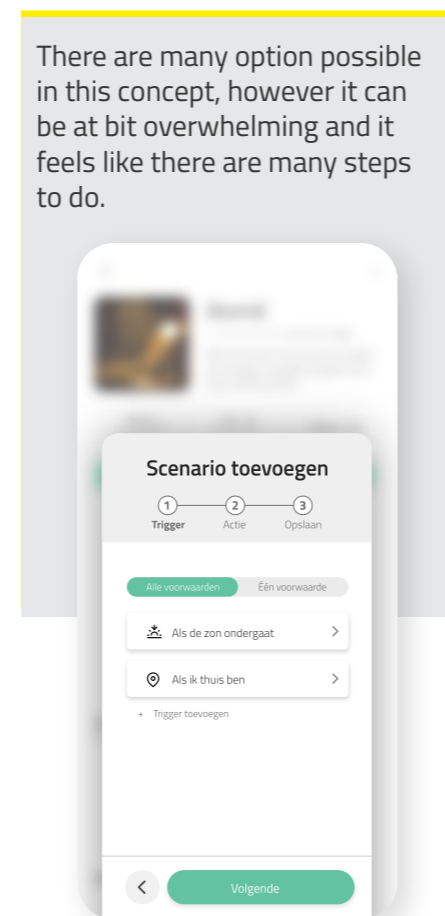
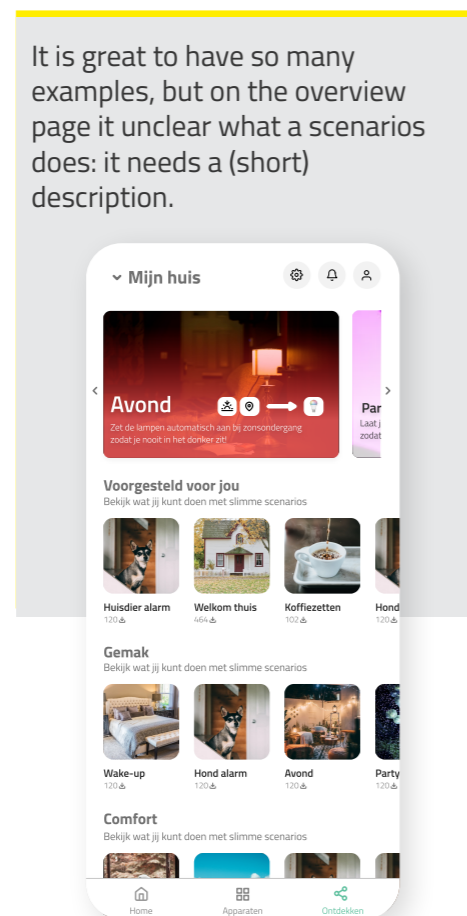
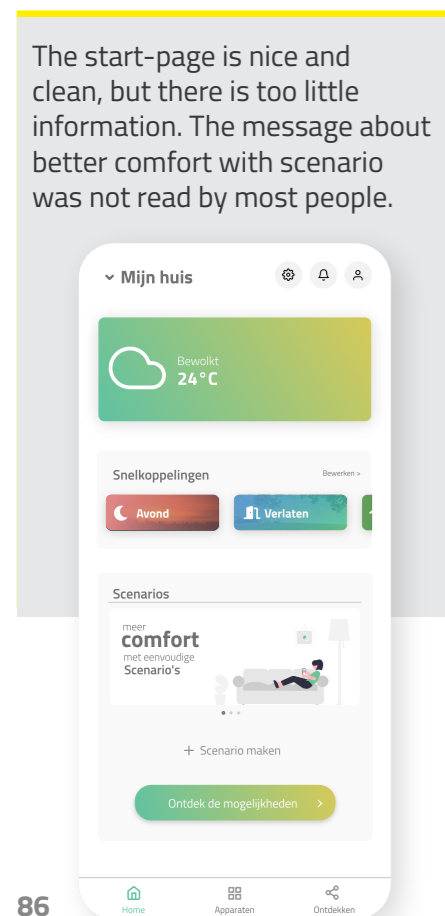
Clean design

3. Convenience



Show examples of scenarios

Overview of current scenarios on homepage





6.

Final design

Refinement for the final digital experience

In this chapter, the insights from the previous will be turned into one final design. After this is turned into a working prototype, the final design will be evaluated with user-tests and checked if it fullfills the goals and requirements defined earlier in this report.

← Contents

- 6.1 Procedure
- 6.2 Design
- 6.3 Evaluation

Goal: Design a concept app that help users with little technical experience, to feel guided and in control when they add smart scenarios, so they can automate their routines.

6.1 Procedure

The final design of the Hombli app combines the best parts of the three concepts discussed in the previous chapter.

All connected Hombli devices are visible on the homepage, it shows current active scenarios and has a personal assistant that helps the user when it needs help or want to change something quickly.

Every step should be easy so people with little technical experience can do every step. People should also always feel in control of every step. So example scenarios should be adaptable by the user.

The mission of Hombli of wellbeing, by delivering a carefree life was also not totally clear in the three different concepts of the previous chapter. The final design should communicate Hombli's mission very clear to set the brand apart and get a feeling of wellbeing to the end-user. This mission will also be the slogan that is visible when the user starts the app. Besides this, the scenarios in the app will be categorized in the four different levels of wellbeing discussed in chapter 2.3.

This prototype will be of a higher fidelit to test if people would be able to create a scenario. More example scenarios will be added and it is also possible to see them show up on the other pages after the scenario is added. To accomplish this, the prototype is created in Protopie. This working prototype can be viewed in a webbrowser clicking below or scanning the QR-code with a phone.

Prototype





Click here for an interactive prototype of the app or scan this QR-code



Video

Click here to view a video explaining the concept app, or scan this QR-code



-  **Body**
Scenarios for a better health
-  **Family**
Scenarios to care for lover ones
-  **Mind**
Feeling of safety and ease of mind
-  **Space**
A house that adapts to the users routine

6.2 Design

The final concept consist of four main pages: Home, Automate, Tips and Settings. These four main pages are visible in the menu at the bottom of the app. This menu also has a big button with a microphone which gives quick access to the assistant that can help the user to change settings quickly or ask for questions.

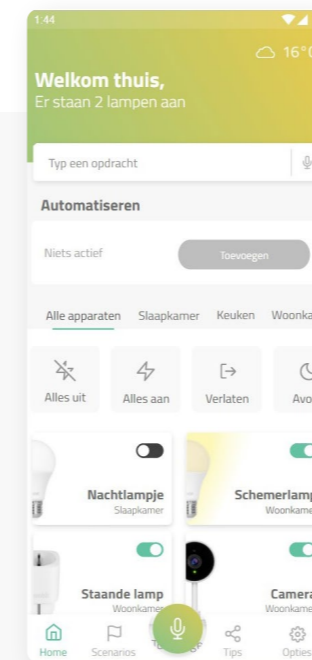
The design has light colors with green tints: the design of Hombli. This gives a light and modern appearance and keeps everything calm. Different parts of the interface are separated by different tones of gray, while some important parts are accentuated with bright colors.

On the next pages, the separate pages of the interface will be explained in more detail.



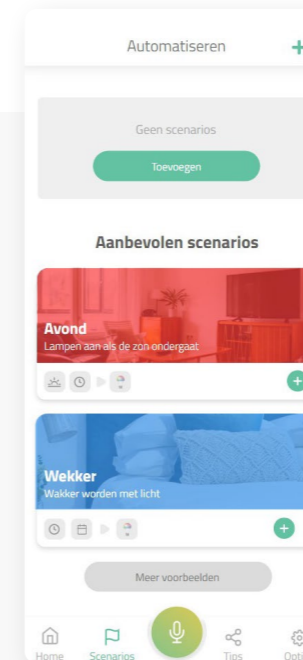
Start/loading

Showing the vision of Hombli: live a carefree life.



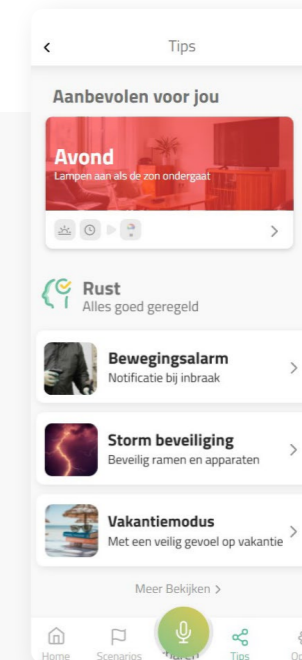
Home

Showing all important information at a glance.



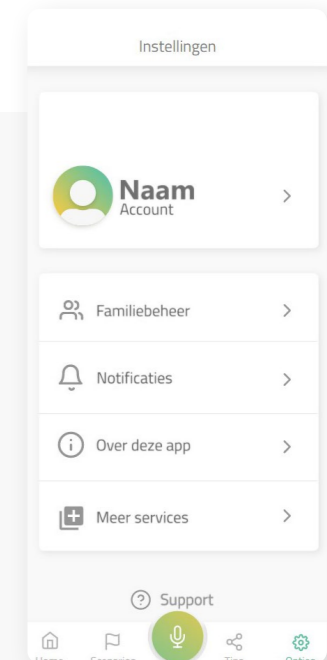
Automate

All scenarios in showed in one place, when nothing is here it shows some suggestions.



Tips

All suggested scenarios categorized in the four levels of wellbeing defined in Hombli's vision.



Settings

On the settings page, the user can manage app options and add services.

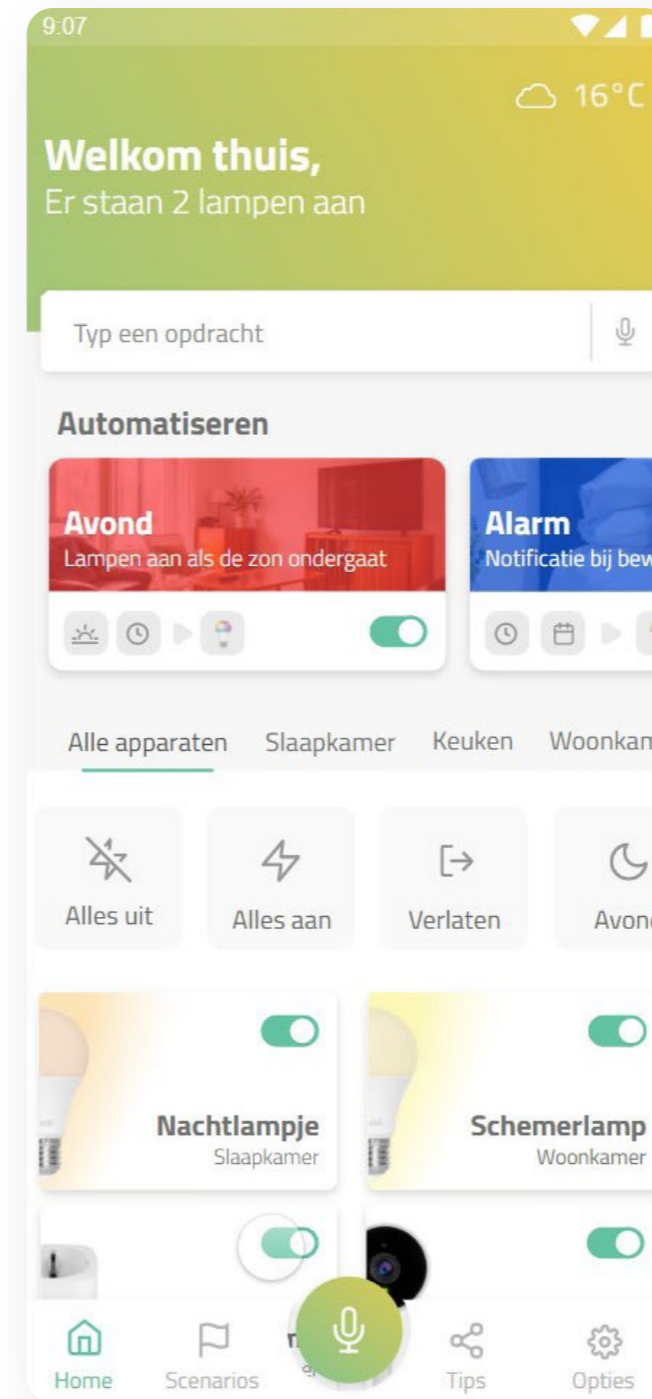
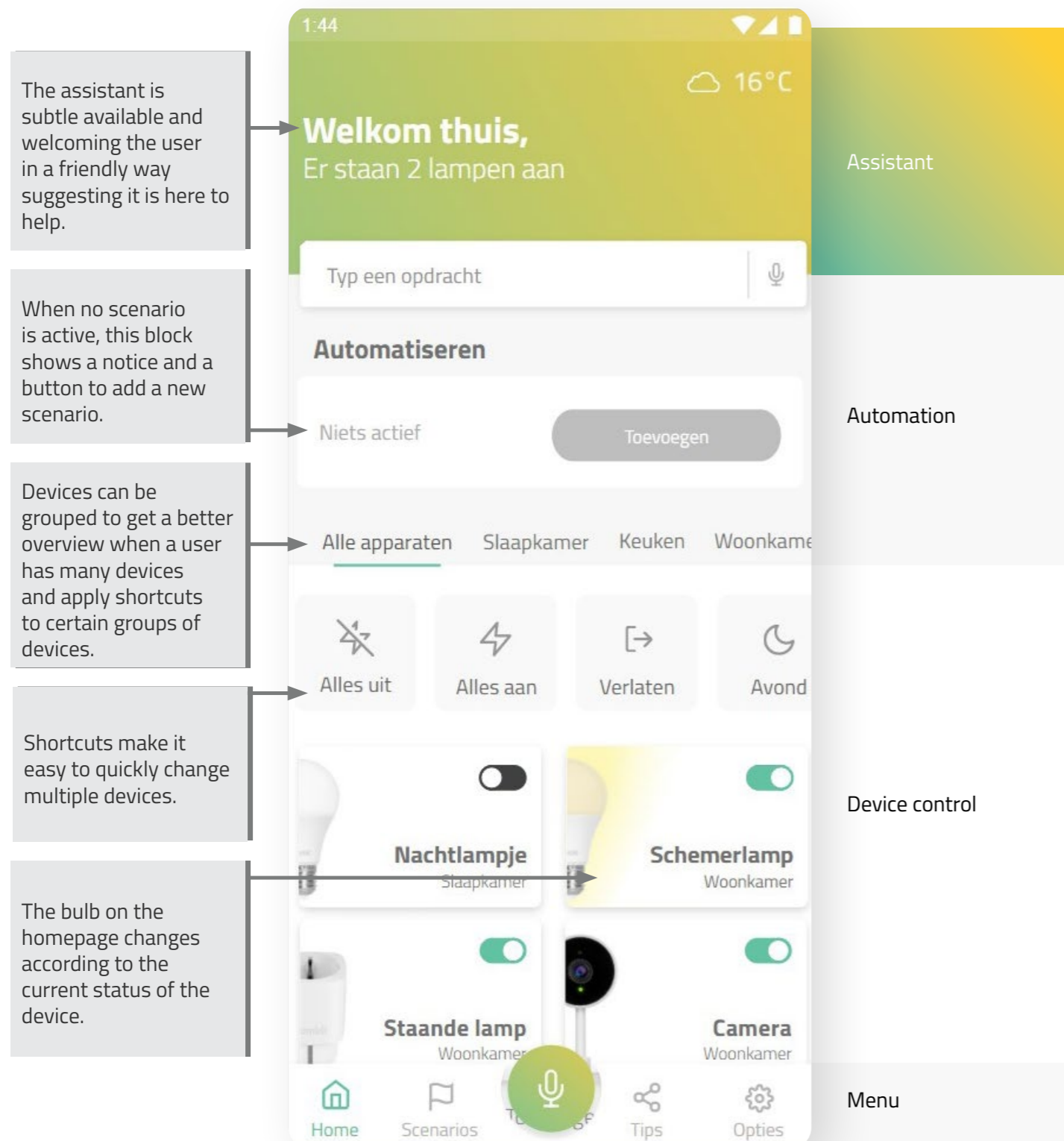
6.2.1 Home

The homepage is the screen where all users start when using the app. This screen should guide the user through the different functionalities of the app and give the user control to navigate through these functionalities. The two most important parts of the app that should be included on the homepage are:

- **Device control**, people want to keep control and see the current status of devices.
- **Automations**, to inform users about the possibilities when they don't use automations and give people that have automations an overview and control over the automations.

Besides these two functionalities, the homepage should also include the assistant and navigation to other pages.

These parts should be visible on the homepage while keeping the interface clean and simple. This is done by using different backgrounds for every part and only showing relevant information. So the homepage adapts to the user. The assistant at the top welcoming. This area becomes bigger when the user asks a question. In this way, the user has a clear clue how to go back.



Activated scenarios

When scenarios are activated, they show up on the homepage, disabled scenarios are only visible on the scenarios page to keep the homepage uncluttered.



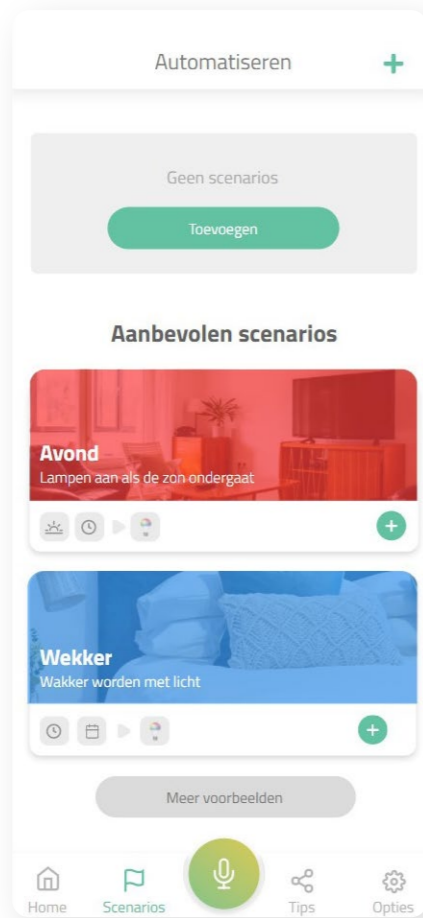
Assistant

The user can ask all kinds of questions to the assistant for extra help and quick change of settings. The user can either talk or type the command. The messages are displayed as message bulbs to imitate text messages.

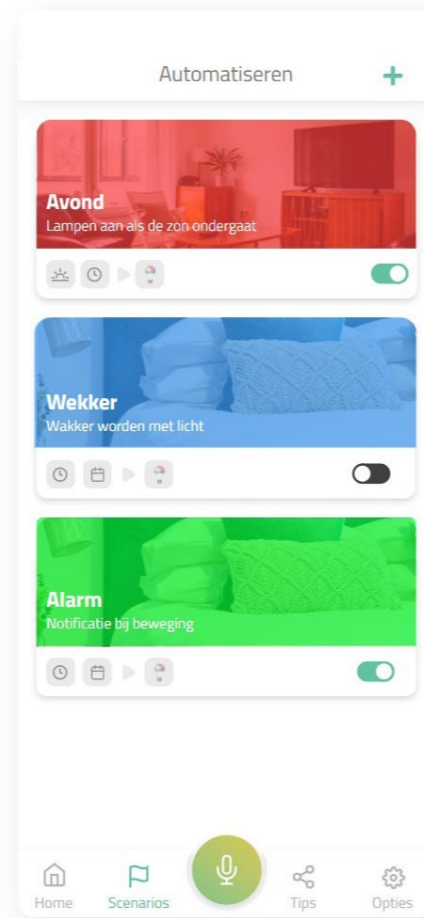
6.2.2 Scenarios

On the scenarios-page, the user can view all active and disabled scenarios that are added to the app. Active scenarios will also become visible on the homepage. On this page, the user can quickly turn scenarios on-and-off or navigate to the scenario to change more settings.

When the user has nothing automated yet, this page shows a prominent green button to create a new scenario. It will also show some example scenarios and a button to more examples which will go to the 'tips' page.



No scenarios added

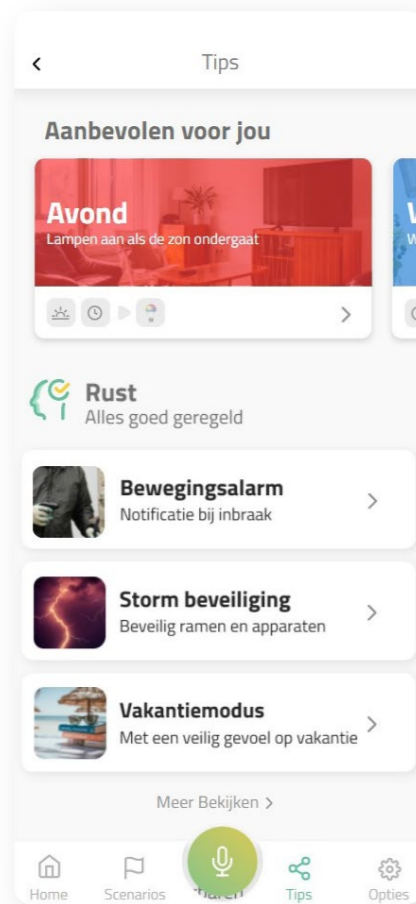


Active and disabled scenarios

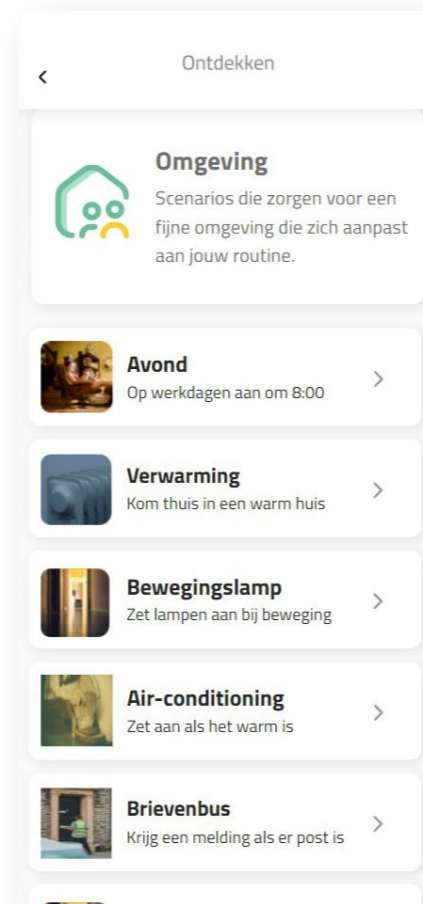
6.2.3 Tips

On the tips-page, the user can view example automations which can be added easily to the app. These examples are categorized in the four levels of wellbeing discussed in chapter 2, this chapter also includes all example scenarios that are currently part of the final design concept.

The main tips-page shows three examples per category, so the user can quickly scroll through the list. More examples can be viewed per category, this page also shows a longer description about each level.



Main tips-page with example scenarios



Category-page with more examples

6.2.3 Example scenario

Before the user can add an example scenario, it first needs to select the right device that should be activated. When no device is selected the "add" button is gray, indicating that it is not possible to press it. When the user presses it either way, the phone will vibrate and the green button "select devices" will shake. This button will pop-up a list of compatible devices. If the user has no compatible devices, a button will appear which leads to the web-shop of Hombli.

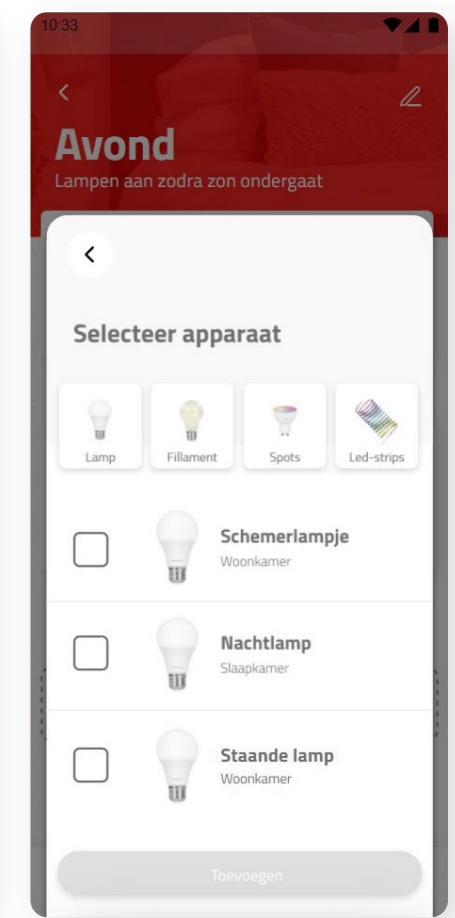
Every example scenario also has a short description at the bottom which explains how this scenario improves the wellbeing. The user can also click on this button for more information and tips.

The name, description and style of the scenario can be changed by clicking on the pencil at the right-top corner. This will show a pop-up with different options.

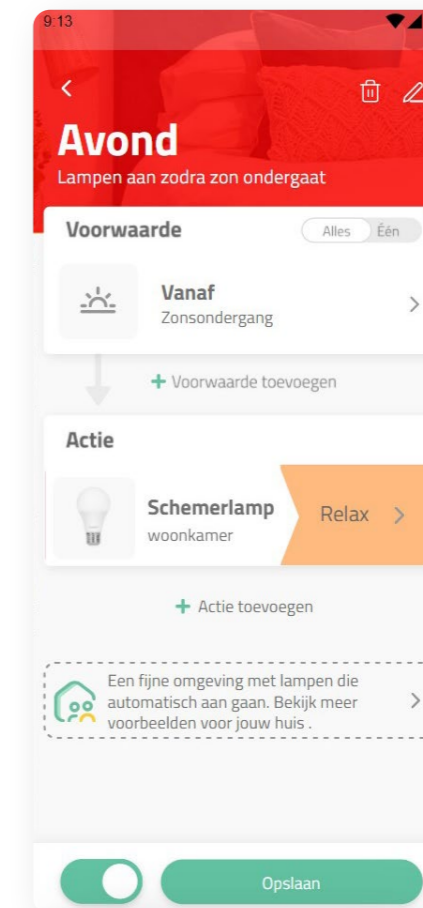
It is also possible to change conditions and actions, this will be explained on the next page.



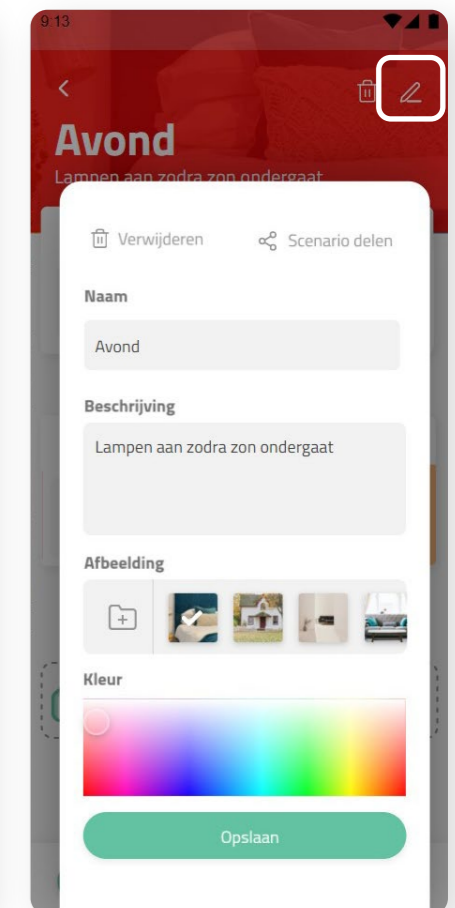
No device selected



Select device for action



Activated scenario



More options

Conditions

Camera
Beweging

> **Aan** Uit Beweging

Vanaf
Slaapkamer

> Vanaf Tot

uur min

18 : 00

Planning
Ma-do

> Z M D W D V Z

Thuis
Aankomst

> **Thuis** Aankomst Vertrek

Weer
Zonnig

> ☁️ ☀️ ☔️ 🌧️ 🌨️

Vanaf
Zonsopkomst

> Vanaf Tot

Zonsopkomst Zonsondergang

Actions

Pauze
8:30 min

> uur min sec

00 : 08 : 30

Notificatie
Bericht

> Bericht

Nachtlamp
Slaapkamer

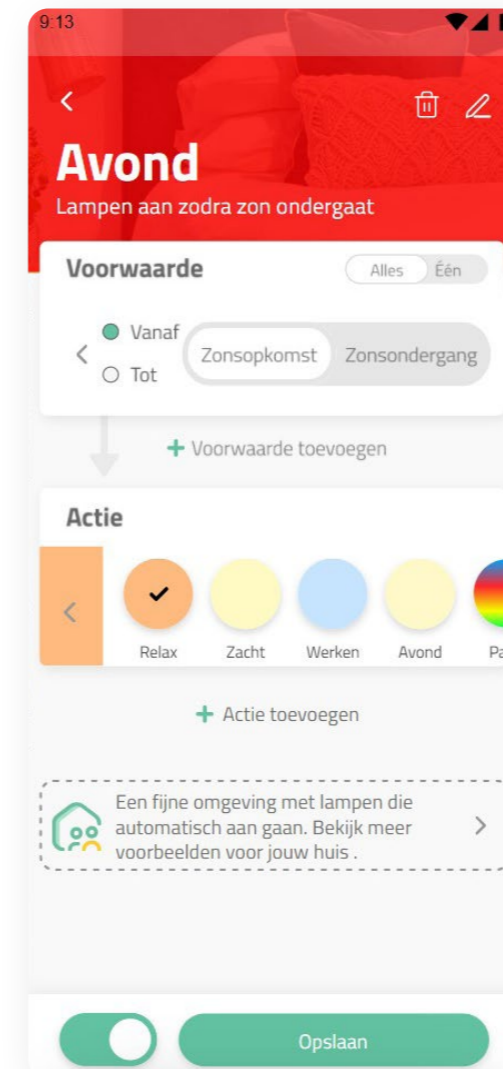
Zacht >

Uit Relax Zacht Werken Avond Party

Aan Uit Switch

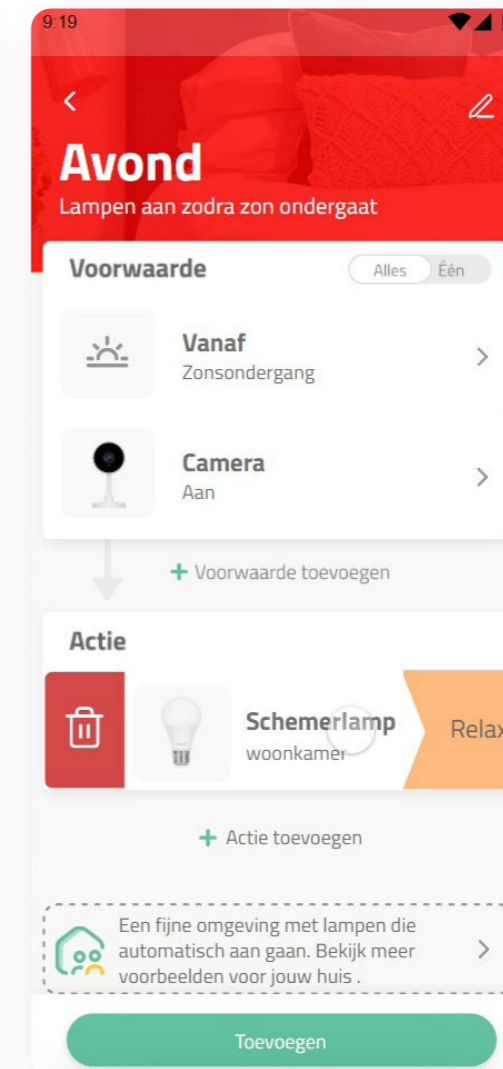
6.2.3 Changing a scenario

Every scenario contains two kinds of blocks: conditions and actions. These can be changed easily by sliding to the left. This gives the user the freedom to change every setting quickly and always be in control, even for example scenarios. The different options for each type of block are visible on the left side of this page. It is also possible to add extra conditions or triggers to an example scenario. These screens are further explained on the next page.



Change condition or trigger

An arrow indicates the user that an action or trigger can be changed. By either clicking or sliding more options become visible.



Delete condition or trigger

An action or trigger can also be deleted by swiping the block to the right. A trash-bin becomes visible from beneath the block, when dragging further the block will disappear.

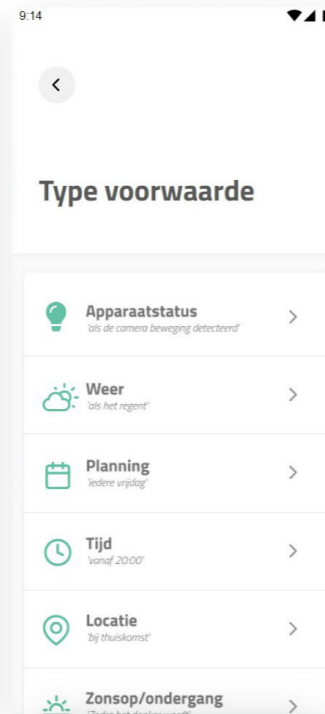
6.2.3 Custom scenario

It is ofcourse also possible to add a custom scenario to the app. To explain the user how a scenario is build, a new scenario will show up first without the conditions and actions. In order to add this scenario, the user first needs to add at least one condition and one action. If this is the case, the "add" button at the bottom will turn from gray to green.

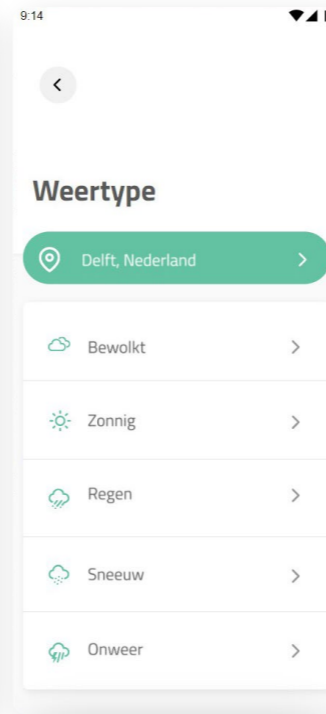
In this way there is no need for along step-by-step procedure to add a scenario. The user stays in control and can clearly see what kinds of steps need to be done to create a new scenario.



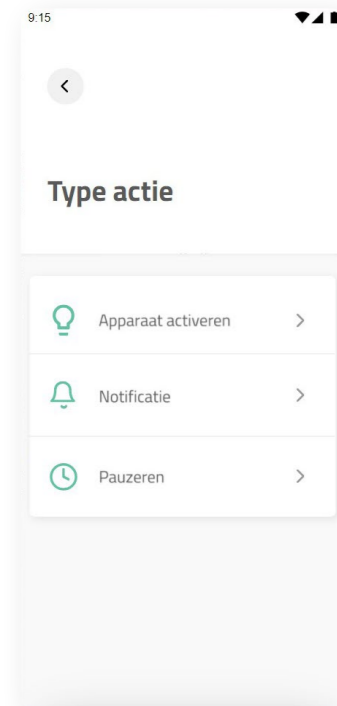
Empty custom scenario



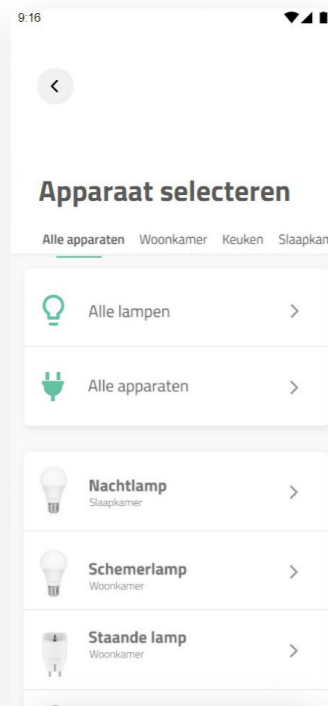
Select condition type



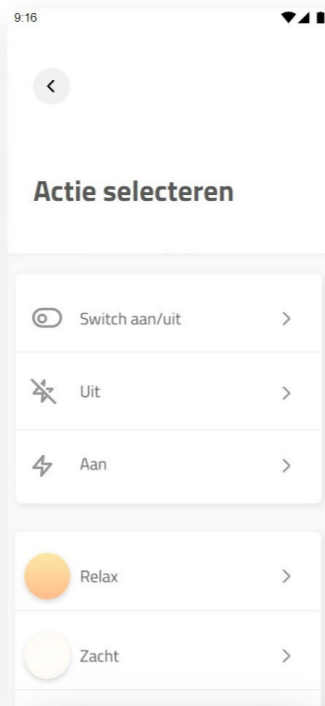
Select condition



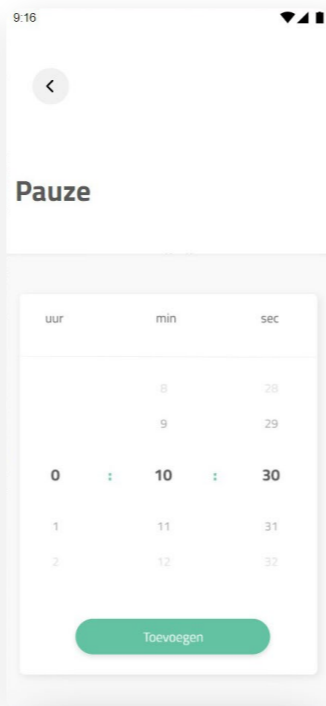
Select action type



Select device



Select action for device

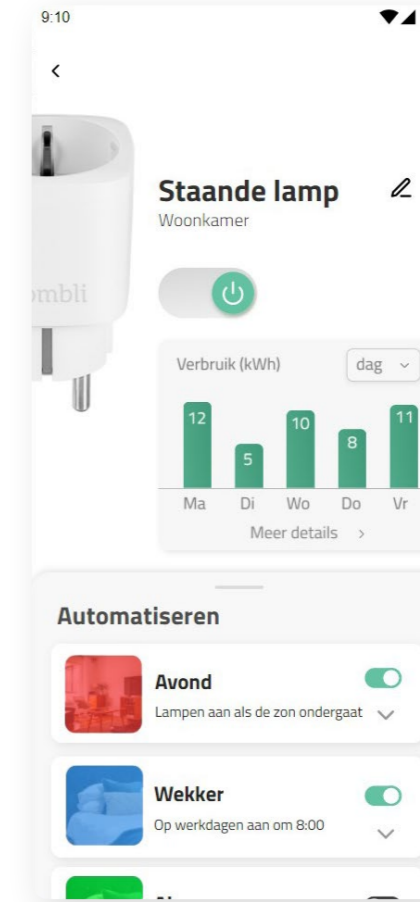


Select pause

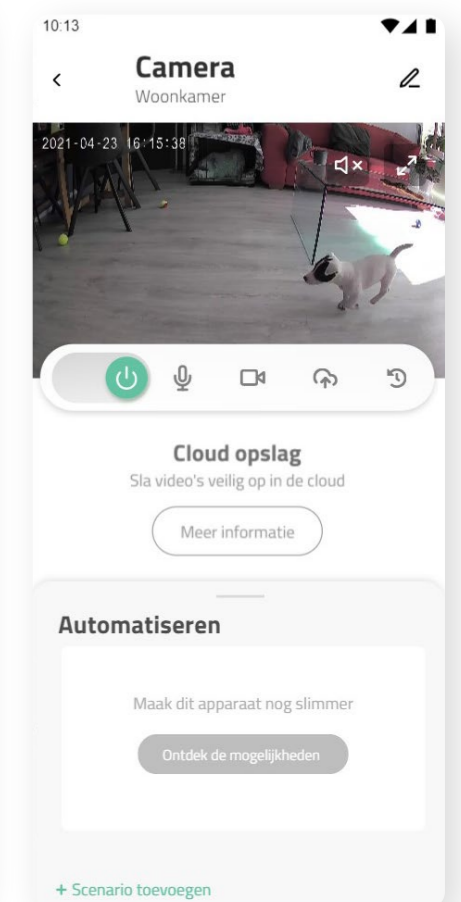
6.2.3 Devices

On the device page, the user can see the current status of a device and turn the device on and off. A lightbulb has several pre-defined scènes so it quickly set the right ambiance. These scènes are also used in the automations. It is also possible to change these scènes or add new scènes. Scènes can either be one color or multiple color, to animates through these colors.

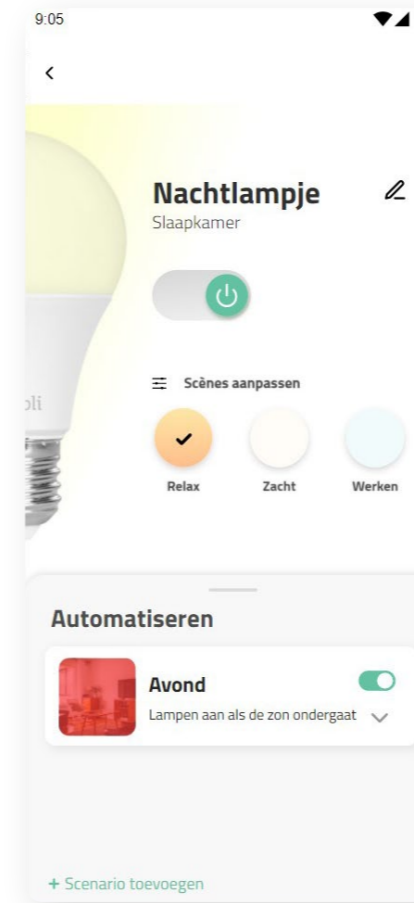
The device page also shows automations that apply to that device. This gives the user the option to quickly add or change scenarios for a specific device. When no scenarios are added, the page will show a notice and a button to explore the possibilities. This button will lead to the "tips" page.



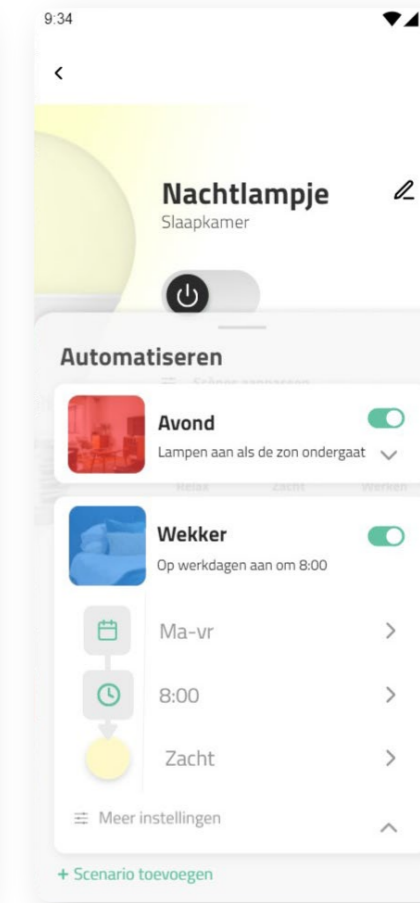
Socket with energy usage



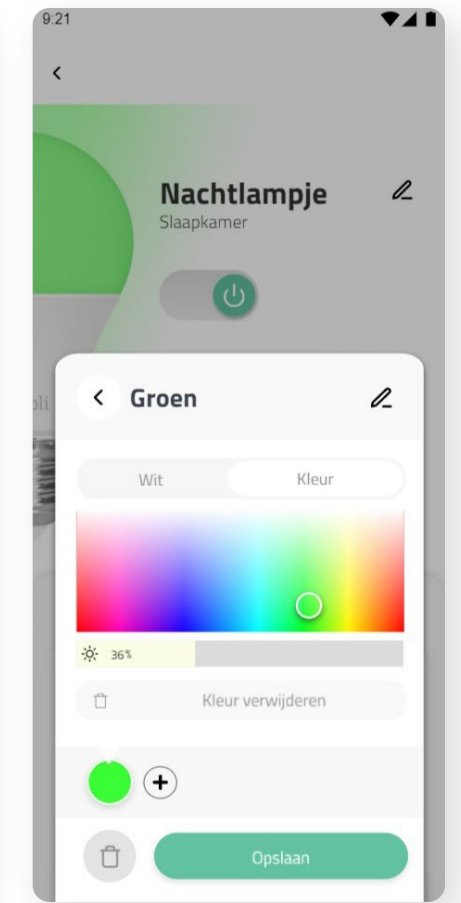
Camera with no automations



Bulb with one active scenario



More details of a scenario



Edit the color of a scène

6.3 Evaluation

To check if the final design meets the design goal and interaction defined in chapter 4, the design is evaluated and tested by seven participants.

6.3.1 User tests

Participants

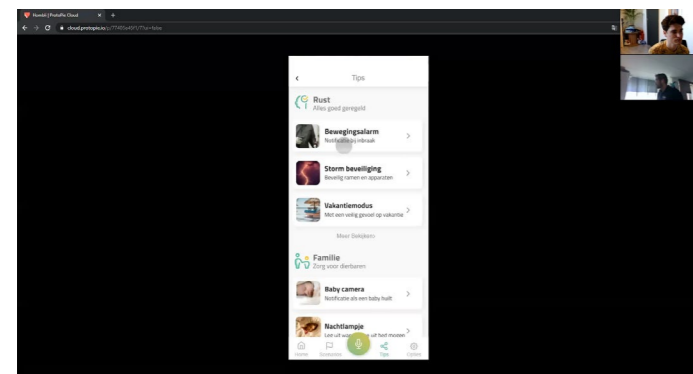
The final concept was evaluated with end users of Hombli that also participated in the sensitizing experiment. Not all of these participants were available though. Because of the restrictions due to the corona virus it was not possible to visit everyone. The people that were familiar with video-calling were interviewed via Zoom. Besides these participants, also some employees from Hombli evaluated the concepts to get more insights of how different kinds of the opinions of different kinds of people. In total 7 people tried the prototypes and were interviewed.

Test the prototype

After this introduction, the participant was asked to make a scenario, they were free to choose any scenario they like. Participants that were interviewed in person could test the prototype on a phone with screen recording so the footage was saved for later review. The participants that were interviewed using Zoom were asked to open the prototype using a link and share their screen. When the participants were testing, they were asked to think aloud to explain the reasoning behind choices they made. The order of the concepts were randomized to create even results.

Interview

After the test, the participant was asked what he liked and disliked in this concept. The user was also asked several questions about the use of this app. The complete interview guide can be seen in Appendix XII.



6.3.2 Results

Designgoal

The designgoal of the final design is yo help Hombli users with little technical experience, to feel guided and in control when they add smart scenarios, so they can automate their routines and live a carefree life. All participants were able to create a scenario without help. There were several ways in which the participants created the scenario. Most browsed through the examples first and choose a scenario they liked, but there were also participants that first went to a device page or created a custom scenario from scratch. The block on the homepage with the notice that there are currently no automations helped most people to go to the next step. They also noted that this would help them in real life to add extra scenarios because they won't bother going to the other pages of the app.

Most participants also commented that they really liked the device preview on the homepage and the possibility to quickly change multiple devices. Although this is not part of the goal to help users automate their routines, it is great that this goal can be achieved without removing the option to view and change the status of devices manually.

Requirements

Chapter 4 also describes several requirements for the final app, categorized in three different categories:

- **Control:** the user is always in control of every step, there are no fixed steps that need to be done to create a scenario.
- **Comfort:** the design is calm and everything is explained clearly, when the user needs help it can always ask the assistant. Participants noted that they would use it especially if they have a problem

and would like to get extra support. Or if they want to change something quickly.

- **Convenience:** the app offers many different examples. After adding an example, the user is able to change it.

Because the app supports different ways to automate smart Hombli devices, it can be used by people with different interests and goals. The four target groups defined in chapter 4 can all automate their homes to their own liking. The focus of the designgoal was to make help and guide people with little technical knowhow, but this final design includes all functionalities that are currently available so it can also be used perfectly by people who want to create more advanced scenarios on their own.

Interaction vision

The participants were surprised about the many different examples that the app provides. They were interested to look at how to implement them and reacted that they could also create something like this. This is reaction is comparable to the interaction of the app: it should be like choosing a nice recipe from a cookbook. It feels inspiring, powerful and natural.

Wellbeing

The four levels of wellbeing was clear to the participants, most participants picked the health and mind categories as most favorite and explained that this was also clearest connecting to wellbeing. The short description with each category helped them understanding what they mean, "I wouldn't get what 'mind' means without that sentence, for instance". The order of the four categories can also better be changed to show health at the top to explain directly that Hombli can be used to improve personal wellbeing. The descriptions on the example page was not always clear though. Also the place at the bottom of that page made it cluttered, the top of the page would be more suiting.

Goal:

Design a concept app that help users with little technical experience, to feel guided and in control when they add smart scenarios, so they can automate their routines.

This chapter brought the findings from the previous chapter together into one final concept. With this final design, the user can easily create scenarios that improves their wellbeing.

Figure 4.2: Participant sharing screen while testing a prototype.



Strategic roadmap

A strategy to implement the design proposal.

The Final design proposed in the previous chapter will bring users of Hombli a better experience and set Hombli apart to the competition. Launching a new app is a cannot be done overnight, so a strategy is needed for the digital experience of Hombli.

This chapter will describe short term actions Hombli can do to improve the digital experience without the need for huge investments and how they could prepare for the long-term future. Before that, the future vision will be explained.

← Contents

7.1 Roadmap

7.2 Discover page

7.3 Custom device panel

7.4 Custom app

7.5 Control center

Goal: Create a strategy for Hombli to create a realistic implementation for the final design.

7.1 Roadmap

Hombli is a Fast follower, is does not develop new protocols or devices, but react quickly to new trends and developments in the market. A first mover like Philips with their smart Hue products showed the great potential of smart products. Hombli reacted on this new product category by launching smart devices which were cheaper and easier to install without a bridge.

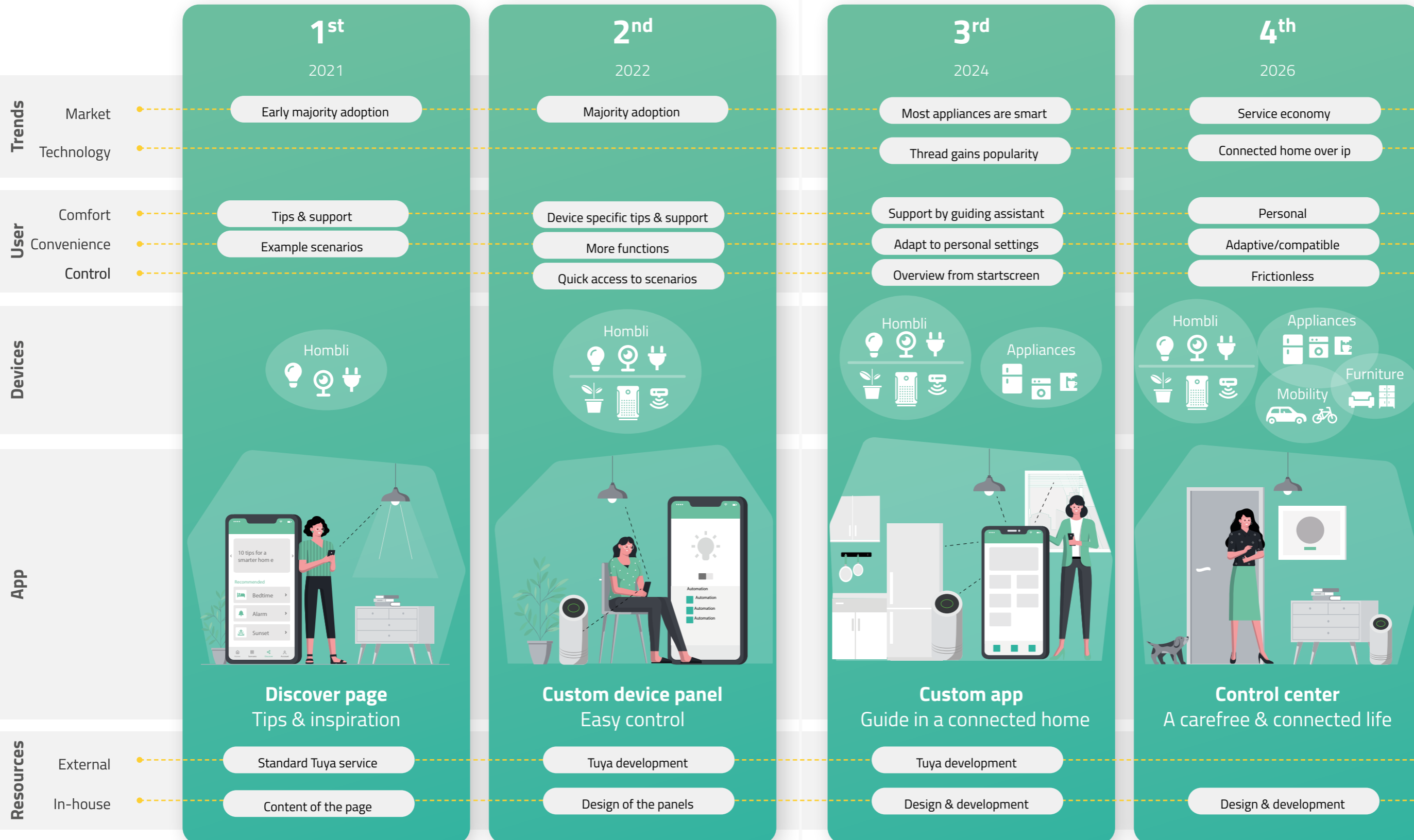
Another example of how Hombli is a fast follower is the recently launched Purifier from Hombli, which was launched because of the new corona virus. These devices existed for a long time, but this new need for clean air made it a product with great potential, and Hombli can launch this device quickly. It is more difficult to launch a good new app within

a few months. Therefore, a clear plan is needed to achieve the future vision of Hombli. This future vision is based on the design goal for the final design and helps Hombli to stand out on user experience from the many other smart home brands.

The first two steps in reaching this goal can be implemented without the need of big investment and can be scaled up according to the needs and growth of the company. The knowledge about the user needs gained in this first period can be used to create a true

custom app as proposed in the final design of this report.

Other trends in the market will also influence the needs of a better user experience. More devices will be connected, creating more possibilities, but also making it more complicated for the end-user. With the future vision deliver a carefree live, Hombli can inspire and guide people in this world of connected devices.



Future vision

“Hombli will **inspire** and **guide** people to automate their homes, so they can live a **carefree life.**”

2021 Discover page

Convenience

Pre-defined scenarios give the option to easily add automations and get inspired.

Comfort

The discover page includes tips and support to help the user get a better experience.



Horizon 1 Tips & inspiration

Tuya offers several 'value added services' that expand the possibilities of the smart Tuya devices. One of these services is an app mall, which adds a 4th screen to the app where products can be sold, and information can be shared.

Besides that, standard automations can be programmed which users can add quickly to their app. This app-mall from Tuya is developed like a webshop but can be used by Hombli as an discover-page with tips and inspiration.

This first step can be implemented in 2021 as an easy and cheap first

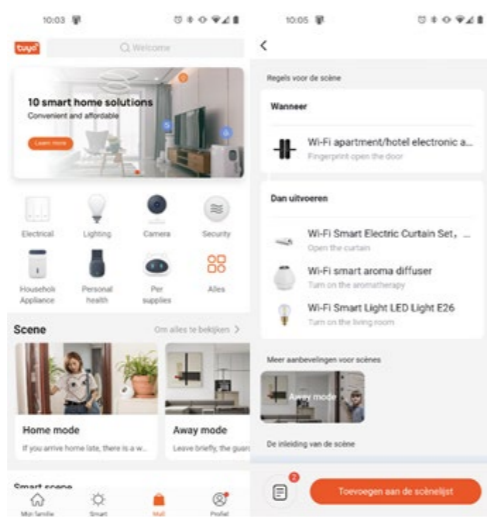


Figure 43 Screenshots of the standard App mall from Tuya

Needs

App mall subscription

Subscription \$1.500 per year

Content

UX designer/ content writer 0,2 fte in-house

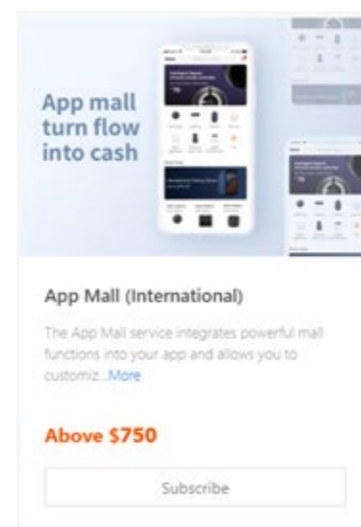


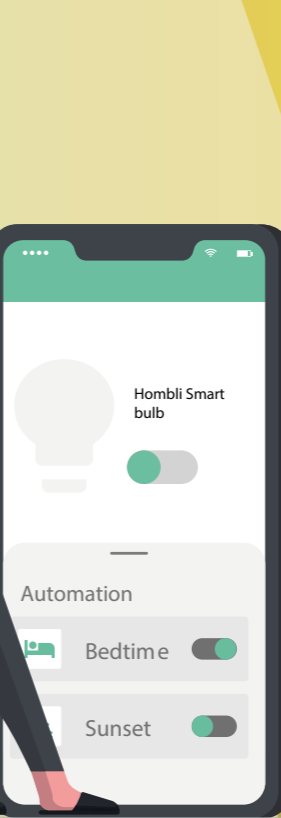
Figure 44 App mall from Tuya

Horizon 2 Easy control

Another value-added service from Tuya is a customized app control panel. Hombli can submit a custom design, developers from Tuya will turn these designs in a working device panel in the app. This service saves investment and development costs, while offering a unique device panel which can be optimized to suit the user needs.

To validate the possibilities of this service, a video meeting was organized with a spokesperson from Tuya. She explained the process and shared the development costs of \$380, - per developer per day. The time was validated by submitting a panel design of a new corner led lamp which Hombli is considering launching in the future (see figure 49).

Because smart home devices now also include more complex devices such as tunable Led strips, Purifiers or robot vacuums. These devices come with more advanced functions; custom panel designs can improve the usability of these devices. These devices are a good start for



2022 Device panel

Convenience

New products come with advanced functions, a custom panel can make it easier to understand these functions.

Control

Automating devices directly from the device panel gives a clear overview and quick control.

Comfort

Users can get specific tips and support from the device panel.

Needs

Development

Tuya developer	\$380 per day
4 -6 days	\$1.520-\$2.280 Per panel
8 devices	\$12.160 -\$18.240 Total

Research & Design

UX designer 0,8 fte in-house

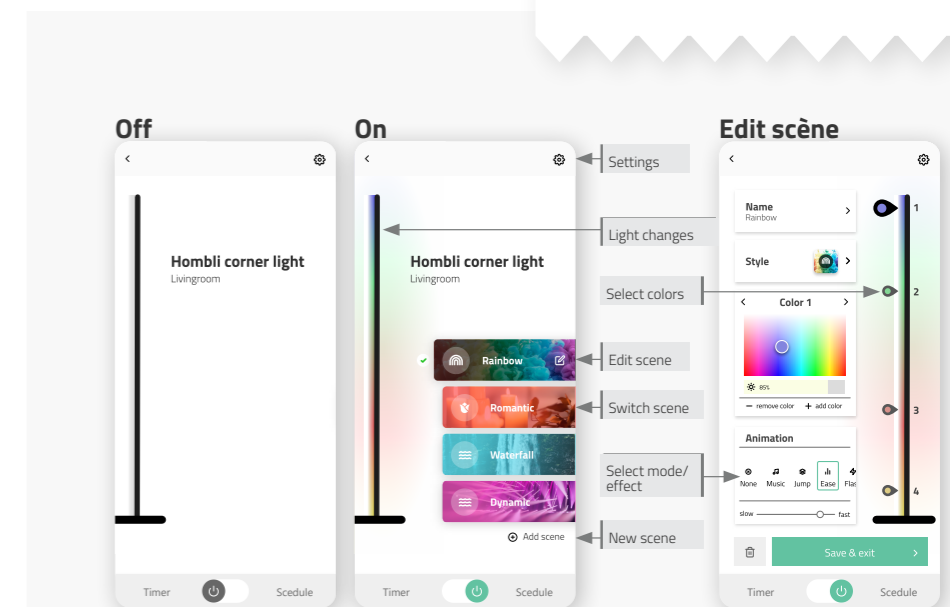


Figure 45 Customized screens of the corner light submitted to Tuya.

2024 Custom app

Convenience

The app adapts to the types of devices to only give most relevant information to the user.

Control

The homescreen shows all important scenarios and devices to give quick access.

Comfort

An optional assistant guides the user through the different scenarios and settings.



2026 Control service

Convenience

No need for different installations or platforms, Hombli takes care of everything.

Control

Most devices can be controlled in the app, a display or other web-services.

Comfort

Safe Dutch brand delivers ease of mind and a secure feeling.



Horizon 3 Guide in a connected home

The development of a custom app can set Hombli apart from all other Tuya-based brands who use similar apps. Developing a complete app in-house is a huge investment. Tuya also often updates the OEM app with new functionalities, so to keep up, the custom Hombli app should be improved updated constantly to keep relevant.

The spokesperson of Tuya confirmed that the custom app can be developed in the same way as the custom panel designs. This means that Tuya developers can modify the OEM, bringing down the development costs. More information is needed however to validate the possibilities and benefits for Hombli.

These changes can be deployed in different stages, changing the most important design changes first. Later new functionalities such as a helping assistant can be added. Hombli will internally take care of designing the app and gathering feedback and Tuya or other external programmers will develop these designs into the

Hombli app.

Besides this new customized app, Hombli can also extend deliver extra tool to help users manage and automate their homes with separate apps or web-services through Tuya API's. For instance, a web-app where users can log-in with their Hombli account and receive a feed from their cameras on a pc or tablet, or a platform where users can create and share more advanced automations. These separate (web)apps can be developed and maintained fully in-house and offer a unique experience that no other Tuya-based brand has.

Needs

First stage

Customizations to the OEM app

Development

Tuya developer	\$380 per day
20 days	\$7.600 Total

Research & Design

UX designer	1 fte
-------------	-------

Second stage

API applications

Development

Web-developer	1 fte in-house
---------------	-------------------

Research & Design

UX designer	1 fte in-house
-------------	-------------------

Horizon 4 A carefree & connected life

As described in chapter 1.4.3.2, a standard protocol is in development called Connected Home over IP (CHIP). With most big brands working together on this project, it can be expected that smart home products from different brands will work together soon (Infineon, 2021). This means that the end user can choose in what way to control all the different smart devices at home. Tuya confirmed that future devices from Tuya will also support this new standard.

This is great for the advanced user because it creates the possibility to configure the ideal smart home in every way possible and buy devices from every brand. However, for the less tech-savvy user, it can be difficult to understand the possibilities. Luckily, Hombli has gained a reputation and experience over the years to be a helping guide in setting up a perfect smart home.

The freedom of choosing any platform or tool to control every

device that supports CHIP also means that customers can choose any brand that support it. A custom app from Hombli can become redundant without a clear advantage over other ways to control smart home. Hombli should distinguish it's solutions from these of big platforms like Google and Amazon keep relevant.

Therefore, Hombli will deliver a unique solution for controlling all connected Chip devices in and around the house with the goal to create a carefree life. It is separated from the big services from Google and Amazon which gather a lot of data by keeping most data locally on a control device. This controlling device also is an easy way to control devices without the need of a phone or app, which is especially handy for kids or friends.

Needs

Development

Font-end developer	1 fte in-house
Back-end developer	2 fte in-house

Research & Design

Product designer	2 fte in-house
UX designer	1 fte in-house



8



Conclusion

Next steps and further research

This chapter will provide a reflection to this report and conclude the different findings. It also will provide Hombli with a final recommendation with further steps that are needed for a successful launch of the new strategy that is presented in this report.

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8.1 Evaluation

8.2 Limitations

8.3 Recommendation

8.1 Evaluation

The initial goal of this project was to:

Design a new app experience of Hombli that: 1) fit the brand and target market, 2) offer a clear differentiation from the competition, 3) is easy to understand and use by everyone, 4) work with technical possibilities of Hombli.

These different aspects of the initial goal are discussed in this report.

Firstly, the brand and target market are investigated. This has brought a new brand vision for vision with the focus on wellbeing. This new vision fits the Hombli brand and portfolio and sets it apart from the competition in the smart home market.

The new design of the app gives the user an easy way to automate their smart Hombli devices. Users can easily add example scenarios that improve their wellbeing. These examples also inspire people to produce new ideas or adapt example scenarios to make them even better. With these automations, the user can improve their wellbeing and live a carefree life with Hombli. Tests show that the different ways to add the scenarios offer people ways to create automations in the way that suits the best to them.

Finally, the technical possibilities are investigated. This is summarized in a strategic roadmap that gives a feasible way to realize the final design in multiple steps. This roadmap also looks at technical developments in the smart home market. In this way Hombli can stay relevant and keep delivering a smart home solution with automations that make it possible to live a carefree life.

8.2 Limitations

Although this was an extra long double master project, time was still too short to perform extensive user testing with the different concepts. These tests were all done using clickable prototypes, but there was no real connection to the smart devices. Therefore, the real impact of these automation could not be evaluated. Although participants noted that this would really help to make it easier to add the scenarios, user test with a real working app would give more insights.

Because of the regulations of the corona-virus pandemic, tests of most participants were only possible via Zoom. This made it possible to still interview them and let them use the app on their computer while sharing screen of the participant. Zoom made it possible to still conduct the user tests and gave enough insights for the development of the concepts. But real-life testing, using a smartphone instead of a computer, would be a more realistic setting. Without corona restrictions it would also be easier to reach out to more people without less technical knowhow.

8.3 Recommendation

The development of the app should be an ongoing, iterative process. This report gives a first step for a new digital strategy for Hombli. A great digital user experience can set Hombli apart from the many white-label Tuya brands that use a similar app as the current Hombli app.

Besides improving the digital experience, it is recommended to include the new vision in every part of the company. Wellbeing should clearly be in the DNA of the company. This gives a credible and consistent experience and not just a thing that is mentioned somewhere. The example scenarios mentioned in this report can easily be used in the marketing and blogs of Hombli to introduce this vision to users. Other ideas are collaboration with influencer, blogs and initiatives that support wellbeing.

New app functionalities should also come with a clear launch strategy. Besides the technical aspects of creating and launching an app, it is also important to create hype, instructions and demos of the different new functionalities.

It is also important to stress that proposals presented in this report should regularly be evaluated. Input from Hombli users should constantly be monitored and turned into iterative improvements of the app. To ensure the continuous improvement of the app, it is recommended to assign a Hombli employee that is responsible for the user experience of the app.





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This project could not have been realized without the help of different people. In this part I want to thank all these people that spend time to give me feedback and support during the project.

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