UNIVERSIDAD DE VALLADOLID

ESCUELA DE INGENIERIAS INDUSTRIALES

Grado en Ingeniería en Diseño Industrial y desarrollo de Producto

Smart Screens in the City

Autor:

Gómez Carnero, Mario

Eusebio de la Fuente López

Artesis Plantijn Hogeschool Antwerpen

Valladolid, julio de 2020

TFG REALIZADO EN PROGRAMA DE INTERCAMBIO

TÍTULO:	Designing for Smart Screens in the City
ALUMNO:	Mario Gómez Carnero
FECHA:	17 de junio de 2020
CENTRO:	Artesis Plantijn Hogeschool Antwerpen
UNIVERSIDAD:	Artesis Plantijn Hogeschool Antwerpen
TUTOR:	Win Gombeer, Marrin Geert

ESPAÑOL.

Resúmen:

El trabajo realizado consiste en la concepción, creación y realización de pantallas inteligentes para. El objetivo es desarrollar la pantalla en sí misma, como objeto y componentes, su localización en la ciudad de Amberes, creación de un software o aplicación disponible en las pantallas y que ofrezca información tanto a turistas como a ciudadanos de la ciudad, y por último una campaña de marketing para definir y publicitar el proyecto ante empresas, organismos y usuarios.

La finalidad del proyecto es la creación de un proyecto que facilite la obtención de información por parte de los viandantes que se encuentren en la ciudad. Esta información va desde meteorológica, noticias o anuncios institucionales hasta restaurantes, planes de ocio, entradas a cines, teatros y festivales, información turística, así como un gran número de apartados desarrollados como un mapa de navegación para ofrecer cualquier información necesaria al usuario. Todo ello, en una pantalla táctil.

Palabras clave:
Pantallas inteligentes táctiles en ciudades

INGLÉS.

Abstract:

The work done consists of the conception, creation and realization of smart screens for. The objective is to develop the screen itself, as an object and components, its location in the city of Antwerp, creation of a software or application available on the screens that offer information to both tourists and citizens of the city, and finally a marketing campaign to define and publicize the project to companies, organizations and users.

The project proposal is the creation of a project that facilitates the obtaining of information by the pedestrians who are in the city. This information ranges from weather, news or institutional announcements to restaurants, leisure plans, tickets to cinemas, theaters and festivals, tourist information, as well as a large number of sections developed as a navigation map to offer any necessary information to the user. All this on a touch screen.

Keywords:
Smart touch screens in the city

Designing for Smart Screens in the City

European Project Semester

Academic Year: 2019 - 2020

Names of students: Sara-Gül Kangöz, Eric Gonzalez, Ben Vinck, Madalina Gavril, Aleksandra Lobka, Mario Gómez Carnero, Joy Agwunedu, Dario Van Mechelen

Sponsor & Coach: Silvia Van Aken & Wim Gombeer

1   Summary

From February to June 2020 for the European Project Semester, a group of seven (who became eight) students, from different fields of study, were paired together to work on the project "Smart Screens in the City". Our main focus was to create a concept of a smart screen that connects and helps people, both tourists and locals, in the city of Antwerp. We provide an alternative for the screens that are already in the Antwerp Smart Zone that are part of a series of projects that have as a goal to transform Antwerp into a smart city.

How can a small community benefit from the smart screens in their neighborhood? Why are they (not) using these screens?

To answer that question, we focused primarily on qualitative studies to find out what people need in a city, which lead us to creating a screen design and user interface that would attract people through its aesthetic and easiness. We created videos to exemplify how the screen will work, a website to present us and our project and we developed advertising strategies.

We were given five months to work on the project. During this time, we worked with an agile project management method and we based our work on doing research, creating prototypes and testing them until we reached a final result.

2 Table of Contents

3 Introduction

Antwerp as a city in Belgium is famous for diamonds, avant-garde fashion, Rubens, the largest Belgian port and the train station which is a real architectural gem.

Is this possible to make technology useful for improving life in the city? The task that we obtained was designing for Smart Screens in the city. In the Antwerp Smartzone are located two public screens. However, it turned out that they were not quite user-friendly, or even being used.

People passed away screens instead of using them. Public screens should be more enjoyable and available for both locals and visitors. This study aims to reinvent the way smart screens are presented outdoors and question their function. It can be concluded that the project is to create a deeper understanding of how to adapt these smart screens while addressing the research questions that follow.

3.1 Research question

How can sensor data and the internet of things be used to communicate stories on smart screens in a memorable and meaningful way?

3.1.1 Sub questions

1. How can you feed the user interfaces of smart screens with sensor data and how can you adapt this data in a memorable and meaningful way?

2. How can you enhance the interaction between people by using interactive and context-based storytelling techniques?

3. How can a small community benefit from the smart screens in their neighborhood? Why are people not using already existing screens?

4. How can the smart screens be designed to fit the needs of the target groups?

To achieve a satisfactory result, the project work consists of research about potential users, using surveys various analyses, interviews with local people and different target groups, survey, prototyping, and making an advertising strategy. The project has resulted in a prototype for the user interface of the smart screens, a website that presents the project, 3D-models for a bigger and a smaller screen, location suggestions, design personas and user research and a suggested marketing campaign for launching the smart screens.

3.2 The Team

The project team of Handle Smart Screens consists of eight students from seven study fields, with six different nationalities. For five months our diverse team has worked on creating a concept for how smart screens and data collection can be used to improve cities

and help people. Each team member has written their own parts of this project report in accordance with the work they have done during the project. To learn more about each team member, take a look at our team presentation on the [Handle website.](#)

Joy Agwunedu.
Multimedia Production
Germany
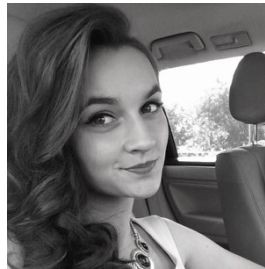
Aleksandra Lobka
Architecture Engineer
Poland

Madalina Gavril
Advertising
Romania

Ben Vinck
ICT
Belgium

Dario Van Mechelen
Graphical & Digital Design
Belgium

Eric Gonzales
Industrial Design
Spain

Mario Gomez Carnero
Industrial Design
Spain

Sara-Gül Kangöz
Media & Communication
Sweden

3.3 Our story

It all started with some strangers in a cafeteria sitting at the round table asking themselves what they did before coming to Antwerp and wandering what is coming next, thinking that in June they will end with a goodbye party and a nice resume. But life is not always like those strangers expected, it is more fun and more unpredictable that they thought at that round table.

Life sometimes means getting from your bed at 6 in the morning on a cold winter day to get some inspiration from Amsterdam for your project and waiting for a bus that would never come, getting to the hospital, being trapped in your country, being sick, being worried, waiting in the airport to go home because a virus turned the world upside down but it also means getting to know a country, being able to adapt to new circumstances, welcoming new people in your life and in your project that you have probably never meet in any other way. From that round table to their home behind their laptops it was a chaotic but beautiful journey that turned those strangers into a real team.

4 Process

In this section of the report we will describe how our work process has been throughout the project. This we will do both on a general level and specifically within our different fields of study.

4.1 Defining the project

Firstly, the given research questions were quite broad, and our team consisted of people from study fields that were not expected by the sponsor or coach. Therefore, our first task as a project team was to define the purpose and goal of our project, given the project briefing and the competences of our team. Since we were also assigned to work with an agile project method, early on we were expected to present a release plan with our project assignment, target group, problem and suggested solution. Defining the project was by far our biggest challenge since our competences were significantly different than what was expected by the sponsor. We had to create new tasks that were both suitable for the architecture engineer and the industrial designers and at the same time relevant for our sponsor.

4.1.1 Release Plan – Agile Project Method

Our first outline of the project was to create a release plan according to the agile project management method. We narrowed our assignment down to "reinvent the way smart screens are presented outdoors and conduct several experiments to feed and adapt these smart screens" (Van Aken, 2020).

With the help of our coach Wim, we decided that our sponsors, the research team, will be the primary benefiters of the project result, since our aim is to create a research-based concept. The secondary target groups are the city of Antwerp, new citizens, visitors and companies along with other institutions of the city.

We will present our research both in this report and in appendices showing user personas and scenarios to give the context of the smart screens. The concept of the smart screen interface will be presented as an Adobe XD prototype along with a website targeted at cities and companies interested in working with the smart screens.

4.2 Methods

The project method of use was the agile project management. The online tools we used for monitoring the project were JIRA and Confluence. For our backlogs and sprints, we used JIRA to list and prioritize tasks and user stories. Confluence was used as a platform for sharing documents, meeting notes and the long-term plan of the project. Some team members were familiar with the method but had not been in charge of leading an agile team.

By using the agile project method, we were able to monitor the progress of the project. We have had weekly meetings with the entire team to show each other what we have done thus far, to receive feedback, ask questions and plan upcoming tasks. During each meeting

we kept meeting notes online for the team to keep track of the decisions made and in case a team member could not attend the meeting.

4.2.1 Division of Work

Each team member has worked within their field of studies. Since our study fields are vastly different from one another, each student within their field has written their own separate parts of this project report. Each team member is responsible for the language, structure and content of their own parts, since we lack the knowledge to correct each other's work.

4.2.2 Antwerp Smartzone

A smart city is a municipality that uses information and communication technologies (ICT)to increase operational efficiency, share information with the public and improve both the quality of government services and citizen welfare. That type of the city is trying to become the Antwerp. The Antwerp Smart Zone is located in Sint-Andries. It is like a miniature version of the city, where innovative technologies make the city smart ans safer for the citizens and tourist as well. The Antwerp Smart Zone includes various projects which are carried out simultaneously. Starting from safe crossing where cameras register all pedestrians at some crossover. The aim of the project is to reduce the number of pedestrians crossing the street on red light. The smart lighting project is being conducted to reduce energy consumption. Parallel to this project is also carried out a smart tracking light where the aim is to provide the streets with the best possible lighting for users. Last but not least, is the project about reworking of public screens, which was connected withour EPS project.

4.3 Unexpected challenges and events

Throughout this project our team has encountered challenges both within and outside of the project work. The first week the team met, one team member became ill and had acute surgery and had do rest for two weeks. To follow, another team member became stuck in their home country for two weeks and after a month of project work, the Covid-19 pandemic spread to Europe and led to a lockdown in Belgium and the closing of the AP College.

This led to a change of work methods and aims of the project. The initial plan to make a video to show the context of the screens had to be change to an animation. The tasks to conduct experiments and feeding existing smart screens with data were cancelled.

4.4 Research

An essential part of the smart screen project has been to conduct research on which the design could be based. The following section describes the process of the research.

4.4.1 Overview of Antwerp's Databases

BasicData

Docks, squares, tunnels, the city, districts, off-roads, slow roads

Trash

Overview, burning ovens, underground sorting, compost, recycle, parks, paper, glass containers,

Culture

Culture Center, Culture locations, libraries, A-card Locations

Economic

Tourism, Horeca, Markets, Shopping streets

Environment

Parks, green, trees

Youth

Youth work, Day-care, playgrounds, party spaces, play forests, youth locations

Mobility

Water bus, park and ride, trams, rotation parking, temp. Parking ban, car reach, bike stalls, airport, handicapped spaces, blue bikes, parking, taxi parking, evening parking, carpool, zone 30, low emission zone, bike cards, charging spaces, tunnels, speed, train stations, water mobility, bikes, bike infrastructure

Public-Services

Post office, court, district house, Wi-Fi, public toilets, graveyards, market, fairs, fire fights, police, charging spaces

Sports

Sport halls, pools, sport terrains, running spaces

Street-objects

Traffic lights, sitting spaces, city boards, drinking fountains, fountains, BBQ, playobjects

Living

BPA, De lijn, SRSA, Student houses, living, open city, water city, eco city, monuments, building

Healthcare

Social center, OCMW, hospitals, care centers, Districts, Doctors, Pharmacy, Service centers.

4.4.2 Online Survey

The purpose of the online survey was to find general needs and behaviors of potential users. Since the group of potential users consists of everybody in a city, each person answering the survey needed to submit age, gender and country of residence for the results to show similarities and differences in and between groups.

4.4.3 Qualitative Interviews and Focus Groups

For more specific information about potential users, the team conducted a qualitative study based on personal online interviews and two focus groups.

4.4.4 Design Personas

At the beginning, Amazon's staff meeting had an empty chair at the table where they were sitting to talk about how they can improve their company. Jeff Bezos wanted that the people who work for him to know that there is the spot for the client, and he is the most important member in the meeting and the others should talk only from his perspective. Amazon is now one of the most successful company in the world, based on the philosophy "the client is the most important person in the room" asking themselves constantly "how can we make the shipping faster for them? How can we have more diversity in terms of the products on our website? How can we create a platform that is so user-friendly that anyone would find it easy to access?"

Designing personas was our way of having the user involved in our project, being able to find solutions for their problems, designing and creating for them. We chose to work with engaging personas, where the use of stories helps the designers empathize and understand the target users. The stories and insights were based on online interviews and focus groups, having multicultural perspectives (the subjects are from Belgium but also from Turkey, Spain, Sweden, Germany, Romania and Poland) to find insights that are universal and help us design a product that is universal, humanized, easy to use no matter the user's age, nationality or gender.

"The engaging perspective is rooted in the ability of stories to produce involvement and insight. Through an understanding of characters and stories, it is possible to create a vivid and realistic description of fictitious people. The purpose of the engaging perspective is to move from designers seeing the user as a stereotype with whom they are unable to identify and whose life they cannot envision, to designers actively involving themselves in the lives of the personas. The other persona perspectives are criticized for causing a risk of stereotypical descriptions by not looking at the whole person, but instead focusing only on behavior."

4.5 Storytelling Animation

Different type of animation styles

For our project "Smart Screens in Cities", we decided to create an animation in the form of an explanatory video. The video should easily enlighten the potential viewer about the Screen. Furthermore, the design should be kept as simple as possible so that the focus remains on the essentials (the offers on the screen).

The term "animation" comes from Latin and means "to bring to life". Items such as objects, figures, shapes, photos, and texts can be brought to life by animating them. A moving image will be created when the individual images get quickly displayed one after the other.
At about 24 frames per second, the viewer gets the feeling of seeing a fluid movement.
The range of animations is very broad, there are for example the 2D animation, 3D animation, stop motion animation, typography animation, and many more.
When creating an animation, it is always very important to see which animation style the product, the target group, the brand, and the message content. To estimate exactly which of the animation styles suits our project, I looked at how they are structured.

The 2D animation comes from the year 1800 and it is very well known. They are often used for animated films, cartoons, marketing videos, commercials, educational materials and much more. The objects and figures are located in a 2-dimensional environment, where there are only heights and widths.

3D animations are similar to 2D animation, but they differ in the fact that the 3D animation is in a 3-dimensional range. The figures can be moved and rotated exactly as well as real objects. This type of animation is very often used for movies, online games, virtual realities, models and graphics.

Compared to the animation styles, typography animation works mainly with text moving images. Typography animation is often used in commercials and films to convey certain ideas and emotions to the recipients.

In the stop motion animation many photos are taken, with every single photo the object is shifted one centimeter. As soon as the images are played back one after the other, a movement arises that is perceived by the recipient as a film. One good example of stop motion animation is Wallace & Gromit.

There is also a significant difference between an animation and a motion graphics video, which is not often recognized immediately. Motion Graphics is part of the animation, but the difference is that they are mainly using graphic design elements such as figures, objects and texts to create a video. In addition, it is less about the storytelling aspect, it is much more about an idea that should be explained in a simple way.

Each animation style can display the same information in different ways, so it is very important to look at what kind of animation best suits our product. Since the smart screens in our project should simplify the lives of citizens in the city, it is very important to clarify what exactly the smart screen is and what it offers. Since motion graphics videos are often used to educate about certain topics, we decided to use this kind of animation for our project.
The advantage of this is that the videos could be shared really easily on social networks after production.

A very important step, which is part of creating a Motion Graphic Video, is the determination of the target group. It is extremely important to know to whom the animation should be directed at the end. For this reason, we conducted interviews with people to classify our target groups. We also created Personas and Scenarios based on the interviews.
Our target groups was divided in young adults, families and elderly people.

Through the interviews, we were able to find out the wishes and needs (such as better bus connections, more information about restaurants, public places and so on) of the respondents.

Before producing the Motion Graphics video, it was very important to create a list of landmarks for the topics that should appear in the video.

Content in the video
Three questions were of particular importance:

- How does the screen look like?
- What does the screen offer?
- Who can use the screen?

The sharing of materials and information with the group members was extremely important, in order to answer the three questions in the video. We used for example various platforms such as "Teams", "Confluence" and "Emails" to share important data. The design of the smart screen, for example was also exchanged with one of those programs. As a result, the model was easily integrated into the animation.

The programs that was used to create the animation was, Adobe Illustrator, Adobe After effects and Adobe Audition.
Adobe Illustrator is often used for creating Computer graphics because, the quality of the illustration is not getting negative affected. Adobe After Effects was used to bring the computer graphics to life. Furthermore, Adobe Audition was used to edit the off text.

To show the viewers the offers of the screen, we used icons. Icons have the advantage of a high recognition value, and they are also space-saving. Besides that, they are visually more appealing than texts. It is really important to make sure that not too much text appears in a Motion Graphics video. Keywords and concise terms are much more effective than longer texts, as they are easy to understand.
The creation of the icons took some time, because for each object a separate layer had to be created. With different layers each object can be animated separately.
For example, if only one arm of a character should be animated, it is important that it has its own layer. If this is not the case, and the arm is in the same layer with other objects, the whole figure will move instead of only the arm. For this reason, the creation of the individual figures also took some time.

Off - Text
Since the video was intended to inform potential viewers, we decided to use an off - text. An off - text is a spoken text in which the speaker cannot be seen. In this video, the off - text should accompany the viewer and help them to understand the product.

The spoken text that appears parallel to the video is:
"Wouldn't it be nice to have an intelligent screen in the city, that immediately shows you what you want? And also gives you suitable suggestion?
No matter if you want to have more information about, restaurants, bars, pharmacies, shops or good bus connections?
The smart screen Handle, can provide you with a wide variety of information. It also doesn't matter if you are a young adult, a family with kids, or a senior.

Everyone has the opportunity to find the right offer for themselves.
You can just easily tap on the screen and select between different type of languages. The screen will then provide you with some suggestions.

Maybe you want to make a reservation because you want to take a friend out for a coffee?
The smart screen will give you the opportunity to choose between different places. You will then get an overview of the important information, where you can choose the time and the day that suits you the best.
If you want to save the reservation on your phone, you could use the QR code."

It is very important that the spoken text matches the appearing images in the video. And it is also very important that the text does not contain too many incomprehensible technical terms, otherwise it is too difficult to understand.
The audio tracks were later edited with Addition and inserted into the animation.

Storyboard

After collecting all the information that was needed, it was time to visualize the ideas. That is why a Storyboard was created. A storyboard contains sketches that helps to see which settings and perspectives could be used for the animation.
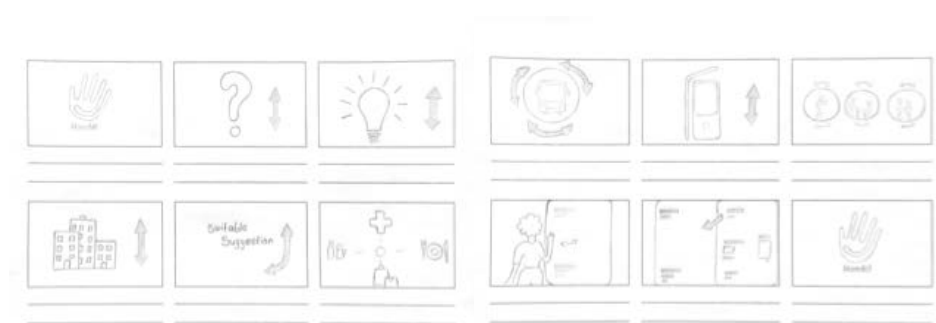
Storyboard 1   Storyboard 2

The storyboard shows the sequence of the respective scenes. The arrows, which can be found in the drawing, serve as orientation. They show how an element in the video should appear and disappear.
To get the attention of potential recipients, the video begins with a question. The question should therefore be dealt in the following of the animation.
The figures in the animation are the Personas that we created based on the surveys that we have made.

4.6 Advertising Strategy

4.6.1 Advertising for the Screens

Advertising should reach all 3 phycological levels of the human mind: cognitive (when the consumer is familiar with the product) affective (when the consumer has an opinion about the product: he likes it or not) and behavioral (when he takes actions based on the previous level (if he likes it, he buys it or the opposite). Big brands usually make campaigns to reach the affective level: depending on how loved they are, people will buy more.

We are not a big brand and people don't know us so with this plan we will try to reach the cognitive level by making the target group familiar with our product. Because we have an abroad target group, we thought of an idea that affects everyone from the city: rain. In that way, we choose to promote the screens through guerilla marketing (an advertisement strategy in which a company uses surprise and/or unconventional interactions to promote a product or service). Some umbrellas would be attached to the screen, in that way when it would be a rainy day, people would go to the screen to avoid the rain, or even when it is not raining people would go out of curiosity. The umbrellas are the way that we want to attract people at the screens

4.6.2 Advertising for a Third-Party Client

Our screen is a way of increasing social life from Antwerp by showing people events, restaurants, cafes, local brands that they didn't know before. That could be a way for national or international tourists or even for the residents of the city to find local businesses that they didn't know before. When people would search for something on the screens, for example, events- they would get a list of all the events that are happening at that moment in the city. We thought of making a subscription for a third-party client, inspired by Google, in a way that the client who pays the subscription would be in the top 3 options. The subscriptions would be available for 3 and 4 days with only 3 clients per session. (6 clients per week) In the weekend (Friday to Sunday would be more expensive giving the fact that social life is increasing).

4.6.3 Selling Data to a Third-Party Client

The local business owners can increase the number of clients by receiving data from the screen. The screen will collect and process data from the users (which language do they choose, which places do they pick based on weather, time of day or year) and sell it to the local business owners so they can lead their strategy based on the data. (for example: as a business owner if you see that people who choose your brand are from Spain because they also choose the Spanish language you can create a Spanish Night to attract more people that would like your brand)

4.7 Graphic Design Process

Design Thinking

Design Thinking is an approach used for practical and creative problem-solving. It is based heavily on the methods and processes that designers use, but it has actually evolved from a range of different fields - including architecture, engineering and business. Design Thinking can also be applied to any field; it doesn't necessarily have to be design specific. For this project we made use of this approach to design the user interface for the screen.

Phases of Design Thinking.

The Hasso Plattner Institute of Design at Stanford describes design thinking as a five-stage process. It's important to note these stages are not always followed after each other and designers can often run the stages in parallel, out of order and repeat them.

The stages of design thinking should be understood as different kind of modes which contribute to the entire design project. The ultimate goal is to create an understanding of the product and its users.
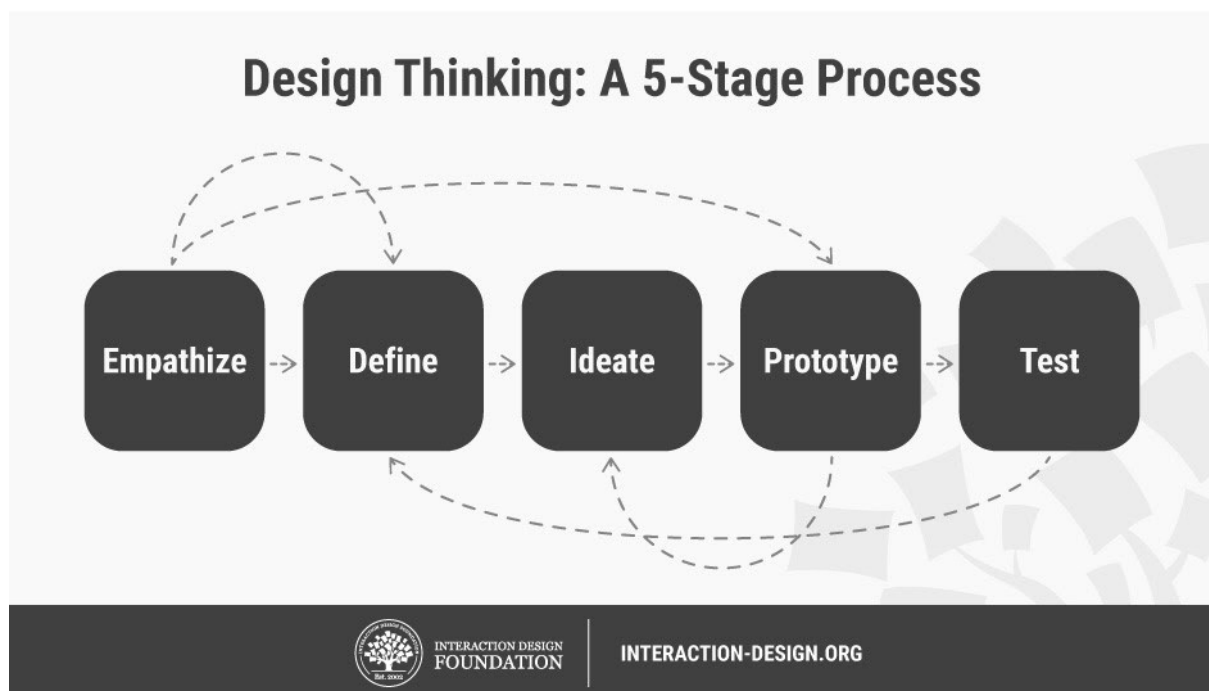
01. Empathize

The first stage of the design thinking process allowed us to gain an empathetic understanding of the problem we were trying to solve, typically through user research. Empathy is crucial to a human-centered design process like design thinking because it allows us to set aside our own assumptions about the world and gain real insight into users and their needs.

02. Define

In the Define stage, we compiled all the information we created and gathered during the Empathize stage. We analyzed our observations and used them to define the core problems our team had identified so far.

03. Ideate

In the third stage we were ready to start generating ideas for the project. The solid background of research from the first two phases meant that we could start to "think outside the box", look for alternative ways to view the problem and identify innovative solutions to the problem statement we had created.

04. Prototype

The experimental fourth stage, and the aim is to identify the best possible solution for each of the problems identified during the first three stages. We produced a number of sketches for the design solution we came up with. Starting from that we went digital to different prototypes.

05. Test

We started testing the completed prototypes. This was the final phase of the model but, in an iterative process such as design thinking, the results generated are often used to redefine one or more problems users might have with the product. We then returned to previous stages in the process to make further iterations, alterations and refinements to improve on the design and user experience.

Project Design thinking process.

01. Empathize Phase

To start the project, we went started to research more about what our project was about. The project mainly revolved around what we wanted to do and the briefing we got. The context we had to work around was provided by the *Antwerp Smart Zone. (n.d.).*

Antwerp Smart zone

We went over to this location to check out exactly what we were working with. While we were there, we also did some research about the Antwerp Smart Zone project and asked some citizens who worked and lived nearby about it.

The user interface

While testing out the screens we noticed a few big problems with it.
Mainly from a designer's standpoint that we are discussing in the chapter, I noticed that the screen looked empty and that there was almost no content on it. It looked like it had no use and that the previous designer struggled to get content on it. The UX (user

experience) was not that great either. The screen posed many difficult to reach places for content and did not keep the height of the users in mind at all. I could keep talking about this for hours on end, but to keep it short, the screen has many problems that needed to be fixed.

Survey
To gather information on what users would like to see on the information smart screen we decided to make a survey that would ask questions regarding that topic. We made the survey and asked people from different countries to answer it. With this information we could compile a list of things users would like to have on the screen.

02. Define Phase
After we defined what we wanted to and compiled all the information from our research we made a list of the core problems and challenges we would have to deal with.

03. Ideate, prototype and test
In the ideation phase we started to think about how the screen should function and what it should look like. This was the real start to start designing the User Interface and the whole prototype behind it.

Sketching & discussing.
The first thing we did was sketch different ideas for the user interface and what should be on it. Then we discussed it in our group and came up with some other great ideas while others got scrapped or were put aside for the time being.

Some of the sketches were really simple. It started out as a general idea of where certain parts should be. For example where we would put the navigation, the logo, all the content , photos, etc.

Low fidelity prototypes
When the sketching was done, we started to try the different ideas on Adobe XD to get a better sense and feel of how certain design feel and would look like. We decided to try a few different options and designs as you can see on the pictures below.
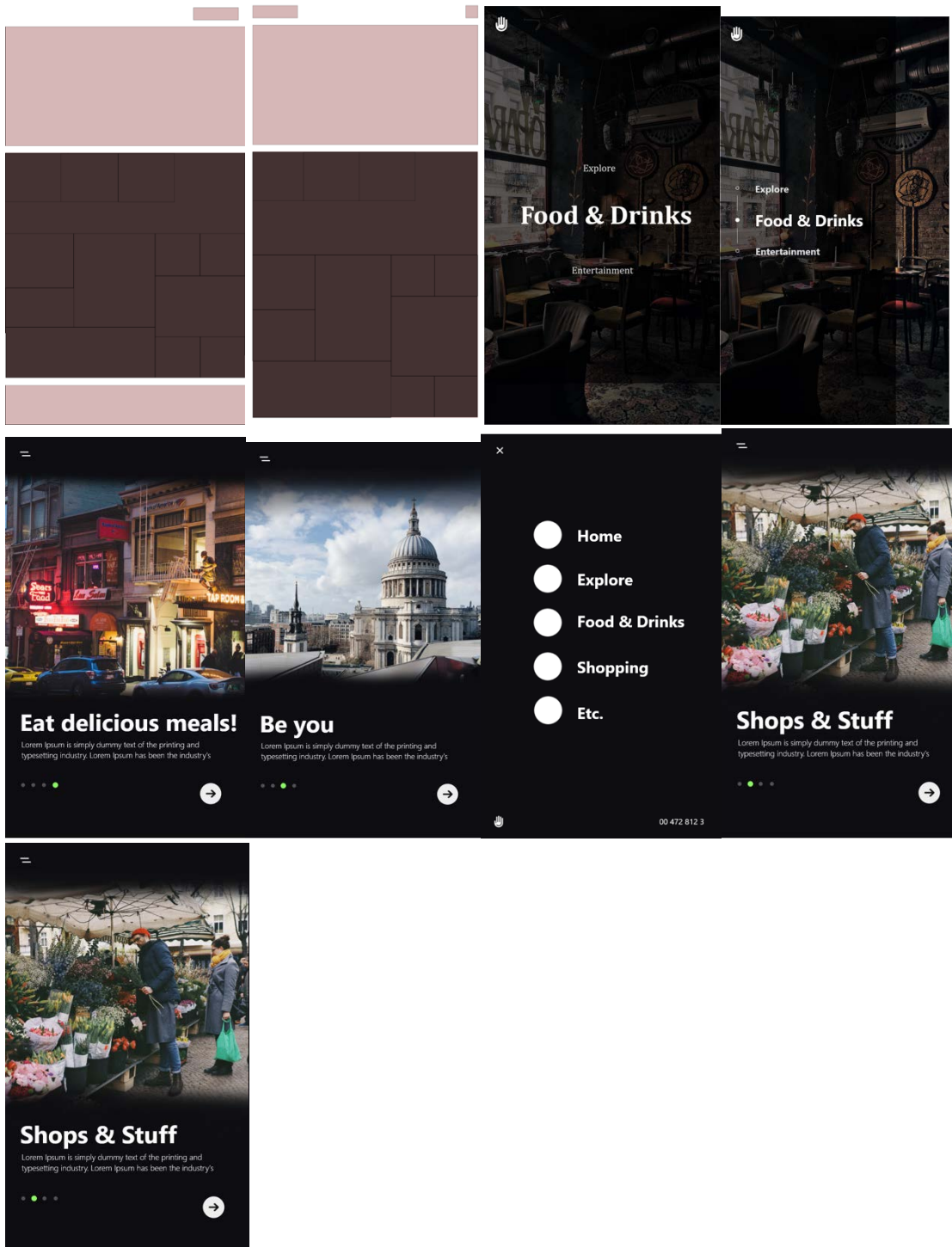
In the end we decided to go for a more tiled version to get to different categories on the screen.
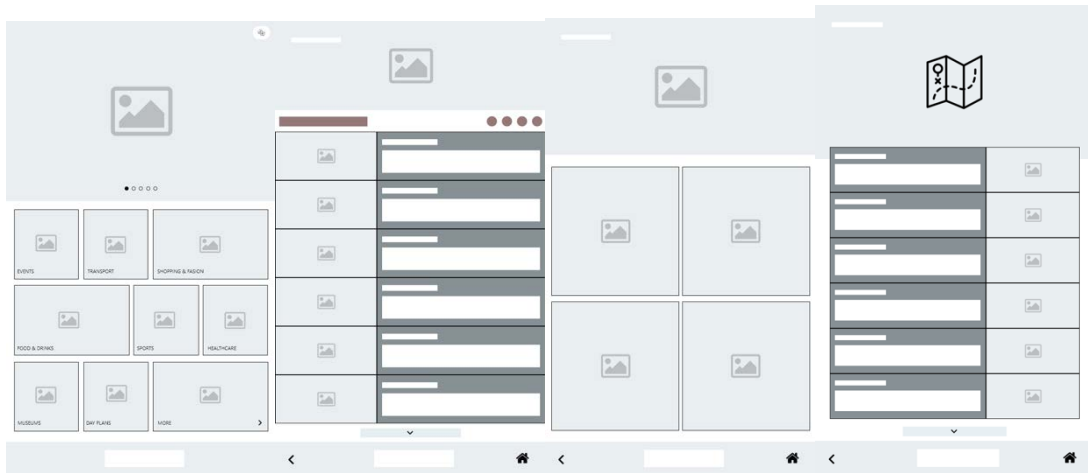
Testing low fidelity prototype

After this prototype is finished we asked a few people to test it and give their first impressions of the idea in design which we got loads of feedback from.

People said that the liked the overall idea of the project we were making but they found it hard to imagine how it would look like exactly. They also weren't sure about the navigation that was used on the tiles and thought it would be hard to use and understand. They also didn't understand why there was no color or more content which made it hard to test.

Mid fidelity prototypes

After we got the feedback from our first test with the low fidelity prototype we started to improve on it to bring it to a better and more expanded prototype. In the prototype we started to experiment with colors, fonts and types of pictures to create a more defined style for the whole user interface.
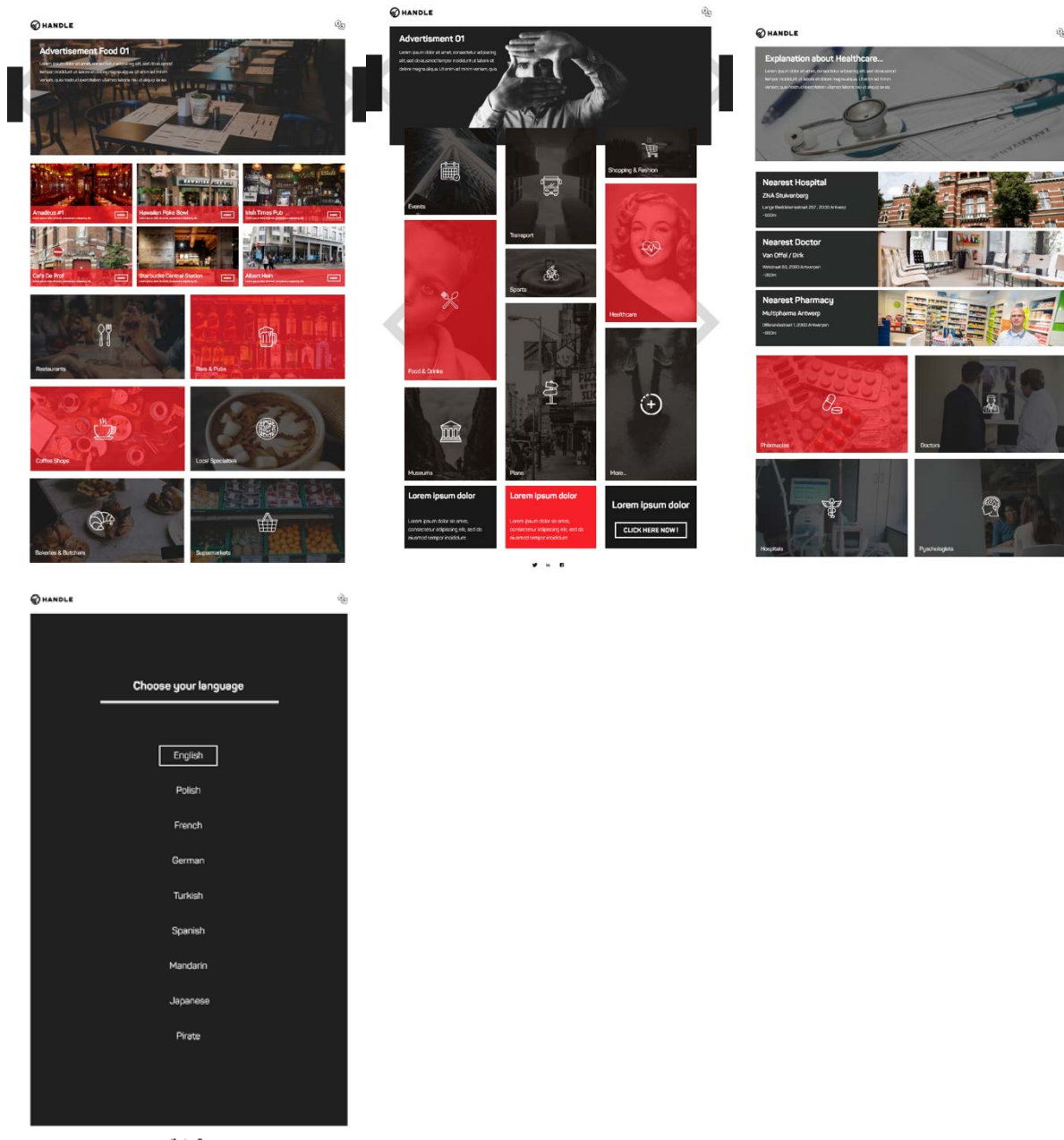
Testing mid fidelity prototype

After this prototype was tested, we noticed from the feedback from our testers and from our coaches that we should review the whole navigation and how we would present certain content. So, we went back to the drawing board and went over all the feedback we got from the testing. This resulted in a better prototype later.

High fidelity prototype

To give the best possible vision of how the interface should look like we made a high-quality prototype that incorporated the best pictures, fonts, content and colors to produce a fa fantastic prototype. This prototype would be as close to the final product as it could get.
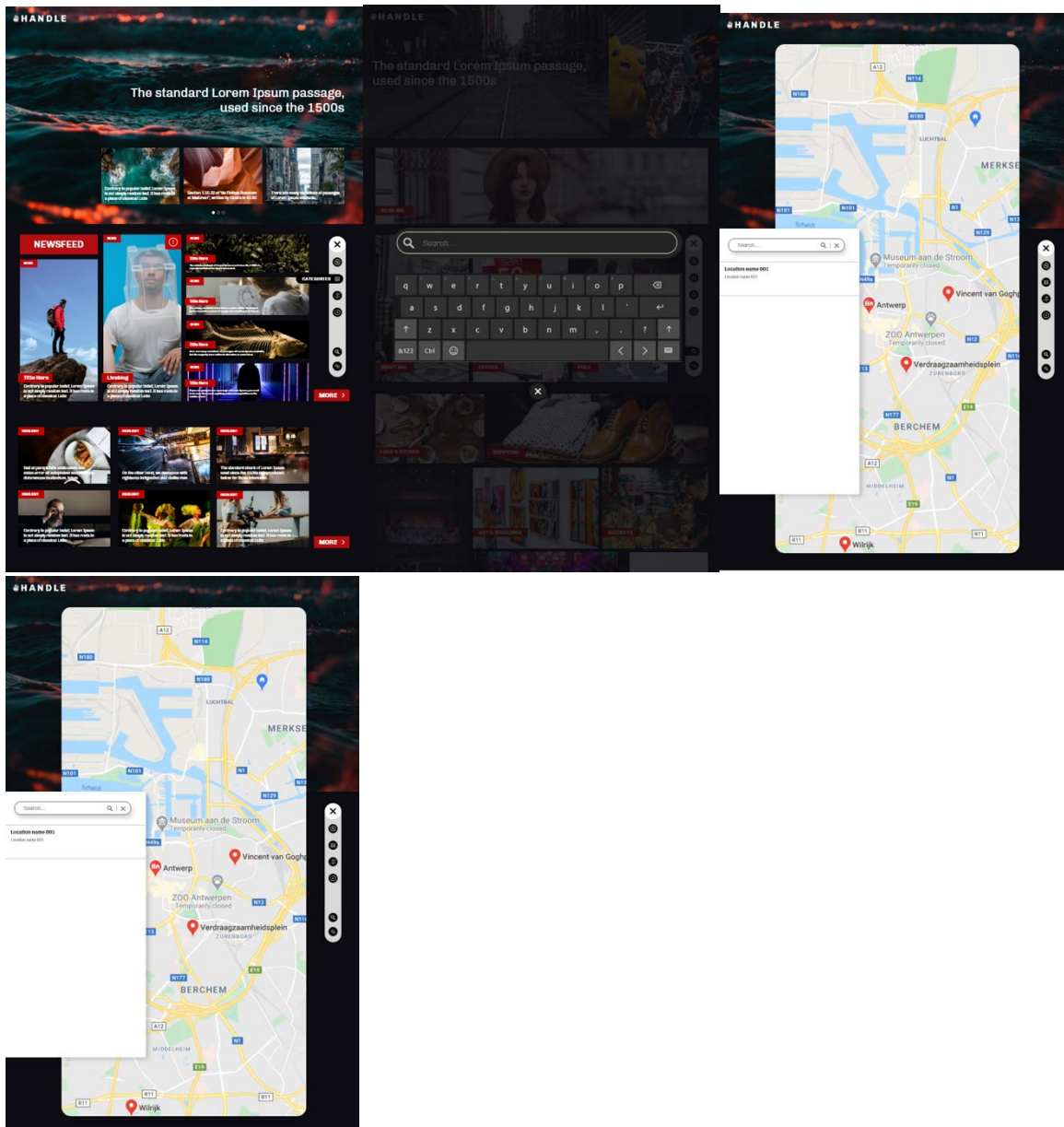
This was the first version of the prototype but after some off time we decided it just didn't have the friendly feel we wanted it to have. It also had a lot of content that felt overwhelming and was to much to fit on the screen in that way. So, after this we decided that a rebranding of sorts was in order. We improved on the logo we had and made a full branding with chosen colors and fonts that we would use. Out of this the new high-fidelity prototype was created.
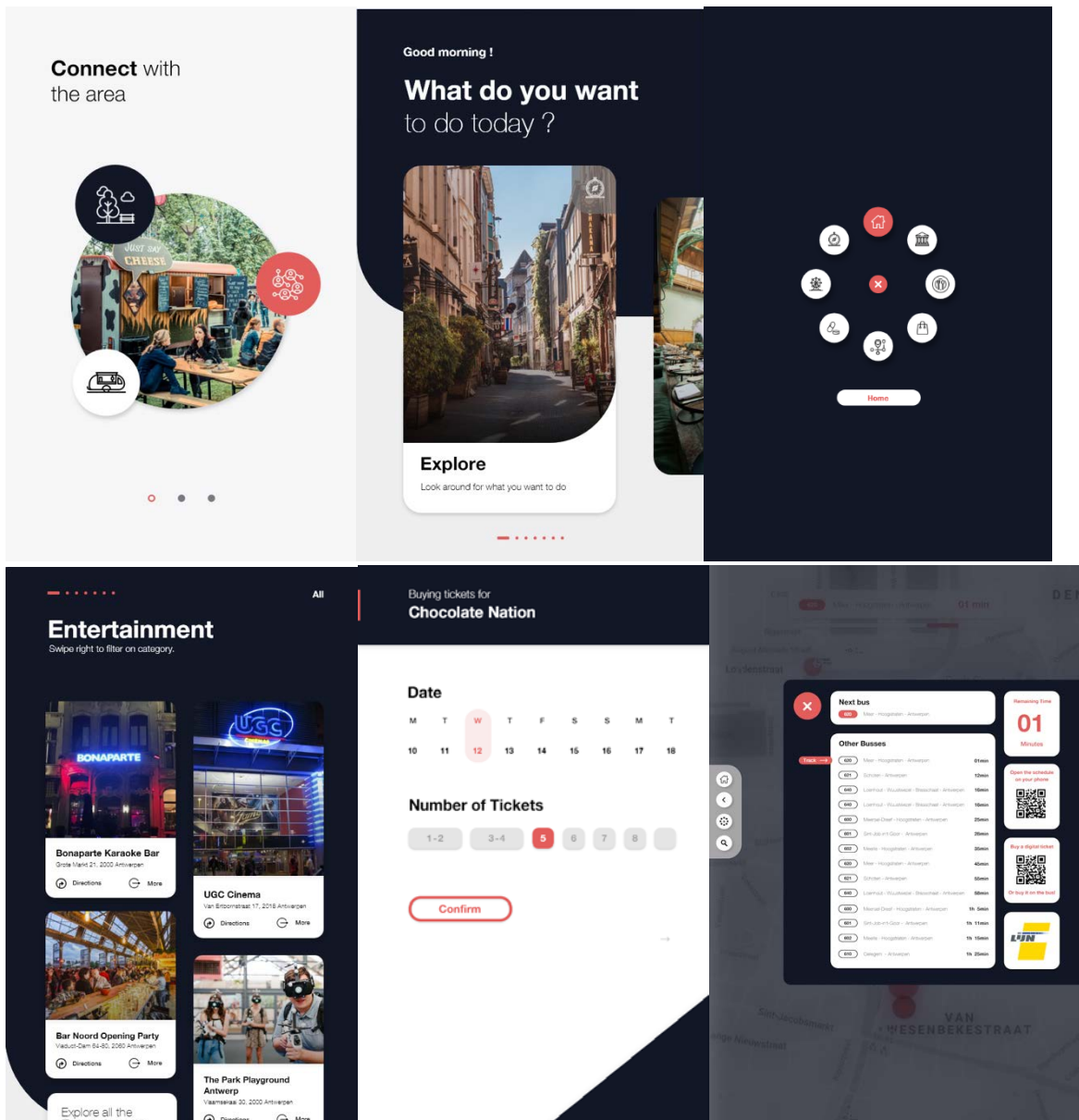
Testing high fidelity prototype

The testing of the high-fidelity prototype went really well. People like the overall design of it and expected it to be larger. Some confusion did happen with the navigation which was not incorporated in the design due to Adobe XD program limitations. The navigation of this prototype falls outside of the designed area but is shown as a separate image to clarify how it would work. Once this was explained the testers understood the whole idea.

There was some debate about the use of colors and why certain things were different from the previous prototypes, but they did find this prototype to be the best one. Some gave feedback about certain text that was written that they didn't understand or features that were missing and they would like to have. One of these was the option to see the most recognized buildings in the city.

With all the testing done we decided to start finalizing the product to bring an end to the project.

5 Results and Conclusions

Questions that may be answered in this chapter:

- Which project results were achieved?
- To what extent do these project results coincide with or deviate from the originally intended results? What influence did those involved in the project and the project process have on this?
- How does the EPS team evaluate the project results achieved?
- What lessons does the EPS team learn from these results in terms of the project process and organization, internal and external collaboration, etc.?
- How is the transfer of all relevant project data ensured with regard to the client and the coach / duo of coaches?

5.1 Antwerp Smartzone

The screens were placed in places and ways that did not benefit their usability. One screen was placed where few people passed by. The other screen was placed facing the cars on the street. Both look like regular advertising boards.

The answers from people in the area around the smart screens show that a majority does not know the screens are interactive. The few who do know they are interactive say they are either uninterested in using the screens or they think they do not function.

5.2 Location of the Smart Screens

After a more extensive study of urban analyses of the Antwerp city, very clear conclusions are drawn that the location of the screens should be divided into three different categories. The reputation and qualities of the places have a major influence on that decision. By providing wide access to the information of cultural events, display in the museums, shows, conferences or concerts there is a contribution to the development of culture among young

people, visitors and citizens of Antwerp. The most important part is understanding how users think, how they behave and what they need in actual localisation.

The suggestions of location can be divided into:

a. **Main Street mainly for citizens:** (De Meir, Nationalestraat, Kammenstraat, Klosterstraat, Leopoldstraat ...)

Pedestrians include people of all abilities and ages, sitting, walking, pausing, and resting within urban streets. Designing for pedestrians means making touch screens accessible to the most vulnerable users. City screens have the ability to reach large audiences, and with their connected data, touch screens are an ideal platform to share brand stories. By combining smart screens and smart data, advertisers have the ability to reach their audience on the street. Noteworthy are the methods of communication on the line city - citizens, such as communication and crisis situations via touch screens, or by automatically broadcasting a message while using a screen. Providing wide access to the information, residents will be able to enjoy their city as fully as possible.

b. **Squares mainly for tourism:** (Grote Markt, Handschoenmarkt, Greoenplaats, Koningin Astridplein, Leopold Plaats ...)

Let's start with an account of the facts. The number of tourist arrivals in Antwerp amounted to 2,142.439 tourist in the December 2019. Smart tourism is a term used for all dimensions that are incorporated into or improved by technology. The city map with the "What's around me" function and travel plan make the touch screen the ideal travel guide when in the city. These also simplify the planning of trip around Antwerp. Touch screens offer numerous ways to find out about various attractions and cultural highlights in advance.

c. **Parking for citizens & tourism:** (Linker oever - next to Sint-Annatunnel, Kaaien-Jordaenskaai Street, Gedempte Zuiderdokken ...)

Smart technologies simplify and improve life in a city – something that both residents and visitors benefit from. Growing populations and increasing challenges such as traffic congestion and air pollution cause that the city turn to digital technologies to solve their problems. Real time messaging indicate available spaces in public parking, air quality alerts, accidents on the roads. What is more, many users in the neighbourhood of parkings will be able to plan their way to the nearest shops, restaurants, cafés, hotels, museums (...), make a reservation, buy a tickets for evening art's or check what are "the must see" places around them by using touch screens.

5.3 3D-Modeling - Design of the Smart Screens

5.3.1 Previous designs

To be able to start a design study that will cover from start to finish, that is, starting from scratch to create one or more structures designed to meet the necessary requirements. In the city of Antwerp there was already a "Smart Zone" that included some Smart Screens, with the same concept in which the current project is framed. The team became a user to understand the concept and the improvements in which the new Smart Screens would be built. Apart from some operational problem that deteriorated the user-screen interaction, the main problem that stood out above all else was its invisibility. The problem was that most pedestrians did not realize that the screens were there.

This happened for many reasons, first because its utility was not known, second because they were positioned and oriented in such a way that their use was complicated even if someone has the intention of interact with it. And finally, they were too big for comfortable use, but too small to attract the attention of a possible user; nor did it have added stimuli such as the use of light or color in the nearby environment.

5.3.2 Design Context

In the context explained according to the pre-existing designs, the new designs are framed, with a clear list of aspects to achieve to cover at least the objectives and expectations. The main objective of the team's design group was to accompany by the creation of feasible designs the ideas and the level of software development that was carried out. As well as achieving an intelligent, simple, useful and attractive design but following the lines of the group work and molded with the internal and external contributions thanks to the large amount of information and opinions that the team managed in order to get to work with a scale model reduced from "Big Data".

5.3.2.1 Things to accomplish

We will proceed to cite all the essential aspects on which each section worked on the design has been based:

- Maintain the lines according to the progress of the project in the different fields. This assumes clean and simple lines but that convey the concept of innovation and technology.
- Have the resistance capacity according to the location on the streets. This means considering a safe design for users even in case of incorrect use.
- Dealing with the main problem the project faces: lack of attention, interest or knowledge. To do this, the design should focus on attracting attention and creating interest or curiosity.
- Find a location in which its use is promoted to the maximum but without disturbing pedestrians who are not interested in its use, and therefore not occupying too much space on the street.
- Protect the user from inclement weather.

5.3.3 Development

From the first moment, dozens of elaborate hand drawings emerge and in which the entire group participates, in order to find the way to where you want to focus the project.
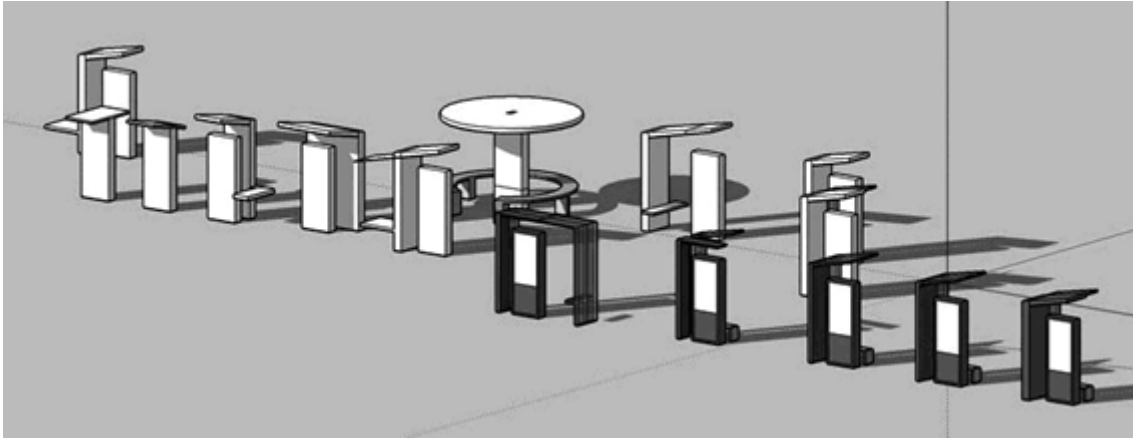
It begins with simple lines, with an overlay of geometric figures to give shape to the ideas. You work with hand drawings or 3D design using CAD (computer-aided design) programs. Without focusing on details, the goal is to shape an object that meets the characteristics studied.

5.3.4 Solution one

The first solution provided emerged as the most obvious but also the most impressive solution to the problem of inattention and protection against rain for the user.
However, although the design seems impressive, most of its visual weight is above our heads, so the actual floor space it occupies is very limited, without interrupting or disturbing pedestrians. It also includes a bench to sit on and a second additional screen on the second support.

This screen emerged as an interesting concept, given that the expected time of use of the Smart Screen is relatively long and would not allow the general public to know such important data as time, weather forecast or temperature, without the need to wait or interact with the screen.

It also included a transparent and thinner part to reduce visual weight as well as giving more beauty to the design as well as a contemporary, modern and technological appearance.

5.3.5 Dome

5.3.6 Conclusions of the ergonomic study

After a more extensive study of the anthropometric variables of the European average human being (Appendix I), very clear conclusions are drawn that delimit the variables on which the screen design is based. The conclusions of this ergonomic study can be summarized in the following sections:

- The screens have to limit their touch zone, that is, the user cannot be asked to interact or touch the screen at points on the screen that do not fall within the following range of measurements:
  1.10 meters - 1.80 meters.

- Screens should limit their touch zone to a width of 88 centimeters so as not to force the user to move horizontally in order to touch the required points.

- The use of the screen will be at a distance of between 65 to 75 centimeters between the user's eyes and the point of the screen in line with the user's eyes. Size and other design variables respond to this distance.

- The size of the typeface used must respond to the use of people with less visual capacity, such as older people. Considering that the screen will be used from about 70 centimeters, the minimum typography that will appear will be a size that would correspond to a size of 24 at least, which would be an approximate height of 0.9 centimeters, the minimum for reading by any user.

- The brightness of the screen should be adapted to the brightness of the environment.

5.3.7 Conclusions of the structural study

A study was carried out using structural load simulation software: Autodesk Inventor Professional 2020. (The complete and detailed study is included in appendix II). This study has included the analysis of the forces caused by inclement weather, amount of precipitation and especially lateral force caused by the wind; as well as possible circumstantial or accidental forces caused mainly by vandalism or hostile behavior, the low probability of which does not exclude that a good design is capable of resisting various forces. A correct design must foresee the most adverse situations to avoid the collapse of the structure, not only due to the good and continuous operation of the smart screens, but also as protection for the users, since the breakage of the structure could damage it. Therefore, the study has applied the adverse situations contemplated in accordance with the regulations to avoid any foreseeable situation of damage to the design.

This involves applying the maximum lateral wind loads according to European regulations, as well as the load applied by a person who, in incorrect use, climbed onto the structure, to check the effects on the structure. Without going into details, these calculations allow the engineer to estimate the behavior of the structure during use.

The thickness and the material used ensure with a very high fidelity that the structure supports the stipulated loads, with a very high margin of safety and therefore complying with current regulations

5.3.8 Ground fixing

Regarding the fixation of the screen assembly on the floor, inferior outputs will be used, which will be fixed to the main body. These outputs have two holes for unthreaded M5 bolts, the thread is in a slot in the floor that fits the outputs of the body and can be anchored by the bolts to the wall of the slot in the floor. Through these two anchors the screen can be completely anchored to the floor, below we can see how the composition of the attachment is distributed. As we can see it also has a cover to hide the whole system.
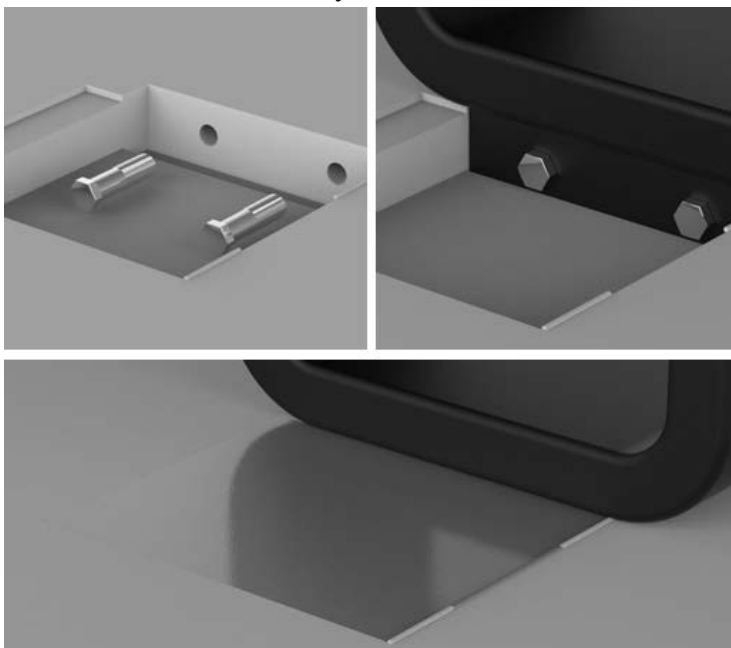
We must bear in mind that the model of smaller screen or "lite" also has the same two anchors that the normal screen explained above and has the same system of anchoring to the floor, having one in the module of the screen itself and another in the module of the protective roof.

Bolt Dimensional size board:

Name	Type	Pitch	Nominal Ø	Bolt		Nut
				Actual Ø *	Thread radius**	Tapping drill Ø ***
		mm	mm	mm	mm	mm
M3	coarse	0,50	3,0	2,95	0,07	2,5
M4	coarse	0,70	4,0	3,93	0,10	3,2
M5	coarse	0,80	5,0	4,92	0,12	4,1
M6	fine	0,75	6,0	5,93	0,11	5,2
M6	coarse	1,00	6,0	5,90	0,14	4,9
M8	fine	0,75	8,0	7,93	0,11	7,2

5.3.9 Materials and coating

Next we will see what composition of materials we will use in our SmartScreen complex. Apart from the structural materials themselves, we will also see what coating we should use on the structure to avoid painting or soiling the surface.

Permanent coatings are often more expensive than sacrificial coatings (If the surface is vandalized the coating can be removed), but if used appropriately only have to be applied once. This work by creating a protective surface that spray paint cannot bond to. After the surface has been vandalized, often all that is needed to remove the paint is a simple solvent (toluene) and some manual labour. The underlying surface and the protective coating will remain undamaged.

Fluorinated coatings are some of the most effective in the field of graffiti prevention. Fluorine is the most electronegative element, meaning that it shows very little affinity for the electrons of other elements. When fluorine is attached to a surface it will decrease surface energy at the interface, minimizing the contact with the graffiti paint. For the same reason that a Teflon-coated pan repels water and oil, a fluorinated coating will repel water and oil-based paints.

With regard to the material of the set itself, analysing the different materials we studied for its use and taking into account the structural and general characteristics of the product, we decided to use polycarbonate and standard safety glass for the main body and for the transparent part respectively.

It should also be noted that structural resistance tests were carried out with materials similar to those chosen in the study and that they gave positive results validating the use of these materials as optimal.

5.3.10 Definitive design

Although the first design (dome) met many expectations and also managed to impact the visual viewer, a very important aspect to provoke curiosity and increase interactions with the screen, it was not ideal for many locations.

He received positive reviews from the interviewees regarding the technological and groundbreaking aspect of the design for there were also people who were reluctant to such a large design. From the beginning the design team worked with the idea of a much simpler screen, whose shape and size were reduced to a minimum. However, an inclined "L" shaped cover was included, which protects the user from rain, provides light (many studies relate the feeling of safety and comfort with a greater luminosity of a space) and also the already explained complementary screen which ended up being added due to all his obvious contributions.

5.3.10.1 *Screen and cover*

5.3.11 Advertising Strategy
How the screen can be used for advertising.
5.4 Data Collection
5.4.1 Design Personas

5.4.2 Online Interviews and Focus Groups
The results from the online focus groups and the phone interviews are not meant for generalizations of any population. They present qualitative data to base user personas on. Factors that might have affected the outcome of the focus groups is that we have asked people we think would be interested in the subject of smart screens. Therefore, they might

be more positive than the average student. The reason we asked people who might be interested, is we had nothing to offer in return and were in need of participants. For detailed

5.4.2.1 People 65 Years and Older

Based on country, it seems that the four people from Spain use less smart technology in their everyday lives than the four living in Turkey. The one who uses most smart technology and is almost ten years older than the rest is the 88-year-old woman from Sweden. The people from Turkey seem more positive towards moving in cities by themselves than the people from Spain. Some participants say they prefer nature areas over cities and that they find the cities too crowded.

Tablets seem to be the most common smart device in this age group for both men and women, regardless of their country. Second most common device is the smart phone. Some have computers, but it seems slightly more common among the men. A slight majority uses Apple products, but many also use Samsung. The main criteria are that the devices should be easy to use and for some it should also be affordable and compatible with other devices. It is common that they have received their smart devices from younger family members who also recommend them certain brands because of their usability.

Everybody finds the smart technology useful, and most of them find it very useful. Some of the male participants and one of the female participants say they understand that they only use a small part of the functions on their devices. The most appreciated function seems to be the communication.

Three women are hesitant to use smart screens in public. One thinks she doesn't need them since she uses her smart phone and the other two do not think they will understand how to use them.

People disagree on the design. Some think it looks nice because it is different from "boring grey billboards" and some think it looks misplaced and too futuristic. The majority of the interviewees over 65 years old say they like the design and would like to see it in the streets. Some of them noted it should not have seat, because it might lead to people using it too long and occupying the screen.

5.4.3 Families

5.4.3.1 Countries:

Denmark, Belgium, Spain and Romania.

5.4.3.2 Similarities between countries:

LIFE IN THE CITY: People have simple needs that are based on how they live their life in a city, no matter where they are from, they all need nice places to eat when they go to a new city, orientation, efficient public transport, supermarkets, museums, events and entertainment in general. When it comes to their own city the common needs that we find in all countries are: more recreational areas and playground for children, reducing time waste (they need more bike lanes and efficient public transport for reducing traffic)

DATA SHARING: They all are hesitant when it comes to data sharing, the screen is too public to use private data. They value privacy and that is reflected in their suggestions regarding the design: the screen is too big for them to feel comfortable looking for things.

TECHNOLOGY: The people that we interviewed said that they have at least 2 gadgets in their homes and they let their kids play with it.

NEW TECHNOLOGY: They have problems to learn new menus and interfaces. The screen should be intuitive when it comes to the interface.

INTERACTION (Rebook-Are you fast enough): They didn't like the campaign enough to interact with it even though it had a prize. When it comes to more interaction with the screen, we should expect that this target group to be hesitant. The interface of the screen should be smooth and fast for people to not lose their patience when they want to interact with it.

5.4.3.3 Differences between countries

LIFE AFTER Covid-19: Their perspective on how this pandemic affect their perspective about using screens in public places differentiates from one family to another. It's not a cultural thing giving the fact that two families from Belgium gave different answers one saying that the crisis changed their perspective and the other one, the opposite.

DESIGN: For some the screen is too big and misplaced, some appreciates it and said that is nice, clean, futuristic.

5.4.3.4 Specifics for Belgium

PUBLIC TRANSPORT: Is both a problem and a need in Belgium. The need for efficient public transport is present in almost every interview.

SUGGESTIONS FOR THE SMART SCREEN: Information about historical buildings. (a 3D map where you can see the buildings around you and you can click on them to see the history of it and other information.

LACK OF INFORMATION FOR TOURIST: The city is not very tourist friendly; the supermarkets do not have language availability even though it's a diverse country and tourists get lost in the city. It's hard to find a way in the city.

5.4.4 Young Adults and Students

All in all, you can say, that the students and young adults are really open-minded to new Technology. They find the smart screens interesting and they are willing to try them out soon.

- They use technical equipment such as smartphone or laptop, for university or private purposes.
- The biggest problem: Bad Bus connections / Public transportation
- What many can imagine: real time bus tracker, orientation map (also for city or stores)
- Places for the screen: next to a supermarket, city center or bus station
- Screen design: it looks good and modern, but it doesn't really fit in a historical / old city. There could be a contrast between the design and the city.
- Also, the screen is a bit too big, maybe only the screen will be enough
- Prevention for the screen in the Corona pandemic: A Hand disinfectant. Using the smartphone to control the smart screen could also be helpful

- It is also important to make the screen available for people who are blind, deaf, amputated or disabled.

5.5 Further research on users

To make generalizations about the users of the smart screens the qualitative research needs to be combined with quantitative data. It seems that the people over 65 years old think that they will not be using public smart screens, while both families and young adults seem to think they will. However, the screens we have designed are similar to many of the smart devices the elderly use, such as smartphones and tablets.

5.6 Storytelling Animation

5.6.1 Excerpts from the Motion Graphic Video:

Excerpts

The plan of the Motion Graphics video was to keep it as simple as possible, so that the focus always remains, on the transmitted information. In addition, the duration of the video should not exceed 1:20 minutes, otherwise there is a risk that the recipient might be overwhelmed by too much information.

The color that runs like a red thread through the whole animation is dark blue. The color blue is on the one hand very soothing and on the other hand it looks very serious. Since the animation should reflect seriousness and modernity, the color is very suitable for it.

Online articles and YouTube videos were used as inspiration to create the animation. It was really helpful to see how other people work with the programs.

The feedback fort the animation was quite positive. The design and the combination of the elements appealed very well to the interviewees. One point of criticism was the tempo of the recording, which is why it was adapted in some places in the animation.

5.6.2 Changes

Doing a motion graphics video was not our first idea, our first idea was to create short videos with protagonist for the smart screen. But during the semester, the corona pandemic occurred. Many places were closed and that made it difficult to film the videos. For this reason, we have decided to develop an animation that should enlighten people about the smart screen. Furthermore, an animation has two main advantages, on the one hand it is a very good alternative to visualize information and on the other hand, it can be created very well from home.

5.7 Graphic Design Results

The Brand

For this project we also created the brand HANDLE that would be our "company" that sells this product/service. The brand comes with a full logo and color palette that has been used in the end product.

Logo

Colors

#EEEEEF

R: 238
G: 238
B: 239

C: 0
M: 0
Y: 0
K: 6

#121726

R: 18
G: 23
B: 38

C: 53
M: 39
Y: 0
K: 85

#ff6763

R: 255
G: 103
B: 99

C: 0
M: 60
Y: 61
K: 0

The official end product that was created for this project is a User Interface that can be used on the created smart screen. This UI has been prototyped to give a better understanding of the concept that was created for this project. It also gives the users an idea of how the screen would work and what would be possible with it.

The User Interface
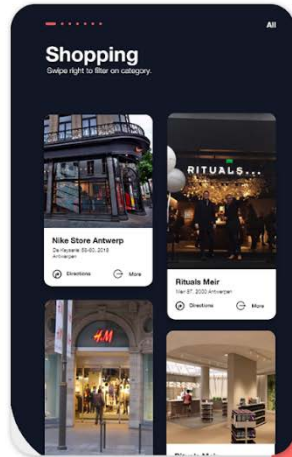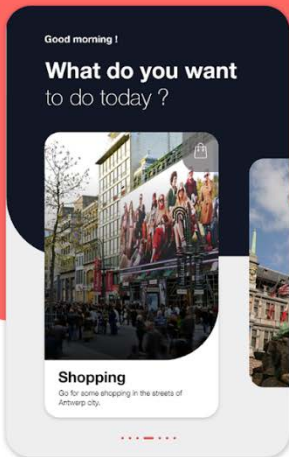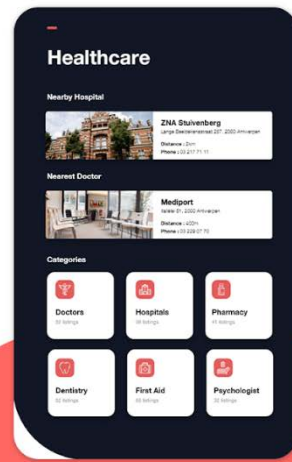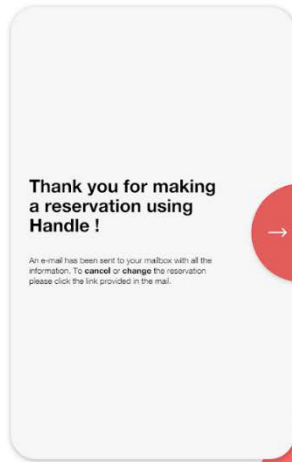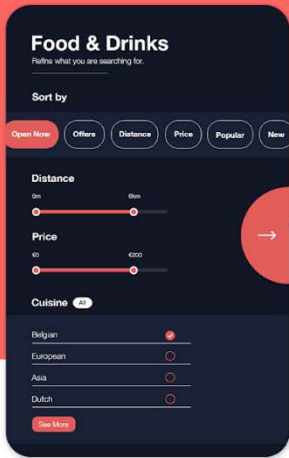
5.8 Smart Screen Software

5.8.1 Technologies

The software of the smart screen is a web application. This means that it runs inside of a web browser, just like other websites. Multiple frameworks can be used that speed up the creation of web sites/apps. As a front-end framework, Vue is used, with Meteor as the back-end. Meteor is set up by default to work with MongoDB as it's the database. As this is an acceptable choice for the kind of data to be stored, this is used. As a programming language, TypeScript was chosen. To get data that the software can use we use the Google Places API and the Antwerp Geodata API.

5.8.2 Development

5.8.2.1 Development Start

The project started from one of Meteor's default templates that was modified to use Vue and TypeScript. This is an almost empty project containing only example code.

5.8.2.2 UI

To get a decent starting point for the project, we started with the user interface. When development for the software began only the mid-fidelity prototype was completed and thus the this is still the design used by the current software. It has not been updated because completely changing the UI takes a lot of time and this time was better spent on adding more features to the existing design.

5.8.2.3 Storage

The first feature of the software was the storing of data so it can be used later. This started by manually getting data and storing it in the database. The process of getting this data and displaying it in a list was more difficult than expected but this was more due to a lack of understanding of how Meteor functions instead of technical difficulties. Now, this process is easy to implement.

5.8.2.4 Google Places API

The next step was to get the data externally and placing it into the database. The Google Places API was used to get data about different places. This data is the same data that can be found on Google Maps. Google allows this data to be used at an average of 15 Euro per 1000 requests, with a single request being, getting the data about a single place. Queries can be entered into the API to get specific results. For example, any restaurant within 150m. Queries like this have been made for each kind of place and sorted into categories such as "fooddrinks", "sports", and "museums".
Then, we created a system to make requests and get responses from the API. We however later noticed that Google had its own solution that had more features and was likely a lot more stable, so we decided to switch to that

5.8.2.5 Caching

The data from the Places API is now stored in the database. We temporarily store the data here and periodically make a new request to the API to get new data. This temporary

storage of data is called caching. It speeds up the software because we don't have to access the Places API every time and reduces costs.

5.8.2.6 Caching Problems

However, it came to our attention that the Google Places Terms of Service disallowed caching. As it was late in development there was not enough time to switch to a different platform like Foursquare that did allow caching. Thus we decided to disregard the Terms of Service.

5.8.2.7 Antwerp Geodata API

The city of Antwerp makes a lot of data public with their Geodata API. The data available varies from where all park benches are placed, to lists of hospitals. We can use this API to fill in the types of data not available by the Places API. The process of requesting data from this API is very similar to the Places API. A solution was available that allowed us to make requests to the API. The only part missing was how the received data should be processed, so we created interfaces. These are essentially templates for data. We can apply an interface to data and then we always know what kind of data it is. Then the data gets stored in the database just like with the Places API.

5.9 Website

The website went through 3 major versions.

When the first version was created without a set design so it was a generic website with the Handle color scheme. There was no content so everything used "Lorem ipsum" as a placeholder. There was a home page, an about page, a team page, and a contact page.

The second version had a design to follow so many elements were swapped out and modified. The team page was also removed with its contents being moved to the home page.

For the third version, we listened to feedback and changed the design accordingly. The team was moved back to its own page and a new cancelation page was added that would be used to cancel reservations made using the smart screen. In this version, the placeholder text and images were replaced with real content.

6 Reference List

Antwerp Smart Zone website: https://antwerpsmartzone.be/en/

Brückner, B. (2018, September 2). Erklärfilm: die 5 besten Animationsstile. https://www.alive-film.com/erklaerfilm-5-besten-animationsstile/

Engaging personas https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them

Jung, R. (2019, April 26). Was ist eigentlich Motion Design? https://page-online.de/branche-karriere/was-ist-eigentlich-motion-design/

Nielsen, L (2004). *Engaging Personas and Narrative Scenarios.* [PhD Dissertation, IT University of Copenhagen] https://www.researchgate.net/publication/246069017_Engaging_Personas_and_Narrative_Scenarios

Renderforest Staff. (2019, January 21). 10 animation styles: Which one is your favorite? https://www.renderforest.com/blog/10-animation-styles

Renderforest Staff. (2019, September 23). 2D Animation: Everything you should know about it. https://www.renderforest.com/de/blog/2d-animation

Margaret Rouse. (2016). *Smart City*. TechTarget Network

Susan Fourtane. (2018, November 16). *Connected Vehicles in Smart Cities: The Future of Transportation.* Interesting Engineering

Pradeep, T & Gurjit, K. (2019). *Green and Smart Technologies for Smart Cities.* CRC Press.

7 Appendices

Appendices - Report
European Project Semester

Academic year: 2019 - 2020
Smart Screens in Cities

AP
ARTESIS PLANTIJN
HOGESCHOOL ANTWERPEN

Table of Contents

Interview Questions

Waiting for train (longer waiting)

- What are you normally doing when you wait for the train?
- Why do you do this while waiting? Out of pleasure or necessity?

- Do you know what a Smart Screen is?
  - If NO - explain and show what it could be.

- What do you associate with Smart Screens?

- If there was a Smart Screen where you wait for the train, would you use it?
  - If YES: Why and for what?
  - If NO: What would make you use it?

- Would you go to a smart screen if you could charge your phone? Why?
- Would you go to a smart screen if there was a wifi hot spot?

In Shopping Center (Meir)

- Do you notice the billboards when you go shopping?
- Do you wait a lot when you are shopping and why?
- If you had the possibility, would you like to choose your advertisement?
- Would you use a smart screen when you shop? Why?
- Would you go to a smart screen if you could charge your phone? Why?
- Would you go to a smart screen if there was a wifi hot spot?

8 Field Interviews

By Madalina Gavril, Joy Agwunedu and Sara-Gül Kangöz

8.1 Interviews in the Antwerp Smartzone

8.1.1 Interview Group 01

 Some of the passers-by we asked about the smart screens, did not know where they were, let alone that they existed at all. For this reason, they do not use the screens in the environment. A lot of the people we interviewed, imagine a touchable display under a smart screen with which they can interact. They also assume that the purpose of the screens is that they can be used for advertising. In addition to that, the passers-by could imagine an event board so that they are always informed about new events in the neighborhood.

They also want to know what the latest news are, and which restaurants are the best. The neighborhood itself is described by passers-by as pleasant and friendly. Many people walk through the streets every day, because of the shops and the different restaurants. But what still needs to be improved in the city is that there should be more information about locations and the exposure in the city should be more improved. Another important point is that the interviewed people tend to keep to themselves and that they are less interested in making new acquaintances. They would also be more likely to access their smartphone when they want to know more about new events.

8.1.2 Interview Group 02

Most of the passers-by from the second interview group did not know that something like a smart screen existed in the area. But when they think about smart screens, they think about a touchable screen. Since they have never dealt with the smart screens before, they have never tried them out accordingly. They rather assumed that the smart screens are a kind of billboard. Most passers-by would be very happy about an event board in Antwerp. They would like to know more about bus connections, museums, places to go out and other things. The neighborhood itself is also described by passers-by as very friendly and open-minded. However, they would find safer stop lights very appropriate, so that people can cross the road much more safely. And they would be very happy to have more contact with people from their neighborhood. That gives them the opportunity to exchange information and do more together.

8.1.3 Interview Group 03

The passers-by from the third interview, knew that the smart screens existed, but they assumed that they were for the rental bikes. Since some of the passers-by were curious, they have tried to interact with the screens. When they think of a smart screen, they think about a touchscreen that can show them what the current weather conditions are. Since the passers-by passes the screens daily, they are already familiar with the screen. The people also prefer an event board in their neighborhood, especially in the area where there are many cafés. So, they can see what the latest events is. The neighborhood is also described as nice, but people would also like to get more information. The passers-by, however, prefer to remain among themselves.

8.2 Interview Questions from Antwerp Central Station

- What are you normally doing when you are wait for the train?
- Why do you do this while waiting? Out of pleasure or necessity?
- Do you know what a Smart Screen is?

- If NO - explain and show what it could be.
- What do you associate with Smart Screens?
- If there was a Smart Screen where you wait for the train, would you use it?
- If YES: Why and for what?
- If NO: What would make you use it?
- Would you go to a smart screen if you could charge your phone? Why?
- Would you go to a smart screen if there was a wifi hot spot?

8.3 Interview Answers from Antwerp Central Station

8.3.1 Woman approximately 30–40 years old

- Uses phone while waiting for the train.
- Would use a smart screen if there was one at the train station. If she has time.
- Would like to find things to visit on the smart screen.
- Would maybe be even more likely to use the smart screen if there was Wi-Fi and charging.

8.3.2 Woman 60 years old

- Interpreted smart screen as smart phone and tablet.
- Does nothing while waiting for the train. Observes surroundings.
- Would not use the smart screen because she uses her smart phone to find information.
- Thinks there is too much information and stimuli around her in public spaces.
- She does not know how to connect to wifi and would need to ask someone.

8.3.3 Woman 20–30 years old

- Don't know the term smart screen.
- While waiting for the train she is eating, reading or working.
- Would go to smart screen to charge her phon if she really needed to.
- Anti smartphones and would remove her phone if she could.
- She would need the screen if she didn't know the city.
- It purpose of the screen has to be clear for her to use it. And the structure of information needs to be good.
- She thinks it could be useful at the entrances of train stations.

8.3.4 Two men 20–30 years old

- Don't know what a smart screen is.
- Uses smartphone while waiting for the train.
- One of them would use screens if they needed it for information.
- The other would not use the screens even if there was wifi or charging.

8.3.5 A man and a woman 20–25 years old

- They talk to their company or listen to music while waiting for the train.
- They would use a smart screen for information about:
- Departure time
- What to do in the city
- They would use smart screens rather than their smart phones if the screens show the most popular places in a simple way.

8.3.6 Woman 20–25 years old

- While waiting for the train she uses social media, like scrolling instagram. She thinks it is out of habit.
- She thinks she might use smart screens.
- She thinks they should be easy to use and it should show the best places in the city.
- She would go to the screen to charge her phone.

8.4 Interview Questions for The Meir

- Do you notice the billboards when you go shopping?
  - Do you wait a lot when you are shopping and why?
  - If you had the possibility, would you like to choose your advertisement?
  - Would you use a smart screen when you shop? Why?
  - Would you go to a smart screen if you could charge your phone? Why?
  - Would you go to a smart screen if there was a wifi hot spot?

Appendix - Online Interviews and Focus Groups

1. People over 65 years
1.1 Female 77 & Male 79 – Izmir, Turkey

2020-04-28 11:00 am
Phone call
Showed examples by sending in chat
1,5 hours
Both would like to take part in the development of the project and perhaps even user testing.

Questions	F	M
What needs do you have in the city you live in?	Being close to good **public transportation** since they don't use their car in the city. Nice **social people** (even strangers). **Eating** and drinking out. **Low prices.** Like free public transport for people 65+, which they have. Likes the <u>many universities</u> they have in the city and that they have plenty of spots.	Being close to **hospitals** and good **health care** is very important. Both agree on that. Likes that the city is close to <u>farmers and crop fields</u>. This way they get cheap and locally produced vegetables.
Do you see any problems in the city you live in? What problems?	Don't really see any problems in the city they live in. Although after a while, she says that the minimum wages are too low for families to survive on. <u>She adds that unemployment is so bad, university graduates struggle to find jobs.</u>	<u>Both say it's a comfortable and safe city.</u>

What do you think could solve these problems?	Both focus on what works well in the city and appreciate how they live.	Both focus on what works well in the city and appreciate how they live.
What needs do you have when you visit a new city?	They enjoy and often visit new cities for travel. They share the experience that they don't run in to troubles when they travel. They research new places they visit in advance and they do it thoroughly. They look up hotels in advance and choose places where they can **cook themselves** since they prefer food they are used to. If they do a longer trip by car, **they use GPS and search hotels on their smart phones as they go.** They prioritize **historical sights and museums** which they have looked up in advance. They find this very important. They don't find **language barriers** to be an issue, since they can translate what they don't understand in their smart phones.	They enjoy and often visit new cities for travel. They share the experience that they don't run in to troubles when they travel. They research new places they visit in advance and they do it thoroughly. They look up hotels in advance and choose places where they can cook themselves since they prefer food they are used to. If they do a longer trip by car, **they use GPS and search hotels on their smart phones as they go.** They prioritize **historical sights and museums** which they have looked up in advance. They find this very important. They don't find **language barriers** to be an issue, since they can translate what they don't understand in their smart phones.
Smart Technology		
Do you use any smart technology and what? What do you use them for? By smart technology we mean devices that are connected to the internet.	Uses **smart phone** and **tablet** and adds that everyone does it these days. They can also connect their smart phones to their **TV**. Both see mainly the possibilities of new technology rather than obstacles.	Uses **smart phone** and **tablet** and adds that everyone does it these days. Uses a **laptop** for researching travel, e-mail, news and finding spare parts for the boat. Understands that the marina is monitored through cameras that

		through the internet can be used from anywhere.
What brands do you use and why?	They used Apple products before but repairing them was too expensive, so they switched to **Samsung**. Most important is that they are **easy to use**.	Tamay understands that **Samsung** are Androids and are compatible with a wider range of devices and are more versatile than Apple. Most important is that they are **easy to use**.
What do you think about the devices you use in your everyday life? Are they useful or time consuming?	They use the **easy apps** on their phones and tablets. It makes her very happy being able to **talk to her family** from all over the world. WhatsApp is so easy to use she says. Does not see the point in texting since it doesn't give her the feelings that phone, and **video calls** do.	They use the easy apps on their phones and tablets. They probably use 20 % of what their smart phones have to offer he says.
Do you face problems when you use smart technology? What kind of problems?	She doesn't understand the technical terms. Her grandchildren do and they can help out. Both see the benefits of how the internet makes the world smaller and **people more connected.**	He only uses smart technology for **easy everyday things**. But he understands that some people can even control industrial machines with smart phones.
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	Both know **advertising screens outdoors** but say they can't interact with them. After explaining interactive outdoor screens, she is excited about the **many possibilities.**	
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	Useful for **navigation** in new cities, since people are sometimes too busy to show you the way. Also, sometimes the GPS or smart phone is not updated on the hotels and restaurants, and then you can't find them.	They should be placed where a **lot of people** pass by.

	They could be place **close to train and bus stations.** Also places that are not too busy or <u>in malls to protect from rain.</u> She wants the screens to show her where she can **stay (hotel)** and **eat** and how to get there. Being able to buy or rebook tickets would be very useful also. Would be fine paying by the screen or just making a reservation. Also useful for finding **pharmacies** and **Airports.** Thinks the screen could be very useful. Would probably <u>not use these screens in home city,</u> since people are helpful enough.	
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	**Instantly likes the screen** and the <u>usage of solar panels</u>. She thinks we should create these in real life. She would like it if people could send personal messages to each other on the screens to display their affection. Thinks the **seat** might make people **use the screen too long** so others can't use it. In a smaller city it might be different they both add.	Thinks it looks like the screen is <u>blocking the road</u> on the Meir image. Finds it ok if people can walk under it. People using the screen might be annoyed by those passing by and vice versa. Questions how long you're supposed to use the screen since there is a seat. Thinks the **seat is unnecessary** and that it could take up too much space. Both suggest **smaller screens** in more crowded areas.
What do you think of this type of face recognition? Would you be willing to try it? Why or why not?	Face recognition seems to be fine with both of them. She adds that pharmacies already use cameras to	Face recognition seems to be fine with both of them. Regarding search history and cookie data they would

How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	measure health related things in your body, (BMI, blood pressure) which both appreciate. This would be too advanced to have on public screens she adds.	be fine sharing it with public screens. He adds that you already share it online and that people publish their own opinions by leaving reviews for example.
What do you think about advertising like the one Netflix has?	-	-
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	Both would still use touch screens in public once they can go out after the pandemic. She would make sure to tell people to keep a safe distance if they didn't.	Both would still use touch screens in public once they can go out after the pandemic. You touch other things in public anyways.
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	They would not stop to play games in public with a screen	They would not stop to play games in public with a screen
What is your general opinion about smart screens in public after this interview?	Overall, they seem positive towards the smart screens, but in their home city they don't think they will use it themselves even though tourists might use them.	Overall, they seem positive towards the smart screens, but in their home city they don't think they will use it themselves even though tourists might use them.

2020-04-28 1:00 pm
Phone call
Showed examples by sending in chat
40   minutes

Questions	F	M
What needs do you have in the city you live in?	Bodrum, where we have our summer house, is a big city but smaller than Istanbul. We are close to **nature**, cafés where we can **socialize**. Dining out is too expensive. Being close to **hospitals** and good **healthcare** is important.	We had to live in the big city (Istanbul) because of work. But we had a lot of problems with it. Pollution, too much traffic and too crowded. As you grow older your preferences change. We wanted a calmer life. We don't go out partying. **Public transport** needs to work well.
Do you see any problems in the city you live in? What problems?	In the summerhouse sometimes electricity and heating doesn't work. <u>You are locked up at home in the big city</u>. You are either stuck in traffic or stuck at home. The amount of traffic makes it take too long to go places and you end up staying at home. The homes are small and sometimes you have no balcony, no garden.	More <u>expensive</u> to live in big cities. It's **too crowded** and **polluted**. People heat their home by burning wood because it's cheaper, but it pollutes the air. Heating is too expensive. High levels of **stress**. Too many people take their car instead of public transport.
What do you think could solve these problems?	Perhaps if more people work from home after the corona pandemic also, there will be less chaos.	Problems could be solved by <u>moving to smaller places</u>. City planning is needed. Stop building in the big cities. Less people need to move to the big cities. Technology is now used to complicate our lives, but it should be used to facilitate our lives.

What needs do you have when you visit a new city?	Financially appropriate place to stay. Need to **know where you shop and go eating out.** Places and activities according to our travel budget.	Get to know a **new culture, visit museums and navigate.** **Language isn't a problem** because we always travel abroad with our daughter who guides us. But we miss home, we are comfortable people. We don't like being away much. Being away a week is ideal for me.
Smart Technology		
Do you use any smart technology and what? What do you use them for? By smart technology we mean devices that are connected to the internet.	<u>No computer</u> **Smart phone** **Tablet** **Smart TV** <u>Surveillance cameras at home</u> Use it for music, online games, news, Netflix and communicating on WhatsApp. And surveillance.	<u>No computer</u> **Smart phone** **Tablet** **Smart TV** <u>Surveillance cameras at home</u> Use it for music, online games, news, Netflix and communicating on WhatsApp. And surveillance.
What brands do you use and why?	**Apple** for all devices because we started buying it and haven't changed brands. We know how to use them. We prioritize **comfort** and want it to be **as easy as possible.**	**Apple** for all devices because we started buying it and haven't changed brands. We know how to use them. We prioritize **comfort** and want it to be **as easy as possible.**
What do you think about the devices you use in your everyday life? Are they useful or time consuming? How about new technology?	We try to learn new technology and **like that it simplifies life**. We learn slowly.	We try to learn new technology and **like that it simplifies life**. We learn slowly.
Do you face problems when you use smart technology? What kind of problems?	-	-
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show	We have seen these screens at <u>hotels, at banks</u>. But not very often.	We have seen these screens at <u>hotels, at banks</u>. But not very often.

advertising or information. Sometimes you can interact with them by touch or through camera.		It's smooth and comfortable. You can do banking from home, look up prices online.
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	Hesitant Most things would be possible to do on the **smart phone**. I would not want to sit long by a screen like that, but **youngsters might like it.**	Hesitant but can imagine it being used for **finding addresses and navigate.** Show **restaurants**. Mostly I either have a plan and then I don't need the screen. If I **don't have a plan, I want suggestions according to my age and where I am.** I might be walking in the city, not knowing what I feel like doing. Also, in a new city. I would **still probably do most things on my phone.** Plus, I know what I will do when I leave the house. But it would be good being able to **charge my phone.** We don't carry these power banks. A lot of devices need electricity now. Should be placed in **parks** and where there are a **lot of people.**
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	If people **stay there long**, then it will be **occupied** by someone.	I there is a **seat**, does it mean we need to sit around for a while?
What do you think of this type of face recognition?	I wouldn't want it to ever have my information.	It shouldn't collect my information. It should delete my information

Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	Very anti data collection and surveillance.	because I don't want to leave any digital trace and I don't want to be watched. I wouldn't want a camera that looks at med, because it wouldn't know my personality for real.
What do you think about advertising like the one Netflix has?	-	-
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	We would be hesitant to touch these types of screens after Corona.	
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	No	No
What is your general opinion about smart screens in public after this interview?		

1.3 Female 88 – Stockholm, Sweden

2020-04-30 3:00 pm
Phone call
Showed examples by sending in chat
1 hour
Wants to be updated in June about our project results.

Questions	F	M
What needs do you have in the city you live in?	**Green areas** and hearing birds. At this age, I need comfort and being close to stores and **hospitals.**	
Do you see any problems in the city you live in? What problems?	In my everyday life it's hard to see a problem. But the city is **hasty and crowded.** The subways are crowded.	
What do you think could solve these problems?	A busy city is a big city phenomenon and you have to accept it. I just choose to avoid rush hours, which I can since I don't work.	
What needs do you have when you visit a new city?	In new cities I still look for <u>parks and nature</u>. I should probably not live in a city. I also need to **find my way** where I'm going. When I visit my daughter in London, I need the **subway and I need to navigate**. The older I am the harder it gets. The pollution makes it bad.	
Smart Technology		
Do you use any smart technology and what? What do you use them for? By smart technology we mean devices that are connected to the internet.	**Smart phone, iPad and two computers**. The computers are only for playing a card game and **economy**. I use Swish (**phone payment**), I blip my card, I Skype, I text, and I use **Facebook**	
What brands do you use and why?	All my devices are from **Apple.** The reason is my **son gives me** his old ones from work or he chooses a brand for me.	
What do you think about the devices you use in your everyday life? Are they useful or time consuming? How do you feel about learning new technology?	Of course, I'm **not good at learning new devices** at this age. But **what I already know I know well**. My son says I'm good for my age. Others my age can't even text or use computers.	

Do you face problems when you use smart technology? What kind of problems?	**If something is doesn't work**, I find it difficult to solve. Then I ask for help. When things are working, I'm confident and independent.	
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	<u>No</u>	
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	No, I can't imagine that. If I use the self-scanners at the store, I need help to check out. I'm not confident enough to not ask a real person. But I think I could learn if I tried. For that reason, <u>I would not use smart screens.</u> But I **think all young people would use them**, like they use self-scanning at supermarkets. **In a mall** a screen could help you **navigate**, and people would use it. Outdoors I can't imagine. Everyone already has their smart phone. Although, I can imagine a **screen on a subway station**.	
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design?	What is the purpose of this? She **doesn't think it fits on the square.** It looks too **plastic and misplaced.** It would fit on a square with **modern architecture**, like Sergelstorg in Stockholm.	

Could you imagine this screen model in your city? If so, in what locations?		
What do you think of this type of face recognition? Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	It sounds bad. If I pass by, will it register me? Can I choose myself if I want it to do that? What is the purpose? I suppose they could use it to find criminals but registering everyone passing is scary. Sitting at home I will search the internet, but in public it's unlikely. I would not like sharing my internet data, I would like to be anonymous. If I go shopping, I already know where I want to go when I leave the house. I would find it intrusive if they offer me stuff outdoors. There is already too much advertising as it is. I don't want moving screens.	
What do you think about advertising like the one Netflix has?	-	
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	I will definitely be hesitant to use public things and I think that applies to others as well. I think it will continue for a long time. Maybe people would use non-touch technology. But maybe people forget it when Corona is over, hard to say. What is the point? I don't want commercials. If I leave home, I already know what I'm doing. I'm very well organized and prepared when I do things.	
Would you take part in an activity in public, like	No. I have never bought in to advertising.	

Questions	F	M
Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?		
What is your general opinion about smart screens in public after this interview?	It's very funny to be asked since I'm 88 years old. At this age it's completely uninteresting. Had I been 70, then my answers would have been completely different. The older I get, the more tired my brain gets from advertising.	

1.4 Female 75 – Barcelona, Spain

Phone call

Questions	F	M
What needs do you have in the city you live in?	Since it's been a year since she has had difficulties walking properly, she just does <u>shopping</u> and goes to **restaurants**. She thinks older people like herself **need help moving in the city**, since public transport doesn't pick you up at home. <u>If you're not in a central area, it's also difficult to find taxis.</u>	
Do you see any problems in the city you live in? What problems?	She is usually <u>struggling to get a taxi</u> depending on the area she is in. She has tried Uber but it's difficult for her to understand how it works.	
What do you think could solve these problems?	She says she doesn't know, but that people like her who don't have a mobile phone can't call for taxis when they are outside. So maybe <u>taxi meeting points</u> (like the ones at airports) could help so people know where to go, given that they are not too far from eachother.	
What needs do you have when you visit a new city?	It's been a while since she has travelled to a new city, but she thinks she would	

	know which places would be nice to visit.	
Smart Technology		
Do you use any smart technology and what? What do you use them for? By smart technology we mean devices that are connected to the internet.	She has had a **tablet** for three years and a laptop that was her husbands, but she never used it. Sometimes she uses the tablet to look for recipes, but nothing else.	
What brands do you use and why?	She would say she uses an **Apple** tablet, because **people told her it was the easiest to understand.**	
What do you think about the devices you use in your everyday life? Are they useful or time consuming? How do you feel about learning new technology?	She thinks they are **very useful** to some that understands the devices and how to use them, but for her they are just another device that can help in a few ways. **They don't make a big difference.**	
Do you face problems when you use smart technology? What kind of problems?	She thinks the smart phones, tablets and laptops are made for people who already understands them. For her it is **difficult to get into using them**, but it **doesn't bother her at all** since she can manage her daily life like she always has.	
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	She thinks of **smartphones**, **tablets** and those **smart tv's.**	
Can you imagine what might be on a smart screen? What would you like to see on a smart screen?	**Advertising** or publicity for **nearby stores or a map of the area.** If she was a **tourist,** she would like to know what **places she could visit in the area.** If she would be in	

Where would you like such a smart screen to be placed in public?	Barcelona, she would like to know **where the taxis are in real time.** She can imagine them being in **open spaces like squares and big streets where there are many people.**	
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	She **likes the design** and thinks it looks like a **futuristic bus stop.** It feels good and she would **like to see it on the streets.** She likes that it's simple but nice. That it's not a grey square like regular advertising boards. She can imagine it being placed in Catalonia square where it would be helpful, or in Sagrada Familia.	
What do you think of this type of face recognition? Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	She has never been in front of an interactive screen but thinks it could be useful. She would be willing to try it. She doesn't think she would want to share data with public screens.	
What do you think about advertising like the one Netflix has?	She thinks it could be useful depending on how but can't imagine it herself.	
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen?	No, she doesn't think anything has changed about it. If she could have the option to use a screen in a non-touching way it would be better for her. If you could interact with the screen by talking to it, it would be a good solution.	

What kind of protection against the virus would you imagine on a public screen?		
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	She doesn't think she would be able to run, but she would like to see people trying. If the prize was from another brand that she likes she might want to participate.	
What is your general opinion about smart screens in public after this interview?	She can see that the screens have great potential to help people in public spaces in need of a smart phone or tourists that don't know where to go.	

1.5 Female 78 & Male 78 – Spain

Phone call

Might not have been able to see the examples

Questions	F	M
What needs do you have in the city you live in?	Card games, **walks**, <u>cultural events</u> and spending **time with friends** is what she mostly does in the city. They both need **transportation**, activities for elderly and basic services and information. They can for example feel very insecure if they have a problem at home with plumbing or heating since they don't understand how to contact people online or over the phone for help. It causes them a lot of stress not knowing how to operate the smart phone and internet to get help.	Walking the dog and having **coffee with friends**.
Do you see any problems in the city you live in? What problems?	<u>Not enough information about public transport and activities</u>. They would like to go more to the theater, cinema or concerts, but they don't know how, where and when there are shows.	

What do you think could solve these problems?	<u>More information</u> and someone who can help her with how to use her smart phone.	<u>More information.</u> There is too much and too fast information on digital platforms do understand it.
What needs do you have when you visit a new city?	<u>Language</u>, **maps and location**, **activities and public transport**. If they would visit a new city right now, they would probably go on a **guided group tour** to get the help they need.	
Smart Technology		
Do you use any smart technology and what? What do you use them for? By smart technology we mean devices that are connected to the internet.	**Computer** for writing and information. The <u>phone</u> to communicate.	He uses the **computer** for writing (he was a journalist), e-mail, information, news, planning travels. Uses the **tablet** for playing games and the <u>phone</u> for communication.
What brands do you use and why?	**Toshiba** for the computer because her **daughter gave it to her.**	**Apple**, because he is **used to it.**
What do you think about the devices you use in your everyday life? Are they useful or time consuming? How do you feel about learning new technology?	**Very useful.** She sees it as an **open window to a new world** she doesn't really understand.	**100 % useful.** He **would like to know more** and to learn how to use much more things. But he thinks technology has advanced too fast.
Do you face problems when you use smart technology? What kind of problems?	Of course, like they said before, they try to learn how to use smart phones, but they advanced too fast. So, they **just use what they really need** instead of really enjoying their full potential. At least the smart phones are a **tool to communicate** with everybody and help them with many things.	
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	**Information.** If it's in a public space it could show the temperature.	**Information.**

Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	Both think of **information that could help people.** Things to do and plans. She would go to any music show, but all those shows are always shown on the internet and she always loses the opportunity to go. **Touristic places.**	Useful **information, plans,** help and **interesting facts.** Should be placed where people live. He thinks they could be a useful tool to receive the information that he can't get now because he isn't using smart phones or social media. The screens should be **placed near people, not only in touristic places.**
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	Very **basic information** and advertising. **Protects from the rain** and should have <u>big enough typography.</u> They **can't imagine the screen in their city.**	
What do you think of this type of face recognition? Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	They really don't know about interactive smart screens. Like a big smart phone? No, she would not think it's useful. She was explained how useful the screens could be for her, but she has a love hate relationship to new technology. She claims she know how to use it and she doesn't so usually she avoids it. No, would not share data with screens in public.	Could be a useful tool for information for old people, who might not usually be in the minds of those designing new technology. He would like to try face recognition. No, would not share data with screens in public.
What do you think about advertising like the one Netflix has?	They should only show the truth. They really feel vulnerable when they hear a lot of different opinions about things that should have a right and wrong. So, there should be facts instead of opinions.	Could be useful for simple information but not for political arguments. Short, concise and useful.

Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	Yes of course. Probably they wouldn't use them. The lack of facts and amount of opinions spread makes them more cautious and suspicious and look out more for their own health.	Yes of course.
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	She probably wouldn't use a smart screen. Mainly because she wouldn't notice it. Maybe more interesting with a prize.	He would probably use a smart screen, but it would have to function well. He has already used a public screen that didn't work well. He compares the smart screens with the phone booths that were once in every street. If the screen is useful for him and he knows before he goes out (that the screens have been advertised and informed about in advance) he doesn't need a prize. But of course, with a price, even more interesting.
What is your general opinion about smart screens in public after this interview?	A new thing that can be more useful for young people. She would probably never use it.	A really good idea that should be in every city. It would show that the government of that city cares about its citizens.

1.6 Female 54 years, Germany

Female age 54 years,
works with people who are 65 and older
face to face Interview

Questions	Female (54)
Questions about city life	

What do you mostly do in the city you live in?	- **Going for a walking** - Cinema - **Cafe** - **Meeting friends**
What needs do you have in the city you live in?	- **More leisure and activities for the elderly** - Drivers should pay more attention to older people
Do you see any problems in your city? What problems?	- It often happens that some train-/ bus stops are not suitable for disabled people. Besides, sometimes the escalator or elevators don't even work …. - Not enough leisure activities are offered for older people - **Sometimes the Bus connection is not good** - Sometimes drivers and cyclists do not show as much consideration for the elderly
What do you think would solve these problems?	- Here in Germany there is a **station mission (at the train station) that helps young, old and disabled people.** Unfortunately not everyone knows how to contact them as soon as possible. With the smart screen this problem could be solved - **Current information about leisure activities** should be presenter. Therefore, it could be very helpful to place the screen where many older people are. A lot of advertising could also be very helpful. - **There should be more bus connections** and if a bus can't come, the smart screen could show it on the display - There should be more zones only for pedestrian
What needs do you have when you go to a new city?	- Get to know the city and its **culture** (visit Zoos, **Muses**, Theatres and Cafes)
Questions about uses of smart screens	
Do you use a computer, smart phone or tablet?	- Yes, a **smartphone** and a **tablet**
a. Why/why not?	- To stay in contact with relatives
b. What do you use it for?	- News - Skype - E-mail - SMS

		- Pictures / Videos
What technology brands do you use? Why?		- **Samsung** because the operating system is **easy to use** and compatible with many other devices
What do you think about the devices that you use in your daily life? They are useful or time consuming?		- They can be helpful if you want to get **quick information**. However, they can also be time- and cost intensive
Do you face problems when you use technology? What kind of problems?		- Not really, the only problem that might arise is when a phone has a different Operating system than the previous model. (I know that when I need help, I can always ask someone
What is the first thing that comes to your mind when you hear 'smart screens'?		- Different type of **information, advertisement**, and colors that could catch attention
Can you imagine what might be on a smart screen? / What would you like to see on a 'smart screen'?		- **Street map** - Information about health and healthcare - Advertisement - **Offers for different activities** - **Information about stores and shopping helper** - Information about church and church services
Where do you think such a smart screen should be in public?		- **next to a train station** - Nursing home - **Park** - Cinema - Hospital
What is the first thing that comes to your mind, when you see the smart screen?		- A modern screen that could catch the attention of people - it **looks good,** and the idea with the chair is also good - It takes up a lot of space
Can you imagine this model in your city, if so which locations?		- Maybe when it is smaller… - It should probably **not** be placed in the **center of the city**, because of its size - Seems to be **more for** younger people
What do you think of interactive 'smart screens'?		- It is very interesting that people can actually interact with the screen - The smart screen could be a good pastime

Would you be willing to try this type of smart screen, if not, why not?	- Yes, because the screen could be a good pastime
Would you be fine with the public screens to use your personal data? Like Google, Apple and Facebook does?	- No, because I like privacy and I don't know what they will do with my personal data
Slide 5	
Do you think this kind of advertising could be helpful in the time of a crisis? Does it have an impact on you?	- maybe, when this kind of advertising will be everywhere in the city
Slide 6	
Did the crisis change your perception about technology integrated in public spaces?	- Yes, because I pay more attention to bacteria now, I try not to touch so much in public
Would you still use them if you needed them or do you prefer a non-touch screen?	- prefer non-touch screens - they will also feel safer with non-touch screens
What kind of protection against a virus can you imagine on a screen that is located in a public space?	- A non-touch screen will be perfect
Slide 7	
Would you use this? Why/why not?	- maybe once, because of curiosity, but that could be more for younger people
Final question	
What is your opinion about smart screens after you have done this survey?	- it seems to be a good way to get a lot of fast information

2. Families with children
8.21 2.1 Female 29 & Male 30 – Copenhagen, Denmark

2020-04-28 8:00 pm
Interview over Messenger video call
Showed examples in chat
50 minutes

Questions	F	M
How many members are in your family?	Four	
Do you have any toddlers? If so, how old are they?	Two toddlers two boys 3 and 5 years old.	
What needs do you have in the city you live in?	No car, so they need public transport and bike lanes. Live in suburbs of Copenhagen.	Live in an apartment with a garden. Need outside space for the kids to play.

	Recreational areas like parks and playgrounds for the children.	They go a lot to the library and museums. Don't eat out often.
Do you see any problems in your city? What problems?	Having time to manage a full-time job and spend time with the kids. Need to reduce time-waste.	Logistics. Getting to and from work, leaving and picking up the kids and doing grocery shopping.
What do you think could solve these problems?	Online grocery shopping, which saves us at least 20 minutes. Having it delivered at the door.	In general, a lot of online shopping because of its convenience.
What needs do you have when you go to a new city?	Lived in Oxford for two months to work. Housing was expensive, so needed downsizing to still be close to most things during that short period. Prefer traveling by foot, both of them. For holidays the most important is weather, prices and restaurants.	Was a stay-at-home-dad during the two months. Important with areas for the kids to play. Should be easily available. For holidays it's ok to go places with few activities for the kids. He can spend a year planning a trip, doing research online and through books. Most important is that there are proper hospitals because of the kids.
Smart Technology		
What does the use of smart technology look like in your family? What devices?	Smart phones for the grownups Laptops for work Chromecast which is the most high-tech thing they have they say	Smart phones for the grownups Laptops for work Chromecast which is the most high-tech thing they have they say.
What brands do you use and why?	Motorola. Good value for the money.	Huawei because it is as good as the more expensive ones. Trusts the Chinese as much as any others.
What do you think about the devices you use in your daily life? Are they useful or time consuming?		
Do you face problems when you use technology? What kind of problems? Learning new technology?	Confident but lazy with new technology. Not interested in getting new cool gadgets but appreciates the practical functions of them.	He hates push messages and anything that pops up. But nice that the phone can update you on the weather and suggest news articles

		based on prior searches. Enjoys custom made service.
Do you integrate technology in your children's lives? Why or why not?	The 5-year-old knows how to use YouTube. Let the kids watch public service. But limited. He will get an iPad when he starts school, so it's better to teach him.	They are checked in and out by a smart screen connected to an app. The smart screen is connected to an app. You can follow them on the app. Smooth, you can update the daycare on the app. You can see them live and that can be a conversations starter when they come home.
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	The university has screens for locating rooms. Shopping malls also have them.	At a big train station in Copenhagen (Norreport) they have a smart screen where you can search where you are going. It gives you directions to the platform. Libraries have them both for finding books and browsing for inspiration. It shows a map of the library to find the books.
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	Since we have smart phones, we would probably not use the smart screens. As a tourist she would be more interested in using it. Internet could be expensive. A quick guide to a playground could be useful. None of them would stay long at a screen.	To use it, there would have to be something I couldn't easily find on my smart phone. He would not want to search on a big screen in public. For public transport the screen should be smaller, so everyone doesn't know where you are going. They often walk around for ages trying to find a restaurant when abroad, so a screen that shows a few choices in the area could be interesting. It could send a guide to your phone.

What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	Looks like a bus-stop. She would be unsure what it would be used for. She wouldn't want everyone to see what she is searching for on the screen.	Looks misplaced with the old buildings. Since there is a seat, it seems like you would stay there long and I would prefer a short use.
What do you think of this type of face recognition? Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	She would be worried about being watched, remembered by the screen and showcased to others. Worrying about the generalization the algorithm does. How does it know you am a woman, and what you actually like because of that? But different in a public space, and everybody sees it. Cookies from the internet would be way too much. People don't want to show their search history of underware or more private things.	It's a bit like at the Lego store, where you put your hand on a big screen and it "scans" it and then turns you into a Lego character. He can see cameras being used on stores. Would not like his data being used for commercial purposes. Would be fine to share with a place he trusts wouldn't misuse his data, like museums. Likes new technology and would like to have a chip in his hand. Cookies from the internet would be way too much. People don't want to show their search history of underware or more private things.
What do you think about advertising like the one Netflix has?		
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over?		He would not be worried about these McDonalds screens. You accept it just like you do with public toilets. Thinks people will be scared for a while, but that it will pass.

Questions	F	M
Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?		
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	Would find it annoying and even if the game was fun, she would not do it in public. Thinks there is an audience for it.	At the train station in Copenhagen (Norreport) they had a campaign where you could have a video call with someone really far away. People were queuing every day. It seems appreciated and is probably fun in the beginning but soon it will be annoying and too much.
What is your general opinion about smart screens in public after this interview?	Already knew about smart screens and has not changed perception of them.	Already knew about smart screens and has not changed perception of them. Used to work with them at the library, so has good knowledge about them.

8.27 2.2 Female 45 – Antwerp, Belgium

2020-04-30 8:30 pm
Phone call
Showed examples by sending in chat
1 hour
Interested in being updated on our progress, both user testing and the design of "street furniture".

Questions	F	M
How many members are in your family?	Five	
Do you have any toddlers? If so, how old are they?	One toddler who is four. The other two kids are 16 and 18. All three are boys. She has a male partner and has separated from the older boys' father and the younger. The younger is sometimes with his father.	
What needs do you have in the city you live in?	Being nearby schools, good schools and different types	

	of them. That is the main reason she lives I the city.	
Do you see any problems in your city? What problems?	Space is a problem. There is not enough space for the children to play. But they have a small garden and a big park nearby.	
What do you think could solve these problems?	Areas that are green, open and accessible for everyone. Stop building new houses and instead renovating old ones. Not using new space to build on.	
What needs do you have when you go to a new city?	Information about food stores or supermarkets. That's the first thing she looks for. With three children she says she needs a lot of healthy food. She looks at the internet and asks the person who she rents the apartment from for good bakeries and places selling vegetables and fruits.	
Smart Technology		
What does the use of smart technology look like in your family? What devices?	There is a platform called smart school, which is used a lot during Corona. The kids' tasks and agendas are uploaded, and parents have an account to follow what needs to be done. Four laptops, each have smart phones, two tablets, a smart tv, a ps4 and a Nintendo Switch.	
What brands do you use and why?	The laptops are from different brands, but none are from Apple. Mac computers are too expensive. Her own work computer is HP. The smart phones are all Samsung, because her phone from work is Samsung and it's easy to have the same.	

	The teenagers break their phones and computers, and she have to buy new ones yearly. Doesn't choose the brands because they are the best, but because she is used to it. Does not care too much about technology, but cares about the price. Open to learn new technology but not to buy and consume new technology.	
What do you think about the devices you use in your daily life? Are they useful or time consuming?	She is online more than her children and says she isn't the kind of mother that limits her children's internet usage. What annoys her are the headphones, because they create a bubble. She understands that they are online connecting with friends. Her partner also likes gaming and Facebook. They are a connected family.	
Do you face problems when you use technology? What kind of problems?	That devices need to be charged so often and that you need to plug them in. She would like them to be loaded wireless. She says it already exists, but that it isn't common. There are too many cables on the floor. In her home office she still needs to be connected with an internet cable to have video calls since the wi-fi isn't stable enough. Wi-Fi needs to be more stable if many will be online at the same time.	

Do you integrate technology in your children's lives? Why or why not?	Yes, they use it.	
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	Understands after explanation what smart screens are and do.	
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	She is always lost and would like to have maps and GPS:s spread all over the city. Although, she uses her smart phone as a compass. It would be "heaven" for her to click screens and see the historical layer of a street or neighborhood. She wants to know the history of a place, partly because it's her job but also because of her interest. She misses the historical information in big touristic cities. She would prefer bid screens in public with maps and information rather than QR-codes or old-fashioned paper posters that exist now.	
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	Her first thought was that it looks like a "Mac design". Thinks it could be useful as a bus stop, but it needs more seats. She uses public transport a lot. There it should be multifunctional and connected to the internet. Useful for tourists and she can imagine it would be used.	

	She can see it being placed in historical parts of Antwerp. Finds it functional and not ugly or out of place. Nice to be under the roof when it rains. Needs more seats for bigger families. If her whole family is together, they can never sit on the same bench. She imagines both sitting and using the screen and standing.	
What do you think of this type of face recognition? Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	She is a bit afraid of facial recognition. When used for rational needs it can be useful, but in China the leaders are not so gentle. Good for a good cause but it will be misused she thinks. She hesitates to share her data, since she doesn't understand where it really goes. To say yes, she wants to understand it better. She doesn't like customized advertising because she feels too influenced to buy things. Online clothing is showing more and more suitable alternatives for her, but she still doesn't want to buy. Thinks it's dangerous for those who cannot resist.	
What do you think about advertising like the one Netflix has?	-	
Has the Corona pandemic changed how you feel about touching surfaces in public?	Would be more hesitant to touch screens outdoors. After the crisis she doesn't use reusable bags for vegetables anymore since it's difficult to wash them.	

How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	Touch screens often don't work with gloves and can be dirty. She really likes things that work with hand moves. Had experience from a museum in Amsterdam where images on a screen moved when you moved in front of it. Likes it when screens react fast. Would prefer non-touch screens.	
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	She would not participate and doesn't like it. Has seen it for kids outside a cinema where they could play games and win free tickets. She thinks the companies only want your e-mail and phone number, so she uses a special e-mail for that purpose. Dislikes commercial motives.	
What is your general opinion about smart screens in public after this interview?	There are a lot of possibilities to give information and she would use them for sure. She is always lost and really fond of information, especially in new cities. But she doesn't like ANY advertising.	

8.33 2.3 Female & Male – Antwerp, Belgium

Questions	F	M
How many members are in your family?	Three	Three
Do you have any toddlers? If so, how old are they?	No toddlers, one child who is born 1999.	No toddlers, one child who is born 1999.
What needs do you have in the city you live in?	Visits Antwerp occasionally, mostly with friends to go drink something or go to an event.	Doesn't visit Antwerp much since he mostly works.
Do you see any problems in your city? What problems?	Not a lot of information for tourists who often have to ask for the way.	Not a lot of information for tourists who often have to ask for the way.

What do you think could solve these problems?	Giving them a sort of info kiosk where they can find the information.	Giving them a sort of info kiosk where they can find the information.
What needs do you have when you go to a new city?	The same as every tourist, an option to find the way to palaces they want to go, Must see stuff, etc	The same as every tourist, an option to find the way to palaces they want to go, Must see stuff, etc
Smart Technology		
What does the use of smart technology look like in your family? What devices?	She likes technology a lot. She has tablets, laptops, a smart phone, Google Home, headphones and Bluetooth speakers.	Doesn't use a lot of tech at home. Regular things like a smart phone and a laptop for work.
What brands do you use and why?	She uses many different brands but mostly Samsung and Asus. She likes the overall design of them and that they are easy to use.	Apple smart phone and Asus laptop. He says he bought them because they are good brands.
What do you think about the devices you use in your daily life? Are they useful or time consuming?	The devices are useful, and they only need them when they use them.	The devices are useful, and they only need them when they use them.
Do you face problems when you use technology? What kind of problems?	Sometimes the devices don't work or get old and stop working as smoothly as before.	Sometimes the devices don't work or get old and stop working as smoothly as before.
Do you integrate technology in your children's lives? Why or why not?	They didn't integrate technology, but their son picked it up himself and introduced it to them.	They didn't integrate technology, but their son picked it up himself and introduced it to them.
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	Touch screens	Touch screens
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	A road map of some sort and information about the area. A roadmap for transport, stuff to do in the place you are ad events that are happening or will happen.	A road map of some sort and information about the area. A roadmap for transport, stuff to do in the place you are ad events that are happening or will happen.

	Could be placed in public spaces where lots of people are, like stations, shopping streets, squares and busy transport places.	Could be placed in public spaces where lots of people are, like stations, shopping streets, squares and busy transport places.
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	It looks nice but really futuristic. Can't imagine any design changes. Can imagine it being placed in Groenplaats, the central station, The Meir and Eilandjes.	It looks nice but really futuristic. Can't imagine any design changes. Can imagine it being placed in Groenplaats, the central station, The Meir and Eilandjes.
What do you think of this type of face recognition? Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	Interactive screens would be more interesting than using paper. Face recognition looks interesting. Would absolutely not share personal data with public screens. They don't like when Google and other companies get access to their information, but there is nothing they can do about it.	Interactive screens would be more interesting than using paper. Face recognition looks interesting. Would absolutely not share personal data with public screens. They don't like when Google and other companies get access to their information, but there is nothing they can do about it.
What do you think about advertising like the one Netflix has?	Sure, it would be helpful in the Corona crisis, to remind people about stuff we have to follow from the government.	Sure, it would be helpful in the Corona crisis, to remind people about stuff we have to follow from the government.
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen?	Not at all. Touching the screens is fine, it would be weird not to because we're so used to it. We think regular cleaning would be great and only to touch it while wearing gloves. Maybe it can have a glove compartment where you give people throw-away gloves.	Not at all. Touching the screens is fine, it would be weird not to because we're so used to it. We think regular cleaning would be great and only to touch it while wearing gloves. Maybe it can have a glove compartment where you give people throw-away gloves.

What kind of protection against the virus would you imagine on a public screen?		
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	No, it's not really interesting for us but maybe for the younger generation it would work. The prize would not really motivate more.	No, it's not really interesting for us but maybe for the younger generation it would work. The prize would not really motivate more.
What is your general opinion about smart screens in public after this interview?	She really likes the idea and thinks it would be nice to have an information screen in Antwerp for new people who don't know the city.	He also likes the idea, but not for Antwerp. He thinks it would fit better in modern countries like Dubai or Japan.

8.39 2.4 Female 53 & Male 56 – Antwerp, Belgium

Interview made in person
They live in Mortsel outside of Antwerp

Questions	F	M
How many members are in your family?	Four	Four
Do you have any toddlers? If so, how old are they?	No, two sons who are 17 and 20 years old.	No, two sons who are 17 and 20 years old.
What needs do you have in the city you live in?	Shopping, biking, grocery shopping, going to cafés and restaurant and going to the zoo.	
Do you see any problems in your city? What problems?	Often too crowded and sometimes there are bad or no bicycle roads.	
What do you think could solve these problems?	Visiting the city early in the day to avoid the crowd. The city should invest in more bike lanes and sidewalks.	
What needs do you have when you go to a new city?	Knowing where you are and how to get to the points of interest (hotel, cafés, bike shops).	Knowing the opening hours and prices of local attractions.
Smart Technology		
What does the use of smart technology look like in your family? What devices?	Everyone has their own smart phone. The children have their own computers and they have a communal laptop. They have one tv.	
What brands do you use and why?	None specifically. Whatever has the best price or quality at the moment.	

What do you think about the devices you use in your daily life? Are they useful or time consuming?	Smart phones are very useful, and they use them constantly to stay in touch with people and follow the news.	
Do you face problems when you use technology? What kind of problems?	Sometimes something just won't work. She often tries to turn it off and on again and if that doesn't work, she asks for help from her children.	
Do you integrate technology in your children's lives? Why or why not?	Na. They used to use video games as a tool to make the children learn.	
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	A screen that provides you with information, like a smart phone.	A large touch screen television.
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	A map with directions, something like google, local restaurants and cafés, summary of tourist attractions. The map. At transport links like train stations and airports. Also, busy places like squares.	Interactive map, advertisements, public transport information. Overview of nearby stores and points of interest by category. Important transport points where lots of people come by.
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	Perhaps too large, noticeable and it looks very modern compared to older buildings. She would like more privacy and would find it annoying with people looking over her shoulder. Train stations, bus stops (hubs like Roosevelt), places of interest (Groenplaats, Steen), shopping streets (Meir), MAS.	Kind of looks like a futuristic desk. The roof seems low. Maybe make the entire thing a bit wider. The screen goes too low and wastes usable space. Larger metro stations, large squares, Zuiderdokken and places of interest.

What do you think of this type of face recognition? Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	Makes the product presented more interesting and fun. Yes, it personalizes your results and gives new ideas you might not have thought of. Sharing data with the screens seems unnecessary.	Funny and nicely done. No, he doesn't like the screen making decisions for them. He doesn't want it personalized. Would absolutely not share his data for privacy reasons.
What do you think about advertising like the one Netflix has?	It makes you think twice about your actions.	It seems like they are playing police, and he doesn't like it. On some people it might work.
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	With people having less personal contact they use their technology a lot more for video chatting and communicating in general. In public spaces, not really. Would prefer a normal touch screen. A non-touch screen would require even more space and it would sometimes be unreliable. Always disinfecting your hands after use.	With people having less personal contact they use their technology a lot more for video chatting and communicating in general. Not in public spaces. Non-touch screens would be more hygienic if they work. If they don't work, it's only frustrating. Hard to realize hygiene. You could supply disinfectant and paper towels but that wouldn't last. Regular cleaning of the screens by the city.
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	No, it would be fun for children but not for her. Prizes wouldn't help, she just doesn't like those kinds of actions.	No, he just isn't a fan of advertisements, but thinks it might be fun for children. No, he doesn't trust it. They'll make it hard enough so almost no one gets the award.
What is your general opinion about smart screens in public after this interview?	Seems interesting to use. Allows you to find new places you didn't know about.	Positive opinion and thinks it could be useful if it works decently. He only wonders what the purpose would be in an age where everybody has a smart phone. Might be good for discovering

		places directly around the screens (500 meters).

8.45 2.5 Female 54 & Male 53 – Barcelona, Spain

Interviewed in person and shown examples

Questions	F	M
How many members are in your family?	Four	
Do you have any toddlers? If so, how old are they?	No toddlers	
What needs do you have in the city you live in?	Go shopping, visit the cinema or meet friends at bars or restaurants.	
Do you see any problems in your city? What problems?	Maybe there are too many people in the city center and sometimes there is a lot of traffic.	
What do you think could solve these problems?	No idea, crowded city centers and traffic seems inevitable.	
What needs do you have when you go to a new city?	Some way to integrate in the city quickly and help finding interesting places to visit.	
Smart Technology		
What does the use of smart technology look like in your family? What devices?	Quite integrated now, everyone in the family has a few tech devices now.	
What brands do you use and why?	They have a variety of brands. They always look for the best price, without caring much about which brand it is, as long as the product is good.	
What do you think about the devices you use in your daily life? Are they useful or time consuming?	They are both useful and time consuming depending on how you use them. A smart phone is the most useful device nowadays, but you can also be on Twitter and Instagram all the time and that's not so useful.	
Do you face problems when you use technology? What kind of problems?	She had some trouble getting used to her first laptop and smart phone but now she manages those devices well.	He does not face many problems with technology since he has always been in contact with new technology.

Do you integrate technology in your children's lives? Why or why not?	They have always tried to limit their access to unnecessary technology but nowadays it's inevitable to get in contact with it. So, at some point they gave the children access to it and made sure they understand what is important to prioritize so they don't get distracted.	
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	Something related to smart tv's.	
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	Everything related to user interaction that may help the user. Depending on where it is and what they need, as tourists they would for example like to know where they should go. In places where people move.	
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	It looks very futuristic, but the white color might get dirty. Not really, it looks very complete. Yes, it feels like it can be integrated in the city. They would consider Park Güell, Passeig de Gracia or Placa Catalonia.	
What do you think of this type of face recognition?	Thinks interactive screens could be useful and would consider using face recognition.	

Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	They don't think they would share data with public screens. If they had the security to keep certain things private, they might consider it, but it seems unlikely to happen.	
What do you think about advertising like the one Netflix has?	It could be helpful in a time of crisis. It takes away the advantage of being outside and is quite eye-catching.	
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	It is obvious the technology has helped people to better understand what is happening around the world and it also make quarantine easier. It hasn't changed their view on touching public screens. A non-touch screen would be a better option. A hand sanitizer dispenser could be very helpful, and they think people would be glad to have one.	
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	They don't think they are the right age to do that, but it looks like a very good idea. Yes, a reward would make people interact with it. If it would be something they were interested in, they would probably try too.	
What is your general opinion about smart screens in public after this interview?	They think it's quite a multifunctional device with lots of possibilities as they have been shown. It could help both users and brands to get closer and have benefits for both parties.	

Questions	F	M	Teenager M
How many members are in your family?	Three		
Do you have any toddlers? If so, how old are they?	No toddlers, the youngest is 16.		
What needs do you have in the city you live in?	Work, walk and sports, grocery shopping and cooking.	Work, walk, read, watch sports, grocery shopping.	School, sports, going out with friends and pubs.
Do you see any problems in your city? What problems?	General ignorance of the cultural events (museums, shows, lectures).	Pollution and traffic.	Something to do for people under 18 on their leisure time. Most clubs and pubs are for people over 18. He is not a child nor an adult.
What do you think could solve these problems?	Apps or technology that communicates info about cultural events.	More bicycles and a more connected and intelligent city.	An app.
What needs do you have when you go to a new city?	Locations, the most typical foods, culture, tours and safety. Most things.	Information about museums and famous buildings.	Plans, young people and pubs.
Smart Technology			
What does the use of smart technology look like in your family? What devices?			
What brands do you use and why?			
What do you think about the devices you use in your daily life? Are they useful or time consuming?			
Do you face problems when you use technology? What kind of problems?			
Do you integrate technology in your children's lives? Why or why not?			

Smart Screens in Cities			
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	Information	Something that isn't for him. He isn't a technological user and he uses only what he has and never in his spare time. He prefers other ways, more personal, to get information. He finds more beauty in asking people or just exploring.	Information
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	Information Useful and true information. Placed where people live. Even if the screen is "magical" people want to access it easily, without having to travel far.	Information and mainly advertising. - Could be placed everywhere. Where people live and go. He isn't a smart phone user so he would use it for a lot of searches.	Information Something really technological that can help each person with personal services. Like a smart phone about the city. It could know what you would like to do before you know it. Where people live and go.
„What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	Something that would help people. Something beautiful. Something that doesn't look like other advertising signs.	Simple, beautiful and not too big. It has to look easy and close to the people. It has to offer privacy for the user. Without a specific location, it could be placed where people can use it peacefully without disturbing or being disturbed.	It should be close to buildings, so it isn't in the way of pedestrians.
What do you think of this type of face recognition?	Something would have to catch her attention. In her own city she probably	He would use the facial recognition screen if he read about it in	Probably would use it.

Would you be willing to try it? Why or why not? How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	wouldn't see it. If she saw it or knew what it was, she would try it out of curiosity.	advance. If he stumbled upon it, he would never use it. Not fine with sharing data. Just some general data like age, general preferences or if they are tourists or citizens, but nothing else.	
What do you think about advertising like the one Netflix has?	All of them think it's a useful advertising. In Spain there are also these cartoons on tv showing children the rules they need to follow during Corona. It seems useful since the information is changing almost daily and knowing what you can and can't do is difficult. Most important thing is to receive true information.		
Has the Corona pandemic changed how you feel about touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	The crisis has changed their view on technology in general. It has made them use technology to be closer to friends and family. At first you might think you shouldn't touch the screen. But when you think about it, it's much safer touching a screen than talking to a tour guide or going into a tourist center.	The crisis has changed their view on technology in general. It has made them use technology to be closer to friends and family. He probably wouldn't touch the screen. Maybe ultraviolet light might protect?	The crisis has changed their view on technology in general. It has made them use technology to be closer to friends and family. At first you might think you shouldn't touch the screen. But when you think about it, it's much safer touching a screen than talking to a tour

			guide or going into a tourist center.
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	Yes, they would all use it. But it would have to be useful and easy and they would prefer to know about it in advance. "You don't use a smart phone that you find in the streets if you have never used on before." It's important to communicate the concept and how it can help people. A prize would of course motivate, since it would be part of the pre-information.		
What is your general opinion about smart screens in public after this interview?	A new invention that can be useful, but like anything new, it's hard to introduce.		

8.58 2.7 Single mom 35- Iasi, Romania

Questions	F	M
<mark>LIFE IN THE CITY</mark> How many members are in your family?	2	-
Do you have toddlers, when yes, how old are they?	Yes, my daughter is 4.	-
What do you mostly do in the city you live in?	I am going with my child in parks, especially now, we are going in the parks for her to see the trees blooming and birds singing. When I was alone, I was spending my time in malls and coffee shops with my friends but now, I spend most of my time in nature.	-
Do you see any problems in your city? What problems?	I don't have a car so for me public transportation is very important and the buses are so crowded and slow that sometimes I don't want to go to a place because of that.	-

What do you think would solve these problems?	I think we should have more buses and the buses should have a schedule. Now, they don't have one and sometimes I wait an hour for it to come.	-
What needs do you have when you go to a new city?	I want to be able to enjoy good food without too much effort. Sometimes I look for hours for a decent restaurant and the food is often not that good. I guess in my city I am not thinking about that too much because I know where to find everything but when I go to a new city, food is important.	-
TECHNOLOGY What does the use of technology look like in your family?	My daughter seems like she was born with the phone in her hand. She was always curious when she saw me with my phone, she is really intuitive from this point of view, she knows where to find games and I let her to discover what she wants.	-
What technology brands do you use? Why?	I use the cheapest brands I can find. I have a laptop that I use at my job and is really old and I didn't change my phone since 2015. I don't care about the design or the brand, I want a device that is working and is cheap. My phone is from Samsung and my laptop is from Dell.	-
What do you think about the devices that you use in your daily life? They are useful or time consuming?	For me, they are useful. Unlike my daughter, I didn't grow with it so I am not dependent, I know how to survive without it but I guess it will be harder to do that.	-
Do you face problems when you use technology? What kind of problems?	If we are talking about what I already own, no but when it comes to something new, yes. It's hard for me to learn the menu.	-
Do you integrate technology in your children's lives? Why or why not?	Yes, because I don't see what disadvantages it could have if I do this. She is so curios about anything and the devices from our home weren't an exception. I let her discover it.	-
SMART SCREENS What is the first thing that comes into your mind when you hear 'smart screens'?	I think about phones, tablets and computers.	-
Can you imagine what might be on a smart screen?	Information about public transport.	-

Where do you think such a smart screen should be place in public?	In the city center and bus stations.	-
PowerPoint- Design What is the first thing that comes to your mind when you see this smart screen? Do you like it?	It looks really nice, clean, simple.	-
Is there anything that else you could imagine on the smart screen regarding the design?	I think it's too big if you want to place it in a bus station or in a city center, it could be smaller.	-
Can you imagine this model in your city? If so, which locations?	Yes, it could be placed where are the office buildings are. It's modern and minimalistic and I think it fits in an environment with modern buildings and corporations.	-
What do you think of an interactive smart screen that gives you information about the city?	It sounds interesting.	-
Would you be willing to use it? If not, why not?	If it would be in my city, probably no because here is the place where I embrace my routine: I go to work, to the kid's school or the supermarket and when I meet with my friends we already know what bars we like and where to go and we don't want to change that, to find information about what to do in my city would be useless. The only information that I want to know about my city would be: public transport.	-
Data collection Would you be fine with the public screens to use your data? Like Google and Facebook does?	No, I need information from google but I am not ok with the fact that they also need information from me. It's a 'trade' that we all make from several years and I am started to get used with it, I don't want to get used to something else that uses my data.	-
Covid-19 Did the crisis that we face now changed tour perception about using technology that is placed in public spaces?	Yes, there is a fear that would be at the back of my mind for a period of time.	-
Would you still use this kind of smart screen or do you prefer a non-touch screen?	For me, this non-touch screen it seems so unfamiliar. I don't know if it could be a better option.	-
(Netflix) Do you think this kind of advertising could be helpful in the time of a crisis? Does it have an impact on you?	It doesn't have an impact on me because I don't watch a lot of movies and I don't think people would hide in their homes just because Netflix gave some spoilers. I think they found an opportunity for advertising and they use it, nothing more: sometimes, a	-

Questions	F	M
	problem for some is a business opportunity for others.	
(Rebook) Would you use this? Why/ why not?	Yes, I would use it for the prize.	-
Would a prize motivate you to use this kind of interactive advertising?	Yes!	-

8.59 2.8 Family with an 18 years old teenager- Iasi, Romania

Questions	F	M
LIFE IN THE CITY How many members are in your family?	3 members: us and an 18 years old teenager	
Do you have toddlers, when yes, how old are they?	No	
What do you mostly do in the city you live in?	Shopping or I am going to parks and in the countryside. I am trying to get out of the city as much as I can.	Business meetings and working almost every day. Sunday is my free day and I spend it with my family away from the city.
Do you see any problems in your city? What problems? Do you see a solution for it?	Pollution, my city is the most polluted city from Romania. It's a huge problem. Solution: public transport should be more efficient, modern and enjoyable.	Traffic. I spend a lot of time in traffic. Solution: infrastructure for bikes
What needs do you have when you go to a new city?	I am a gourmand; I want to taste local interesting food. The first thing that I am searching for in a new city is a good restaurant.	Parking spaces. I even come to a point where this is my only request for hotels: to have a parking space.
TECHNOLOGY What does the use of technology look like in your family?	I use technology only for entertainment: relaxing in front of my smart TV with a good movie, posting pictures on social media.	I use it because of my job and when I get home, I find myself answering to emails all evening. I miss the times when your job was done when you left the office. Now because all of this technology, you have to be available all the time. I hate this!
What technology brands do you use? Why?	Samsung. My husband buys all the gadgets because I don't have any special need or preferences and I let him decide.	Samsung- maybe because in the past it was budget friendly and now, even when it comes to more expensive acquisitions, I buy it because I am used to it.
What do you think about the devices that you use in your	For me, they are useful.	Time consuming like I said at the previous question: I

daily life? They are useful or time consuming?		miss the times when I didn't have all this technology but I can't go back: now, I am dependent on it.
Do you face problems when you use technology? What kind of problems?	Yes, if I buy a new phone it takes weeks for me to learn how to use it and where are all the apps.	No, at my job when a colleague buys something he comes to me to teach him how to use it because he knows that I am always informed about any new gadget even if I don't have it.
Do you integrate technology in your children's lives? Why or why not?	Yes, my son has an iPad and he uses to take notes in school. I think it's easier for him this way, instead of carrying a lot of books and notebooks.	My son was 14 years old when I bought him a phone and it wasn't that hard for us to grow him without technology because back in the days everyone was like this. You wouldn't see a 10-year-old with the latest iPhone. Now, he just uses it because of the utility not because he is addictive to it.
What is the first thing that comes into your mind when you hear 'smart screens'?	Technology? I don't know	Something that is made to help you.
Can you imagine what might be on a smart screen?	Information about the city, nice places where you can go	It would be cool to respond to certain questions, like Alexa does. For example, I would ask him about where I can find a place to play tennis and the screen would give me indications and it will talk to me: Google Home outside of home.
Where do you think such a smart screen should be place in public?	In restaurants or near restaurants, when people are in a new city, they are for sure going to eat somewhere. It would be easier to see the smart screens if they would be placed near restaurants.	Near tourist attractions
What is the first thing that comes to your mind when you see this smart screen? Do you like it?	I like it but I think it's too big.	It looks like a bus stop, a modern one.

Is there anything that else you could imagine on the smart screen regarding the design?	I would like it to be smaller.	I think it will be better to have only the screen.
Can you imagine this model in your city? If so, which locations?	Near malls or in the city center	Bus stops
What do you think of an interactive smart screen that gives you information about the city?	It is a good idea for tourists.	I agree, I think it's the most suitable for tourists.
Would you be willing to use it? If not, why not?	If I am in a new city, yes.	I think having this in a new city would be really helpful. In my city I would not use it, I don't need suggestions from a screen to know what to do in my city!
 Would you be fine with the public screens to use your data? Like Google and Facebook does?	No!	Absolutely not. I am not ok with the fact that all this companies (Google, Facebook) are using my data but I need them and I play by their rules. A public screen is not that necessary for me to let it use my data!
 Did the crisis that we face now changed tour perception about using technology that is placed in public spaces?	Yes! I am little skeptical to touch things that are touched by a lot of people but it wouldn't last forever.	Yes and no, I think we will see after it how much this would affect me.
Would you still use this kind of smart screen or do you prefer a non-touch screen?	If it is easy to use, it would be a better idea but it is so much different than what I have seen till now that I don't know what to say. I need familiarity when it comes to technology.	I am exactly the opposite; I like new technology. I think it would be better not just because of this crisis but because the screen would have something different and people would be curios to try it.
(Netflix) Do you think this kind of advertising could be helpful in the time of a crisis? Does it have an impact on you?	No, I don't have a Netflix subscription and I think this could have an impact only on youngsters.	Also, no!
 (Rebook) Would you use this? Why/ why not?	No. I can't see a situation where I would stop and run in front of a screen to win something. It's not for me!	It depends. Maybe! I think if I would be with my son, I would try this but an old man running for shoes it's not a fun image in my head!

Questions	F	M
Would a prize motivate you to use this kind of interactive advertising?	No!	No!

3. Young Adults and Students

3.1 Female 26 – Stockholm, Sweden

2020-05-01 8 pm
Interview on Messenger video call
Sent examples in chat
1 hour
Interested in being updated on final result and doing user testing

Questions	F	M
What needs do you have in the city you live in?	Company in the sense of community. Bonding with people.	
Do you see any problems in the city you live in? What problems?	She finds it to be too individualistic. Like every man is for himself and people are too afraid to be true to themselves.	
What do you think could solve these problems?	If there were more places to hang out without having to consume or consumption being the primary reason for meeting up. Supposes there already are but wants more.	
What needs do you have when you visit a new city?	She first goes to the park or looks up green sports in the city. She doesn't mind sitting observing people. She also looks up second-hand stores.	
Smart Technology		
Do you use any smart technology and what? What do you use them for? By smart technology we mean devices that are connected to the internet.	I Phone and computer.	
What brands do you use and why?	Apple. The reason is she was given both devices second-hand. For her the price matters more than the	

	brand but also the functionality.	
What do you think about the devices you use in your everyday life? Are they useful or time consuming?	Both scared and interested. If she has to learn a new tech-device she is hesitant and not so excited.	
Do you face problems when you use smart technology? What kind of problems?	Lots of problems. Addiction and getting used to being served things with the click of a finger. Not meeting people face to face, losing body language and real connection. Even so she appreciates being able to reach people who are far away.	
Smart Screens in Cities		
Do you know what a smart screen in a public space is? They are digital screens in public spaces that show advertising or information. Sometimes you can interact with them by touch or through camera.	Has not encountered smart screens specifically, apart from advertising. Has heard of guerilla marketing using interactive screens. When explained about information screens in malls, she recognizes them, but adds that they aren't very exciting.	
Can you imagine what might be on a smart screen? What would you like to see on a smart screen? Where would you like such a smart screen to be placed in public?	Screens that would make people interact with each other in the physical world. Create new interactions, perhaps by answering some questions and connecting those with similar answers. Finding intriguing things that people have in common. Should not be placed somewhere people are walking past in a hurry. It could be where you're bored, waiting for transportation or strolling in the park, when you have time. If it somehow connects people quickly, then people	

	who have interacted with the screen would be there at the same time, in a fun way. Spontaneous. Could connect people at different screens. Since advertising runs the economy, realistically a company would sponsor the screens. She would want a company to only sponsor the screens being built, not interfere with the content. Then I would find it ok and the companies should be chosen with care.	
What is the first thing you think of when you see this smart screen? (Our design, both white and black) Is there anything you would like to change about the design? Could you imagine this screen model in your city? If so, in what locations?	Thought the roof was a bench. A minimalistic bench with a cup holder. Thinks the person sitting on the bench would be exposed. Depend on what is on the screen. You wouldn't want everyone to see what you do if it's private. I would still find it interesting if I saw it and I would try it. Date, time and weather you have in your phone. For her idea with connecting people the screen is too big she thinks. For that it should be more discrete. Maybe for other purposes like finding your way in a map it could work, but for sensitive info it's too big.	
What do you think of this type of face recognition? Would you be willing to try it? Why or why not?	The commercial is funny but not very useful. She would not be excited about the function if it's for selling something.	

How would you feel about sharing personal data with public screens? The way you share it with Google, Facebook and Apple?	Would be comfortable with face recognition if the company had strict rules about not selling the data. But she would not want it to be used for commercial purposes. Finds it a bit worrying that it tracks every face that passes by. We already share our data with Google maps. Would feel differently about sharing data with a public screen. Embarrassing search history might appear. She isn't angry about data collection on her phone, like the audio recording. It feels strange but could be beneficial. She doesn't buy things regularly from adds, almost never, even though she clicks on them. She thinks it's wrong when they sell the data to other companies. She would prefer if it didn't happen. She thinks we can find what we need without advertisement and that it wouldn't harm people if they had to search a bit. She would prefer having to search herself.	
What do you think about advertising like the one Netflix has?	Finds Netflix's spoiler campaign during the Corona pandemic funny and provocative. No one dies from having their tv show spoiled. She wonders how legal it is to spoil tv shows they have purchased. If it isn't published on Netflix yet it might be illegal.	
Has the Corona pandemic changed how you feel about	She wouldn't be more hesitant to touch things in	

touching surfaces in public? How do you think you will feel after the pandemic is over? Would you prefer a non-touch screen instead of a touch screen? What kind of protection against the virus would you imagine on a public screen?	public after the pandemic, but during it she tries to avoid touching things. Still she uses public transport kiosks for buying tickets. She thinks she would be contaminated by bacteria and viruses even if she didn't touch screens outdoors, but she can see that others might be bothered. She isn't very amazed by the non-touch screens and says people already use that in Nintendo games. She thinks it could be used and that people would just need some time to get used to the technique. She thinks it would be easy for people to get used to it. During the Corona pandemic non-touch might be more useful but she questions how long people will remember to be cautious. Maybe it could take years, and then this solution would be smarter than touch screens. Or the screen could interact with people's smart phones and have the screen be controlled through the phone. Important to make it available to people who are blind, deaf, amputated or disabled in other ways.	
Would you take part in an activity in public, like Rebook's running challenge? Why or why not? Would a prize motivate you to use this kind of interactive advertising?	-	

What is your general opinion about smart screens in public after this interview?	They might be more common soon. In the malls she doesn't see people using them a lot, since they ask people or look at their phones. As we move more towards digital meetings and less physical contact, screens can be normalized. Yet she hasn't seen anything that catches her interest. It would have to be better than her smart phone for her to use it. She doesn't find a car commercial revolutionary, but rather old school with new technology. Maybe if you try finding your way somewhere you can be connected with others who are also going there she adds.	

3.2 Female 20, Female soon 18, Germany

Questions	Female (20)	Female (soon 18)
Questions about city life		
What do you mostly do in the city you live in?	- Sport - Shopping - Meeting friends - Party	- sightseeing - going out with friends - shopping
What problems do you face in the city you live in?	- Bad traffic connections - More older people than younger people are living in my area. That makes it a bit difficult to connect with people of my age	- Bad bus connection (and they are always coming late)
What do you think would solve these problems?	- The bus connections could be better developed (For this you would most likely	- more bus connections

	have to deal with the traffic office) - In order for several younger people to get to know each other, it would be very helpful if they could be informed about current interesting events	- Busses should drive more often
What needs do you have when you go to a new city?	- When I go to visit a new city, I would love to do a city tour so that I can learn more about the city itself. I would also like to go shopping and go to restaurants	- sightseeing - shopping - trying out new restaurants
Questions about use of smart screens		
What kind of smart technology do you use? (Whatever uses internet)	- Smart Phone - I Pad - Smart TV - Alexa	- Smart Phone - I Pad - Alexa
What do you use it for?	- Social media - Research - News - Quick information	- for entertainment - for updates about the latest news - online shopping - Alexa
How do you feel about using new technology?	- I would say that I am something like a technology freak. I love to try them out	- I am always a bit skeptical at the beginning because no one really knows what (new) technology can do. For example Alexa, she always listens and she also collects a lot of information. In addition to that, no one exactly knows where all the collected data go to.
What problems do you face using smart screens or your computer?	- I love to use technology, but I am also a bit skeptical about some points. Like for example, Lice privacy. Since most technical devices use tracking services or webcams, I do not always feel safe. It is also really important to be careful not	- I have noticed that technology, such as smart phones or computers for example, don't last long and that they often break down after a few years.

	to fall into a chopper (hacker)	
What is the first thing that comes to your mind when you hear 'smart screens'?	- New technology - Big screen - A lot of colors - Lots of colors that attract attention	- When I think about smart screens, I imagine a screen that suggests different bus schedules and also different types of locations
Can you imagine what might be on a smart screen? / What would you like to see on a 'smart screen'?	- Emergency numbers - City Map - Information about tourist attractions - (Search field, so that you can search for something special) - Categories, about different offers, such as events, sport activities …	- I could imagine the screen to have a city map, advertisements and current discounts. In my opinion, I would find it very good if a smart screen contained such information
Where do you think such a smart screen should be in public?	- In places where many people are, such as the train station ore shopping streets. I could also imagine these screen on the edge of a park. I think that it is also important that the screen should not be placed near roads (where a lot of cars are driving), the screen could be disturbing and distracting.	- The smart screen could, for example, stand next to a bus stops, so that people can search for suitable connections
What is the first thing that comes to your mind, when you see the smart screen?	- The screen looks good and very modern. Probably the way people used to imagine the future. - Very High-tech	- I like the design because it looks so modern, but I can't imagine the screen in the city center, it looks a bit too modern and it doesn't really fit into the overall picture of an old city
Is there anything else you could imagine on the smart screen regarding the design?	- maybe a voice control	- It is actually really nice, when you can immediately see the

		weather conditions on the screen
Can you imagine this model in your city, if so which locations?	- The screen looks very High-tech, maybe a bit too much for an old city - The screen seems to be a bit too big and it takes up a lot of space. - (Nowadays people are trying to build as space - saving as possible in large cities, for example.)	- I can't imagine the screen in a old place, but I can imagine it in a very modern place
Slide 4		
What do you think of interactive 'smart screens'?	- I find it interesting that you can interact with the screen, but I also find it a bit scary that the screen films you - Apart from that, I could imagine that the screen could be used for interactive advertising	- I find interactive smart screens a bit scary because everything can be recorded immediately. You don't exactly know what is going to happen with the recordings
Would you be willing to try this type of smart screen, if not, why not?	- I could imagine that I would try the screen out, maybe because of curiosity	- I find the idea with the interactive screens very interesting, because you don't see it everywhere and it can catch a lot of attention.
Would you be fine with the public screens to use your personal data? Like Google, Apple and Facebook does?	- Since I use Google and Instagram every day, I know that a lot of my data got already collected. However, I find it frightening to see that a screen (that you don't know) keeps your own data. I would ask myself, what will happen to my data? (In addition, google has offers settings, where you can decide which data should be collected.)	- However, I would be concerned about the data that will be collected. I think that I will decide spontaneous.
Slide 5		
Do you think this kind of advertising could be helpful in the time of a crisis? Does it have an impact on you?	- Since I don't like spoilers, I would try not to pay attention to the advertising. I would look immediately away if it is possible. That is	- No, and since I'm not a fan of spoiler, I would look away

	why I think that the advertising will not have so much impact in the time of this crisis. Maybe a lot of people would look away	
Slide 6		
Did the crisis change your perception about technology integrated in public spaces?	- Yes, I would be more careful with the screens and I would most likely not touch them. - But I think that I will use contactless screens	- Yes, it did, and because of the bacteria everywhere, I would prefer to use a contactless screen
Slide 7		
Would you use this? Why/why not?	- Yes, I think that I am a bit competitive and the game seems to make a lot of fun	- I think that I will like to try it sometime, because it seems to make a lot of fun
Would a prize motivate you to use this kind of interactive advertising?	- Yes, definitely!	- Winning a price will definitely be a good motivation for me
Final question		
What is your opinion about smart screens after you have done this survey?	- I think smart screens are a good invention and that they can be very helpful for a lot of people. But I also think, that users should know what exactly happens to their data.	- To be honest, I didn't knew that smart screens could do so many things. I am very surprised at the progress of today's technology

8.61.1 3.3 Focus Group 1- 29th of April 2020

Questions	Female	
	Country: Romania Age: 20	Country: Sweden Age: 25
LIFE IN THE CITY What is the one thing that is most important to you in the city you live in?	The community- I come from a small town and for me, the most important thing are the people. If you go in the city, the majority of the people are familiar and you say hi to them. This doesn't happen in a big city, for example the city where I study.	Commute- it doesn't work as it shou Stockholm is not massive and you can w but I live in the suburbs and I am not able get anywhere without the tube so I need it to work.
What problems do you see in your city? How do you thing the problem should be solved?	High rent- There are few dorm rooms and not everyone gets a place and you have to find yourself an apartment. The prices are absolutely insane.	High rent- The landlords follow the mar prices instead of being up to each ren place. People even start protesting. Traffic, transportation in general

	Solution: more dorm rooms, the landlords should be more realistic	
Needs in a new city (where you go either to live or in a vacation)	Safety and attractions that are outside the box- different libraries, gardens, streets that are not that crowded Language availability in supermarkets and other places	How the city is built- good and b neighborhoods where to move around city and which are the safest place.
TECHNOLOGY What kind of smart technology do you use or own? What brands do you like and why?	Devices: iPhone, laptop, tablet Apple- it's really versatile to use it, you can do a lot of tasks with it (graphic design, taking notes, photo and video editing). I love the design and the simplicity of it.	Devices: iPhone, computer, iPad, wat smart TV, Xbox Apple- easiness, simplicity, design, it's e to understand and learn.
New technology- How do you feel about it?	I love it! I would love a smart house where everything has voice commander.	I adore it. I can't afford to buy all the r technology but I am one of those people t watch every new release whatever is a n phone, a new Tesla or anything else.
SMART SCREENS Do you know what I mean by that?	No	No
(explaining…) Have you encounter these smart screens?	Yes, in museums and shopping malls or in fast food restaurants to place an order.	The closest thing that I encounter are smart screens where you can find stores the mall.
What would you want a smart screen that is placed in a public space to do for you?	In supermarkets it will be cool to have a screen where you can scan your products there and it will show you the price of every product that you buy or the total amount that you have to pay before you go to the cash register. In city center- a smart screen that will show you where the exhibits or the places worth visit. In Italy they have these smart screens in big squares that are replacing the tourist centers and it will tell you what to visit based on your preferences. Also, the screen offers you direction to the place that you want to go and you will have more screens on your way there.	Smart screens in public spaces would great especially in big cities. I still stand commuting and how to get from one place another. As a tourist, usually you want walk and the distances are quite big or (you don't know that) so it could give y directions. Also, if you want to go to restaurant it could show you one based your preferences but without advertiseme I think would not be that easy to differenti one place from another. This screen wo be like a mini google maps.

What would make you use these smart screens instead of your smart phone?	The screen should have suggestions based on my preferences.	I think if it could be a little bit specialized. example, you press on some things and would show you personalized suggestio That is different from a smart phone!
Would you use these screens if it was in your hometown?	Yeas, I would use it!	Yes, because I always go to the same plac all the time: I have my favorite ba shopping centers, restaurants and if y have this kind of screens you can disco new places, events that are happening a you didn't know about it. I would love tha
POWERPOINT Design- What do you think about this? Where would you see it placed?	It's really nice and futuristic but you need to find a really good place for it because older people would be reticent to try that or to understand what it is. I would like it to be placed where are new buildings, modern architecture or advertising (it would fit really well in Piccadilly Square in London)	The screen doesn't invite you to interact w it and when it comes to public places, I wo like from the design to blend in, not to invisible so you don't notice it but to similar with the architecture. For example this picture the houses are beautiful and and the screen just stands out and it lo ugly.
How do you feel about the size? Would you like it to be only a screen?	Yes!	Yes! I would prefer only a screen. I like tha has a roof so you will be protected if it ra but for me, the bench is not necessary.
Do you think that the design should be different depending on the surroundings?	Yes, I think it's important to blend in.	Personally, I would like to blend in and adapted to the background and the city.
Facial recognition and data collection – How do you feel about that?	It's a nice idea but I think it has the potential to get mixed reactions from the public: some people might be scared, some excided. I don't think something like this it would be that welcomed because it's not your choice to interact with it, it starts automatically when it detects your face.	I think it's scary! I like facial recognition wh it comes to my phone because is a secu thing but if it's used in advertising there so many questions when it comes to integrity of that.
Let's say that they are not allowed to store it after you leave from there. Would that make a difference?	Yes, if who is behind this can't use this in their purpose it will be better or if they want to use it, they should ask for consent.	Yes! I think the fact that you can keep y integrity in these situations is re important!
How do you feel about public screens having access to your phone data, your search history?	No! Its invading my privacy!	BIG NO from me! Massive invasion!
But you share it with Google, Apple or other companies. What makes it different?	For me, when google, Facebook or Apple uses my data I feel like I am in a safe space. I know that this is not used for wrong reasons, they use it for	It's the fact that it's called public makes a difference.

	advertisement most of the times but in a public place I don't know the purpose.	
Would you feel different if you actively consent to it?	I don't know, probably yes.	It would make a difference but it a important who is behind the screens, wh making them, what is the purpose of t data.
Do you thing a partnership between us and google will make a difference? Would you let Google collect your data?	I am not 100% comfortable with sharing my data with anyone but when it comes to a well-known company, I would say that I trust them more than I trust some company that I never heard of.	I think it will make a difference. Wher comes to Google, I wouldn't say that I tr them, I just accept the fact that they own in some way. Both yes and no!
<mark>COVID-19</mark> NETFLIX- Spoilers What is your opinion about this?	I think it's good when companies have social oriented campaigns because they bring people who share the same values together and sometimes it contributes to the good of the society.	I am a big fan of companies that are tak initiatives like this one because I want know what values they have to see if they the same as mine so I will know from wh to buy or not things from. I like that they t a stand point in this situation.
It's not ruining the good cause because it's a corporation?	No	No
How do you feel about moving around in public spaces touching things? Would you be more hesitant from now on to touch a smart screen?	I think after this pandemic end there is going to be a fear that will remain but it will go with time.	Absolutely, during this period I am hesit to touch things but when it ends, most lik no!
<mark>Non-touch screen</mark> How do you feel about something like this?	I think it would work for the ones that are skeptical!	I think it will be cool to have hand sanitiz next to the screens during this period. Al a non-touch screen is interesting and fur try but I will not choose this just because safer.
<mark>ADVERTISING</mark> REEBOK- Are you fast enough?	I would try it and I think it's a good cause, it encourages people to exercise!	I love interactive things so I definitely wo try this! I don't care that much about sho I would do it because is fun.

3.4 Focus Group 2- 30th of April 2020

Questions	F	M		
	Country: Romania Age: 21	Country: Germany Age: 22	Country: Sweden but lives in The Netherlands Age: 25	Cou
<mark>LIFE IN THE CITY</mark> What is the main need that you have in your everyday life in your city?	Public Transport	Public transport and places where you can stay for a long period of time (benches, parks)	Public Transport Social life- to have things to do in the city	Pub

What problems do you see in your city? How do you thing the problem should be solved?	Traffic jams: We don't have a subway in my city, buses and cars are the main way of transportation and it takes a long time to go to one place to another even if the distance is short.	I live in Stuttgart and compared to other cities from Germany but also other countries, we don't have bike lanes and people want to use their bikes but they don't have infrastructure for it. Also, you are not allowed to take your bike in the subway during the rush hours.	Same in Sweden: we need bike lanes In Rotterdam: recycling, it's too much plastic that it goes into the ocean.	Pub we sub tran a bet Sol infr
When you go to a new city, what is your biggest need?	Orientation, places to have fun.	Social life- It's hard to find events when you are in new to a city. Or even if you find some, its hard for you to find everything that is happen in that city	Information about the social life.	Info pub
TECHNOLOGY What kind of smart technology do you use? From which brand and why?	Devices: iPhone, iPad, MacBook Apple- for the quality, beautiful design and their values. Also, they are really good for the content creators.	iPhone, MacBook, iPad Apple- because it suits my needs (MacBook- programming, iPad-taking notes, iPhone- communication). I also have a heart rate monitor from Garmin.	Huawei phone- good deal for the money MacBook- I use it in university	Sm wir sm lap San alw bra
NEW TECHNOLOGY- How do you feel about it? Are you excited about it or hesitant to learn it? Do you want to buy it immediately?	It depends on technology. For me, if it's something really different from what I know, I am hesitant.	Most devices that are new they don't bring anything that is necessary or special. For example, they have an extra feature that is there for nothing (I don't want to know what an app thinks about my sleep.)	New technology creates new need. I am satisfied with what I have and I don't want to buy anything that needs my attention.	I lo to I ca
SMART SCREENS Do you know what I mean by that? Have you encounter these smart screens?	No!	We have one in my town that gives information about the public transport but I've never seen anybody use it, they are really bad and it takes 2 or 3 seconds for the screen to react when someone touch it. Most people just use their phones.	Yes, I know what they are. I had an interaction with one in the city I live in that was there to give information based on categories. I think that the screen should be helpful but not invasive.	In the tha the

What would you want a smart screen to do for you?	It would be nice for a screen to show pollution level and ways you can reduce it. It could be placed in the most crowded places in the city. (city center, universities area)	To be honest, I don't see for myself any case where I would use a smart screen because most of the information that I need I can easily access with my phone but it will be interesting to have a screen for a specific area from a town that shows you things to do in that area. If you just walk by the city and you don't have a specific plan these screens could be helpful. Also, it would be interesting to have a feature that you don't have on your devices. For example, in Freiburg, Germany there is a smart screen that shows the overall noise level so in the night there are people that are really loud and you can see on the smart screen at which level the police is called to come to that place.	It would be nice to have a screen that can make society better by giving useful information: ways of reducing Co2 emissions, public transport. Hint: There was a campaign in Sweden and it had this message: if 100 people would leave their cars at home and they will take the bus, it will be just 1 bus instead of 100 cars. The content should be helpful, not invasive and it should be adapted to the community's needs. Placement: near restaurants, malls, bus stops	One exp had scr Fin sto scr rea info the had you you wou hel Ant kno bus the late
Would you like to interact with these smart screens?	I think that even if I have all the information on my phone, I will interact with the screen out of curiosity. In my city would be something new, there are no interactive screens and I think people would be curious to try it.	*he answered in the previous question*	Yes, because it simplifies the process of searching for things that you are interested in.	I w the offe info nee
POWERPOINT Design- one word to describe it	nice design	no seats	sterile	futu
What do you like/don't like about it?	I like that is minimalistic. If it is something interactive it shouldn't have a seat and the fact that	I like that is sustainable with the solar panels but it looks like a cinema: you have one seat from where you can see the screen and it seem like a place	It doesn't look appealing at all. The background is historical and the design doesn't fit in.	If y this son futu wou cer

	you have to interact with it is not clear.	where you should look at a movie. It doesn't invite you to interact.		old sho the sou if any any Ant get am tha
Facial recognition What do you think about this? Would you enjoy this kind of technology?	It was really interesting and engaging at the beginning but then it became scary. More important that the purpose itself (engagement) is who comes with it and if that person/company wants to harm you in some way.	I don't see any use case for non-commercial purpose. It's too invasive.	It's invasive, it seems harmless but there are children involved and it's not ethical to have access to their data without the parents' consent.	I tha kno wou acc inva
How do you feel about sharing your data with a public screen? (search history or other information that you share with Apple, Google, Facebook)	I think right now we don't realize that these companies have so much information about us. When it comes to a public smart screen, I don't want to give my data to it.	The difference between giving your data to this companies and giving your data to a smart screen is that when you search on google for example, you are alone and only you can see what you are doing but when you search from a smart screen, other people can see what you are searching for. I don't think is a good idea: the smart screen is to public to use private data!	I am critical with this: when you allowed to browser to have access to your data is usually for commercial purpose and after, you will receive personal advertising based on your searches and your preferences and you end up buying things that you don't need just because they advertise a certain thing at a right time. I don't want to give my data to a public screen for it to create more needs that I don't have.	-
Covid-19 Do you think you would be more hesitant to touch a smart screen in a public screen after the pandemic?	Yes! In my country the public health is not that good and people don't trust the authorities. It's difficult to say when things are going back to normal and we will not be afraid to touch things that are placed in public. It's different	For me, no!	I think it depends on where you live in and how much the virus affected your country!	No!

	from other countries from this point of view!			
Non-touch screens- Do you think it would be better to use a non-touch screen after this pandemic?	I think it will be a better choice in this situation. It's a clean environment and an insurance for people that they are in a safe.	I don't know!	It depends on the target. If it's for the young people I think they would adapt easy to this kind of technology but if the screen is for older people, they probably wouldn't use it because is something new to them.	-
Netflix- Spoilers What do you think about a campaign like this?	It's engaging but frustrating!		Good cause marketing!	
Advertising Rebook- Are you fast enough? Would you interact with these kinds of games/screens?	Yes! If there is a prize involved it increases the chances for me to do that.	Yes!	Yes!	Yes

8.61.2

Content for social screens

Features

- Eat & drink
  - Bakeries
  - Coffeeshops
  - Bars
  - Restaurants
  - Supermarkets
  - Local specialties
- Museums
  - Arts
  - History
  - Science
  - City tours
- Healthcare
  - Pharmacies
  - Doctors
  - Hospitals
  - Psychologists
- Transportation
  - Busses
  - Trams
  - Taxi
  - Trains
  - Bicycles
  - Car rental
  - Airport
- Events
  - Concerts
  - Theater
  - Sports games
  - Lectures
- Sports
  - Gym
  - Running areas

- o Football courts
- o Basketball courts
- o Yoga studios
- o Swimming
- Shopping & Fashion
  - o Clothing stores
  - o Local Fashion Brands
  - o Interior design
  - o Children's stores
- Day plan
  - o Half a day
  - o Whole day

Language options
- English
- Dutch
- French
- German
- Spanish
- Mandarin

Pagina-einde

Restaurants
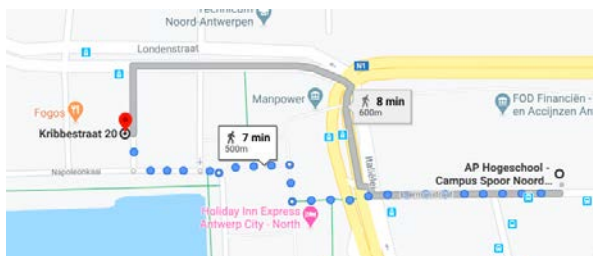
Opening hours

Wednesday – Sunday 10:00 – 18:00

- Vegetarian friendly
- Child friendly
- Lunch restaurant
- Rainy days

Pagina-einde

SATAY

Unique saté dishes inspired by the Asian street food scene.

Tuesday12:00 — 15:00
18:00 — 21:00
Wednesday12:00 — 15:00
18:00 — 21:00
Thursday12:00 — 15:00
18:00 — 21:00
Friday12:00 — 15:00
18:00 — 22:00
Saturday12:00 — 15:00
18:00 — 22:00

MORE INFORMATION

Payment means: American Express, Cash, Visa, Mastercard, Meal Vouchers, Wire transfer, Payconiq, Bancontact Mobile App

Free Wi-fi

Wheelchair Access

Catering

Meals served: Dinner, Lunch, Desserts

Aircon

Wijngaardbrug 8
2000 Antwerpen
België

+32 3 435 87 90[Einde van tekstterugloop]
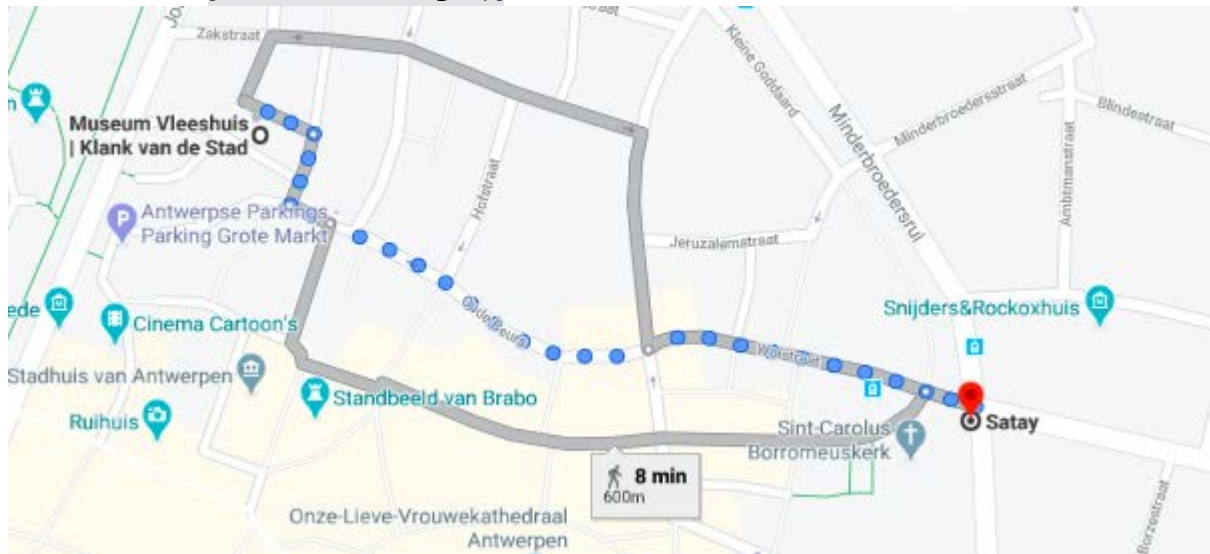
APPELMANS®
BRASSERIE
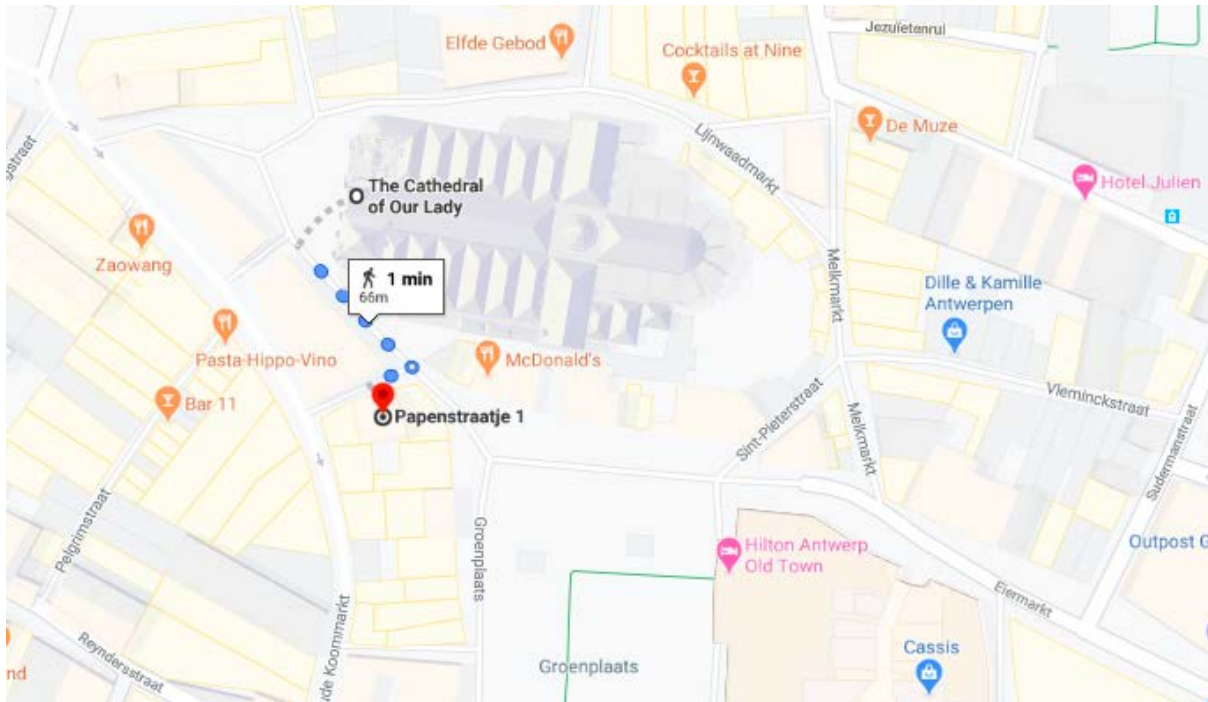
Opening hours
Mondays to Thursdays
Bar 16h – 0h30
Kitchen 17h – 22h
Fridays and Saturdays
Bar 12h – 2h30
Kitchen 12h – 15h & 17h – 22h
Sundays
Bar 12h – 0.30
Kitchen 12h – 15h & 17h – 22h

OPENING HOURS

Monday	11:00–22:00
Tuesday	11:00–22:00
Wednesday	11:00–22:00
Thursday	11:00–22:00
Friday	11:00–23:00
Saturday	11:00–23:00
Sunday	11:00–22:00
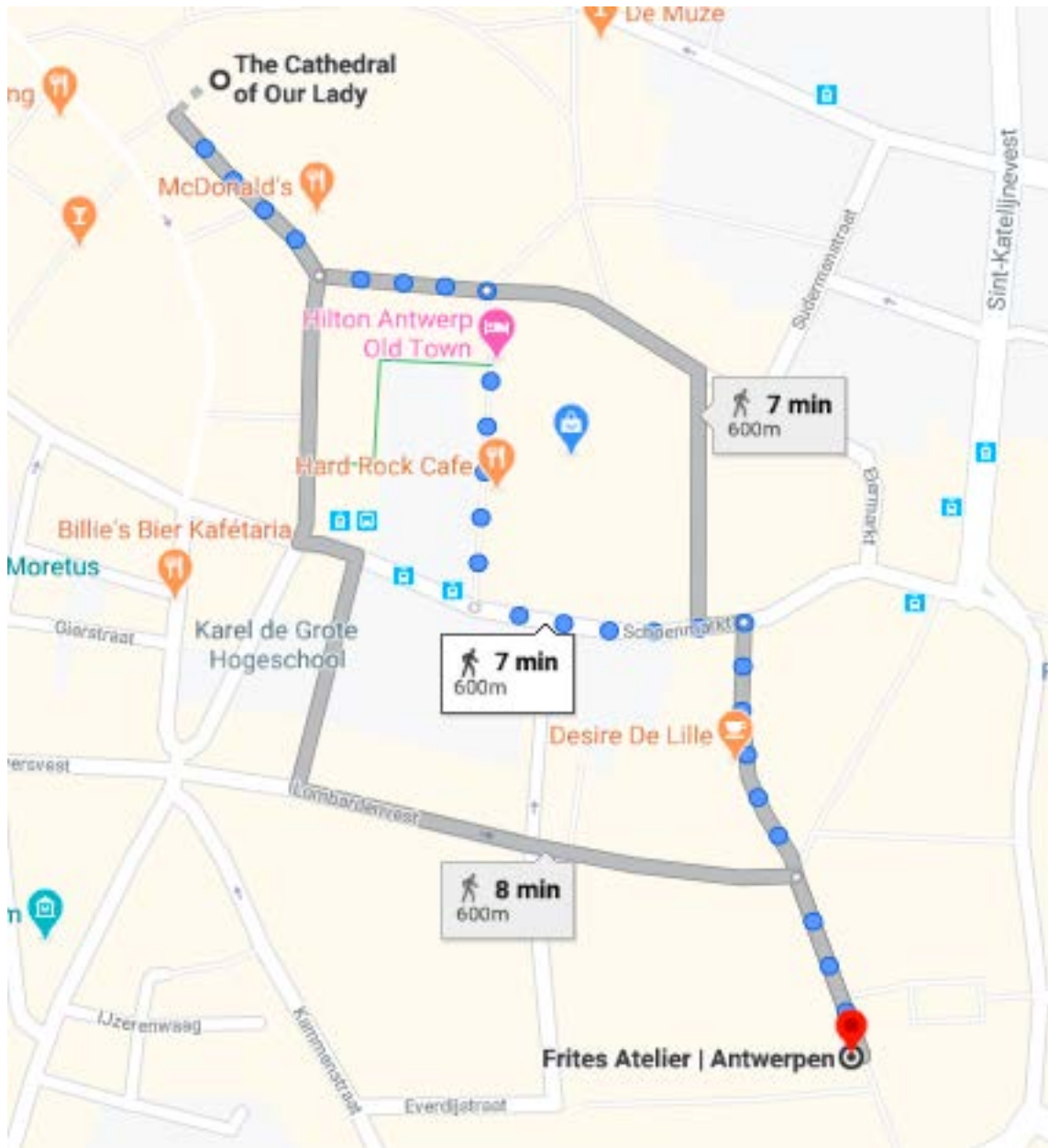
Bar Noord

Opening hours

Every day of the week 10 am – 12 pm

3 April to 4 October 2020

What does this mean? Bij slecht weer kunnen de deuren vroeger sluiten.

BAR NOORD
PARK SPOOR NOORD
2060 ANTWERPEN
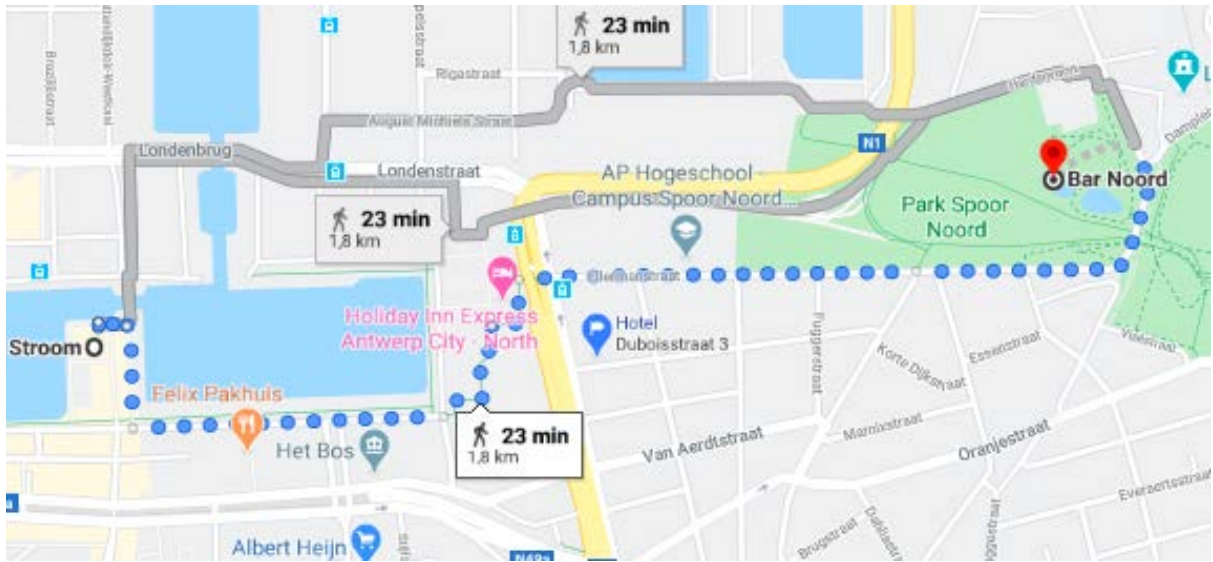
David and Margot-persona description

A family that has a lot of devices in the house. They have problems using new technology because the devices, from their point of view, have complicated interface. They don't buy expensive gadgets because they are not interested in the design or any specific feature. They need simple and fast but not too expensive technology. Most of their time is spend at work and in the weekend, they are going out with the kids.

They don't have too many friends and for them is important that they city they live or travel in to have recreational spaces and playground for children and restaurants that suits their family. They are from Gent, Belgium and they occasionally visit Antwerp because they like train rides but the kids do not have patience for them to visit places that are further away so an hour with the train is the perfect get away from the city.

They prefer to spend time with their kids in the weekend and they are not a very social family, they don't like planning and their getaways are usually spontaneous and for that reason, they find themselves in situations when they arrived in a new city, kids are crying and they don't know which restaurant is the best for them or where to find parks for the kids to play.

David and Margot-user scenario

Month: June
Weekday: Saturday
Weather: Sunny
Time of day: 12 in the afternoon
Location of Screen: Central Station
Height F:164 cm
       M:180 cm
Amount of people: 4

They search **Eating & Drinking**; Lunch; Local specialties. But they decide they want traditional Turkish food, since they prefer that, and look for **Turkish restaurants** under the tab **International food.** They find **Mevlana** restaurant in Borgerhout. Now they that they need to use public transport or a taxi to get there. The screen knows this and shows examples of how to get there and how long it will take.

They choose public transport, meaning they will take the tram.

Buying tickets for the tram on the screen. (QR code)

They eat at Mevlana restaurant and now, they need a recreational space for kids to play so they search on the screen that is located in Borgerhout and they find Park Spoor Noord.
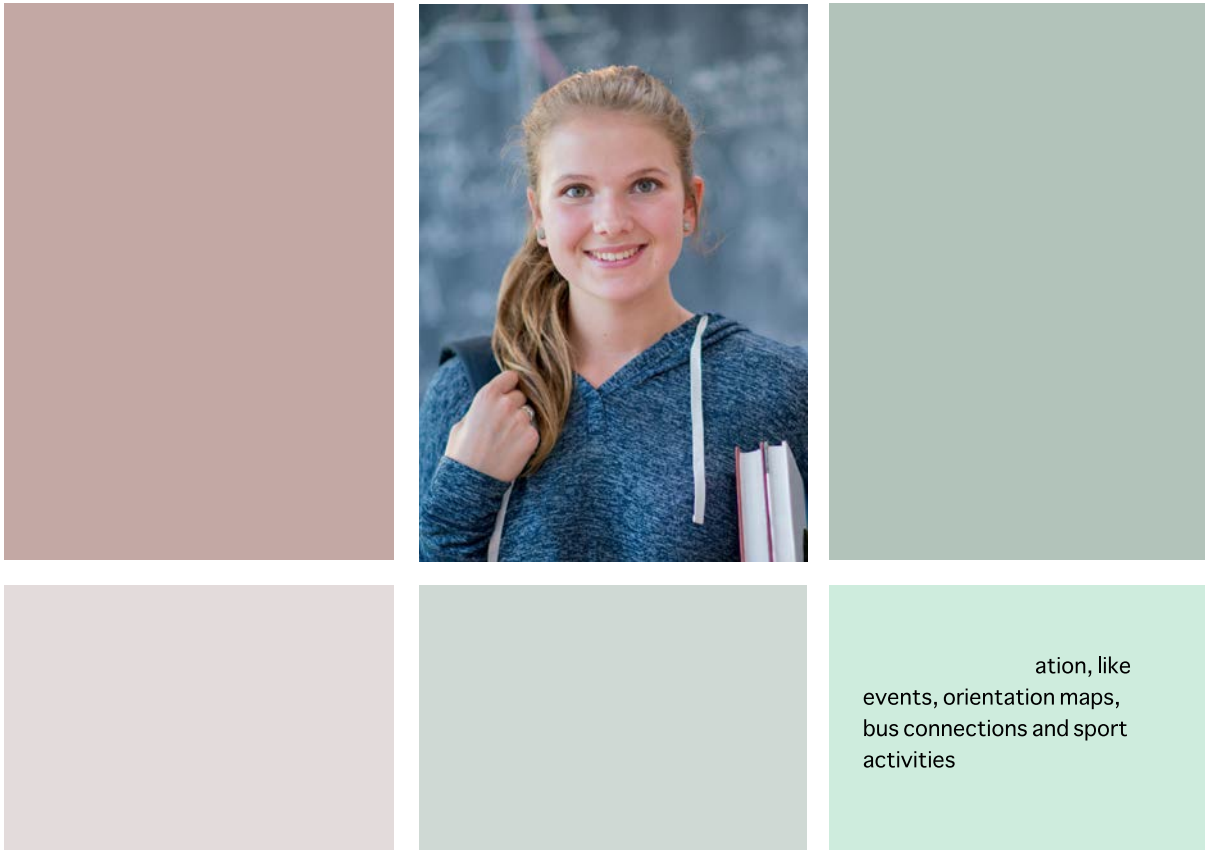
ation, like
events, orientation maps,
bus connections and sport
activities

Problem / Solution

Cim is a young student, who likes to take a lot of pictures in her free time.
She also likes to keep things simple, that means that she don't really pay much attention to branded products. Besides that, she often likes to ride her bike on a sunny day. However, whenever it is raining, she has to take the bus in order to reach her destination.

Solution:
The screen could offer a "real-time tracker", for buses

The "real-time tracker" should be able to answer this questions:

- At which stop is the bus currently located?
- How long does it take for the bus to arrive?
- Are there any better connections that can get me faster to my destination?
- Is the Bus fair for the disabled?
- Does the bus still have space for a bicycle?

Problem:

The bus connection in the city is not really good. Sometimes you can't be sure if the bus will arrive on time, or if it will fail completely.

Josef García

Age: 79
Education: Retired Engineer
Language: Spanish
Smart Screens in city: Should be placed where people live, not just in tourist areas. Would use them.
Smart devices: Smartphone, tablet, computer
Tech brands: Samsung. Cheaper than Apple and more compatible.
Tech use: Messaging, research travel and finding information. "I only use 20% of the devices capacity."

Curious   Logical   Reflecting

Maria García

Age: 77
Occupation: Retired Anthropologist
Language: Spanish, little French
Smart Screens in city: Would probably not use them, but seems useful for tourists in new cities.
Smart devices: Smartphone, tablet, computer.
Tech brands: Apple, because daughter chooses them.
Tech use: Contact with family and friends. Confident user. "It makes the world smaller!"

Social   Active   Persistant

NEEDS & PREFERENCES
Easy access to transport.
Easy access to healthcare.
Information about activities for elderly.
True and reliable information.

PAIN POINTS
People not showing the way.
Learning new technology.
Insecurity about ability to use new technology.
Too crowded cities.

MOTIVATIONS
Explore history of a new city
Learning facts about a new city.
Finding nature and green areas.
Calm activities.
Familiar activities.

Scenario Josef & Maria 65+

Tourists in Antwerp
Josef and Maria are tourists in Antwerp and have just had breakfast at a café in the historic parts of the city. They are now strolling a bit before returning to their hotel where they will ask for places to visit in the city. They are walking towards the Schelde, crossing Grote Markt and the statue of Brabo. At the corner of the city hall is a smart screen. First, they see the screen showing them: **"Tap here to discover the history of Antwerp"** and a hand animated as if it was clicking. There is also a big image in the background showing a historic site.

Noticing the Screen
Josef notices the screen. "Look, it says discover history." Maria is skeptical and says, **"It's probably just advertising**, let's go to the hotel to ask for places to visit." So, they walk towards their hotel at Groenplaats. In the middle of the square there is another one of those screens and there are some people touching the screen.

Dismissing the Screen
"It's not just advertising, you can click on the screen," says Josef. "That's **too complicated** for us Josef, **it's for younger people**," Maria replies. She doubts that she will understand how to use it and thinks it will be too much work."We can ask the ones using it," says Josef, since he thinks it would be interesting to see if the screen works like their tablets. "I'm going to the hotel to ask for help, you do whatever you want," says Maria who is now getting annoyed by this screen that she finds unnecessary.

Choosing the Hotel over the Screen
Maria goes to the hotel to ask for historical sights and museums to visit and Josef goes to the screen. After getting a map and instructions, she asks the hotel worker, in French again, what these big screens do. Her **knowledge in French isn't so good** but she understands that they are a bit like tablets or smartphones, where you can look for things to do in the city and then have instructions. "But **I can just do that on my smartphone,**" Maria replies. "Why do I need a big screen in the middle of the street?" The hotel worker says the screens adapt the information to where they are placed and that they are owned by the city of Antwerp.

Learning about the Screen
Meanwhile, Josef is outside the hotel trying to understand the screen. He is looking at what the younger couple is doing, but he is a bit too shy to ask since they probably don't speak Spanish. When they leave, he is just about to approach the screen when Maria comes. "Did you ask them to show you?" he asks. "No, I didn't want to disturb them," Josef replies. "At the hotel they told me it's like a big tablet or smartphone, and that the city owns it," Maria explains.

Wanting to use the Screen
Maria shows the map she was given by the hotel and proposes that they first visit the Plantin-Moretus museum since it is in walking distance. They visit the museum and afterwards they see another smart screen on the square outside. "These screens are everywhere in the city," says Maria. "This is for the younger generation." But Josef who is now starting to think that they might need to learn how to use them, if the city has put them everywhere. Maybe for transport you can only get tickets on the screens? **"If it is everywhere in the city, we might need to learn how to use it.**" They automize everything these days, like the payment at the supermarkets," says Josef.

Using the Screen
Therefore, he tries to use the smart screen outside the museum. He clicks it, and the first thing he sees is the language selection. He chooses Spanish and lands on the main page where he can choose between See & Do, Eat & Drink, Dayplan and Healthcare. Now Maria is also looking, and she points at See & Do, because she thinks here will be information about historical sites and museums. Josef clicks and they are shown historical sites around the area, the Plantin-Moretus and the Cathedral of Our Lady.

Needing the Screen
Now they want to go back to the main menu but are both **a bit confused until they see the main menu button** that they recognize from their tablets. Now they find their way to healthcare, because Josef realizes he has forgotten his blood pressure medication in Spain. He needs to sit down so Maria searches for pharmacies on the screen and finds suggestions for one that is just around the corner. She is shown a map with directions and a QR-code to scan the map into her phone. She understands the map but is **confused by the QR-code** and asks Josef what to do. He suggests that she should take a photo of the map on the screen, which she does before they walk to the pharmacy.

Sceptical but Pleased with the Screen
Even though they were skeptical about the screens in the city at first, they both are now more willing to use them. Especially Maria who was hesitant to use the screens since she thought it would be too difficult or her, has changed her mind. Josef thinks it's necessary to learn how to use them to get around in the city, while Maria likes that the screens showed her a small selection of places nearby. They both **appreciate that the screen is in Spanish**, so they really understand the information, instead of having to rely on Marias brief knowledge in French when asking for help. It also **feels like the information is reliable and correct**, since the city owns the screens.

Appendix - Report IT

European Project Semester

Academiejaar: 2019-2020

Ben Vinck

Appendix - Report IT

European Project Semester

9 IT background

In web development, there is a front end, a back end, and a database. The front end is the part that end users will interact with. The back end is the underlying functionality that makes the website work. The database is where data is stored
To speed up development there are many frameworks available for both the front and back end. Frameworks are pre-built packages of code that provide additional functionality. What frameworks are used depends on the needs of the project and the preferences of the developers.

9.1 Back end

The Meteor is a full-stack framework that was chosen because its features were suited for the smart screen. A full-stack framework is a framework where only a single programming language is used for both the front- and back end. For meteor this language is JavaScript.
The reasons why it was chosen are:
- Integration with many different front end frameworks.
- "Full-stack reactivity". This allows the app to live update when data changes. An example given by Meteor itself is a todo list. When a new item is added and saved in the database, it will appear on any website which is displaying the list.

9.2 Database

With databases, there are two major types, relational and non-relational. Relational databases are structured by the different relations between the different kinds of data they store. For example, a building will have multiple floors, which will have multiple rooms.
A non-relational database thus is a database that does not have the same system of using relations.
Meteor uses a non-relational database, MongoDB, by default. As the data that needs to be stored are just lists of items with no relation, MongoDB sufficed. The way that MongoDB stores data is in collections. These collections can contain BSON documents. These documents are the actual data being stored.

9.3 Front end

Angular and React are by far the two largest front end frameworks available, backed by Google and Facebook respectively. I used Angular in the past but was not a huge fan of it, and as I am also not a big fan of Facebook I went with for another framework, Vue. This is the third-largest front end framework available.

9.4 TypeScript

The programming language used by modern web browsers is JavaScript. TypeScript is a superset of JavaScript. This means that all Javascript code is also valid TypeScipt. And being a superset, Typescript adds extra features and static typing.

9.5 Google Places API

An API or Application Programming Interface is a software intermediary for two pieces of software to communicate. The Places API by Google allows other software to access the places data from Google Maps. These are things such as restaurants, cafes, museums, hospitals, etc.

9.6 Caching

Caching is the temporary local storage of data to increase performance by preventing the need of requesting the same data every time it is required. This could for example be an image on a website you visit regularly. Because the image is already cached it is not required to be downloaded again. Caching decreases loading times and data usage.

The smart screen requests data from the Google Places API and caches the result. This increases performance and decreases costs by limiting the number of requests to the Places API.

Every day the age of cached data is checked. When the data is older than 7 days a new request to the Places API is made to refresh the existing data. This way it keeps data about the place, such as opening hours and ratings, reasonably up to date.

9.7 Terms of Service Caching problem

Google Maps Platform Terms of Service has a point that was overlooked. Under point 3.2.3b it states "**No Caching**. Customer will not cache Google Maps Content except as expressly permitted under the Maps Service Specific Terms.". The exception stated is the id of places. As this problem had been encountered too late in development, it was decided to ignore the terms of service as there was insufficient time to switch to an equivalent API.

10 Smart Screen Software

Because the design for the UI was still being developed and changing constantly, the mid-fidelity prototype of the design is being used.

10.1 Database

The data stored are lists of local places like restaurants and hospitals. These lists are divided into categories: fooddrinks, healthcare, museums, sports, shopping, events, and transport. The names of the lists are thus prefaced by the category. For example: fooddrinks.restaurants and healthcare.hospitals.

10.2 Client

The client starts in the client directory, it contains main.html, main.js, and App.vue.
main.html is the file that the web browser will display, it contains no content besides the necessary base to make the website function.
App.vue contains the actual content of the website.
main.js will call the startup file, index.js, from imports/startup/client/.
index.js initializes a Vue instance and it imports App.vue and main.html. Here Vue will take the content of App.vue and insert it into main.html. This now the content of the website is being displayed in the web browser. Vue will also import the router from router.js. The router is responsible for the navigation between different pages on the website.
router.js thus imports all the pages from imports/ui/pages/.
The pages are Vue Components that contain the content of a single page. Thes pages are sorted into different categories. These are the same as the categories used by the API.
Because some pages reuse the same elements such as buttons, these elements are moved to their separate component in imports/ui/components/.

Vue Components are custom elements that can be reused. They are made out of 3 parts: the template, the style, and the script.
- The template contains the layout and more components.
- The style specifies how the components are styled, this includes things like colors, fonts, and margins.
- The script adds functionality to the component.

The components in the global folder are imported by index.js which makes these components available everywhere without the need to import them individually.

10.3 API

The API in imports/api/ is categorized into multiple folders
The apis/ directory contains the external API's that are used with google/ being the Google Places API and antwerp/ being the Antwerp Geodata API.
google/ contains 3 files.

- Methods.ts contains the functions used by the API. Currently, only one function is used, this being a request for nearby places.
- ApiKey.ts contains the key required to access the Places API.
- Parameters.ts contains extra parameters used by Methods.ts.

antwerp/ currently contains 2 files. Methods.ts is the same as for the Places API. IResponse.ts is used to process the data that is received from the Antwerp Geodata API.
Further, there is a directory for each category used in the database. These contain 3 files the CategoryName.ts file will initialize all the collections from that category so the data can be accessed. Publications.ts will make a publication of each of the collections of that category. The publication will make the data available to be used inside the Vue Components. Methods.ts contains the methods for the items in that category. These are startup, update, clear, and placeholder. Startup will check if there are documents inside the collection. If the documents are older then the specified date, or if there are no documents, an API request will be made to update/fill this data. Update will only check for date and update the collection if it is too old. Placeholder will clear all the documents and replace them with placeholder data from Placeholder.ts.
Because these methods are similar between categories they all refer to the same methods in imports/api/management/collections/Actions.ts. This abstraction cuts down the amount of duplicate code.
Further, in management/collections/ there are 3 other files.

- Collections.ts initializes the management.collections collection from the database. This collection is used to store data about other collections. Most notably, when the collection was last updated. This is how the system keeps track of when it needs to update the existing data.
- Publications.ts does the same as for the other categories.
- Methods.ts only contains the clear method.

10.4 Server

The server starts in the server directory. It only contains the import of the index.js file in imports/startup/server/. index.js will import the two other files in the startup/server directory.

- register-api.ts will register all of the method and publication files of the API by importing them. This makes them available to use for the rest of the application.
- api-load.ts will load in the API by running the startup methods of all categories and configuring the update method to run every day.

10.5 Smart Screen software diagram

On the following page is a software diagram. It shows the file structure of the project and aids in viewing the relations that files have with each other. The large black, red, and green borders are directories. These borders are nested inside of each other and indicate that this directory is inside of the other directory. The names of the directories are listed in the top-left corner of the border in the same color as the border itself. Inside of the directories are squares. These are the files, their filename is written inside of them. The blue and purple files are imports. If the contents of a file are imported somewhere, an arrow will point to the file where it is imported.
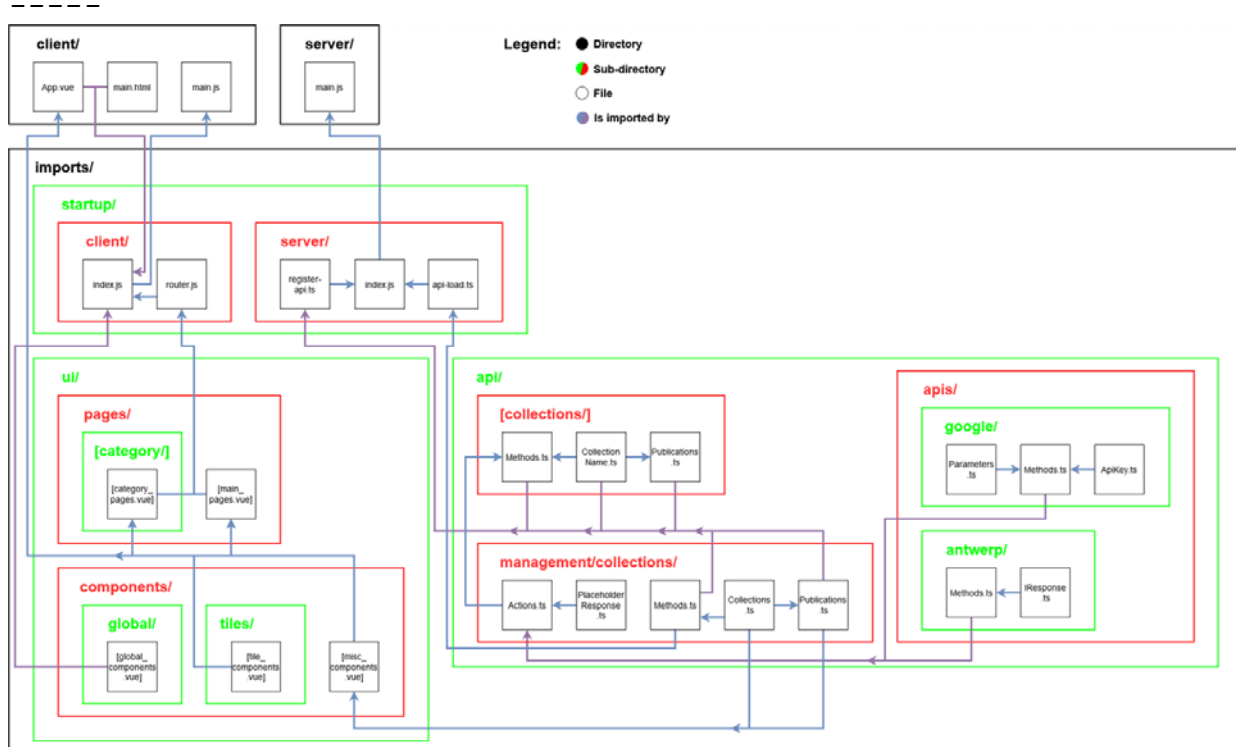
DESIGN APPENDIX

European Project Semester

Mario Gómez y Eric González

ARTESIS PLANTIJN
HOGESCHOOL ANTWERPEN

11 APPENDIX IV: ERGONOMIC STUDY

11.1.1 Definitions

From a general perspective, the definition of ergonomics is an attempt at delimitation: "indication of the purposes or limits of a person with respect to others (people or objects)". This means that every aspect of the design that is taken into account for Smart Screens must be studied. One of the first tools is to "put yourself in the user's place". Although it is always useful to start in this way, the science of ergonomics gives tools and studies so that the designs developed have a more scientific and therefore more realistic character, and in the end useful and better.

First of all, the designer places himself in the user position thinking about what he can and cannot do. However, we will proceed to use statistical values of the population as a whole to know the measurements of the possible users and to be able to define how high the users reach, which movements are comfortable, which are not...

Two main choices could be distinguished when developing the measurements of an object taking into account its ergonomics. First, it is the design following the means or standard values taken from the population. That is, determine the average heights of the group of possible users and from there develop the screen to adapt and be comfortable for the user.

Secondly, use the "design for ends". Examples will be used to understand this type of design. When manufacturing a chair, the height of the seat is measured following the average standards of people or possible users, because the extremes, both very tall people and very short people will be able to use it equally, it may not be comfortable for the user of a height 2 meters, but could still sit. However, when manufacturing a door or tunnel or something similar, design for ends should be used, because if the door is designed for the average height of users, people who are extremely tall, even if it is a population group They could scarcely pass underneath because they could be struck, and yet the shorter people are not affected by the higher door. This in conclusion supposes, for example, and although it is perhaps surprising, to design following the measurements of women. On average, men are 10 to 12 centimeters taller than women, and following what has been said, a screen that can be used by a 1.60 m user can be used by a 1.95 m user. Probably not the other way around.

Lastly, it should be added that what is being explained refers to the reach of the hand, and therefore, the height that the tactile part must have. This may mean that the screen is higher, but that there is no need for touch, i.e. no point on the interactive screen above the height to be calculated in this study, and therefore the visual screen may be more large since the visual range, obviously, is much wider.

Explained this, it can be concluded that for the development of a touch screen, it must be designed with extremes in mind. If you think about the average, a person who is shorter than normal may not be able to touch the highest part of the screen and therefore their possible use of the device would be null. This would be a serious mistake as product designers. Without falling into an excessively small design, if the screen is a few inches lower, it may be a little more complicated or uncomfortable for an extremely tall person, but you could still use it. So it would not mean losing a user, but it would allow those shorter people to use it.

As the use of the screen is for a very short time, with less than 10 interactive gestures in the total use, it is not necessary to take into account specific protection measures or care regarding the gestures of the user, since they do not exist repeated repetition may not cause any injury during use caused solely by it. To put a simile, a teacher writing on the blackboard of a classroom, that in what is available to the panel or screen-blackboard and the position of the body are very similar, it is not the same to have to write, which supposes a continuous movement pressure with the arm in different positions and for hours, for years. Therefore, a more specialized study is ruled out. Even so, it will try to design a size as comfortable as possible both for the gestures of the user and to be able to see the entire screen with a comfortable and non-harmful position of the neck and eyes.

11.1.2 Anthropometric variables

An anthropometric variable is a characteristic of the organism that can be quantified, defined, typified and expressed in a unit of measurement. Linear variables are generally defined as reference points that can be precisely positioned on the body. The reference points are usually of two types: skeletal-anatomical, which can be located and followed by palpating the bony prominences through the skin, and virtual references, which are defined as maximum or minimum distances using the branches of a caliper.
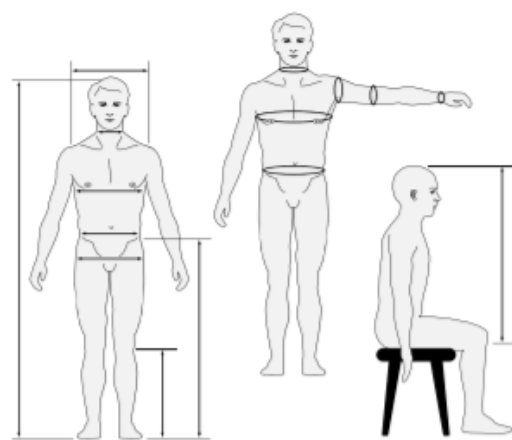
Anthropometric variables have both genetic and environmental components and can be used to define individual or population variability. The choice of variables must be related to the specific objective of the research and typified by other types of research in the same field, since the number of variables described in the literature is extremely large: up to 2,200 variables have been described for the body human.
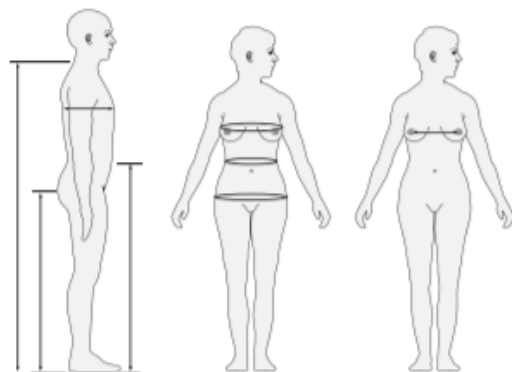
Anthropometric variables are mainly linear measurements, such as height or distance from the reference point, with the subject sitting or standing in a typified posture; widths, such as distances between bilateral reference points; lengths, such as the distance between two different reference points; Curved measurements, or arcs, such as the distance on the body surface between two reference points, and
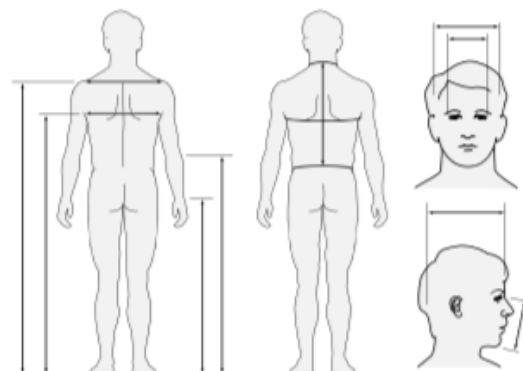
perimeters, such as measurements of closed curves around body surfaces, generally referred to at least one reference point or to a defined height.

The study of muscle work will also be omitted as it is considered so scarce that it can be omitted.

11.1.3 Variable systems

An anthropometric variable system is a coherent set of body measurements obtained to solve a specific problem. In the field of ergonomics and safety, the main problem is to adapt the equipment and the workspace to people.

The equipment and workspace primarily require linear measurements of limbs and body segments, which can be easily calculated from reference heights and diameters.

For the correct design of the screen, the following variables will be taken into account, with the aim of developing the most ideal possible and at the same time simplifying the design. These will be:

- Height
- Eye height
- Shoulder height
- Arm reach outstretched (maximum reach)
- Maximum reach height by hand (maximum and minimum height)

The screen width measurements will not be taken into account, because the ability of an average person to cover a space horizontally, that is, without having to move, can view the screen and touch anywhere from one end even the other with a single arm is about 96 cm for a man, about 88 cm for a woman, in any case it is more than enough to cover the width of the screen that is intended to be designed.

In addition, it should be noted that in terms of horizontal movement, although the user could move to access the screen, the goal is to make it as comfortable as possible, both for gestural and visual interaction with the screen. For this reason, these values have been taken to establish the maximums in width, however, it is concluded that they are more than sufficient for the objective that the group intends and therefore no further details will be entered.

11.1.4 Perceptual capacities and limits

11.1.4.1 Sensory limits

The first category of limits in the information process is sensory. Its importance in this process is evident, since when the information signals approach the perception thresholds, the process becomes less reliable. This statement may seem trivial, but sensory issues are not always taken into account when designing. For example, the alphanumeric characters on signs and information signs should be large enough to be distinguished at the proper distance, always depending on the action being taken.

Readability, however, depends not only on the absolute size of the characters but also on the contrast and, due to lateral inhibition, on the amount of information in the signal. Readability is a problem important enough for special measures to be taken, particularly in low visibility conditions (for example, while driving or piloting in rain or fog). The latest traffic and road signs have been designed with these factors in mind, but the information signs next to and within buildings are quite often practically unreadable. Screens are another example in which the sensory limits of size, contrast and amount of information play an important role. At the hearing level, some of the most important sensory problems are related to the understanding of verbal messages in noisy environments or to the low quality of transmission or hearing systems.

11.1.5 Distinction of characteristics

Once sufficient sensory information has been obtained, the next stage in the information process is to distinguish the characteristics of said information. The most recent research shows that the analysis of characteristics precedes the perception of meaning. This analysis is especially useful for locating a special object among many others. For example, an essential value on a screen that contains many other values can be represented by a different color or size, and this feature will automatically highlight the value. Theoretically, "feature maps" are considered to exist for different colors, sizes, shapes, and other physical features. The value of attention to the characteristic will depend on the differential activation of the feature maps belonging to the same class; for example, color. Activation of a feature map will therefore depend on the ability to discriminate different features. This means that when there are many colors on one screen, most color feature maps are activated in the same way, and none of the colors stand out more than the others.

Here again, since the objective is to be able to offer a service to the entire population, the design should be taken into account for those with greater visual difficulties. Therefore, although for a young person, thanks to his good visual capacity, he can read a text in small print; a person over 65 may not be able to. Therefore, the texts or characters that appear on the screen must be adapted to people with less visual capacity.

Once all this is explained, the data obtained from databases and own studies will be exposed.
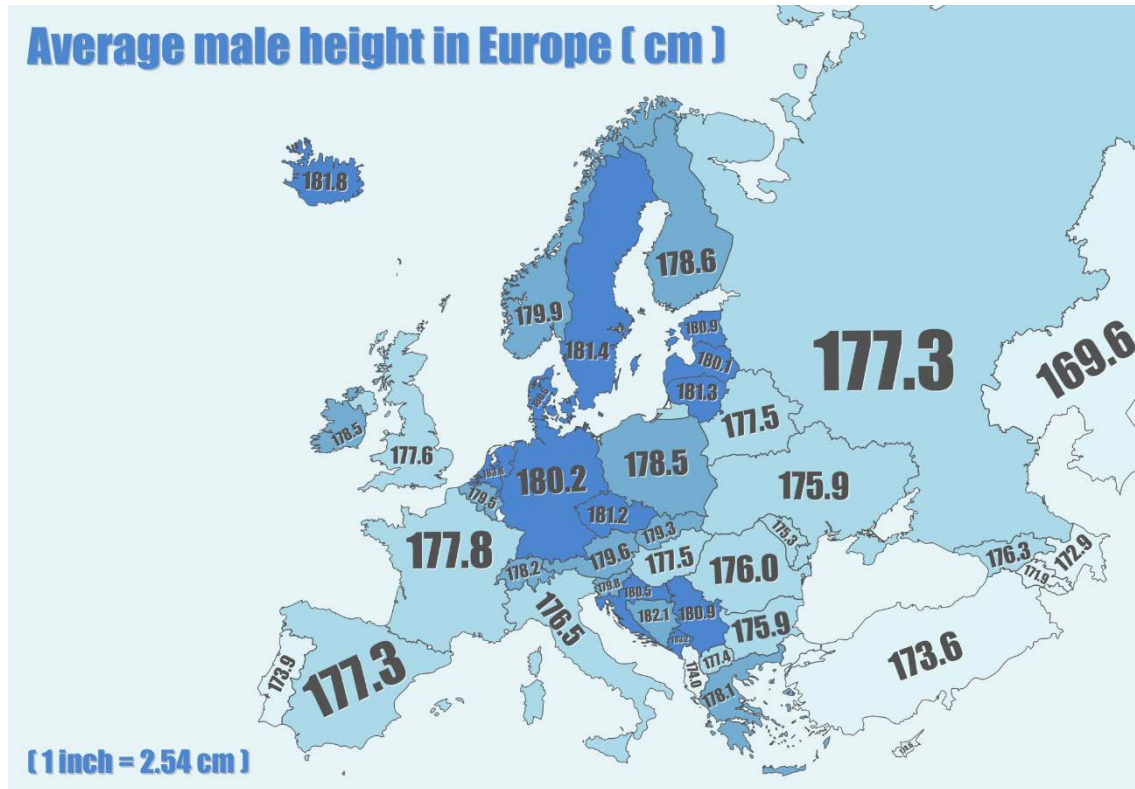
The average height of male European citizens is approximately 1.78 meters; for women it is 1.65 m. Depending on where the data is obtained, these figures vary slightly 1 or 2 m above or below. Furthermore, the data for Belgium is similar to the European average, specifically it is the same for women, 1.65 m; and slightly higher for men, between 1.80 and 1.81 m.

The measurement of the average length of a woman's arm is 60 centimeters, while that of a man is an average of 65 centimeters. The variations between the countries obviously depend on the average heights, but these differences are smaller. One of the sources that can be taken to estimate these values is although it may seem unprofessional are clothing sizes.

Although they have been verified with the results of newspaper and statistical articles that indicate data very close to or equal to these. To determine the maximum reach, the length of the hand must be added, which is very accurate to consider that it is a tenth of the body, that is to say for a man it would be around 18 centimeters and for a woman, approximately 16.5 centimeters.

This would assume that the reach of the arm would be slightly above 80 centimeters (82 cm), and slightly below 80 centimeters for women.

As a curiosity, it can be mentioned that all these measures taken from different studies and media, all of them corroborate the proportions of Vitrubio's Man

In order to calculate how these measurements transform into the real scope for the person in terms of the use of the screen, the angles in which the arm is projected must be determined without considering a torsion of the spine.
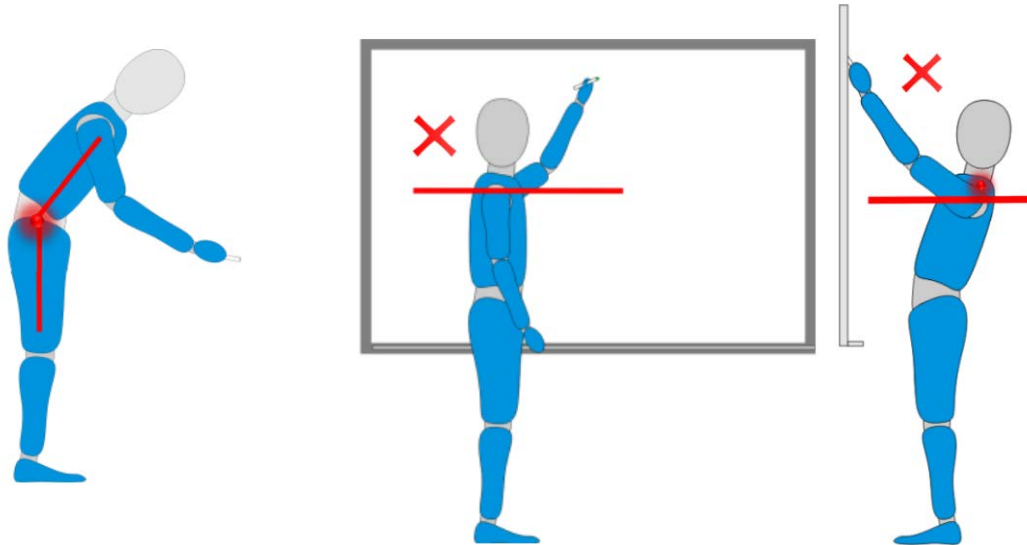

As for what angle we can raise the arm while stretched, it is a more complicated question. For jobs that repeat in this repetition, it is not recommended to exceed the height of the shoulders. For this calculation, angle 0° is considered when fully stretched frontally, considered negative when lowering the arm and positive when raising it. As it has been said, for repeated movements, maintained for hours, the arm should not be raised (positive angle), however for specific and punctual gestures (1, 2.3... repetitions) the arm can be raised comfortably until 30 degrees. This would suppose, considering the heights and arm lengths, that a man would reach an average of one point at a height of between 1.90 and 1.95 meters, in a comfortable way. In the case of a woman, she would easily reach points at a maximum height of between 1.75 and 1.80 meters.

Although in terms of the minimum height, it is easier to access, since the user could lean forward or slightly flex their knees, the goal is to find the maximum possible comfort. Considering the angle previously exposed, the person would be about 70 centimeters from the screen while using it, which is a correct measure not to strain the eyes but to be able to cover the screen with the field of view.

Considering that the user does not bend the spine, he could reach the lowest points by stretching the arm downwards, with a negative angle following the previous criteria. This would mean that the average men would reach points at 1.10 meters in height and women at points between 95 centimeters and 1 meter in height.

Following the "design for maximums" criteria outlined above, one could not choose the highest points that men reach and women do not, and similarly, the lowest points that women reach but No men.
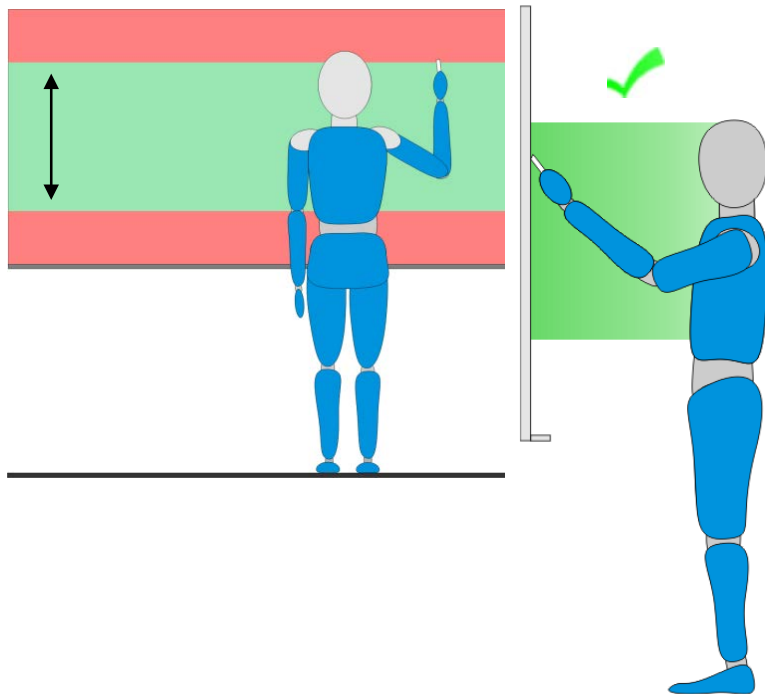
This would conclude that the maximum screen measurements would be 1.10 meters high as the lowest point and 1.80 meters high as the highest point. Again, it should be emphasized that this interval corresponds to the touch area of the screen, that is, the visual information can be shown in a larger size, but the user cannot be asked to interact with the screen (touch or press the screen) outside the aforementioned range of 1.10 meters - 1.80 meters since otherwise, there would be a good chance that some users would be excluded from using the screen.

11.1.7 CONCLUSION

The conclusions of this ergonomic study can be summarized in the following sections:

- The screens have to limit their touch zone, that is, the user cannot be asked to interact or touch the screen at points on the screen that do not fall within the following range of measurements:

<div align="center">

1.10 meters - 1.80 meters.

</div>

- Screens should limit their touch zone to a width of 88 centimeters so as not to force the user to move horizontally in order to touch the required points.

- The use of the screen will be at a distance of between 65 to 75 centimeters between the user's eyes and the point of the screen in line with the user's eyes. Size and other design variables respond to this distance.

- The size of the typeface used must respond to the use of people with less visual capacity, such as older people. Considering that the screen will be used from about 70 centimeters, the minimum typography that will appear will be a size that would correspond to a size of 24 at least, which would be an approximate height of 0.9 centimeters, the minimum for reading by any user.

- The brightness of the screen should be adapted to the brightness of the environment.

11.1.8 References

- **Pedro R. Mondelo, Enrique Gregori, Pedro Barrau. Ergonomía 1. Fundamentos. Mutua Universal, 1999.**
- Laurig y Joachim Vedder
  https://www.insst.es/documents/94886/161958/Cap%C3%ADtulo+29.+Ergonom%C3%ADa
- https://en.wikipedia.org/wiki/Human_factors_and_ergonomics
- ES Jung, D Kee, MK Chung - International Journal of Industrial Ergonomics, 1995 – Elsevie
- MA Ayoub - Journal of occupational medicine.: official publication of ..., 1990 - europepmc.org
- DS Hira - Ergonomics, 1980 - Taylor & Francis
- GL Lage - US Patent 5,305,489, 1994 - Google Patents
- https://gestion.ibv.org/gestoribv/index.php/proyectos/descargables/ambito-de-indumentaria/855-e2-1-eurohandfeet-estructura-de-datos-de-la-poblacion-europea-v4/file
- https://en.wikipedia.org/wiki/Average_human_height_by_country
- https://es.statista.com
- https://www.spineuniverse.com/wellness/ergonomics/ergonomics-human-body-injury-prevention
- https://www.kinnarps.com/knowledge/ergonomics/ergonomics-the-essentials/the-human-body/

12 APPENDIX V: STRUCTURAL STUDY

12.1.1 Structural calculations

The objective of a structural study is to check whether the object under study, in this case, the two swamp designs, both the large one in the form of an arch, and the small one together with the cover; they supply the required forces. The standardized forces that the structures that are placed on the street must bear in mind due to the most extreme climatic conditions that may occur in the chosen location.

It is important to highlight that some values are followed that estimate the encrusted organisms to check the validity and safety of the constructions. Therefore, using simulation software, it will be checked whether or not the object supports the maximum conditions, that is, the forces that would be applied in the most extreme cases. If it is able to withstand the most extreme conditions, there will be no problem under normal conditions. The main environmental force to be studied is the wind, and in the case of the arc-shaped structure, the force that could be caused by the accumulation of precipitation (snow) at the top.

If necessary, a calculation must also be added to simulate a case of vandalism, such as a person hanging on the structure. The design is not designed for this purpose, but when being on the street, it must be able to withstand some examples of forces that can be caused by uncivil behavior of any citizen. But if you can't bear it, the consequences are disastrous.

12.1.1.1 Analysis of the structure I.

Structure 1 is the arch-shaped structure with the complete cover that includes the Smart Screen at one end and a seat and a small information screen at the other end, connected by a cover that protects the user.
The tests carried out for the wind loads have very satisfactory results since none of the maximum loads have remarkable effects on the structure since it has two anchors at each end.
The example of vandalism has been considered, which would imply a load of one person raised on the ceiling (100Kg or 1000N). As it has already been said, obviously the objective of the structure is not that, however an adequate design must consider this type of uncivil behavior so that they do not cause the breakage of the structure and endanger passers-by.
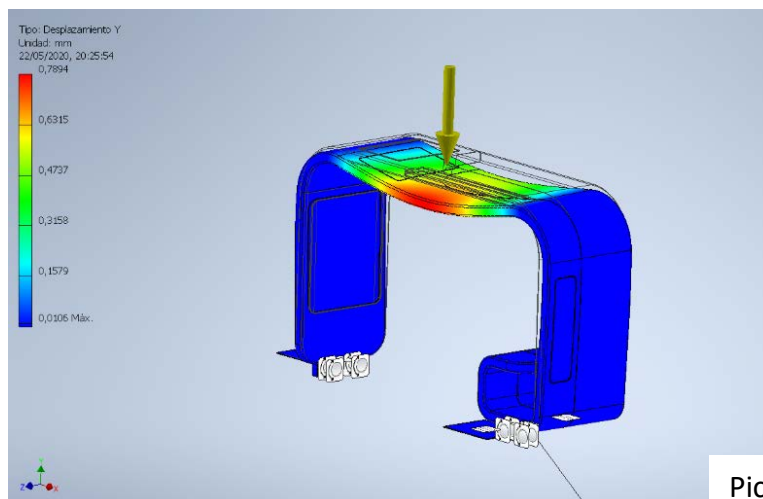
Picture 1

The previous image (picture 1) shows the simulated displacement of a 1000 N load applied punctually at the midpoint of the roof. The image shows the exaggerated displacement caused by force. The displacement is minimal (less than 1 millimeter), so it can be safely concluded that the displacement of negligible and the structure easily supports the applied loads. Since the displacement and stresses of a structure are directly proportional to the applied load, and during the elastic period, the linear displacement is maintained. This means that the displacement and the stress load can be estimated, that is, how the structure will behave in any case.

The conclusion is that no foreseeable case of force would jeopardize the stability of the structure.
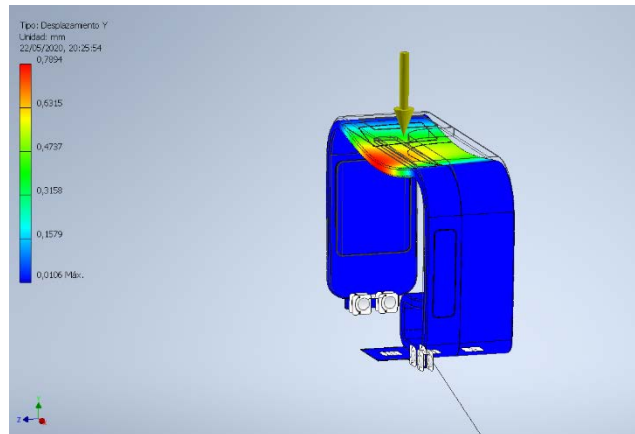
Picture 2

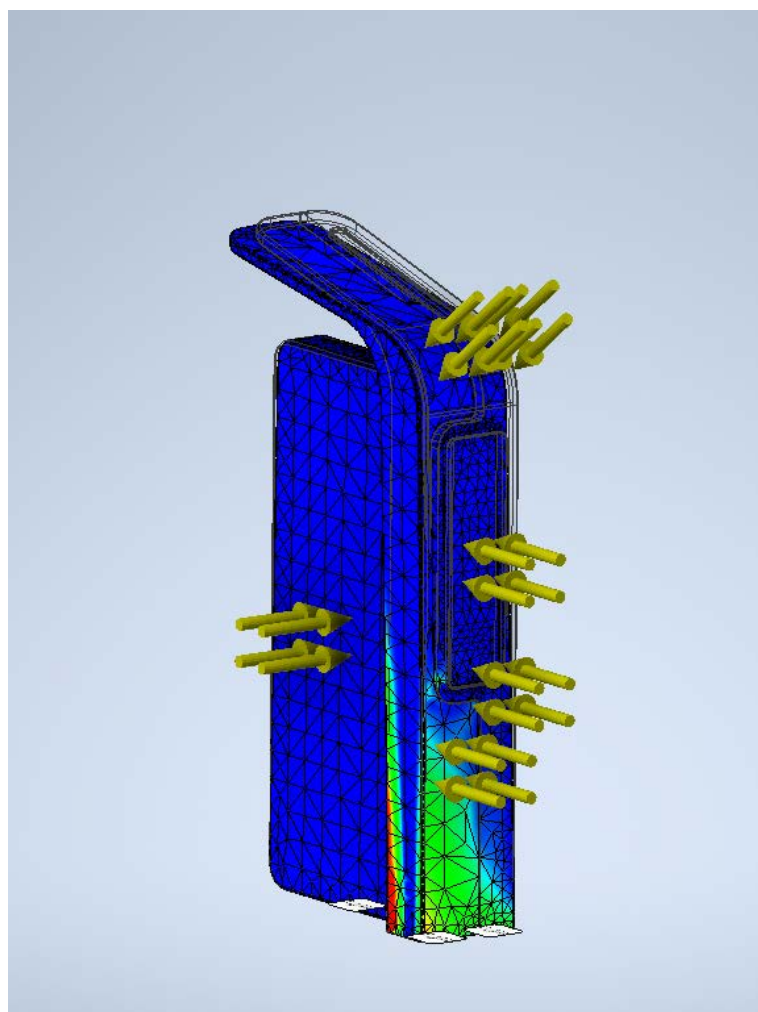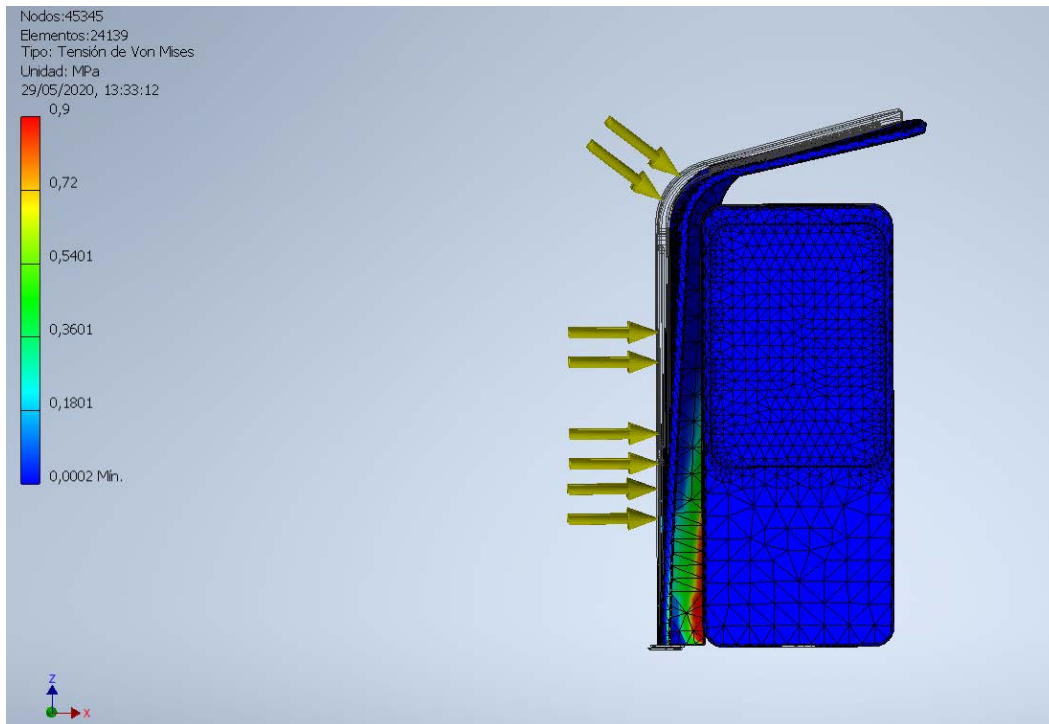### 12.1.1.2 Analysis of the structure II.

The second structure consists of the simple screen, similar to a prism, next to the "L" shaped cover. The exact measurements can be checked in the annex of plans.

Impact of the force made by the wind in the most unfavorable extremes.
In a simplified way, as a value anywhere in the territory, 0.5 kN / m2 can be adopted as the maximum load that can be caused by the wind on a vertical surface.

In the example studied, a load distribution is used in an extreme case with very little provble and the force of the wind is applied to the largest lateral surfaces, even if they do not have the same geographical orientation. Therefore, loads are applied to the rear surface, and to the roof on the side and on the roof; as can be seen in the images.

Nodos:45345
Elementos:24139
Tipo: Tensión de Von Mises
Unidad: MPa
29/05/2020, 13:33:12

0,9
0,72
0,5401
0,3601
0,1801
0,0002 Mín.
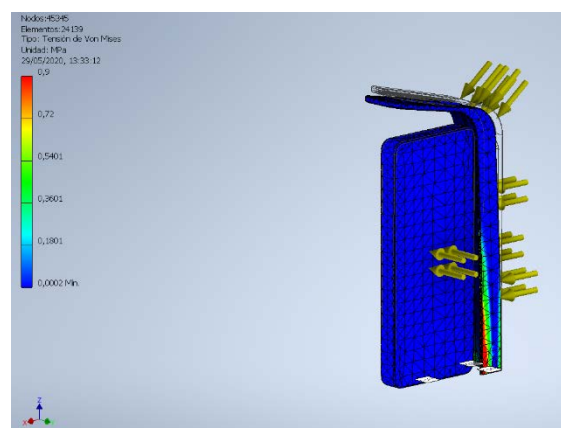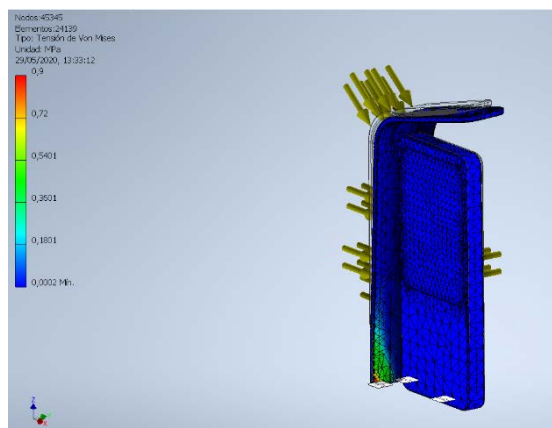
Impact that causes a force of 1000 Newtons, equivalent to the weight of a person placed on the deck.

Again, the values obtained indicate that the applied force is not sufficient to cause permanent deformations. A force 6 times or more, greater than that applied, would be necessary, therefore, it can be concluded that any force applied accidentally or vandalism would not be sufficient to cause permanent deformations or breakage of the structure. It can be affirmed that the design of the structure is valid for placement on the streets.
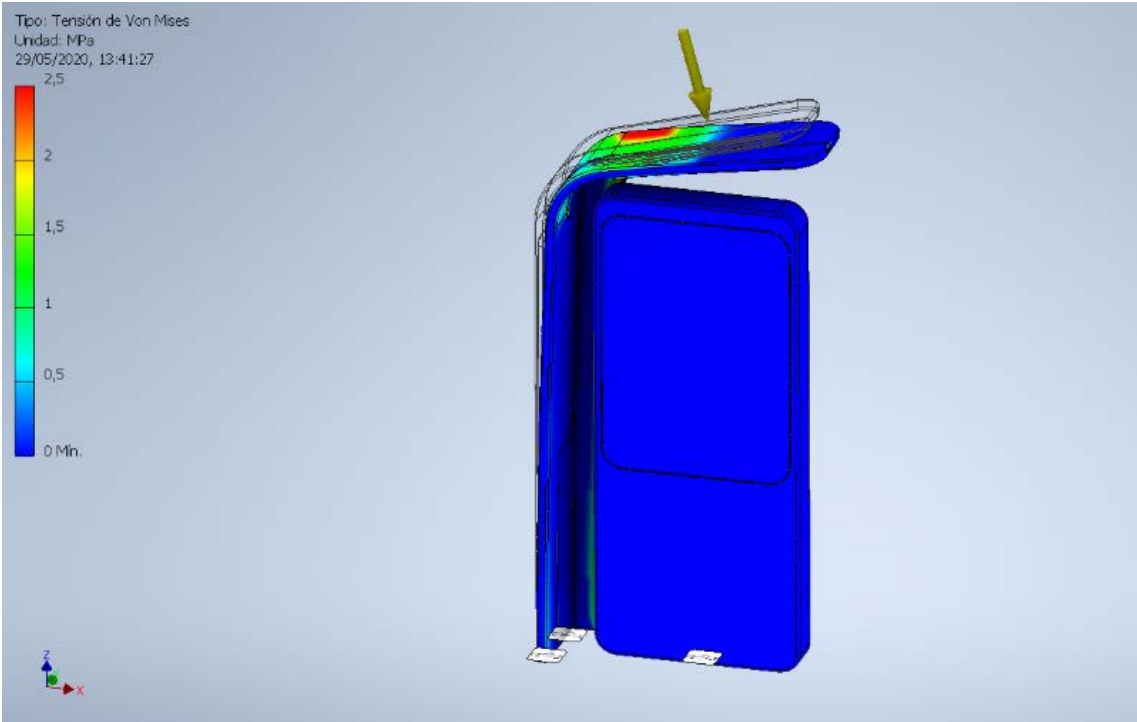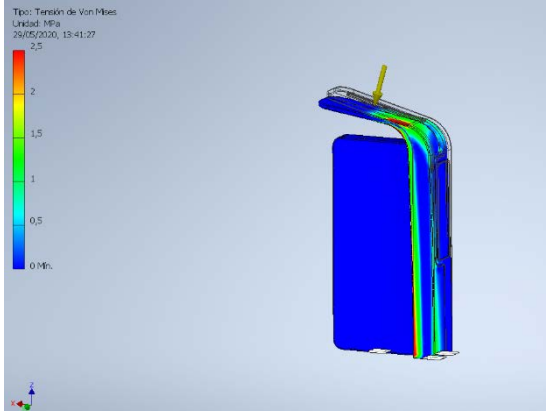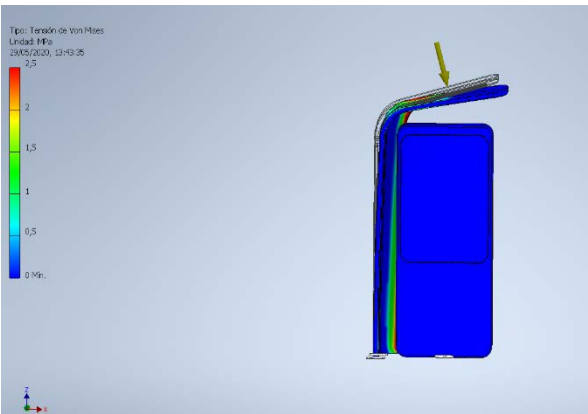
12.1.2 Conclusions of the study of stresses on the structure

The study has included analysis by the forces caused by inclement weather, as well as possible circumstantial or accidental forces caused mainly by vandalism or unfriendly behavior, the low probability of which does not exclude for a good design to be able to withstand said forces. A correct design must foresee the most adverse situations to avoid the collapse of the structure, not only due to the good and continuous operation of the Smart Screens, but also as protection for the users since the breakage of the structure could cause damage to it. Therefore, the study has applied the adverse situations contemplated according to regulations to avoid any foreseeable situation of damage to the design.

The thickness and material used ensure with a very high fidelity that the structure will support the stipulated loads.

12.1.3 Software:

Autodesk Inventor Professional 2020
CATIA V5
SolidWorks 2020

13 APPENDIX VI: MATERIAL AND COATING

To get the best option in terms of the material that should be used we will see which are the most used materials for this type of structure and discard those that are less appropriate for the use we should give it.

13.1.1   Recycled plastic:

Some bus platforms are made from a plastic coating of what were once electrical cables and other PCV waste. The resulting structure is self-locking, which allows the system to be installed or uninstalled in a short time. In addition, its environmental impact is lower, as is its cost. They are highly resistant to weathering and have a high resistance to surface slippage. Today, both plastic and other recycled materials are an important part of the structure of many intelligent bus stops around the world, confirming the need to rethink urban accessibility from a more environmentally friendly point of view. In addition, the fact that the material is 100% recyclable may be attractive to the public.

Some of the characteristics that make this material prosperous to use are the next ones:

·Robust and does not splinter

·Made from 100% recycled plastic

·Environmentally friendly

·Does not rot

·Minimal maintenance

·Weather resistant

·Long lasting (potential life is over 100 years)

13.1.2 Thermolacquered aluminium:

Refers to aluminium treated to be more resistant to corrosion, heat, extreme temperature changes, rain and impact. It is a material that has several uses and is especially useful for making urban furniture, as it has a fairly long lifespan and requires no maintenance. In addition, it is very resistant, so it is ideal for designing outdoor structures that by their nature are used by a large volume of people, and therefore must resist the impact of time and usage. its aluminium base is a very abundant element in nature, only surpassed by oxygen and silicon. It is a light metal with a density of 2700 kg/m³ and a low melting point (660 °C). Its colour is greyish and it reflects well the electromagnetic radiation of the visible and thermal spectrum. It is a good electrical (between 35 and 38 m/(Ω mm²)) and thermal conductor (80 to 230 W/(m-K)).

It is a soft (Mohs scale: 2-3-4) and malleable material. In its pure state it has a tensile strength limit of 160-200 N/mm² (160-200 MPa). This makes it suitable for the manufacture of electrical cables and thin sheets, but not as a structural element. To improve these properties it is alloyed with other metals as it is the case, which allows carrying out on the casting and forging operations, as well as the extrusion of the material. It is also used in this way as a weld.

13.1.3 Polycarbonate:

It is a material that belongs to the group of thermo-plastics, and is very easy to mould, so since its invention in the 50's it has had multiple industrial applications, including street furniture. Its usefulness in structures of this style lies in its high resistance to impact and deformation, it also protects against UV rays, it has good resistance to electrical insulation and can be kept in good condition for a long time, even against damage caused by various environmental factors. It is one of the most widely used materials for bus stops, especially in intelligent bus stops.

Taking into account the information we have collected on each material, this is the one we have found most attractive so we will better develop its characteristics:

- Density: 1,20 g/cm3

- Operating temperature range: -100 °C to +135 °C

- Melting point: approx. 250 °C

- Refractive index: 1,585 ± 0,001

- Light Transmission Rate: 90% ± 1%

Thermal properties	Mechanical properties
- Specific heat: approx. 1200 J/(K- kg)	- Elongation at break: 100-150%
- Coefficient of Thermal Expansion: 65×10-6 - 70×10-6 K-1	- Coefficient of Friction: 0.31
- Thermal conductivity at 23 °C: 0.19-0.22 W/(m-K)	- Hardness - Rockwell: M70
	- Traction Module: 2.3 - 2.4 GPa
	- Poisson's ratio: 0.37
- Maximum Operating Temperature: 115 - 130 °C	- Abrasion Resistance - ASTM D1044: 10-15 mg/1000 cycles
- Minimum Operating Temperature: -135 °C	- Compressive Strength: >80 MPa
	- Tensile Strength: 55-75 MPa
	- Izod impact resistance: 600-850 J/m

- Hot deflection temperature - 0.45 MPa: 140 °C - Hot deflection temperature - 1.8 MPa: 128 - 138 °C 	- Yield stress/elastic limit: 65 MPa - It scratches very easily and does not have easy repair unlike methacrylate.
Physical properties - Water absorption - balance: 0,35 - Water absorption - in 24 hours: 0,1 %. - Density: 1,20 g/cm3 - Refractive index: 1.584 - 1.586 Flammability: V0-V2 - Ultra-violet ray resistance very reduced.	**Electrical properties.** - Dielectric constant at 1 MHz 2.9 - Dissipation factor at 1 MHz 0.01 - Dielectric strength 15 - 67 kV/mm - Surface Resistivity 1015 Ω-m - Volume resistivity 1014 - 1016 Ω/cm3

13.1.4 Safety glass:

This material apart from the others will be used for the transparent section. The most important thing about this material is that if it breaks or fractures, it will not cause any damage to users, as it is designed to break into non-sharp parts (tempered glass) or to remain attached to a sheet of plastic (laminated glass), preventing serious damage or injury. Together with polycarbonate and recycled plastic, it is one of the most widely used materials in intelligent urban furniture proposals. The most used is a coated polycarbonate which is 300 times stronger than glass.

14 APPENDIX VII: PLANES
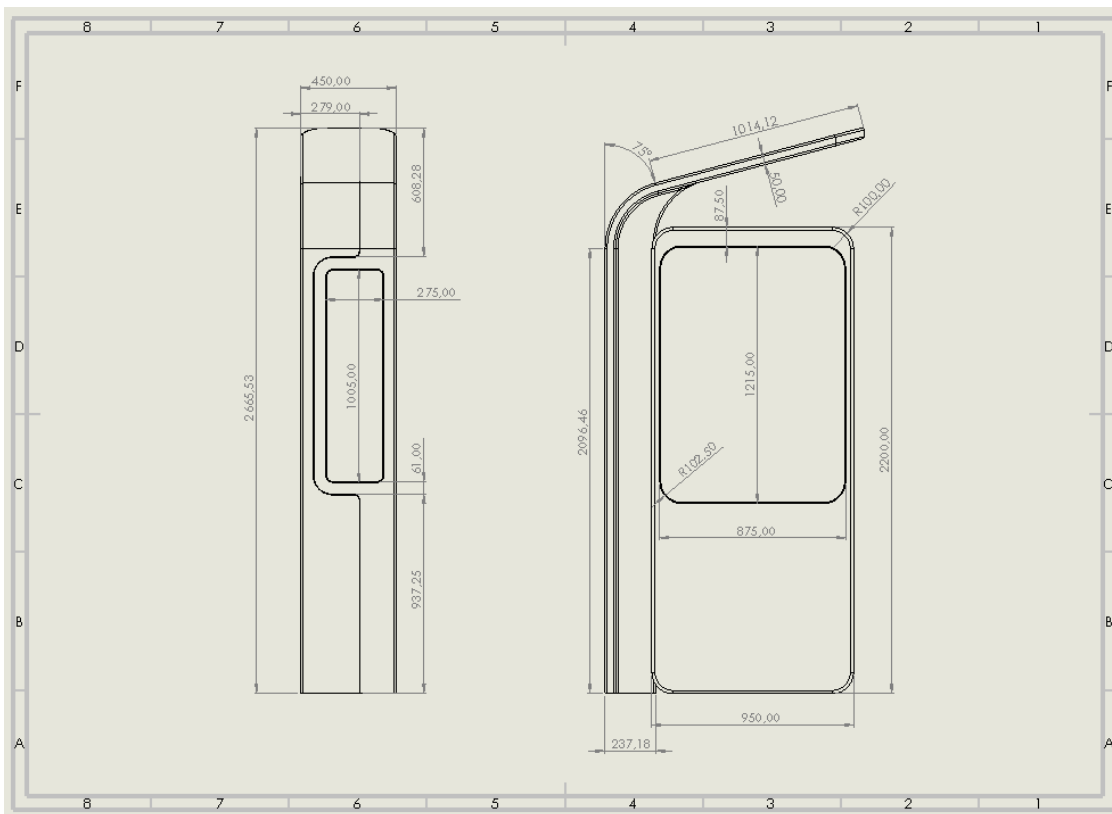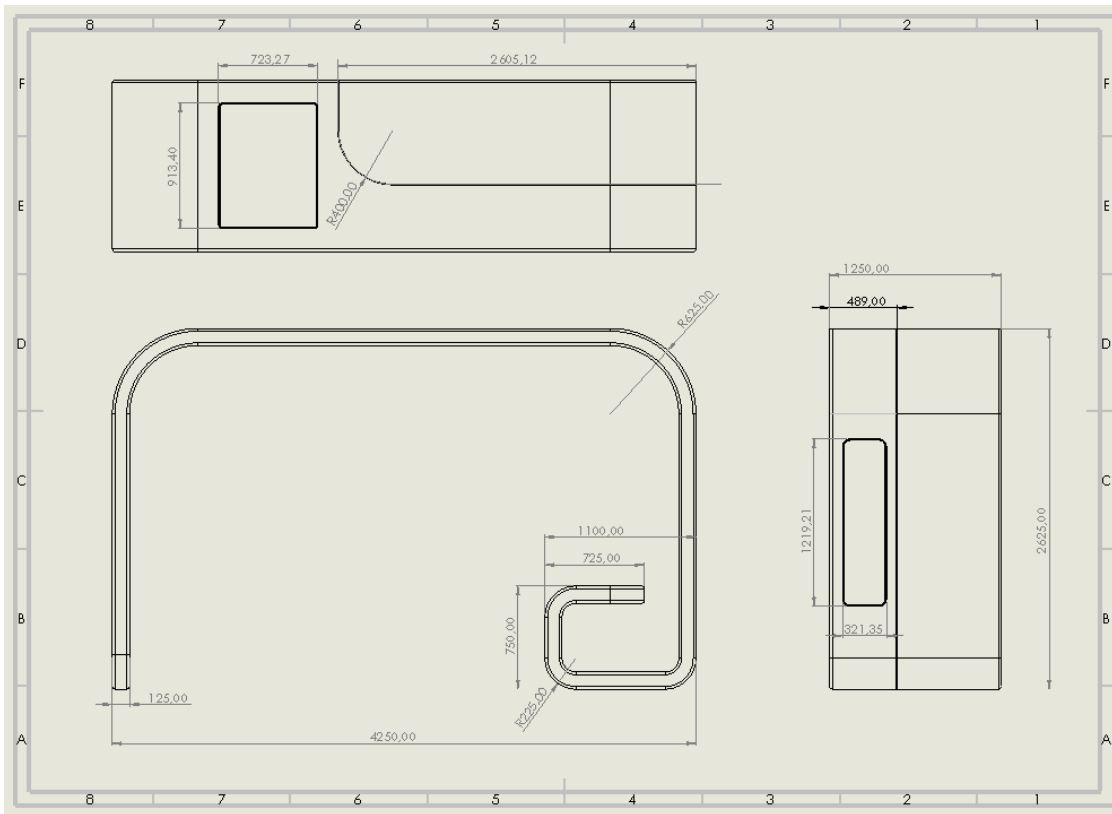
15 APPENDIX VIII: GRAPHICAL STUDY