A design investigation into the desired way of influencing people's waiting experience at a future airport.

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A design investigation into the desired way of influencing people's waiting experience at a future airport.

Bachelor assignment

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"The world is a book and those who do not travel read only one page."

— Augustine of Hippo, *November 354 – August 430*

Preface

During the bachelor study Industrial Design Engineering we all develop ourselves more and more into the designers we will be in the future. When searching for the right bachelor assignment as a student, you firstly encounter the difficulty to determine '*What do really I want?*', especially because choosing the right master track is in prospect. Some of us already knew the exact answer to that question for a long time, most of us did not.

While walking through Barcelona, truly admiring Gaudi's masterpieces, I realized my interest lies not only in (industrial) design but also in architecture. I started looking for a bachelor assignment where the field of Industrial Design Engineering overlaps with Architecture and found a perfect place: the international architectural firm Liong Lie Architects (123dv) in Rotterdam.

Summary

This review summarizes Samra Sabljic's Bachelor Thesis. The aim of this bachelor assignment is researching what the desired way of influencing people's waiting experience at a future airport is and how this can be achieved through design, resulting in an adequate proposal. The whole perception of the airport's waiting area has been considered; from the security check until the boarding, having in mind the future developments around 2030.

The target group has initially been divided into six types of passengers: "Simplicity Searchers", "Cultural Purists", "Social Capital Seekers", "Reward Hunters", "Ethical Travelers" and "Obligation Meeters". Such a differentiation was necessary because all of the six "future traveller tribes" have their own goals and travelling wishes, influencing the final design. Secondly, having a customer journey in mind, it has been studied how people feel during various moments of their journey. The conclusion was that minimising stress and boredom is necessary. It has been finally inquired how to achieve this desirable effect by applying a specific type of design. Furthermore, the strength of interaction design and the effect of biophilic design have been thoroughly analysed.

When we consider the waiting process in general, we should first investigate how to affect the time elapse experience in order to (at least partially) take the unpleasant waiting experience away. It can be done (among other things) by using the background music or smartly applying Maisters "Laws of Waiting". In order to influence the way people experience things, it is of a great importance to know how each of the senses can be stimulated and eventually which consequences this simulation causes within this experience. While creating a certain experience, the most important impression is the first one, and the last memory of it. Also, part of the research was finding out future technological developments at the airports. More and more equipment is going to be automatized in the future.

The stress reduction and, as a part of it, the boredom reduction can be managed in different ways. With all gained insights, a basis is created for the development of the final design. The final concept is a design proposal of an ideal future airport experience after the security check. It consists of five parts that address the stress and boredom on various levels, with different mechanisms. Their combination results in a complete stress-free waiting experience from security and passport control to the moment one steps in the plane. This approach reduces stress on different levels step by step, so not only in a practical way but also on an emotional, cognitive and sensational level. The first part is a smart phone app which is minimizing the greatest amount of stress directly after the security check by providing clear and personalised information. The second part is a relaxation area where all remaining unconscious stress disappears. In addition to it, an interactive suggestion system has been designed, providing the passenger with an ultimate personalized waiting experience – giving suggestions mostly for the shopping areas. What follows next is the waiting at the gate: nature elements and personalised comfort will relax travellers while they obtain information about the destination. The last part of this passenger's airport experience takes place in the jet bridge, giving him the last "WOW" experience just before entering the plane.

Samenvatting

Dit verslag beschrijft de bachelor opdracht van Samra Sabljic. Het doel van deze opdracht was te onderzoeken wat de gewenste verandering in de ervaring van wachtende mensen op een vliegveld is en hoe deze verandering bereikt kan worden door het design van de wachtruimte. Hierbij wordt gekeken naar de gehele beleving van de wachtruimte van het vliegveld vanaf de security check tot het moment dat reizigers het vliegtuig in stappen, met een blik naar de toekomst rond 2030.

Allereerst is de doelgroep verdeeld in zes typen reizigers: 'Simplicity Searchers', 'Cultural Purists', 'Social Capital Seekers', 'Reward hunters', 'Ethical Travellers' en 'Obligation Meeters' omdat deze zes 'future traveller tribes' allen eigen eisen en wensen hebben. Zo kan er gerichter ontworpen worden. De customer journey is in kaart gebracht, waarbij vooral is gekeken naar hoe mensen zich voelen op verschillende momenten tijdens de customer journey. Er is onderzocht wat de gewenste verandering in ervaring en gemoedstoestand is, dat bleek vermindering van stress en verveling. Uiteindelijk is er onderzocht hoe er door middel van design deze gewenste ervaring bereikt kan worden. Hierbij is de kracht van interaction design en de werking van biophilic design geanalyseerd.

Wanneer we het hebben over wachten in het algemeen, is er eerst onderzocht op welke manier het gevoel van tijd beïnvloedt kan worden, zodat het gevoel van wachten (ten minste gedeeltelijk) ontnomen wordt. Dit kan onder andere door achtergrondmuziek of door slim om te gaan met Maisters 'Laws of Waitings'. Ook is er onderzoek gedaan naar wat een ervaring eigenlijk is en hoe de perfecte ervaring bij de perfecte gelegenheid kan worden gecreëerd. Om de manier hoe mensen iets ervaren te beïnvloeden is het van belang na te denken over hoe elk zintuig geprikkeld wordt en wat voor gevolgen dat heeft voor de manier waarop iets ervaren wordt. Bij het creëren van een bepaalde ervaring is de eerste indruk en laatste herinnering van hetgeen het belangrijkste. Tevens zijn toekomstige technologische ontwikkelingen op vliegvelden onderzocht; in de toekomst zal steeds meer automatisch gaan.

Het verlagen van stress en, als onderdeel hiervan, het reduceren van verveling kan op verschillende manieren aangepakt worden. De bovenstaande inzichten vormen een basis voor het gehele ontwerp. Het eindconcept is een ontwerpvoorstel van hoe een optimale beleving van het vliegveld na de security check eruit kan zien. Deze bestaat uit vijf delen, die allen stress en verveling op verschillende manieren tegen gaan door het gebruik van verschillende mechanismen. De combinatie van de onderdelen resulteert in een complete stress-vrije wacht ervaring van security controle tot het moment dat men in het vliegtuig stapt. Deze stapsgewijze aanpak reduceert stress op verschillende niveaus, dus niet alleen op een praktische manier door informatievoorziening, maar ook op een emotioneel en cognitief niveau. Het aller eerste onderdeel is een smartphone app, die neemt meteen na de security check de grootste stress weg door het verschaffen van persoonlijke en duidelijke informatie. Ten tweede is er een relaxatie gebied, waar alle resterende onbewuste stress weggenomen wordt. Vervolgens is er een interactief scherm met suggestiesysteem bedacht, die de reiziger aan de hand neemt en een de ultieme persoonlijke wachtervaring aanbiedt, gericht op de shopping-area. Daarna volgt het wachten bij de gate waar natuurelementen en persoonlijke comfort reizigers ontspant terwijl ze voorzien zijn van informatie over hun (eind). Het laatste deel van de ervaring van het vliegveld vindt plaats in de jet bridge, die de reiziger een laatste 'WOW' effect meegeeft voordat ze het vliegtuig instappen.

Content

1. INTRODUCTION

This bachelor thesis is a large individual project, finishing the three years of the bachelor Industrial Design Engineering. This thesis is about researching how people experience the waiting a waiting area at an airport and how this can be influenced in a positive way, through the design of the waiting area. The first part of the research is thus finding out what change in behaviour is desired and is thus considered positive. In this introduction I will describe my client, the motivation for this bachelor assignment, the objective and the research questions. This introduction contains a reading guide as well.

1.1 Client

Liong Lie Architects is an architectural firm in Rotterdam which operates internationally. This is one of the two labels founded by the successful business owner Liong Lie. The other label, 123DV, designs modern villas. Designs of Liong Lie Architects are focused on public spaces. Examples are the Gold Souk in Rotterdam, the Bazaar in Beverwijk, the Media Plaza and Supernova Jaarbeurs in Utrecht.

Gold Souk   Supernova   De Bazaar   Media Plaza

According to their online brochure Liong Lie Architects stands for "form follows identity". This means that they listen to the needs of customers with an open mind and create a suitable design that reflects the identity of the customer. While designing they seek for the limits. The focus on each designed villa or building is on the experience of the space, where 'imperfection and perfection are perfectly in balance'. Liong Lie explained to me how he sees imperfection as a unique feature that matters just as well, provided that it fits aesthetically into the whole. It is all about the story that the design tells. It goes beyond just designing a beautiful building; the whole picture needs to be right. Not only exterior but also the interior is customized design.

Designs of Liong Lie Architects are bound by time and pace with the time; seeking for innovation. An example of innovation is interaction design: design that responds to human behaviour. Continuing; design can also cause certain behaviour and influence, or even anticipate the behaviour of people. Since Liong Lie Architects' designs often deals with large crowds they have an interest in knowing the ways in which design can influence certain behaviour. Their partners are already more engaged with the idea of crowd control and design that influences people's behaviour. This bachelor assignment could be a great case to obtain more knowledge themselves within this field of interest, to stay ahead of the market. When designing large object or spaces where crowds are involved, it is important to learn more about how people experience that space, the term crowd control needs to be extended with an component of experience. By better understanding the crowd, better designs can be created.

1.2 Context & motivation assignment

The context within this assignment is waiting areas at airports. The first thing that comes to mind when thinking about waiting areas is most often a relatively room where people wait for some sort of appointment. These waiting areas are generally thoughtfully styled, considering that the area where the customer is waiting mostly reflects the identity of the company, instance or organisation. The appearance is very important, but is the way people experience the waiting also considered? At airports people generally wait much longer and they can wait almost everywhere, so within this assignment the waiting area is considered to be a large area. In this context it is interesting to look at the way people experience waiting and behave while waiting, because there are so many different moments people wait at an airport; different moods that arise on different occasions, as an result of the actions one must undertake to meet all the requirements before stepping into a plane. Waiting is essentially the transit time from one of these activities to another, where everyone has their own experience and perception of waiting. For example, one may find waiting a waste of time, while someone else regard it as relaxation. The challenge within this research is mainly to determine what the desirable change is considering the experience of waiting, and how that change can be achieved through design.

This bachelor thesis is a great opportunity for the client to develop an innovative project or concept, without already having a particular customer. This assignment can lead to new, attracting projects for the client from potential customers. Namely, the content of this assignment can be used and applied in many different environments; there are waiting areas at many different places. This assignment could be a great showcase. In this manner, Liong Lie Architects wants to profile themselves more with design responding to human behaviour. They want to add a psychological dimension to their design process. In their opinion we can get more out of waiting areas, by researching how design influences people. Moreover, they wish a design proposal in response to this research.

1.3 Objective

The aim of this bachelor assignment is researching what the desired way of influencing people's waiting experience at a future airport is and how this can be achieved through design, resulting in an adequate proposal. The previously mentioned term 'crowd control' will hereby be extended with a component of experience.

1.4 Research questions

In order to establish a proper research method research questions have been conceived. The answers to these questions shape this bachelor assignment report. The questions are sorted into two parts. The questions from the first part describe the research of this bachelor thesis, while the questions of the second part search for a suitable design concept in response to this research.

1. **What is the best way to divide the target group in different types of travellers?**

    1.1   What kind or types of travellers does the target group consist of?

    1.2   What are the known models in terms of classifying different types of travellers (regarding the future)?

1.3   What are the features, wishes, demands and needs of the different types of travellers from the specified target group?

2. **In what way is the current airport situation going to change in the future?**
    2.1   Who are in general the stakeholders involved at an airport?
    2.2   What are the future developments at airports, concerning the improvement of the experience of customers as a whole?

3. **Which aspect(s) of experience provide interesting opportunities; what is the desired effect that needs to be achieved in terms of positive experience for the target group?**
    3.1   How can the feeling of waiting be taken away?
    3.2   In what manner do the wishes, demands and needs (determined in question 1.3) of the different traveller types (determined in question 1) accord to one general mood?
    3.3   How do you create an experience?

4. **What are the ways I see as most promising within this project, influencing the behaviour of the target group in the desired way?**
    4.1   What are the possibilities regarding nature incorporated in the design of a waiting area to positively influence the behaviour of people?
    4.2   What are the possibilities regarding interaction design in the design of a waiting area to positively influence the behaviour of people?

5. **The design question: What is an appealing concept for designing a waiting area at an airport that influences the behaviour of the waiting people, which enables the client to recruit potential customers?**
    5.1   What requirements can be derived from the insights acquired in answering questions 1, 2, 3 and 4?
    5.2   How can we redefine the design challenge based on the insights acquired in answering questions 1, 2, 3 and 4?
    5.3   What is the best way to create a future vision waiting experience that can be reflected on by involved stakeholders, by means of a prototype of the concept with limited means and time available?

1.5 Reading Guide

This bachelor assignment report contains four main chapters. **1. INTRODUCTION** explains the background of this assignment; information about the client, research objectives and research questions. The second chapter, **2. RESEARCH**, is the biggest one. This chapter contains among other things a stakeholder mapping, a customer journey, a division of the target group into different traveller types, speculation about a future airport, different views on how to influence the behaviour of people at an airport waiting area and an explanation about the creation of an experience. After the research the designing part starts in chapter **3. DESIGN** by determining the design requirements from the insights acquired in the research. The workshop 'generating insights' is the kick-off of the ideation phase, an enumeration of the many ideas that arose during this design process follows. This chapter will end with an explanation of the final design of the waiting experience. Lastly, in chapter **4. EVALUATION & DISCUSSION**, the final design will be evaluated, as well as this bachelor assignment in general in a personal reflection. In the back of this report you will find the appendices containing the references, more information about the target group and more sketches from the ideation phase. Within the list of references there is a list of experts and their expertise, used as sources of information throughout this whole report.

2. RESEARCH

THIS CHAPTER DESCRIBES THE WHOLE RESEARCH OF THIS BACHELOR ASSIGNMENT. IN THE FIRST PARAGRAPH (2.1) THE CURRENT AIRPORT SITUATION WILL BE EXPLAINED, CONSIDERING THE STAKEHOLDER MAPPING AND THE TARGET GROUP. THE SECOND PARAGRAPH (2.2) THEN DESCRIBES THE FUTURE TRENDS IN AIRPORT DESIGN, REGARDING THE TECHNOLOGICAL POSSIBILITIES. THE THIRD PARAGRAPH (2.3) ELABORATELY EXPLAINS DIFFERENT WAYS OF INFLUENCING PEOPLE'S BEHAVIOUR. QUESTIONS LIKE 'HOW CAN A MOOD OR THE PERCEPTION OF TIME BE INFLUENCED?' AND 'HOW DO YOU CREATE AN EXPERIENCE?' ARE ANSWERED HERE. LASTLY IN THE FOURTH PARAGRAPH (2.4) THE DESIGN STRATEGY WILL BE EXPLAINED: WHAT IS SEEN AS THE MOST PROMISING WAY OF INFLUENCING THE BEHAVIOUR OF THE TARGET GROUP IN THE DESIRED WAY.

KIDS

KIDS

WORKING

ALONE

2.1 Current airport situation

The first important thing before the research really begins, is getting a clear picture of all parties involved when designing something for an airport. There are many other stakeholders besides the client. The first research question answered is therefore 2.1 (see questions in paragraph 1.4). Furthermore the target group will be discussed extensively; questions 1.1, 1.2 and 1.3 will all be answered by dividing the target group into specified types of travellers. The features, wishes, demands and needs of these different types of travellers from the specified target group will also be discussed, answering research question 3.1. Besides answering the research questions the goal of my bachelor thesis is also attracting new customers for the client, so it is significant to figure out his interests, goals and focus area businesswise. Therefore David van Ling, the business developer of Liong Lie Architects, and I planned a conversation with Mr. Vonk and Ms. Lanza to get a general idea of an airport business case and to see on what scale of airports and/ or other businesses my client could focus on.

2.1.1 Stakeholder mapping

In this paragraph we answer research question 2.1: 'Who are in general the stakeholders involved at an airport?' The answer to this is pictured in a clear stakeholder mapping, shown below. **The people waiting** in a waiting area on an airport should be mentioned first as the main stakeholder. One could however mention the **client** and **project executer** first, because they initiated this project, but in my opinion it is the waiting person we are designing for so he needs to be on the first place. This target group is very broad and will be, as mentioned, more specified into types of travellers. Considering that the target group consists of different people all waiting together in a public space, their main interest is simply respecting their general human rights. For example everyone has the freedom to be there without being bothered by anyone in any way. Besides freedom there is a need for safety, especially in these uncertain times. People should feel safe at an airport, especially at waiting areas where they come to relax. So, **security** guards are also stakeholders. The airport organisation, represented by the **responsible management** is of course also an important stakeholder. The waiting area is seen as a part of the airport and not as a component of the external **business owners**. These **business owners** of the shops and catering facilities are also stakeholders. It would be a problem if for example people would go less to the cafeteria because of the new waiting area. The remainder of the airport staff, like **cleaning staff**, is also a stakeholder, just like **installers**, **maintenance staff**, **manufacturers** and **'possible other users'**. Lastly the **government** is also a stakeholder. When an airport is an independent company and no instance of the government, then the government is a less influential stakeholder.

STAKEHOLDER MAPPING

PEOPLE WAITING

ARCHITECTS

MANAGEMENT

GOVERNMENT

DESIGNER

BUSINESS OWNERS

MANUFACTURERS

SECURITY

INSTALLERS

OTHER USERS

MAINTENANCE

CLEANING

MOST

LITTLE

LEAST

INFLUENTIAL ON THE DESIGN OF THE WAITING AREA
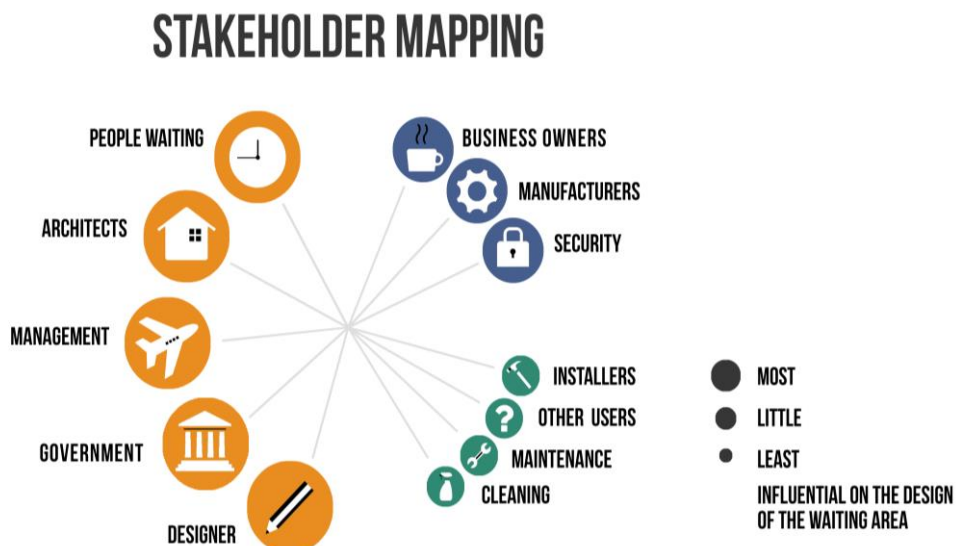
2.1.2 Airport business findings

As mentioned before, this part is only focused on my client, to get a general idea of an airport business case and to see on what scale of airports and/ or other businesses my client could focus on in the future.

The first important thing I learned during the conversation with Mr. Vonk and Ms. Lanza about the business case of an airport is the battle between airlines and airports. Contrary to expectation they are rivals in many ways. The airlines for example want the travellers to go just efficiently and quickly from the check-in, through the passport control, to the gate. Their main interest is a plane filled with people, with no empty seats left. In the meanwhile the airport wants that the travellers to spend as much money as possible in the shops, cafes and restaurants on the airport. It is disadvantageous for the airlines since there is a possibility for delay or other problems; people can for example lose track of time while shopping, eating or drinking.

Other interesting facts about the business case of an exemplary airport is for example that a huge part of the money a large airport makes is from the parking and the retail; these two are the most important sources of income, together with the real estate. Also for an airport it is very important to have a main carrier, Schiphol for example has KLM. However, the customer is getting more and more important. New revenue models are greatly diminishing the importance of aeronautical revenue, derived from airline tenants, displaced by other sources such as retail, customized passenger services, and mobile advertising to take up the slack in an "end-to-end" passenger experience.

2.1.3 Division of the target group

The first thing to do when designing something is defining who to design for. In this case that is rather difficult, because every kind or type of person can be found at an airport: different religions, ages, genders etc. The challenge here was to answer the first research question and thus classify different types of travellers, regarding a scenario of future airports. When defining the final division of different types of travellers Ms. Lanza also helped and made sure that in her opinion it is legit.

The first research question consists of three subquestions. Many interesting classifications of travellers have been found, while answering the first subquestion: 'What kind or types of travellers does the target group consist of?'. The most common division of travellers is between business travellers and leisure travellers. In order to get a clear picture of this division globally, much data has been researched. First of all interesting reports have been found with data from the Asian Pacific (APAC) (Amadeus. 2013, January) and the United States (Dresner, M. 2006). Because it was hard to find information about the European Union as a whole, information about some important acquainted airports is gathered. This is just to give an impression of the business-leisure travellers ratio, compared to the numbers found in the other two reports from the APAC and the US. An explanation about all the data found in these reports can be found in Appendix B.

However, this division between leisure and business travellers is too general to be useful in the design process. Namely, both groups of people differ yet again in almost everything. In conversation with Ms. Lanza I found out that airports (considering the business model) divide travellers into Origin and Destination Passengers (travellers who just go from A to B) and Transfer Passengers. The transfer passengers are popularly speaking called zombies: totally confused by different time zones they

mostly just want to sleep. Whatever service the airport offers, they are almost ignored as a target group. This is interesting to regard when designing something that should fit everyone who is waiting at a waiting area, but 'Origin and Destination Passengers' is still a too large and unspecified group of people. Therefore the division in less and more frequent travellers is the more useful, because there are business travellers who only travel once or twice a year while e.g. owners of a second home abroad (leisure travellers) sometimes travel very frequently over one year time. The needs of a group of frequent travellers (no matter if they are business or leisure travellers) are more similar, so this division is decent but not specified enough. Also, in comparison with the division between leisure and business travellers, hardly any data could be found about more and less frequent travellers. Therefore the next research question about the target group had to be answered: 'What are the known models in terms of classifying different types of travellers?' Apart from some models for dividing people in general or divisions in generalized groups of travellers like families, backpackers and seniors (Five emerging traveller types that will define the future of the industry, 2013) not much information could be found, especially not from scientific sources. Fortunately, the company Amadeus does a lot of research considering the future developments throughout the entire travel industry, focused on improving the business performance of many different customers. Their goal is to provide the technological innovations which keep the travel sector moving. Amadeus operates in 195 countries, giving an acceptable image of the global travel industry. In 2007 they commissioned a report (Future Traveller Tribes 2020, 2007) on key consumer groups travelling in the year 2020, with four significant demographic segments outlined. In their new report (Future Traveller Tribes 2030 – Understanding Tomorrow's Traveller, 2015) those tribes are brought into the present, and projected forward into 2030 with a greater focus on the wider travel ecosystem.
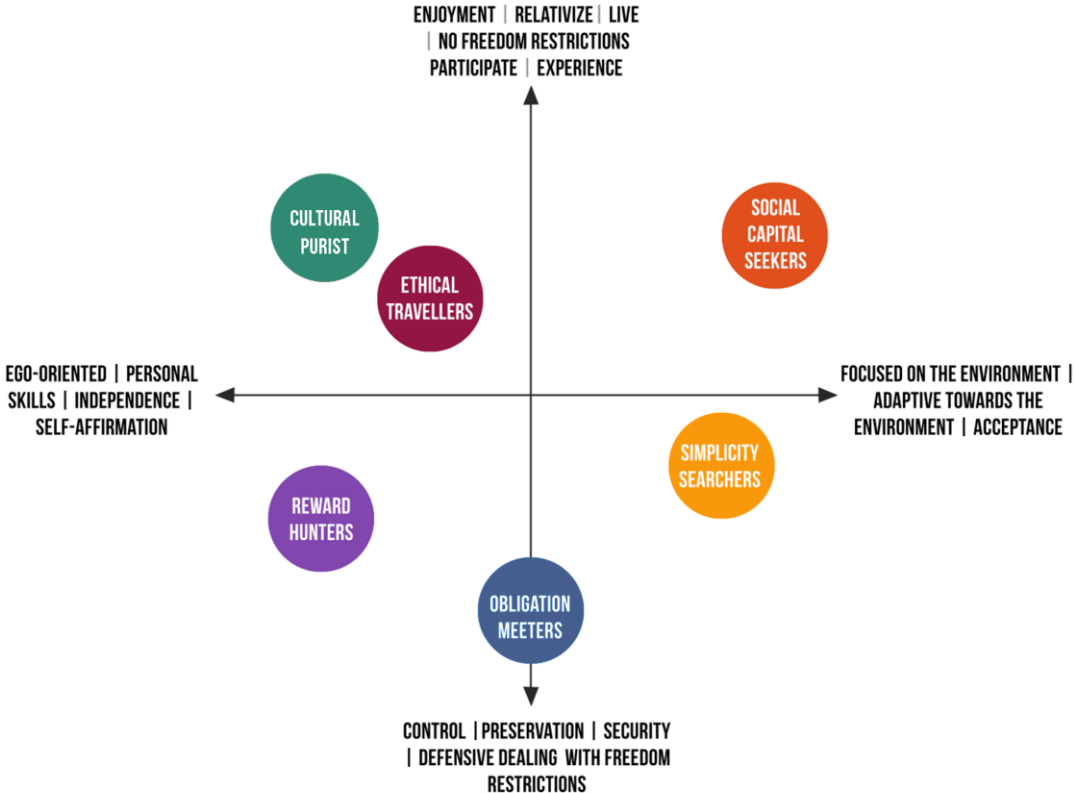
This report of theirs has a different approach: the described division in 6 types of future travellers tribes is based on the values, behaviours and needs of travellers. Evidence for the existence of these

tribes is already visible; this report explain expectations for how their size and makeup will change over the next 15 years is expressed. The future travellers are divided into six groups, inspired by e.g. ageing societies worldwide, the growth of flexible working options, the growth of visiting friends and relatives (VFR) travel and multi-located living. However this report looks past the superficialities of demographic breaks, and drills into the key motivations and needs behind these categories, emerging with six tribes, as follows: Simplicity Searchers, Cultural Purists, Social Capital Seekers, Reward hunters, Ethical Travellers, Obligation Meeters. In the picture above you can see a visualisation of these six types of future travellers in a diagram. While I was looking for known models to divide the travellers, Ms. Lanza provided me with the Adler Model, often used to divide travellers into different types. This model is originating from the Censydiam True Colours model. **Concluding and answering research question 1; the final division of the target group is visualised by a combination of the known Adler-model and the division of the six traveller tribes from the Amadues report 'Future Traveller Tribes 2030', pictured in the diagram above.** The persona's from each traveller tribe, copied from the report to provide you with a visualisation, can be found in appendix C, as well as extended information about their wants and needs.

2.1.4 Characteristics of the target group

Now that the target group as a whole finally is specified by dividing it into these six tribes, research question 1.3 can be answered by describing the characteristics of these different tribes. As stated before, this report focused on the characteristics of travellers instead of only looking at them through a demographic approach. Persona's described in detail, from the report, can be found in Appendix C.

Simplicity Searchers travel planning and holidaymaking, and are willing to outsource their decision making to trusted parties to avoid having to go through extensive research themselves.

Cultural Purists treat their travel as an opportunity to break themselves entirely from their home lives and engage sincerely with a different way of living. Cultural Purists are perhaps most likely of all these tribes described here to travel alone.

Social Capital Seekers understand that to be well-travelled is an enviable personal quality, and their choices are shaped by their desire to take maximal social reward from their travel. They will exploit the potential of digital media to enrich and inform their experiences, and structure their adventures with the fact of their being watched by online audiences ever present in their mind.

Reward Hunters are the luxury travellers of the future that seek a return on the investment they make in their busy, high-achieving lives. Linked in part to the growing trend of wellness, including both physical and mental self-improvement, they seek truly extraordinary, and often indulgent 'must have' experiences.

Obligation Meeters have their travel choices restricted by the need to meet some bounded objective. Business travellers are the most significant micro-group of many falling within this camp. Though they will arrange or improvise other activity around this purpose, their core needs and behaviours are mainly shaped by their need to be in a certain place, at a certain time, without fail.

Ethical Travellers allow their conscience, in some shape or form, to be their guide when organising and undertaking their travel. They may make concessions to environmental concerns, let their political ideals shape their choices, or have a heightened awareness of the ways in which their tourism spend contributes to economies and markets.

2.2 Future airport

By 2030, the world's demographic and economic landscapes will change drastically and there will be an extra billion people in the world, according to the United Nations. Boeing forecasts that there will be a 5% annual increase in passenger traffic from 2015. These figures may sound alarming, but our standards of living will improve, so we will probably approach a population plateau which will create a prosperous and stable global market for travel. In this paragraph we will speculate about a future airport, around approximately 2030. What are future developments at airports, concerning the improvement of the experience of customers? With technology changing faster than we can imagine, there must be an impact on the customer journey at airports. In a second conversation with Mr. Vonk, some very interesting future airport possibilities came up. Researchers from Gensler (2015) sought to interpret existing data and predictions from a design perspective to understand the effect on airports. A lot of information is obtained here and combined with the opinion of expert Mr. Vonk. Also interesting information is found in an interview (Gaffney, G. 2012) with Ben Kraal: a postdoctoral research fellow and lecturer with the People and Systems Lab at Queensland University of Technology (QUT) in Brisbane. His approach adapts rich sociological techniques to investigate the complex interplay between people, making it clear where technology and design interventions are able to achieve the greatest positive impact. Lastly interesting information about future developments considering airports are found in reports from firms like Amadeus (2015) and Skyscanner. In this paragraph research question 2.2 will be answered by using the mentioned sources to discuss possible future changes. Regarding these future changes several topics are identified and each one will be explained in this paragraph: 'everything gets more personal', 'emerging technology' and 'architectural change'.

2.2.1 Everything gets more personal

The present-day airport is about waiting. Wait to park. Wait to check-in. Wait to be screened. Wait to board. The near-future airport will be about moving. Passengers will experience a personalized journey through the airport, with increasingly seamless transitions and blurred lines between terminal spaces, as security becomes "invisible" and services become tech-enabled and individualized (more about this in the next topic). Researchers and experts of Skyscanner say that the era of losing much time while searching online comparing and booking on different platforms and devices will become past tense. In the near future there already will be a mass adoption in the market towards semantic, context-sensitive and Big Data applications. Nowadays most of people book their travel on a computer or tablet, only an average of 21% book their travel on a smartphone (Google travel Travel Study, 2014), but this will significantly increase in the future. Through these devices travel sites will be able to give people very personalized inspiration in the process of researching the travel. Travel Services like Skyscanner will soon put up semantic and intuitive online tools which will get to know your preferences. For example, that you travel frequently for business, you always bring only hand luggage, you always fly first class and want to stay in a four star hotel, that the airport must be close to your meeting location etcetera. Booking summer holidays will become just as simple, because these kind of apps will know that you prefer sunny destinations up to seven hours of flight from your hometown, that you take at least two suitcases and that you like to stay in a hotel with a gym nearby the beach. The future will be like e.g. F. Filipov (chief of the B2B department of Skyscanner) says: "Imagine a world where the traveller comes first and the technology corresponds perfectly to it, providing an intuitive, rich and inspiring experience." Nowadays people already are very attached to portable devices like tablets and smartphones; we cannot imagine a world without them. In the future this

technology will merge with humans even more. Every airport will have an app that guides people personally through their travel-journey, helping out and providing information wherever needed along the way. This app will be very important, giving continuously real-time information and showing all possibilities at the airport.

Improving the passenger's experience is becoming increasingly important. In the future not only the travelling inspiration through the internet will become more personal. Airports themselves are already more and more looking for a personal touch. For example YVR Vancouver International Airport and Mumbai's Chattrapathi Shivaji International Airport have implemented local design in the design of the airport to enhance the arrivals experience.

YVR Vancouver International Airport:

Mumbai's Chattrapathi Shivaji International Airport:

When looking at the future considering the fact that everything is getting more personal, there is another important development. This change we can already see in supermarkets at train stations for example: more self-service. This will increase in general in the future; the global tendency is less staff and more automatization. Self-service does not mean bad service. Future Travel Experience (established in 2006; an independent events and online media business, dedicated to improving the end-to-end passenger experience) thinks for example that kiosks will be totally removed from the airport of 2025 and that people will use virtual assistants, robots and off-site agents via video conference to get to the information they need. However, if self-service results in less queues and a quicker service, it will be applicable at future airports. Also because the environment is quite similar to train stations: both have people hurrying to get in time for (public) transportation. Some people don't like the fact that everything is getting more automatized and individual, but technology is changing rapidly in this direction anyway.

2.2.2 Emerging technology

It is very tempting to frown your eyebrows when reading about some predictions about the impact of new technology in the travel industry of the next decade. Predicting which will become a success and which fall into oblivion is difficult. M. Raymond, co-founder of The Future Laboratory for example says that when technology which makes personalised leisure travelling to *another planet* possible already exists, is being tested or is already in the prototype phase. And he is just one of many who argue that leisure travelling to outer space will become reality in the near future – I am not so sure about that. However, there are many more realistic predictions about emerging technology considering travelling. This thesis is about improving the waiting experience of people waiting in waiting areas. Whether you have to wait for dropping off luggage, arranging the check-in, for the security check, or just for the boarding: in the future there will probably still be some waiting involved at airports. The goal would however be to get rid of the queues in the future. Everyone experiences waiting in a waiting area differently, but standing and waiting in a queue is rarely experienced positively. As stated before, the future airport will not be about waiting but about moving. Lots of things will change. Airports will continue to grow, resulting in a shift in the routes and economic interests. An evolving aircraft fleet mix, a more refined Hub and Spoke network, satellite-based air traffic control systems, and innovations in biometric and self-service technology are already changing airport infrastructure needs, passenger flow, and baggage processing. All passengers will arrive at an airport checked-in, with a lot of locations where they can simply drop off their luggage through self-service. The baggage will be tagged, making automated baggage tracking and tracing through mobile devices possible. To avoid passengers spending time and requiring space to crowd around baggage claim units a new arrivals bag claim system will arise. A permanent bag tag will allow tracking and delivery of bag to passenger when they are ready to receive it. This universal tracking of baggage would allow a push notification to be sent to each passenger alerting them when their bag is ready for collection, as part of the app mentioned before. Instead of waiting around a baggage claim unit wondering when their baggage might show up, passengers will be free to patronise retail and entertainment offers, removing stress and worry.

As statet above, the security check will become streamlined and "invisible" and services become tech-enabled. This shift will be realized through secure Near Field Communications technology, allowing passengers to use an NFC-enabled phone as a boarding pass to automatically open security, airline lounge, and boarding gates. Smart scanners scan people while walking through a corridor equipped with technology: biometric control and facial recognition among other things.
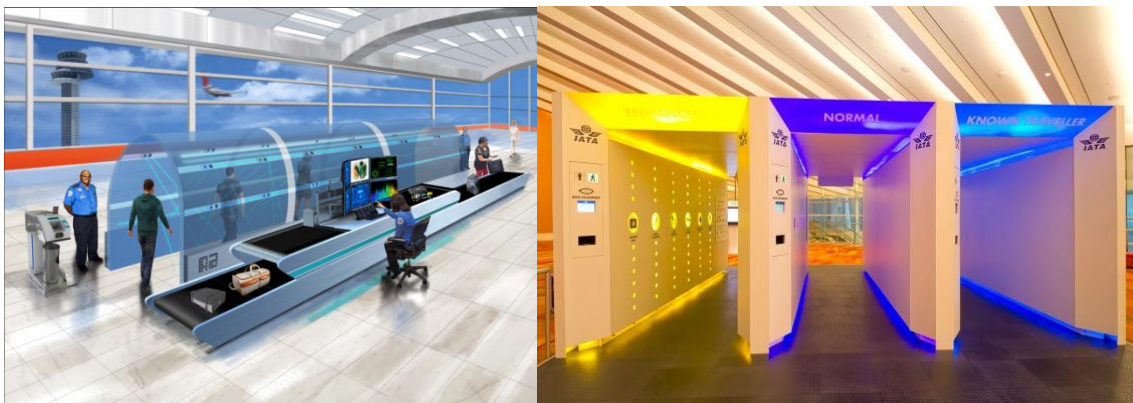
Almost everything will be automated, for example passport control can become much faster in the future by using e-passports. This shift has already begun; "self" bag tagging and "self" boarding have

been implemented in 115 instances around the world according to the IATA (International Air Transport Association). I experienced new technology at an passport control myself: I needed to hold my passport in front of a scanner and look into a camera. If the technology decides that it is the same person, the gate opens and I can pass. It is designed in such a way only one person can be checked at a time. There was very little staff; only double checking if everything went all right. Another option to make the border control and security check easier and faster in the future could be some kind of 'token'. Passengers are biometrically validated and issued with a personalized 'token'. This could be integrated with the boarding pass and will be used to positively identify passenger at each processing point.

2.2.3 Architectural change
The aviation industry is highly dynamic and competitive, and as the globalization of business and culture continue apace, air travel is increasingly essential to the global economy, but ripe for change and innovation. The significant CO_2 impacts of air travel and volatile fuel costs make sustainability a key concern for the future, while the stress and frustration induced by travel highlights the importance of a new and improved passenger experience. Alongside these issues, the business of air travel is changing as well. A significant amount of research is currently focused on the impact new technology has on the travel experience, and is largely published by technology companies. However, gaps exist in wider research on how this technology boom affects the architecture of the near-future terminal. Researchers from Gensler (2015) sought to interpret existing data and predictions from a design perspective to understand the effect on airports. They reviewed existing papers, surveys and studies in three key areas of interest for the future of airport terminals: the passenger experience, changing revenue models, and sustainability. To meet community and sustainability expectations, smart buildings must become genius buildings. Sustainability will be more important in the further future. Ultimately, the near future terminal building will be a sophisticated machine, continually adjusting systems based on millions of real-time weather and passenger movement data points. Green environments will play a huge role in future airport architecture, biophilic design will be increasingly incorporated in the future airport design.

Not only will the terminal building itself change, but the experience of the airport will most definitely change. In the future airports could become like little towns, covering all the needs and wants of people. Small towns with (short stay) apartments, museums, conference rooms, medical facilities, barbers etc. The things providing an experience (like a museum) will possibly in the future become even more important than the retail and shopping as a source of income. This way airports could also become a great place for live advertisement; stands of big firms advertising for a new product, but only providing a new experience, not selling the product itself. The airport could become a place you want to arrive one day earlier then the departure, to spend time and experience the airport completely. This airport experience will become a huge part of the travel in the future. People like to relax before the travel, spend time watching airplanes come and go, in spatial areas with lots of daylight, high ceilings and in the middle of nature. Considering the future interior design of airports, there will be a growing need for relaxation areas, to relieve the stress of travelling. Also for more differentiation at waiting areas, since it will be important to meet everybody's needs. The

airport of the future will have to stop thinking only in matters of people flow and start thinking more about individual experience.

The collages shown above are, in my opinion, examples of what an future airport could look like. As written in these pictures: high ceilings with enormous glass surfaces letting a lot of daylight through. Nature incorporated into the architecture, lots of green and a smooth transition from public transport / cars into the airport itself. Nature incorporated into the interior is called biophilic design and it will be part of the airport waiting experience. More about this is explained in paragraph 2.4.1.

Now, linking all this information back to the specified target group, it can be looked upon from another point of view. Namely, it is important to push past the idea that there is one customer experience and try to figure out how experience happens in service encounters, and the ways that different experiences happen in what is ostensibly the same service. Ben Kraal, mentioned before, says his expertise is in conducting studies of people doing stuff with things, or things with stuff, which

is slightly ambiguous, but he is working with his colleagues on the part of the project 'Airports of the Future'. In this project they look at passenger experience and human systems: how all humans use the airports. Mr. Kraal says that one of his colleagues has got 600 hours of people going through airports. They code that in different ways, chart it and diagram it etc. in order to come to an outcome. They state that none of these things look the same, everyone has a different experience. Everyone does different things, within the bounds of what's possible, does discretionary activities in a different order, takes different amounts of time to do things, and so they forecast that there is no singular passenger experience in airports. There are multiple passenger experiences and those experiences are shaped by the service provided, the physical layout of the airport, the artefacts of the service and the people that you're with. What they are trying to show is that the way people use airports is much richer than it has been understood in the past. **Concluding, and hereby answering research question 2; Lots of things are going to change in the future regarding the way people will experience an airport, the most dominating changes will consider a more personal approach towards the travellers while technology is taking over human tasks more and more.**

2.3 Influencing people's waiting behaviour

The next step after specifying and defining the target group is researching how the behaviour of people in an airport waiting area can be influenced. In this paragraph one of the main research questions 'Which aspect(s) of experience provide interesting opportunities; what is the desired effect that needs to be achieved in terms of positive experience for the target group?' will be answered by looking at different aspects of people waiting. Firstly question 3.1 will be answered by a literature research that tells us how the feeling of waiting and perception of time can be influenced. Secondly question 3.2 will be answered by looking at moods and how the way people feel can be influenced. In order to get a clear picture and full understanding the customer journey is mapped, considering especially the moods on each step of the way. The third and last research question of this part (3.3) will explain how one can create an experience in general. The last part of this paragraph explains how attention works in order to understand how much design of the airport people will 'see' at all.

2.3.1 How to influence the feeling of waiting

People at an airport wait on many different occasions. Queues may form in front of the toilets or while ordering food or drinks, the longest queues at airports are correspondingly while waiting to drop off luggage, pick up luggage or for the security check. However, for this bachelor assignment the focus is not on waiting in queues, but waiting in a waiting area in between those 'queue-moments'. Also, as stated in the previous paragraph, these queues will probably disappear in the future.

Queue at the check in and baggage drop, Cologne-Bonn Airport Germany

Most periods of waiting time are short, when compared to the time a person has to wait after the security check, before the boarding. This is the most interesting part of waiting at an airport because everything except from finding out which gate a person has to be at which time is taken care of. During this period of time people can go shopping or get something to eat or drink, but essentially everybody is just passing the time till the boarding. Because this is the longest time that people wait in the same area (you cannot go back through the security check) this is the area chosen to design for.

So many different people in a waiting area; naturally everyone has their own perception of time. It is a common feeling that a two minute wait can feel like nothing at all, or can feel like 'forever'. It is important to learn to influence how a person feels about a given length of waiting time. A good example of both managing the perception and the expectation of waiting time is provided by Sasser et. al. (1979); "the well-known hotel group that received complaints from guests about excessive waiting times for elevators" (Barlow, G. L. 2000). After an analysis of how elevator service might be

improved, it was suggested that mirrors be installed near where guests waited for elevators. The natural tendency of people to check their personal appearance substantially reduced complaints, although the actual wait for the elevators was unchanged. This has everything to do with D. H. Maisters study, where he specified 'The Laws of Waiting':

1. Occupied time seems shorter than unoccupied time
2. People want to get started
3. Anxiety makes waits longer
4. Uncertain waits are longer than know, finite waits
5. Unexplained waits are longer than explained waits
6. Unfair waits longer are longer than equitable waits
7. The more valuable the service, the longer the customer will wait
8. Solo waits feel longer tan group waits

These important findings on how people experience a wait explain the example mentioned above. **The goal when influencing the behaviour of people in a waiting area is also taking away the feeling that they are waiting. This can be done by influencing these 8 factors.** The first one is obvious because that is the reason people are stressed when for example shopping in the duty-free at an airport: you are occupied and simply lose track of time. So when there is some kind of amusement in the waiting area, occupying the waiting people by providing a fun experience, their time will pass faster. Favourably the second factor already exists at an airport: the total amount of waiting is chopped into smaller pieces and you get started by checking in, dropping off luggage etc. This way the total amount of time you wait at an airport seems shorter than it actually is. The third factor is very obvious: when a person is anxious about flying or afraid of flying the waiting time until getting in the plane could figuratively speaking seem like forever. Although the odds of getting in a plane crash are 1 in 11 million, still nearly 1 in 3 adult Americans e.g. is either anxious about flying (18,1%) or afraid to fly (12,6%). (Davis Darrell, 2012). The fourth, fifth and sixth factor are all about people wanting to have control of the situation where they have to wait. You want to know how long you have to wait, why you have to wait so long and it has to be fair otherwise the frustration makes it seem even longer. The seventh factor is about the service during the waiting. For a waiting area at an (future) airport this for example means that there should be sockets and Wi-Fi. If these basic needs are not fulfilled and people cannot charge their electronic devices or be on the internet (to check information they need, contact people or just to pass time) the waiting will naturally seem longer. Regarding the last factor of the Laws of Waiting, one could think that this is already managed, because a person at an airport is rarely waiting alone. However, someone can still feel lonely, even with lots of people in the same space. Especially when there are lots of travellers who do have (a) fellow traveller(s), so the last factor is not as self-evident as it might seem. When designing something that connects people, this last factor influencing the feeling of waiting can be positively influenced as well.

The feeling of waiting can also be influenced by something else than these 8 factors stated by Maister; background music appears to have a major unconscious effect on the perception of time of humans. It is known that music can influence people in many different ways. Evidently there have been no actual surveys to reveal the exact numbers about how many people in the world listen to music. However, even primitive tribes sing and dance, so it must be over half of the world's population. Music changes mostly the way people feel by changing or enhancing their mood, but music can do more than that. A. C. North and D. J. Hargreaves did a very interesting study about the effect of musical complexity and silence during the waiting time; in order to find out whether the music can move people. Previous

research suggested that music might influence the amount of time for which people are prepared to wait in a given environment. In an attempt to investigate the mechanisms underlying such effects, their study employed three levels of musical complexity and also a "no-music" condition. While one of these played in the background, participants were left to wait in a laboratory for the supposed start of an experiment. The results indicate that the presence of music cause people to wait longer, and the specific type of music played seemed to have no additional effect on this. **That is why airports in general should have some subtle background music (not interfering with the important information provided through audio notifications) to unconsciously influence people's perception of waiting time positively.**

Other evidence indicated that this may be imputable to the music distracting participants' attention from an internal timing mechanism. Several studies of time perception have indicated that subjective time (i.e. our own personal experience of time) is governed by an internal clock. At the risk of overgeneralizing, research indicates that this internal clock can be biased, such that distractions from it caused by environmental stimuli can influence the perception of how much time has elapsed (North, A. C., & Hargreaves, D. J. 1999; Fraisse, 1984; Kellaris and Mantel, 1994; Kellaris, Mantel, & Altsech, in press; Zakay, 1989). Considering distractions and attention in general; it is very interesting to think about how much attention people at an airport pay to the design or experience of the airport itself, when their mind is much consumed by thinking about getting to the right gate at the right time. More about this topic can be found in the paragraph about creating an experience.

2.3.2 How to influence a mood

Now that it is clear how the feeling of waiting can be influenced, we will take a look at moods of people at an airport. Namely, by influencing the mood the behaviour is most often also influenced because they correspond very neatly to each other. How does the target group behave and feel while waiting in a waiting area at an airport? To answer this question research has been done by looking at photos of people waiting at an airport and going to an airport myself (twice), observing the people around me and photographing waiting people. Firstly it occurred to me that many people travel alone, which is not something outstanding, but I simply have never noticed it before. Almost everyone who was waiting alone was reading or using a smartphone/ tablet, this can be seen in the pictures below. Some people were spotted working together, business people discussing business things. Also lots of people travel with kids. They can immediately be recognized; all their attention is consumed by taking care of the children, guiding them through a busy airport and keeping them amused and content while waiting.
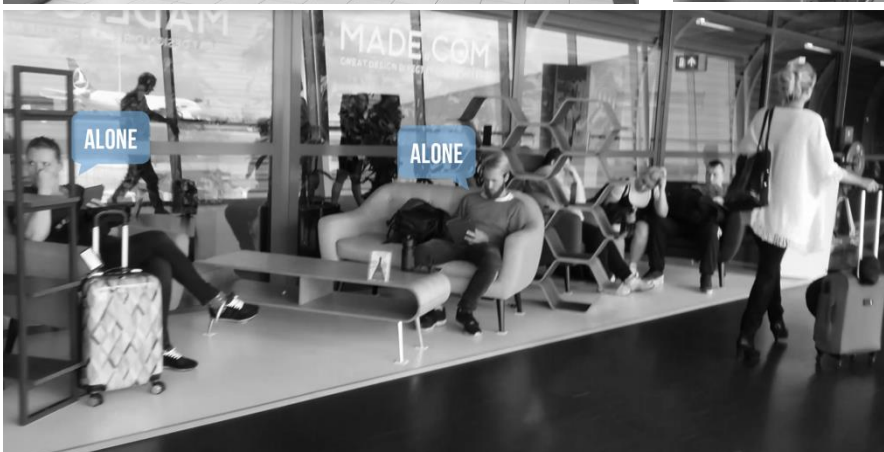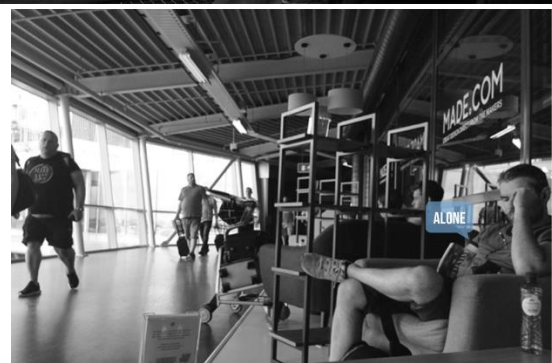
To answer the question how people behave and feel at airports we have to go more into depth; by not only looking at *what* people are doing but also *why* people are behaving in a certain way. First it is important to get a clear view and a better understanding of how people feel at an airport, therefore a specific kind of customer journey is mapped. A customer journey map is an oriented graph that

describes the journey of a user by representing the different touchpoints that characterize his interaction with the service. This customer journey I made is specific because it looks at three moods throughout all the activities at an airport: excitement, boredom and stress (validated by Ms. Lanza). It is a very useful design tool, by visualizing every step of this journey I specified carefully how the traveller feels at each touchpoint. (A large picture can be found in the Appendix).
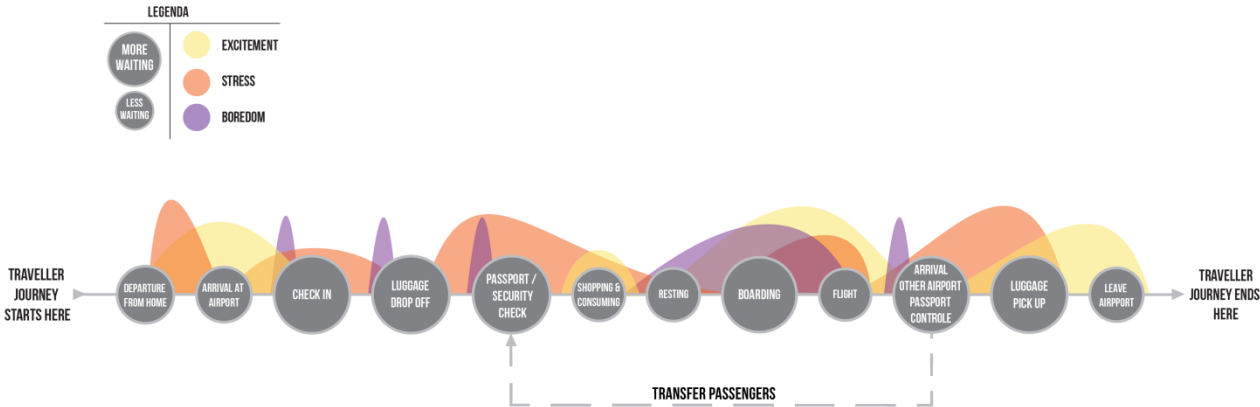
When looking at this customer journey it is also clear why the part from passport control or security check until the flight is chosen. There is a lot going on there which makes it the most interesting part of the customer journey to design for. Following an explanation of the graphic. First, there is stress involved because people need to arrive at the airport in time. Will there be a traffic jam, will the public transport be on time? However there is also excitement of leaving the house and travelling. When at the airport, first you need to check in and/or drop your luggage. Checking in can already be done at home and if you only have cabin baggage these two steps can be skipped. There is always a little stress involved to find the right place for dropping of luggage, besides there are many differrent rules and every airline has their own so people tend to get stressed because of the insecurity of the luggage is all right. However most of the stress is at the passport control and security check. You need to go through the huge body scan, which can be revealing and very privacy-sensitive. The short periods of boredom before the check in, luggage drop of, security check and also at the passport control when arriving at the other airport are when standing in a queue. After the passport and security check the stress gets less and less, because the possibility of being too late at the gate and missing your flight gets smaller by every step. At the boarding there is mostly boredom and excitement because people have to wait for the gate to open and the moment of flying is getting closer. For people who are anxious or afraid of flying there is also stress involved. The last stressful moment is waiting for the baggage when arrived at the other airport. You never know for sure if you will find it there, maybe someone takes yours by accident for example. However it is exciting that you arrived at your destination, most people are glad they made it through the journey safely and are relieved when they arrive. The big question here is, when looking at the specific part from security check to flying away, why do people rush to the waiting area which is the closest to the boarding while there is a big area where you can relax in a restaurant, café or go shopping even though there is enough time left? The answer to this is the need for certainty. Certainty to be in time at the gate for the flight, without hurrying. When people are next to the gate, with the airplane in sight, then 'nothing can go wrong' anymore as in losing track of time and being late. Then there is a feeling of 'I made it' and people

finally start to relax. Until then lots of things can go wrong or cause delay; there could be strikes in public transport, extreme weather withholding airplanes to depart, extra-long queues at the security etc. Another important stress-factor is that you don't know how far away the gate is from the security or passport control. The unrest-factor is always 'Am I going to make it in time for the flight?' because the consequences of missing a plane are quite big, often concerning extra payments and being much too late for appointments. Once arrived at the gate people let all these worries go. At that point there is nothing you can do anymore; you are not in control anymore. The gate will open, people will enter the plane and fly away, the control is in the hands of the pilots and the passengers are a case of 'captured audience'. It is not only (unconsciously) stressful because you have to surrender yourself to the situation and let go of control but also because humans are simply not made for flying.

During the journey only two negative moods are included; boredom and stress. However exhaustion or tiredness is also an well-known mood when travelling, this mood is deliberately left out because it is more physical than a state of mind. People are physically tired of travelling, often simply because of lack of sleep or a jet-lag. However, when designing something considering the experience of an airport it is important for people to stay awake and alert in order to be in the plane in time, so in a way tiredness is taken into account. (More about this in the next chapter in paragraph 3.3.3: Design Challenge). **Concluding, when thinking about how to influence a mood in a rather positive way, the focus is on reducing stress and subducting boredom through the design.**

2.3.3 How to create an experience

Within this bachelor thesis it is all about designing an experience, but how is an experience designed? How is an experience defined? In this paragraph we will find the answers to this research question (3.3). With so many different individuals at an airport it is hard to design something that will be experienced the same way by them all. Therefor a couple of steps for designing an experience will be discussed, obtained through a conversation with architect and designer Mr. Schaper, who worked at Philips on ambient experience projects. When designing an experience in general, there are four different steps that have to be taken into consideration, these will be immediately applied on an airport scenario. As Levitt reminds us; "Products are consumed, services are experienced." (Maister, D. H. 1985) Accordingly, a waiting area can be seen as a service. When a person is in transit from one airport to another, this person expects certain service (the 7th law of waiting). There has to be e.g. something to sit on while waiting, sockets to charge all devices, preferably Wi-Fi etc. The **expectation** people have about the experience of the airport is the first step of creating the experience. For the ones who have never been on this airport before it is naturally different than for the ones who have memories from the last time. Considering that it is their first time people have expectations like e.g. whether it is a large international airport or a smaller regional one, what kind of feeling the airport radiates etc. People who had already been the have expectations about e.g. what kind of atmosphere can be felt at the airport and what are recognizable features of the airport. Secondly people get a **first impression** about the airport experience. This is a crucial step, because if people get a wrong first impression they will experience everything in a wrong way. For example when entering the airport and the first area is crowded, small and it is not clear where to go, then this feeling of confusion and maybe even irritation will stay as a poor first impression. After the first impression there is the **discovery and usage**. People really get a feel for the airport; how large it is, what it looks like, what it smells. Everyone forms their own opinion about the airport by their personal discovery. Finally, when leaving there is a **memory** about the airport experience. Together with the first impression it is the

most import part of an experience journey; it forms the total image a person has about the airport. By changing a first impression or the last memory a person has about the airport experience in a rather positive way, the appreciation rises as well.

These four steps provide a clear view on how to influence an experience in a more broad sense, but a closer look at the way people perceive and experience things must be taken to really understand this. As mentioned before, people have filters to inhibit all the things perceived from the outside world that needs no attention. These things are perceived by our five senses; hearing, sight, smell, touch and taste. By influencing each sense in the right way, the desired behaviour can be obtained. Within this bachelor thesis the focus is only on hearing, sight and smell. Firstly hearing, because (background) music was already mentioned before in this report as beneficial when waiting. Also, ambient sound, such as music heard in hotels, restaurants, retail stores, and supermarkets, can influence consumer mood, actual time spent in a location, perception of time spent, and actual spending. For instance, stereotypically French versus German music has been shown to affect the choice of wine— shoppersbought more French (German) wine when French (German) music was played (North, Hargreaves, & McKendrick, 1999); classical music has been shown to enhance pleasure, whereas pop-style music to increase arousal (Kellaris & Kent, 1993). Music in a store also influences shopping pace—slower music produces slower shopping and results in more purchases since customers progress at a slower pace as they move through the store (Milliman, 1982). However, we do not only hear music; we hear the world around us. When we hear a sound of a word, we attach meaning to it, even perceiving physical features to the source of the sound. Lowrey and Shrum (2007) showed the role of expectations in sound symbolism. For example when a brand name sounded congruent with expectations, they found brand evaluations to be positive. Secondly, the sensation sight. One could say this is the most important sense when designing, however it is hard to describe more detailed how influencing this sense can influence people's behaviour. For example when talking about colours it is too broad to define; a red button can be very alarming, giving people a feeling of turning something off or SOS, while red light in a room (especially at night) is associated with warmth, passion and romance. By influencing the way something looks, the way people react on it can be changes, so their behaviour can be influenced. Because this seems like stating the obvious, we will not go further into depth. Lastly the sensation smell. Research on smell and memory identifies several biological or anatomical/ structural reasons for why scent-encoded information may last for longer stretches of time versus information encoded along with other sensory cues. Primary among these reasons is the physical and neural proximity of the systems associated with olfaction and memory. The transfer of olfactory information thus differs from that of the other senses, none of which have as direct a connection to memory. Memories for scents exhibit flatter forgetting curves over time than do memories for information acquired via the other sensory modalities. Also, Herz (2004) found that memories triggered by scent retrieval cues were rated as more emotional than those evoked by the other types of cues. He also found that memory for (recalled) verbal statements was better with an incongruent ambient odor vs. a congruent one only if the odor was present at both encoding and retrieval (there was no improvement in recall otherwise). Most of this information is from an interesting article about our senses by Krishna, A. (2012).

Considering how to influence the behaviour of people by influencing their senses, I had an interesting conversation with Mr. Krebbers (sales manager of the Jaarbeurs in Utrecht, contact of Liong Lie) about how the experience of an area can be influenced. "The Jaarbeurs offers space to businesses for

meetings, events and activities where the focus is on innovation and talent." As mentioned before, my client Liong Lie Architects, designed the Media Plaza at the Jaarbeurs. Media Plaza is one of the most modern and innovative conference and meeting locations in Europe, containing 17 foyers and session rooms. Millions of LED lamps, innovative applications and ultramodern facilities for image projection, sound effects and design give every room a unique character, because of the concept 'MeetingMoods'. This concept provides the perfect experience by powering different kind of meetings accordingly, by choosing the right music, reception, furniture, the right food and drinks and even temperature. For example when there is an auction, the senses are all stimulated to increase the sale. There is fast background music with a high synthesizer tones because that raises brain activity, the colour of the room is red in order to make people more aggressive and passionate, the temperature of the room is a bit too warm in order to raise the heartrate, the food is slightly spicy, the coffee is strong because of a higher caffeine level and lastly the chairs are not very comfortable persuading people to stand up faster. I asked Mr. Krebbers for his opinion about designing a waiting area at an airport which influences the behaviour of people in a positive way. With knowledge about MeetingMoods, and expertise in sales management he explained his ideas. Firstly on an airport it is very important that there is a right temperature; not too warm otherwise people get sleepy, warm enough to get a cosy feeling, cold enough to stay alert. Atmospheric background music for subtle, maybe even unconscious, relaxation. To fulfil people's needs there should be lots of different possibilities for food and drinks. Considering the waiting areas at the gates, there should be an open space in order to provide overview for the people waiting there. For example higher seating possibilities, because people like to have an overview. Peace can be created in the waiting area by eliminating front / back and left / right in the design of the waiting area with round shaped furniture. It is very important that the furniture is comfortable and that there are different forms of furniture. People often wait alone, also on an airport many people travel and thus wait alone. It would be nice if there are individual waiting spots as well, where people can withdraw themselves from everybody else. He also confirmed the well-known term 'a happy passenger is a buying passenger' by stating that business wise it is important to think about relaxing people at an airport and reducing there stress, as long as it pays itself. **Concluding, the first impression and the memory of it are the most important parts of an experience.**

2.3.4 You only have 'one attention'

Before learning how to create an experience it is important to know how people perceive things around them. Scientist and experimental psychologist Stefan van der Stigchel does research about attention and focus of people to certain things. Recently he wrote a (Dutch) popular science book: 'The way attention works '. While writing the book his view on the research changed because he had to look for concrete examples; he found parallels between his experiments in the lab and the real world. "People are always surprised when I tell them that many of the world around us, is not perceived by us at all. We have the illusion of a rich, three-dimensional, fully focused world that penetrates us. But you only see clearly what is right in front of you, you miss everything else. The personal film that you see, is not the complete reality. It is a reconstruction of it." Attention is actually a filter. People are cluttered with all kinds of visual information every day. Luckily we don't have to process everything, each individual only has to focus on the things that are relevant for them, everything gets filtered automatically. That is why it is possible to be sitting in the middle of a crowded place, reading a book without being distracted. However it also depends on that the outside world

'asks'. There is an ongoing battle between the two. Especially when these days the outside world is becoming more and more obtrusive with screens, banners, pop-ups and neon signs everywhere, intensifying this battle. But your attention is just a way to deal with because you select one or two things only and the rest gets lost. The environment can be screaming and flashing, but you only have 'one attention'. Attention architects, such as advertisers, traffic designers and website developers should realize that: a sign in a forest attracts attention, but a sign at a central train station does not. That is why for example it happens that drivers miss all the red crosses above a highway, and even the barrier at the end of the roadway. People miss bits of reality, because they only see what they expect. Another great example to explain this is the famous gorilla-movie: while two basketball teams are throwing a ball one to another the viewers are asked to follow and watch the ball. Because you are so focused on the ball almost everybody totally misses the fact that a man in a gorilla suit suddenly appears between the players, pounding on his chest and running away. A barrier on the highway is like the gorilla: people simply don't expect it there.([https://www.youtube.com/watch?v=vJG698U2Mvo)](https://www.youtube.com/watch?v=vJG698U2Mvo). At an airport the attention of people is extremely focused on things like finding the way and being at the right place at the right time. When designing something for a big area like the part of an airport from security and passport control until the plane it is important to know this. As explained above, people won't see and won't be aware of a lot of things when only focused on wayfinding at an airport. For example, the long hallways you have to walk through to get to the gate. People are mostly in a hurry to get as soon as possible at the gate; not paying attention to the interior of these corridors and only looking at the wayfinding. Advertisement on those walls will thus not have much effect since people simply will not register it.

2.4 Design strategy

In this paragraph the design strategy will be explained, that provides design solutions to the problem stated in the insights and conclusions in all the research that has been done. This paragraph is a translation from researching to designing.

2.4.1 Stress reduction by biophilic design

These days the modern lives of people seem to be very stressed. Today's modern and complicated technology world brings an immense amount of stressful pressure on individuals. For example highly competitive work environments stress people in a greater way. There are many ways people can consciously reduce stress in their busy lives, for example through meditation and mindfulness. There is even technology that helps; for example stress-relief apps. As stated in the previous sub-paragraph travelling by plane is an exciting but also stressful experience. These are however not possible solutions when designing something to influence the mood of people at an airport. The goal here was to reduce stress unconsciously and the best way to do so is through nature. Biophilic design can reduce stress, enhance creativity and clarity of thought, improve our well-being and expedite healing; as the world population continues to urbanize, these qualities are ever more important. Biophilia is a study of human connection to nature. We see neuroscientists, psychologists, evolutionary biologists and a number of others looking at how people respond psychologically and physiologically to experiences of nature. Those experiences frequently translate to lower stress level, which you can see through heart rate and blood pressure and a number of other indicators. Another outcome of experiencing nature is improved cognitive function.

In Japan the research is called forest bathing "Shinrin-Yoku" (Tsunetsugu, Y., Park, B., & Miyazaki, Y. (2009)). They would give people a stressful situation and then put them into a forest to see what happens to the heart rate and the blood pressure. They also measure cortisol level in the body, which is the best indicator of stress level. What is intriguing from this research is not only that the level of cortisol is lower, but that after you experience nature that cortisol level stays lower for an extended period of time. The second example is the research of Bill Browing, founding member of U.S. Green Building Council and partner of Terrapin Bright Green. He is focusing on bringing nature into urban build environment through Biophilic design. Terrapin Bright Green is an environmental strategies research and consulting firm, Browning's clients include e.g. Disney, Google, Bank of America and the White House. At Terrapin Bright Green theorists, research scientists and designers defined aspects of nature that most impact our satisfaction with the built environment, by collecting scientific papers on this topic and categorizing them by what it is in the environment that leads to a positive response. That led them to develop a series of patterns or metrics based on the science: 'the 14 patterns of Biophilic Design' (Terrapin Bright Green. (2014)). This is a collection of science that says, for example, having water in the space leads to these types of responses, or having a view to nature from the space, helps with stress reduction and cognitive function. Their reasoning for doing this in the built environment comes from the fact that now more than half of the world's population lives in cities; the opportunity to connect with nature is pretty diminished. In many cases people can't get out to a forest, mountains or the beach. Biophilic Design is an attempt to bring the qualities of those outdoors experiences into the built environment. A great example is The Parkroyal Hotel in Singapore:

Another example are researchers at Cardiff University who compared the productivity levels in two offices, one with natural elements (e.g. live plants) and one without. (Creating Productive Environments using Biophilic Design, (2015)). What they found was that the offices with the natural elements had a 15% rise in output amongst employees within three months of implementing this into the design. Additional studies have shown the following benefits to be true when natural elements (including plants, water features and natural light) are present within the working environment: significantly higher levels of productivity, higher levels of happiness, creativity and motivation, lower levels of stress, lower levels of absenteeism and lower staff turnover.

There are many more examples of research done about biophilic design, proving that visual contact with greenery reduced blood pressure and heart rate; thus reduces stress. For example the field study done by C. J. Beukeboom, D. Langeveld and K. Tanja-Dijkstra (2012) that investigated the potential stress-reducing effects of exposure to real or artificial nature on patients in a hospital waiting room. This research states that not only people in hospitals heal faster when they have a view on nature, but more interestingly shows that patients exposed to real plants, as well as patients exposed to only posters of plants, report lower levels of experienced stress compared to the control condition. We know now that natural elements in hospital environments have the potential to reduce patients' feelings of stress, but by increasing the attractiveness of the waiting room by adding only posters of plants, hospitals already can create a pleasant atmosphere that positively influences patients' well-being. Further analyses show that these small but significant effects of exposure to nature are partially mediated by the perceived attractiveness of the waiting room. Concluding, there is plenty evidence that biophilic design has a positive effect on people, therefore it is a good idea to use it in future airports, especially in waiting areas. Two good examples are the Incheon International Airport in South Korea and the Changi Jewel Airport in Singapore, future-focused projects that are now being developed. Following are renders of these project.

Incheon International Airport in South Korea:

Changi Jewel Airport in Singapore:

These kind of images are merged together into a collage, to provide you with a visualisation of stress-free future airport:

2.4.2 Subducting boredom with interaction design

There are lots of things people can do while waiting at an waiting area at the airport, but people tend to get bored. The problem of boredom can however quite simply be solved by providing something to do while waiting. Nowadays people mostly grab their phone, because it is easy to pass time scrolling through a social media feed, reading news or chatting with colleagues.

Mainly because both my tutor and my client have interest in interaction design, there are research questions about the possibilities regarding interaction design in a waiting area and in which ways

these interactive possibilities in a waiting area could positively influence the behaviour of the people. It is important to have a reason for interaction design, not to only to incorporate it because it is fun. So, in this setting interaction design will be investigated considering it to be the perfect solution for boredom while waiting at an airport.

However, interaction is more than a remedy for boredom, it can for example also be used to connect people. Regarding Maisters 8th Law of Waiting that lonely waits seem longer than group waits, by connecting people the feeling of waiting can be thus reduced as well. People can get connected through interaction design, creating this way a more positive waiting experience. Or even the other way around: by creating a more positive experience trough interaction design, people could get connected because they all experience the same. Connecting people can be very profitable: one can find a new friend or business partner, exchange valuable information, just keep each other company or even help someone out.

During my bachelor in Industrial Design Engineering I learned to approach interaction design a certain way. As J. van Dijk explains in his PhD thesis 'Creating Traces, Sharing Insight' (2013): "We see a similar trend towards integrating the physical and the digital, although historically starting at the other end: the physical product increasingly becomes an 'interactive' product, enriched with sensors and actuators, which creates new design challenges (Frens, 2006). Industrial Design work on interactive systems shows integration of social, physical, emotional and psychological levels of meaning into complete product concepts (rather than 'mobile apps' or 'tangible interfaces')". As an example he mentions the intelligent lamp designed by Philip Ross, shown in the bottom right picture in the collage below. The work of Philip Ross (2008) investigates how to design Ambient Intelligent products and systems, taking into account the ethical dimension. The question he researches is how to design intelligent products and systems that invite people to change their behaviour in a specific way, through incorporating specific aesthetics in the interaction design. In other words, how can we make specific behaviour in the interaction with a product or system so attractive that people are enticed to engage in it? Ross developed the intelligent lamp AEI to explore how to design a product dynamic form that has a specific effect at the person value level.
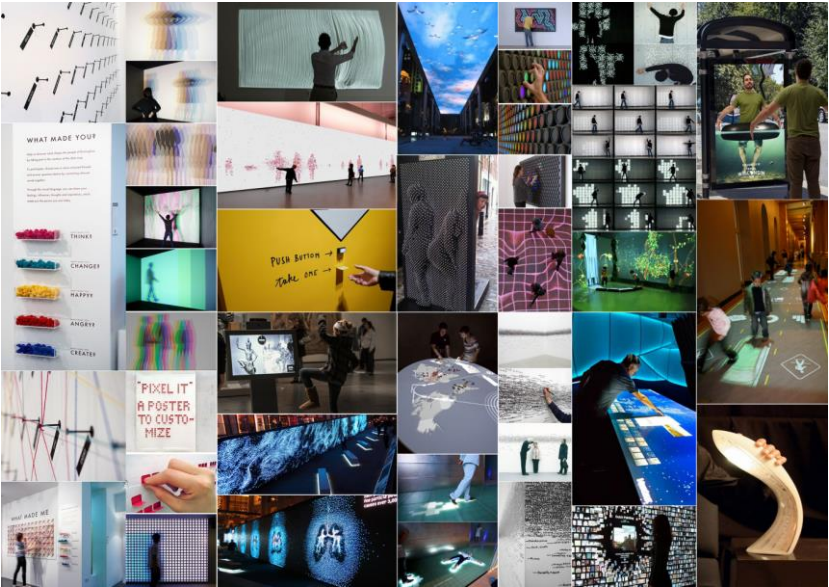
In this collage many ideas for interaction design and examples of interaction design are shown. Most of them are entertaining, providing a funny or surprising experience. Lots of possibilities for interactive

walls are shown, because at an airport there are big areas where people just pass by, looking for shops or somewhere to sit and pass time. An alluring concept could be a (large) interactive wall that somehow reacts on the behaviour of people passing by, for example to their movement. This way people would get triggered and activated to move in front of the wall, they could even get connected this way. This is just one example of occupying people's (waiting) time in order to take away the feeling of waiting, the boredom, and make time pass faster.

Accoding to J. Van Dijk there are four transforming possibilities when designing interaction (for embodied cognition): **SENSE** transforms or creates new opportunities for the ways a person may sense/perceive the environment. This means creating new, artificial 'sensors' by means of which people can start to respond to aspects of the environment that they hitherto couldn't. Interactive tech for example can enable you to see/detect/observe things that you could not see without the technology, for example things that are physically far away, things that happened in the past, or even projections of things that may happen in the future. **ACT** creates new opportunities for physically manipulating the environment. Think of the technology as a 'tool' that extends your possibilities of acting in the world. This is not unlike the design of conventional tools (the hammer, the blind-man's cane, and so on). **RELATE** provides new ways of social interaction with other people in face-to-face contact. Technology can be a 'platform' through which people get into contact with each other and remain in contact. Think of the function of a whiteboard during a meeting or the way a table can help a group of people to 'be together'. **TRACE** entails enabling the creation and use of expressive traces. (People leave a trace of their activity, and that trace can then be seen by that same person or by other people, and people can react to it. Compare the way a 'trail' evolves in the grass of and how people then follow the trail, and then the trail becomes stronger, etc.). J. van Dijk visualises it in the drawn picture on the right (2013). In the picture he has artificially separated them, which may be useful for finding a concrete starting point for design. As we are intervening in a loop, however, SENSE and ACT are strongly interrelated. Now when looking at the collage of examples of interaction design possibilities again, some interesting examples can be idetified. When virtual reality changes the way people perceive the world around them, or the way they picture themselves, it is a way of transformation of sense, but also a way of acting when for example VR in a smartphone app changes how people act in the world. Examples of relate are like the 'pixel it; a poster to customize' at the left bottom of the collage: platforms where people connect through interactive design. This theory is however only used in this paragraph, to get a clear view on all the possibilities of interaction design, we will not go further into depth within this topic.

3. DESIGN

NOW THAT THE RESEARCH PHASE OF THIS BACHELOR ASSIGNMENT IS DONE, IT IS TIME TO USE ALL THE ACQUIRED KNOWLEDGE IN THE IDEATION PHASE TO DESIGN AN WAITING AREA EXPERIENCE THAT WILL INFLUENCE THE BEHAVIOUR OF PEOPLE IN A POSITIVE WAY. FIRST THE REQUIREMENTS OR DESIGN GUIDELINES WILL BE DESCRIBED, NOT ONLY IN GENERAL, BUT ALSO CONSIDERING THE SPECIFIED FUTURE TRAVELLER TRIBES FROM THE TARGET GROUP. AT THE ARCHITECTURAL FIRM IN ROTTERDAM I ORGANISED A WORKSHOP WITH MY CLIENT AND ALL COLLEAGUES. THE GOALS, PROCEDURE AND RESULTS OF THE WORKSHOP WILL BE WIDELY EXPLAINED. ALL IDEAS THAT HAVE COME UP DURING THE RESEARCH AND AROSE IN THIS IDEATION PHASE WILL BE SHOWN, THE BIGGEST DESIGN CHALLENGE(S) WILL BE EXPLAINED AND SOLVED, AND EVENTUALLY, THE FINAL CONCEPT OF THE WAITING EXPERIENCE WILL BE EXPLAINED AND PRESENTED IN A SUITABLE FORM.
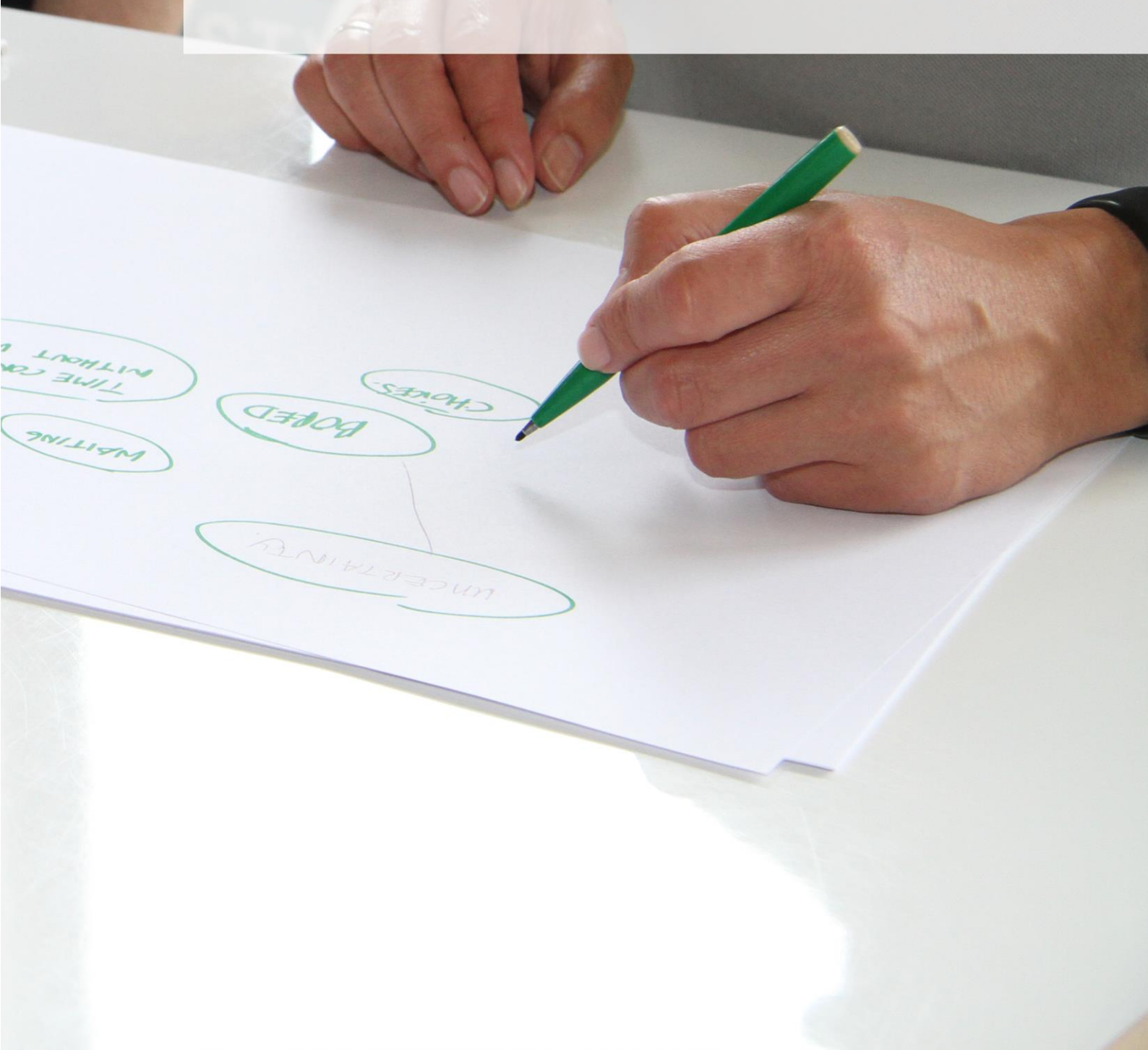
3.1 Requirements

In order to define the requirements which will be taken into account when designing the final airport experience, the conclusions that answers the research questions from chapter 2 'Research' will shortly be listed, answering research question 5.1:' What requirements can be derived from the insights acquired in answering questions 1, 2, 3 and 4?'

- *Paragraph 2.1.3:* The final division of the target group a combination of the Adler-model and the division of the six traveller tribes from the Amadues report 'Future Traveller Tribes 2030'.
- *Paragraph 2.2:* Lots of things are going to change in the future regarding the way people will experience an airport, the most dominating changes will consider a very personal approach towards the travellers while technology is taking over human tasks more and more.
- *Paragraph 2.3.1:* Airports in general should have some subtle background music (not interfering with the important information provided through audio notifications) to positively unconsciously influence people's perception of waiting time positively.
- *Paragraph 2.3.2*: When thinking about how to influence a mood in a rather positive way, the focus is on reducing stress and subducting boredom through the design.
- *Paragraph 2.3.3:* The first impression and the memory of it are the most important parts of an experience.
- *Paragraph 2.4.1*: Reducing stress by biophilic design
- *Paragraph 2.4.2*: Reducing boredom through interaction design

From this list the requirements that will be taken into account are derived:
- The design must never decrease the seating capacity
  Since the first priority of an waiting area at an airport will always be as much seats as possible, the waiting experience will always come second.
- The design needs to fulfil the needs of the whole target group as much as possible
- The design needs to fit into the future perspective of an airport
- The design needs to keep people alert
  Since it should never happen that through the design people totally forget about time, then the opposite will be achieved in a negative way
- The design needs to reduce stress
- The design needs to take away the feeling of waiting
- The design needs to reduce boredom
- The design must strengthen the business case of an airport
  Otherwise it will not be useful to the client
- The design must have a surprise effect on people

In Appendix D you can find a table with more detailed requirements for each future traveller tribe. Those are not taken into account in this design of the future airport experience, but should be taken into account when every part of the experience is designed more profound. Within the size of this bachelor assignment there is unfortunately no scope for that.

3.2 Workshop 'Generating Insights'

This workshop was organised to synthesize tangible insights from my research by merging all the information, data and findings and translating them into design ideas. The goal was mainly to get inspired and to obtain interesting insights that I otherwise would not have discovered. This workshop is the translation from the research phase into the ideation phase of this bachelor assignment. Research questions 1, 2, 3 and 4 are answered; this information will be used to generate new insights.

3.2.1 Description of the workshop

After I introduced myself, the first part of the workshop was a 'brain warming up'. This is an exercise to get all ideas that first come to mind on paper, in order to really start thinking out of the box. After the warming up I explained the design case and divided everyone in three teams. Every team needed to design a waiting area for people with an extreme negative mood. Team A got the assignment to design something for extremely bored people at an airport, team B got people that are totally stressed out and team C needed to design something for the so-called 'mummies': exhausted people at an airport. In Appendix E you can find many pictures and an extended

explanation of the Workshop. We will now take a look at the presentations of the teams and after that the results.

Presentations

After one hour each group presented their final design to the group very briefly. The first group had a very amusing way of presenting their idea. Because they were designing for bored people, they did an overly boring presentation introduction. Their idea was a huge object full of sensors that measure everything from a person that walks in. Their appearance, their height, their social media data etc. Then it calculates what the person wants and when the person walks in their needs will be fulfilled. For example, if the phone of someone is scanned and it appears to be that that person loves to read, that person will be led to a quite space for reading inside the object. Although their final design was not very impressive, their approach of the design process was very structured and thorough.

Pictures from Team A; Concept 1: a design for bored people

The second group had a very business wise approach, thinking about what is realistic and what not. They were very careful considering the needs of the people at the airport and how the stress could be reduced. Their final idea was typical for architects, they re-designed a concourse with satellites and places where different needs can be fulfilled. They elaborated on the idea that future airports could be like little towns. Nearby every gate there is a smaller area where different activities can be done. People could for example go to a barber, to a fitness area, to a mediation area etc. Their design included an app for the smartphone which helps people in the decision making of what they want to do while waiting, how many time they have left and where the fast route through the airport is, when they do not need anything to relax but just quickly need to get to the plane. This app provides all the information that people need to be sure that they will catch the plane in time. At the end, when they finished their design, they took post-its from the pillar in the office, that were covered by their final concept. As you can see in the second picture, a lot of them were applied in their design.

Pictures from Team B; Concept 2: a design for stressed people

The last group was the creative one, the only group that immediately started with the materials. They through of ideas through the materials, grabbed all some things and started brainstorming the way Vitto and I are used to as Industrial Design students. Therefor this group was the easiest to inspire. Their starting point was water; the idea was that when our senses perceive water in any way it had a calming effect. Whether we feel water with our hands, see an ocean flow, or hear water streaming, it does relax people. This basis principal was very good, but this group had trouble staying realistic in any way, in their presentation they talked about airports from a very far away future when everything will be very different. Even though they speculated maybe a bit too much, some interesting insight were created. Their main idea was that tired people would float in 'pods' from place to place because all they want is to sleep. This way they can rest and sleep while getting at the right place in the right time. Their future airport vision was like that; no more walking to a gate but relaxing while you float to the gate, people would only have to enter the airport ant then everything would be taken care of while you float around in a pod. Truth is, if this would be possible, a major stress factor would be reduced because the pod takes over the responsibility of getting there in time. Maybe in 2174 people will be floating on water in airports, who knows?

Pictures from Team C; Concept 3: a design for exhausted people

3.2.2 Results workshop

After the workshop I analysed all the concepts explained in the previous paragraph and mapped as shown below. As shown in the vertical legend in the picture, blue stands for moods and in concept 1 there is a lot blue: this concept is all about moods and looking very carefully at people's needs. Concept 2 provides very functional and technical solutions, while concept 3 is all about relaxation and nature. I did not expect such different approaches to the design case and such different outcomes. I am very pleased with the results, these ideas are a big inspiration and the next step in the design process.

Organizing a workshop for the whole office was a very interesting and learning experience. Everyone agreed that brainstorming together is very powerful tool to get inspired and obtain new ideas.

Colleagues applauding afterwards

3.3 Ideation phase

The workshop ended the research phase and kicked off the ideation phase. With the results of the workshop in mind, more ideas arose and more different concepts were developed. Firstly the ideas that arose during the research will be shown, after that the ideas inspired by the workshop. Lastly, in order to create the final concept, a redefined design challenge is solved.

3.3.1 Ideas during the research

Naturally, many things and people inspired me during the research, so many ideas already arose during the process. For example biophilic design and interaction design were two large inspirations, explained in previous paragraphs. Nature as a stress-relief factor is an important basis for a lot of ideas. Another example from the research is Maisters 8th Law of Waiting: Lonely waits seem longer than group waits. As mentioned before, this inspired me to try to think of ideas that connect people. Not only because this takes away the feeling of waiting, but also because these days everybody is only looking down on a smartphone or tablet instead of looking up and connecting with the people around them. People can get connected in many ways, considering interaction design and a positive experience there are two possibilities. People can get connected through interaction design, creating this way a more positive waiting experience or the other way around by creating a more positive experience trough interaction design people could get connected because they all experience the same.
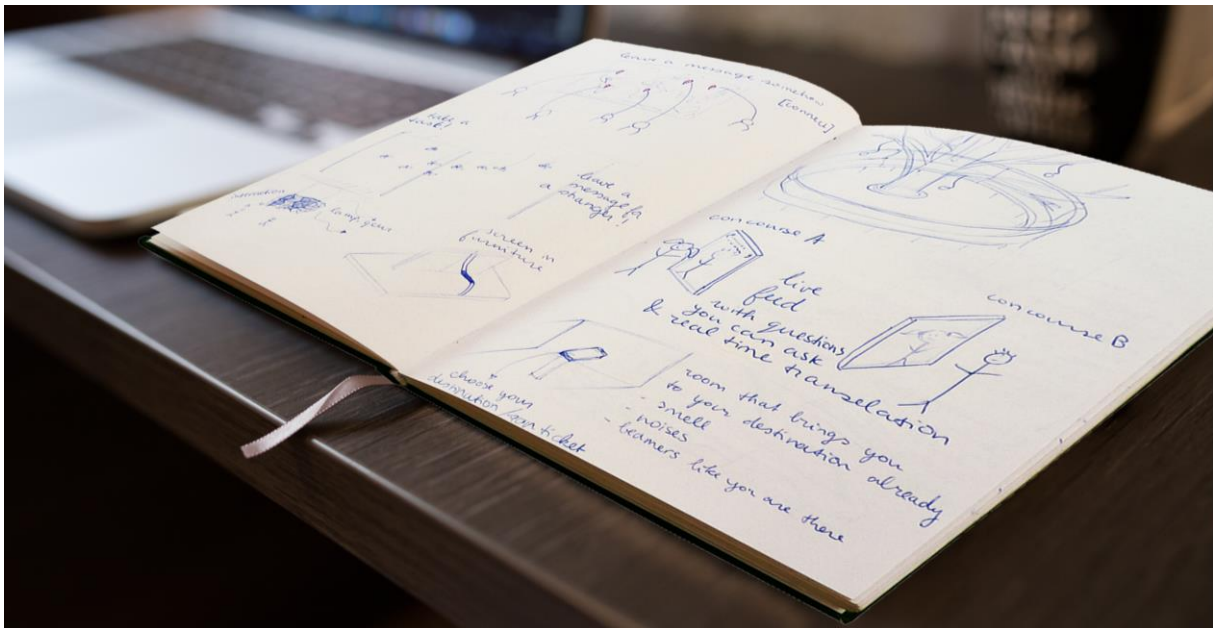
This is a picture of my sketchbook, showing some ideas about connecting people. This can be done by for example looking at what passengers have in common and using that as a tool to connect. A very obvious but also interesting way to connect people is by exchanging information about different destinations where they have been. One idea that came to mind is to realise this connection through interaction design; on live video feed screens placed on different terminals (right page on the sketch shown above). On the left page some other ideas about exchanging information about the destinations people have been are drawn. These are however not very technological, but rather very simple and playful. Contrary to the idea for the concourse, these ideas are focused on the waiting area at the gate.

In this picture you can see some ideas about ambient intelligence in a waiting area, when looking at the smaller waiting areas before the gate. Some furniture ideas are drawn that reacts to people's behaviour and also biophilic ideas; using nature structures and nature materials to unconsciously make people also more relaxed. There is the idea of a waiting room, styled as a living room, I saw it after I came up with this idea when I travelled from Schiphol airport! Nevertheless, it is very comfortable to wait there. Several ideas consists organic forms and are connected to nature in a way, made from wood for example are drawn. Also ideas where people are sitting higher, as the manager of 'Meetingmoods' suggested. Ideas where design reacts to mood of people or causes several moods with people are drawn. More ideas are explained and shown in appendix F.

3.3.2 Ideas inspired by the workshop

As explained, after showing some ideas that arose during the research, ideas inspired by the workshop will be shown. This time it are digital drawings, with explanations written next to it.

Most of these ideas are based on biophilic and interaction design, also in a search to combine them.

embedded ambient technology

speakers giving all necessary information

colors reacting on people (their stress level / movements) creating new experience in a area

parametric design: nature element

interactive furniture: surprise element

technology senses what you want & need

slightly rounded so you can swing a little

relax with nature sounds in a closed environment (all practical things are taken care of)

child friendly environment

feeling of floating on water: letting worries go...

taking the nature from outside to inside

• sockets
• wifi
• kids - friendly
• information for flight
• distance & time to walk to the gate

SCREEN
- information of the destination
- interaction design
  • connect people
  • surprise people

big screens attracting attention and making people curious what the pixels are

hundreds of selfies form an (pixel sea) image

take a selfie

nature element in a green area

INTERACTION

possibilities considering the business close of the airport (could be used as surprising advertisement)

nature in the ceiling

structure of a leaf: giving the feeling of walking through nature

connecting the ceiling with the ground

nature elements in combination with technology creating a smart forest, providing a surprising experience

interactive lighting surprises people by following their movements

hanging from above, making it more interesting to follow moving people

digital nature

technology creates the environment that relaxes people

the whole experience, triggering each sense

CONNECTING PEOPLE

a picture of your facebook account

the location is shown on the map

smartphones connected to the wifi of the airport with all the needed data from social media etc. providing the information needed: location of last wive.

3.3.3   Design challenge – reduce stress but stay alert

Now we will look at the research and all devised ideas to answer research question 5.2: 'How can we redefine the design challenge based on the insights acquired in answering questions 1, 2, 3 and 4?' When taking a more careful look at the requirements one can see a major contradiction: people need to relax, but still stay alert. That is like saying that people must sleep, but still stay awake: at first sight it may seem impossible. A lot of different ideas arose to solve this problem. For example a place to lay down (body is relaxed) while an interactive ceiling keeps you awake (alert) (see sketches before). However, none of these kind of ideas, where people were consciously relaxing and kept awake at the same time, actually solved the issue properly in my opinion.

One day at the firm in Rotterdam my client had a meeting with a light specialist and introduced us. Mr. Hoeksma owns a small firm specialized in light and told me lots of interesting facts I did not know about. Because I was looking for a rather unconscious solution to this design challenge he provided the right inspiration at the right moment: light. With cold lighting people stay more awake and feel more energetic because our brain connects it to the blue bright sky, when people go outside they get energetic for that reason. The solution to this design challenge is therefore a combination of nature and right lighting (right amount of lux and right warmth of colour): the nature relaxes people as explained before in the chapter about biophilic design, while the light keeps people alert. According to the study of Cajochen et al. (1999), 500–1000 lux is needed on the eye to increase alertness Juslén, H., & Tenner, A. (2005).
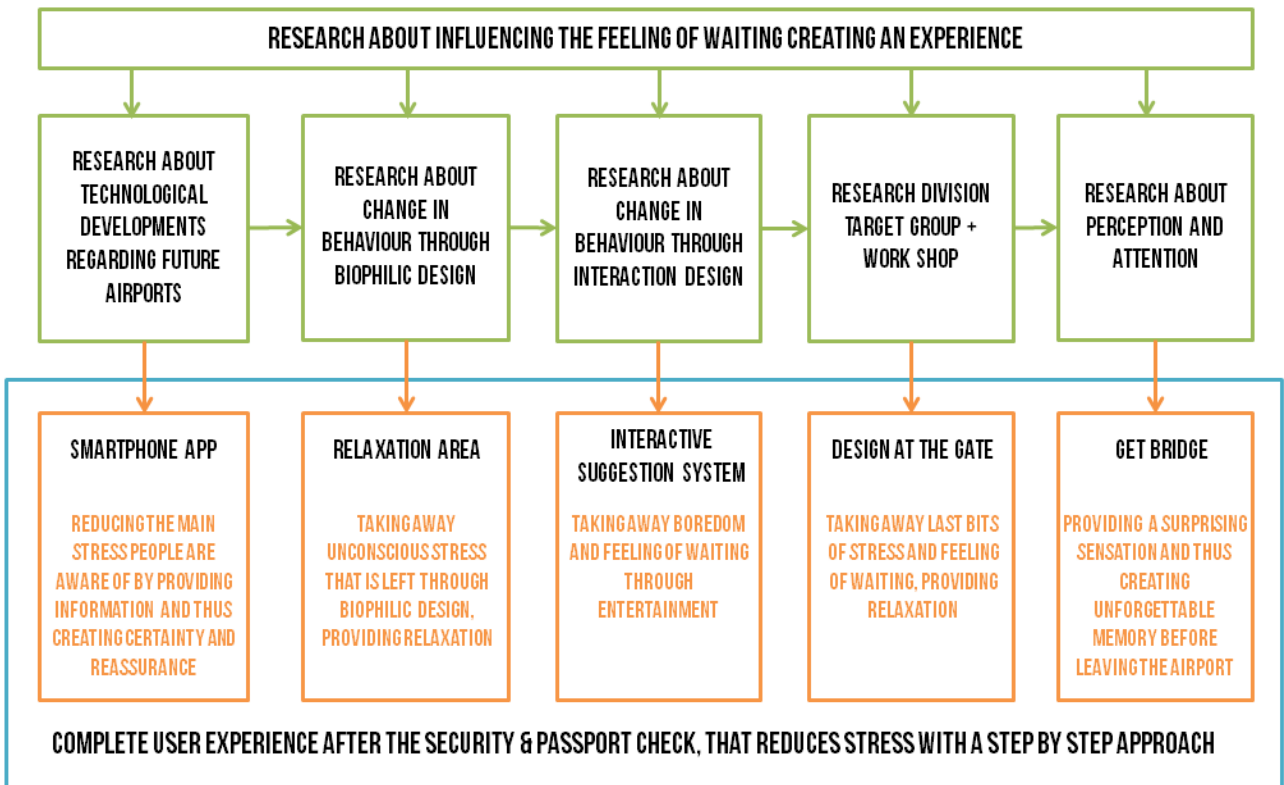
3.4 Final concept: complete experience after the security check

In this paragraph the final research question will be answered: What is the best way to create a future vision waiting experience that can be reflected on by involved stakeholders, by means of a prototype of the concept with limited means and time available? This final design is merely an example of what a future airport experience could look like, because every airport is different and this bachelor assignment is about airports in general, not a specific (existing) one. While creating ideas I found out quickly that it is very hard to design just one product, as students of industrial design engineering are used to, that will solve all the problems and satisfy all the requirements. The reason for this is mainly the extent of the case: the waiting experience after the security check is something huge, where people do many different things and feel many different ways. As mentioned before, the main goal is to reduce stress and boredom through biophilic and interactive design. Ideas were devised combining those two into one final design concept, but soon enough it became clear that such design won't cover all the insights from the research. The solution for improving the complete experience after the security check, in response to the whole research, is something bigger. The final design concept consists of five parts that address the stress and boredom on various levels, with different mechanisms. Their combination results in a complete stress-free experience from security and passport control to the moment one steps in the plane.

The approach of this final concept is that stress is being reduced on different levels step by step, so not only in a practical way but also on an emotional, cognitive and sensational level. First, the main stress from hurrying to get in time at the gate and in the plane is reduced by personalized information through a smartphone app at level 1. This is a very practical approach: by providing information certainty and reassurance is created, taking away the worries. However, for different reasons there is always some unconscious stress left. In level 2 people will reduce the unconscious stress left while relaxing in the biophilic designed area. After that there is still much time left before boarding. In level 3 travellers will forget about the waiting through entertainment of the playful interactive suggestion system. As a result of the surprising suggestion they will go shopping or for a drink and the time will pass by. When the gate opens people will be in the waiting area at the gate in here, in level 4, the last bits of stress are taken away. Nature elements and personalised comfort will relax them and information about the destination will provide distraction from boredom and the feeling of waiting. Before they know it, time has passed and it is time to board! While walking towards the plane, a last 'wow' effect is created by a colourful jet bridge. This surprise ensures that the people step into the plane delighted and with a unforgettable last memory of the airport. In the figure below this complete user experience is explained considering the research; what research led to what design solutions. For the visualisation of some elements a quite simple and basic exemplary 3D model of an non-existing airport is used.

RESEARCH ABOUT INFLUENCING THE FEELING OF WAITING CREATING AN EXPERIENCE

RESEARCH ABOUT TECHNOLOGICAL DEVELOPMENTS REGARDING FUTURE AIRPORTS	RESEARCH ABOUT CHANGE IN BEHAVIOUR THROUGH BIOPHILIC DESIGN	RESEARCH ABOUT CHANGE IN BEHAVIOUR THROUGH INTERACTION DESIGN	RESEARCH DIVISION TARGET GROUP + WORK SHOP	RESEARCH ABOUT PERCEPTION AND ATTENTION
SMARTPHONE APP — REDUCING THE MAIN STRESS PEOPLE ARE AWARE OF BY PROVIDING INFORMATION AND THUS CREATING CERTAINTY AND REASSURANCE	**RELAXATION AREA** — TAKING AWAY UNCONSCIOUS STRESS THAT IS LEFT THROUGH BIOPHILIC DESIGN, PROVIDING RELAXATION	**INTERACTIVE SUGGESTION SYSTEM** — TAKING AWAY BOREDOM AND FEELING OF WAITING THROUGH ENTERTAINMENT	**DESIGN AT THE GATE** — TAKING AWAY LAST BITS OF STRESS AND FEELING OF WAITING, PROVIDING RELAXATION	**GET BRIDGE** — PROVIDING A SURPRISING SENSATION AND THUS CREATING UNFORGETTABLE MEMORY BEFORE LEAVING THE AIRPORT

COMPLETE USER EXPERIENCE AFTER THE SECURITY & PASSPORT CHECK, THAT REDUCES STRESS WITH A STEP BY STEP APPROACH

3.4.1 Application

The smartphone will become an essential part of the travel experience in the future, as explained in paragraph 2.2. Smartphones are already so merged into people's daily lives that many cannot live without them; we read the news on it, answer to important e-mails on the way to work and check time tables of public transport. Many airports these days already have apps, which provide you with information and show you the possibilities of different activities on the airport. However, when talking about the part of the customer journey after the security check, there is only one large need for everyone as soon as they get out of the security control: reliable real time information about how to get to the right gate in time, and there is still no app for that. People will nog go shopping or enjoy a coffee if they are not totally sure that they have more than enough time. In the future people will even book their travels on mobile devices, they will simply be impossible to imagine future travel without them in the lead. Therefore, an application should be designed and developed which will assure people about the time left. In order to convince people that this is true, real time location of a person should be shown, calculating how far it is to the gate and how long it will take you to get there (considering the speed at which you are walking). This app will tell you personally whether you have enough time or not and show the way with augmented reality.

Regarding the near future; the only thing people would need to do before their journey, is scan the barcode or QR code on their tickets. This way the app gets all information it needs. However, in my opinion we will travel without paper tickets very soon in the aviation industry as well. In train traffic this change has happened in the Netherlands already; there are only cards that use NFC scanning. People check in before getting in the train and check out at the destination; the same could happen in the future air travel.

3.4.2 Relaxation area

As extensively explained in paragraph 2.4.3 and 2.5.2, a stressed mood can be influenced in a positive way through biophilic design. The greatest effect is created with real nature, a couple of examples are shown in the mentioned paragraphs. This knowledge is now being applied to a part of the waiting experience, in combination with the solution to the design challenge. In this 'relaxation area' there is lighting that keeps people awake and energised, while they relax in nature. Almost all the senses are being triggered while people wait in this relaxation area.

You see the greenness, the water fountain flowing and the daylight coming in. You smell the forest and the grass. You feel the sunlight and a very subtle (warm) breeze. (Depending from the location of the airport this can be real wind from outside, coming through open windows or an artificial breeze created by inconspicuous fans for example). You hear sounds of birds far away and wind rustling.

When designing such a relaxation area a couple of things have to be taken into consideration. First, it is important that local vegetation is used, because people want to recognize the location of the airport also when they are inside. Future airports should, as mentioned before, reflect the local environment somehow. Considering this relaxation area, the vegetation is in this way particularly important. Secondly when talking about security measures this design gets really complicated. There should be overview at any time for example. However, the Changi Jewel Airport that is being built right now, is the perfect example that it is indeed possible. Maintenance of real nature inside is also an important job that cannot be forgotten. Lastly, the location of the relaxation are should be close to the last security check (as shown below). After people checked with their app whether they have time or not, they can immediately go and take a break.


3.4.3 Interactive screen

Behind all these parts of the created final experience there are some surprise effects, because surprising people in a positive way changes their mood in the right way. Surprise moments last only short, thus there are many of these moments incorporated in the final design and one of them is provided by this design. It may seem like a simple screen, but it is a very intelligent system. This screen scans a person thoroughly and decides what kind of suggestions for things to do at the airport suits the person best. The main idea behind this interactive screen is providing a personal experience of the airport for passengers and generating needs that they did not even knew they had. Through this fun experience boredom will be reduced, stress will be forgotten (even if it's temporary) and most importantly: the feeling of waiting will be taken away for a while. However, this concept is not only beneficial considering the way passengers feel. They get a personalized suggestion of shops where

they should go; this is very profitable for the airport business case. How this service is intended to function exactly will be explained in the following scenario.

The screen is quite large, so it needs to be standing in an open area, preferably a hallway where people pass by all the time. The headliner 'A PERSONAL AIRPORT EXPERIENCE' attracts attention. De two dots on the floor persuade people intuitively to stand on them, this installation makes people curious to find out what that personal experience is.
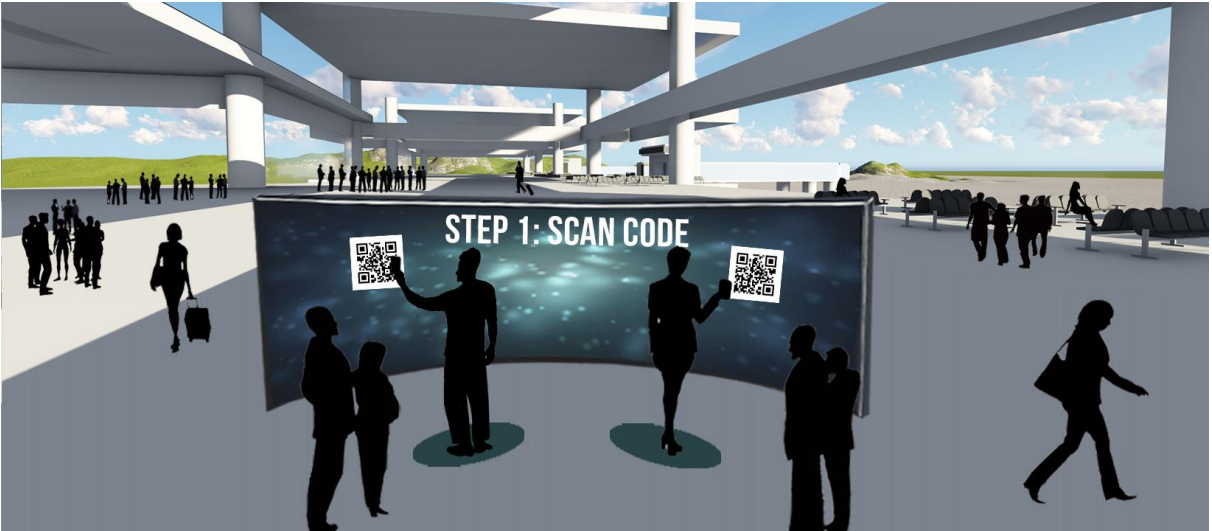
As soon as one person stands on the dot, the first step appears: the code needs to be scanned. In the future there will be many other possibilities to do so, other than simply with the smartphone. By scanning this the device gets connected with the software of the interactive screen. All public data from (social network) accounts is scanned, looking for interests, origin, hobbies etc. of the person.

This data will be combined with the appearance data after the 'body' scan at step 2; your height, posture, fashion taste, gender etc. will be determined by comparing it to a huge dataset of people's appearances. This way the smart system of this screen is profiling the people standing in front of it.
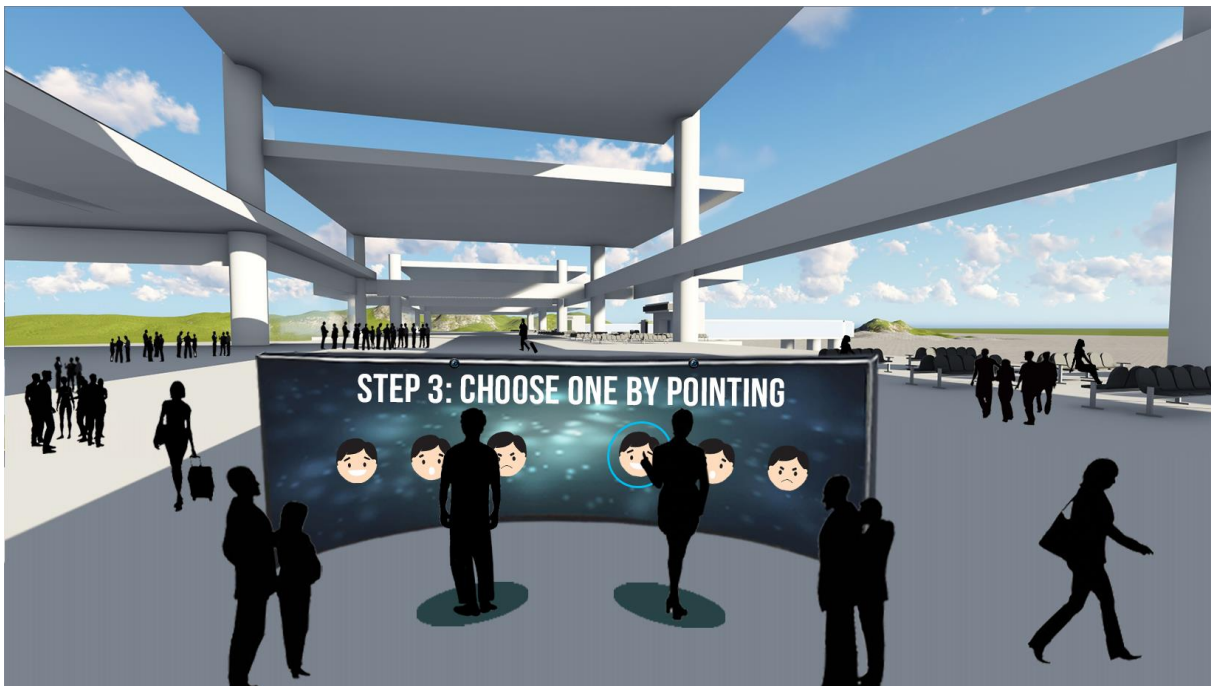
The last, but certainly not least, important step before providing the perfect airport experience suggestion is a 'mood-question'. Three simple flat design heads are shown, one very happy, a second surprised and a third angry. People have to choose one, but the machine is not asking why, so it is totally intuitive which one people choose. This final choice makes the system determine which suggestion is the best for one.

Every person gets a suggestion for a dish or drink and a shop where they should go shopping. As an example: the woman on the right got a large white chocolate mocha coffee from Starbucks, because there were pictures of her with Starbucks on Instagram and she said she loves white chocolate on twitter. The shoes she is wearing are high heels and the cloths are chic. Therefore a Italian shoe store is the perfect suggestion to go shopping at the airport. Considering the man on the left; he likes all the chicken memes from 9gag and other funny blogs like that so the dish proposed to him is a chicken dish from a Mexican restaurant at the airport. Furthermore he wrote some articles about smartphones these days, so he is referred to a mobile devices store at the airport.

3.4.4 Waiting area at the gate

When designing the smaller waiting area at the gate it is firstly important to look at the specific needs regarding the target group. Not for every future traveller tribe there is something necessary to be designed in this last part of the waiting area with seating.

- **Simplicity Searchers.** No special needs other than clearness and simplicity in every step of the way during the customer journey. If there is clear routing to the waiting area, with the app and signs on the airport as well, they will be easily satisfied with simply enough sitting spaces. So there is no special design for this tribe.
- **Cultural Purist.** Their only need is to see the identity of the culture of that country or town the airport is. By using art or specific furniture a part of the waiting are should reflect the local design. Because this is also specific for every airport there is no perfect concept that 'fits them all', but rather just this idea that can be applied to every airport in a different way.
- **Social Capital Seeker**. To suit their biggest need the furniture should have sockets and there should be a good Wi-Fi connection at this waiting area as well. To provide a feed-friendly experience in a cheap and easy way; for example a selfie wall can be created. This was a last post can be posted on social media before flying.
- **Reward Hunter.** Their need is very clear; a VIP lounge with all the luxury they want, this tribe don't want to be in the waiting area at the gate at all. So, also for this tribe there is no special design at the waiting area.

- **Obligation Meeter.** They also need a strong WI-Fi connection, to arrange everything that considers their travel according to plan. Other than that there are no special needs considering this waiting area.
- **Ethical Traveller**. This is the smallest tribe, with also not many needs considering the airport design. However they are interested in e.g. sustainability, so information about the sustainable relaxation area would be appreciated.

Apart from the tribes as single groups of people, in the waiting area nearby the gate there are some other requirements. Firstly it would be nice to provide people with information about the destination they are going. This can be done in many ways, for example with a simple screen showing a travel-program about that destination. This is however more complicated then it seems because the destinations change many times a day, at every gate. The best concept here is a big world map on a big touch-screen where people can tap on every destination they want and leave tips and tops. These ideas are all possibilities providing the desired change in behaviour. The reason I did not choose one and elaborate on that one more is because there are too many possibilities, where it is very hard to compare which one is better. The most important thing is what change in behaviour is desired here.
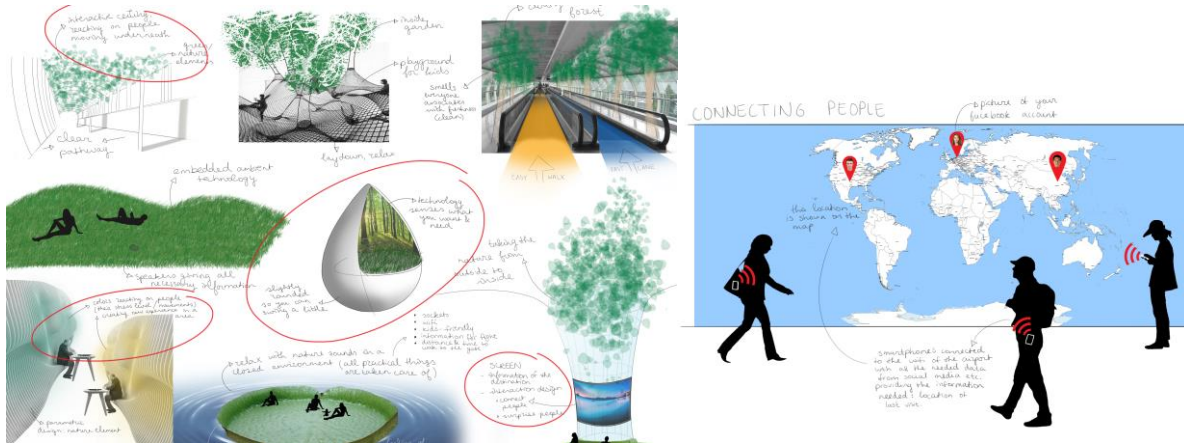
3.4.5 Jet bridge

The jet bridge is often very claustrophobic and a ugly last experience of the airport. People feel safe with hard ground beneath your feet and this is the last moment they have that, before flying. With coloured lights a final unforgettable experience of the airport can be very simply created. Some examples are shown below.

4. DISCUSSION

Within the bachelor Industrial Design Engineering at the University of Twente we learned a certain way of solving design problems, a certain way of walking through an entire designing process, from scratch to final design. However, this project is different, in many ways. Firstly I will take a critical look at the final design and at the research questions I made at the very beginning. Secondly and lastly a personal reflection on this bachelor assignment is explained.

4.1 Evaluation final design

At the beginning of the final design paragraph I explained that I chose a different approach to designing the final concept. This was my way of handling the difficulties that came across in the final phase of a project with this extent. After many conceived ideas one could perhaps expect a more defined concept phase where all these ideas are compared and viewed, since this step is needed to get to a satisfactory final design. However, this bachelor assignment is different. Normally when designing a product within the field of industrial design engineering, everything is very specified and tangible. This bachelor assignment is all about human behaviour, which already makes it more complicated. Secondly, the area at an airport from security and passport control until the last door before walking out the airport and getting in the plane, cannot be considered as one simple product. It is a huge product, containing many utterly different parts and many utterly different people using it. That is why the final design is based on the step-by-step approach. There is no 'classical concept phase' after the ideation phase because the final design is not just one idea or concept that seals the deal and solves all problems. The whole experience after the security check or passport control is a combination of ideas and findings from the research. Before looking carefully at the final design considering the research questions to see the conclusions and possibilities for further research, a couple of other things also have to be considered first. The difficulty with this project was not only the challenge in combining IDE with architecture, but digging into psychology as well. Within the course of the last three years of IDE we passed subjects like 'Cognitive Ergonomics' and we did a more psychology-focused project, but this bachelor assignment really takes a closer look at human behaviour. The amount of new information is so much that one can easily get lost in it. Also, this thesis is about designing an experience which is more a service rather than a product, which is a different design approach as well. Lastly, because of the extent of the assignment, there was not much time for the design phase. This is not a problem, from the beginning it was planned that the focus on this bachelor assignment was on the research and design process, instead of the final design. However, within the IDE bachelor we learned to design a product completely into detail: from scratch to the production details such as materials and production processes. The fact that this final design is so large, and there is simply not enough time to go more into depth of each part of the experience, is bothersome.

The answers to the 5 main research questions will be listed to show that every research question is answered within this bachelor assignment.

1. **What is the best way to divide the target group in different types of travellers?**
   The target group is divided into six future traveller tribes: Simplicity Searchers, Cultural Purist, Social Capital Seeker, Reward Hunter, Obligation Meeter, Ethical Traveller. These six types of travellers are then put into the Adler model to visualize the differences.

2. **In what way is the current airport situation going to change in the future?**
   Lots of things are going to change in the future regarding the way people will experience an airport, the most dominating changes will consider a more personal approach towards the travellers while technology is taking over human tasks more and more.

3. **Which aspect(s) of experience provide interesting opportunities; what is the desired effect that needs to be achieved in terms of positive experience for the target group?**
   The feeling of waiting can also be influenced in different ways: with background music (not interfering with the important information provided through audio notifications) the internal clock gets confused and people seem to think they waited shorter than they did. Also with Maisters eight Laws of Waiting the waiting time can be influenced. When thinking about how to influence a mood in a rather positive way, the focus is on reducing stress and subducting boredom through the design. Lastly, the first impression and the memory of it are the most important parts of an experience.

4. **What are the ways I see as most promising within this project, influencing the behaviour of the target group in the desired way?**
   There are a couple of ways this behaviour or moods can be changed. Stress can be reduced by providing reliable and clear information (for example trough an app) and through biophilic design. Boredom can more easily be reduced by providing an entertaining experience, with for example interaction design.

5. **The design question: What is an appealing concept for designing a waiting area at an airport that influences the behaviour of the waiting people, which enables the client to recruit potential customers?**
   The final concept is divided into 5 different parts, each one creating an element of the final experience as a whole and taking away different parts of stress, influencing people's behaviour more and more positively. This is visualized with renders of a non-existing airport model. The client can use this knowledge of influencing the behaviour of people through design in future projects. Especially by combining this concept with knowledge about special configuration, very useful design-guidelines are created.

4.2 Personal reflection on assignment

As explained in the paragraph of the final design, this bachelor assignment is different than other Industrial Design Engineering (IDE) projects I did so far. Of course the fact that this project concerns not only IDE but also architecture, already makes it more complicated, but regarding the difficulties of this project as a whole, the psychology part surprised me the most. When talking about human behaviour things can get very vague; as an Industrial Designer I am used to designing practical, tangible products. One of the things I struggled with was translating the findings from my research about human behaviour into tangible design ideas. Looking back, there is one thing I would have done differently: defining the assignment more specifically. The fact that I am designing something for *an*

airport, without having an actual example makes many things harder. As a result, there is no way to go more into detail when designing, since all possible airports have to be taken into account. This is partly because my client has other needs than my university, and it was sometimes difficult to come up with ideas that corresponds to both of these parties. This was a big learning experience; finding a way of putting my own interests into the design, while I take into account all wishes of all parties. Lastly, I want to conclude that I have learned more than I have ever expected, through working in such an international environment and professional firm. This business experience was very valuable.

Appendices

A. References

Information used throughout the whole thesis report from these experts:
- **Tanno Bregonje**
  Business Development and High Performing cultural change programs within complex and highly dynamic environments. Action Learning based Executive (Team) Coaching and outbound programs for (potential) high performing teams.
- **Jacco Bregonje**
  Jacco Bregonje was educated as an architect and industrial designer in The Netherlands. His probe-project 'Macrowave' has become one of the most important approaches with respect to Whirlpool innovation at a global level. In 2001 he responds to the need to further develop as an independent designer and is working since on several assignments for small family businesses and large multinationals. Some of his furniture designs are part of renowned international museum collections, such as the SFMOMA in SanFrancisco, Vitra Design Museum and Stedelijk Museum Amsterdam.
- **Chris Vonk**
  Mr. Vonk is an architect with a post doc degree in experience economy. After working in a architecture and design studio, he joined Amsterdam Airport Schiphol. He worked there on passenger processes like for example passenger flow and waiting areas. His redevelopment of the seating areas in Schiphol increased the quality perception of passengers enormously.
- **Conny Lanza**
  Ms. Lanza holds a master both in Social and Organizational Psychology and in Communication Science and has years of experience in development, realization and airport management of priority programs and lounges. She created PRIVIUM; a successful international loyalty scheme for frequent travellers. Together we found out what kind of airports my client would focus on.
- **Niek Krebbers**
  Salesmanager Jaarbeurs Utrecht
- **Thomas Schaper**
  Ambient Experience Design who focusses on translating insights and needs of people into relevant experience design solutions. The integration of light, image and sound into architecture in is key of Thomas Schapers activities. He successfully implemented ambient environments in Saudi Arabia, North America, Switzerland and the Netherlands.

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B. Research division travellers

In the Amadeus report about the APAC there are four dominant themes identified that will fundamentally change travel in the Asia Pacific region to 2030. The theme which is applicable when talking about the division of the target group is the fragmentation of the travel market into ever-increasing niches. This report states that travellers across the region will become increasingly distinctive, travelling for a much wider and more specific range of reasons, and with different aspirations and requirements for the travel experience. While travel in Asia Pacific in the past has often been undertaken in large groups through leisure packages sold in bulk, or in large organised business groups, future travellers will be in smaller groups, or alone. Matching this individualism is an increased willingness by travellers to self-manage their travel, circumventing traditional sources of information and transactional channels in favour of a do-ityourself approach. Significant new traveller segments will emerge, such as the female business traveller, the small business traveller and the senior traveller, all of which have different aspirations and requirements from the travel experience. For example, according to expectations senior 65+ travellers will double until 2030 (mainly China and India will have a great increase). (Amadeus. 2013, January).

The research described in the Journal of Air Transport Management (Dresner, M. 2006) stated that leisure and business travellers in the US will not be divided almost equally in the future, as it is now. The shift that takes place is more leisure travellers than business travellers. This is because of the growing low-cost-carriers. A growing amount of low-cost carriers does not only result in a growing amount of leisure travellers but also in an even higher drop in flight rates.

Only one source was found providing information about the European Union as a whole; saying that Business trips by Europeans account for 14 per cent of all worldwide outbound travel (Business travel market Germany 2010/2011). To check this, information about some important acquainted airports is gathered, just to get a better impression of the business-leisure travellers ratio, also compared to the numbers found in the other two reports from the APAC and the US. The results found are incorporated in the map below.
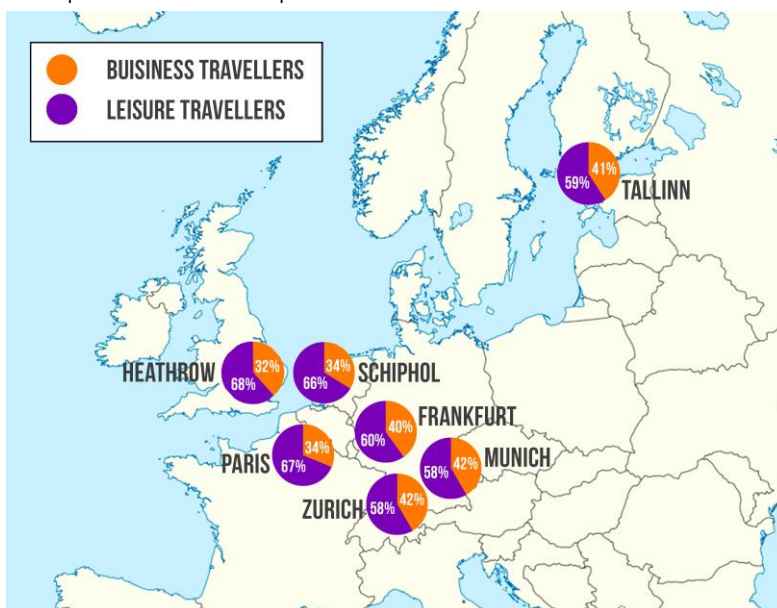
C. Personas future traveller tribes, from the Amadeus report

1: Persona Simplicity Searcher

Arjun, 40, Indian, Marketing Manager

Arjun's job is stressful and exhausting, and he doesn't get much holiday time. Every year he concentrates his savings into one two-week splurge. This used to mean backpacking or skiing with his wife, but since their first child was born in 2026, they generally take more relaxing breaks built around school holidays. Holidays for him are nothing more complicated than a chance to reset, recover from a year of overwork and burnout, and cloudgaze for a sweet fortnight.

He spends his days looking at screens, so he goes to a travel agent for a more human input into his planning. He consents to share his data – his travel history, his recent browsing history, his media habits, his quantified self outputs, his medical needs – to help form his ideal package, but the agent also asks questions and looks to probe his more nebulous motivations for travel. The approach is a mixture of talking and telepathy, and the results are so thorough and the process so simple, fun even, that Arjun is happy with the knowledge that he is paying a little extra for their commission.

The package, taking in the destination, flight, hotel, activity, entertainment, food, insurance, etc. options, is composed of hundreds of tiny customisable modules and micro-modules, right down to the lighting options in the hotel bathroom. Arjun doesn't admit this level of granularity – fundamentally the lighting options in the hotel bathroom will have no impact on his enjoyment of the holiday, he doesn't concern himself – so he consents for the agent to use a mixture of his best judgement, and a download of his previous experiences, to shape the holiday around his "core" decisions.

The algorithm-informed judgement of the agent is also informed by the shared data of his family, creating a set of compromises of the three sets of needs and preferences.

The result is Singapore, and everything is itinerised, a nuanced mix of museum visits (in which he personally couldn't be less interested, but will keep the wife happy), and long, lazy afternoons on the beach. They even book tables at restaurants on the shore-side. All of this is recorded in an itinerary app with a geolocation-tracking function to help him keep track of where his family are at all times when their paths diverge. It already, as he sits in the travel agent's office, picks up the family wearables and the connected luggage at home, and he is also given tiny, waterproof, connected markers for the family to wear in case they want to abandon their devices at any point.

At the airport

Info-light navigation. Simplicity Searchers will favour user-friendly, non-invasive forms of technology. Wearables will fit their purposes like a glove. They will use navigation technologies which tell them where they need to go, preferably with very little in the way of manual input into apps required and no staring at screen required.

A service, for example, which used geolocation data, willingly shared, to create an augmented-reality route map through an airport space, or other intuitive solution, will be widely used. They will happily be shepherded by smart airport systems, and will readily share their data if this can be shown to result in more streamlined and hassle-free processes.

Culturally-sensitive service. Many millions of new travellers will be Simplicity Searchers. Whilst the rebalancing of global power presents an imperative for travel companies to expand their global reach, it also challenges them to re-engineer strategies to effectively engage multi-ethnic (and multi-linguistic) consumer-citizens holding values and attitudes towards brands and behaviours that so often differ from those in established markets. There is a strong argument to be made for the automation of service along these lines, or for supplementing human service with connected aids – how else would it be possible to address each customer in her native language?

In-flight

Proactive in-flight entertainment. Ever willing data sharers, providing that the benefits of this sharing are apparent to them and are directly linked to the data being shared, they will be happy to disclose their media preferences to brands – perhaps by giving access to historical records of their use of subscription streaming services – to receive tailored content in-flight. The future of in-flight media obviously does not feature heavy, costly hardware (built into the backs of seats). Consumers will be mainly tablet-equipped. Airliners will build branded media platforms (the in-flight magazine for 2030) and offer free or reduced content as an incentive to use this platform in-flight (as opposed to whatever other apps they could use).

On arrival and at destination

Mobility. Simplicity Searchers are the most likely of our tribes to have health and mobility needs. These could be catered for in some ingenious ways in the future, in the form of biometric health tracking and geolocation-broadcasting mobility equipment.

2. Persona Cultural Purist

Kwame, 28, South African, Freelance Author

Ever since his journey north to Kenya last year, Kwame has been immensely interested in the cradles of civilisation, eating up ebooks and watching documentary after documentary online. Chief among them for excitement and colour, in his mind, is Ancient Mexico. He has harboured the idea of going off and exploring the ancient ruins of the Olmecs and Aztecs for a few years now, deciding to wait until he is far enough along in his reading, and his learning of Spanish through an immersive online course (he can't abide those phoney translation apps), so that he can really get the best from it.

He develops his plans on a social network for people interested in primitive cultures,Atavista. He follows the blogs and vlogs of experts in the field of anthropology, charismatic travellers and expert travel agents, bringing their opinions together in his mind about what approximately to do and where approximately to go on his trip – though he doesn't want to stifle the authenticity of his experience with too rigorous planning.It is on this site, during a webinar on the provenance of the Aztec Calendar Stone, that he first finds out about a special week of events – talks, live music, poetry, dancing – held in a few months' time at the National Museum of Anthropology. Quite a few people on the site are going. Previously anxious about travelling alone, and never having gone so far afield from home before, this is just the impetus he needs – he can check in with his online friends when he is there if he feels overwhelmed.

He books his trip, customising on a granular level to strip himself of every home comfort he can stomach to lose – he wants every detail to be as authentic as possible – and pays a little extra for an open fare in case he wimps out at the last minute.When he arrives, he logs into a sofa-hopping network to arrange for a place to stay for the night, and locals to eat with. There are plenty of options in busy Mexico City and once he decides whom to stay with, he sends a few messages back and forth and confirms his time of arrival – roughly. He will pay cash-in-hand for three nights.

He wears his connected eyewear around the city, which gives non-obtrusive pop-up flashes of information and insight on what is around him, without detracting from the feeling of being, like a 17th century conquistador, on strange and wonderful alien soil. When touring the ruins, the audio app pools his data on his reading and his progress on a MOOC on Aztec Civilisation, to create an audio tour tailored to his level of expertise. Augmented reality brings a long-lost culture to life before his eyes.In general though, he finds Mexico City to be too clogged with tourists for his taste, and after two days changes his plans (sending his host family an apologetic message and receiving a partial refund via automatic transfer through a payment app) and heads to a quieter village further north. Here, he uses an app to explore what is going on in the local area – what are people talking about on social media? Any events? Do I know anyone here? – and dials the personalisation coefficient down and the serendipity coefficient way up – he wants to be absorbed entirely into the local culture.

At the airport

Human(like) airport concierge. Cultural Purists will resist the impersonality of cybermediated service. This resistance may be futile in all but the contexts of "luxury" travel (to which Cultural Purists may, generally, be less receptive). Instead we can talk about human-like digital concierge services, using Natural Language Processing, organic and analogue interfaces and culturally-adaptive software, popular amongst this group. More radically, they may embrace imperfections in customer service, to an extent, in the name of "local character". The worst thing that service can be for the Cultural Purist is bland.

In flight

Charismatic transport. They may see fluid, standardised airport processes as lacking in character. They may prefer to fly to smaller, peripheral airports, or even circumvent air travel altogether as much as is possible, adding rail, ferry, boat, hovercraft and other forms of potentially charismatic transport into their travel mix when they can. This will be particularly attractive when touring multiple destinations within close geographic proximity – in exploring clusters of islands in the Asia-Pacific region for example. They may look to imitate the locals in their travel customs and transport preferences, and may be drawn to travel planners and providers that can support this. Cultural Purists will ask that the experience of cultural immersion begins long before they leave the airport at their destination – it should be felt as they collect their baggage, as they are welcomed from the plane, even in-flight. The process must be part of the experience.

On arrival and at destination

Curated discovery. Hostile to pre-planning, the adventurer's mindset of the Cultural Purist will be celebrated by apps/tools that make suggestions and allow improvisations in situ. Better network infrastructures will make this eminently possible. "Surprise and Delight" has been an established marketing maxim for decades. In an environment where data is increasingly leaned on and proactive anticipation of needs is increasingly held up as the ideal of service, the challenge of delivering the unexpected at scale is intensified. Cultural Purists may be suspicious of recommendation engines, viewing them as a trap reinforcing established preferences. In other words, they want their preconceptions, likes and dislikes to be challenged, not consolidated, by their travel experience. For those seeking authentic immersion in the unknown, "personalisation" may be something to dial down wherever possible.

Unknown pleasures. Cultural Purists will be attracted to all things untouched, uncharted and unsupervised, as scarce as these experiences may be in 2030. Some consumers might be willing to go a step further and position themselves as "discoverers" of truly unknown territories, courting a sense of risk or danger (or favouring experiences where this sense is curated for them). This will come by degrees. A Cultural Purist's holiday would not necessarily exclude immersion in cosmopolitan museums, galleries and historical landmarks, rather than cafes, family-run restaurants and shanties, if this is seen to be where the heart of a locale's

3. Persona Social Capital Seeker

Fionnula, 20, Irish, on her second gap year

Fionnula is lying on the grass in St. Anne's Park, Dublin, on an unusually hot weekend in April, thinking about how to boost her online following. Looking out over the Duck Pond, with the beautiful follies around, she gets the hazy sense that there is something nice, maybe Mediterreanean-like, about this afternoon, something she can't put her finger on.

She takes a photo, and tags it with a temperature and atmospheric reading from sensors embedded in her smartphone. She sends the Instagram to the account of @SenseMatchTravel with a budget range and consent to use her social media data in forming a response, and within the hour she receives a reply with three envelopes, each containing a heavily-discounted personalised offer based on the service's interpretation of her Instagram photo, as well as gleanings from her list of followers, her likes, her recent listening... Amused, she creates a poll on the social media site where her best-travelled friends hang out. "Which one should I pick?"

She gets an unusually large response – her social media analytics tell her that this post received 50% more clicks and 60% more likes than anything she has shared in the past 12 months. Maybe this deal is worth a closer look...

A few days later and Fionnula is snapping a selfie by at the Temple of Isis at Pompeii, pretending to prop up a column, and her feed is ablaze. She had set the lifelogging device around her neck to 24/7 record from the moment she arrived, and her stream is steadily attracting growing numbers of viewers. Subscribers are also sent an automatically-edited highlights-reel from her day, based on her check-ins at beacons at areas of interest, detection of noise levels and tracking of her heart rate and cortisone levels.

She is sure to fill her days with beautiful sights and quirky attractions from her area, and barely takes a moment's rest. On one day she uses a geolocation function within her social app to locate other social influencers in the area. She goes to the beach with one popular vlogger from the area – they both know that two famous faces in a video are better than one. She spends her evenings managing her feeds and producing a daily vlog.

When she returns home, she receives a number of messages through her professional social network from travel brands inviting her to visit Naples, Genoa, Sicily... next time, and enjoy discounts and VIP services.

At the airport

Feed-friendly experiences. This represents a whole new paradigm for travel, and is the most important and challenging thing for travel brands to get right for Social Capital Seekers. This applies throughout the journey (though the airport and hotel are particularly loaded with opportunity). Social content is at an age of content overload and time-crunch has come to be synonymous with short-lived, witty, quirky, colourful and exceptional moments. The most important thing that travel brands can do for this tribe is a) to curate such moments, and b) invite customers to move between social media and physical spaces seamlessly to capture and promote these moments. This will be a form of concierge service. Social Capital Seekers may be particularly open to luxury offerings (a la "Rich Kids of Instagram"), but for travellers across the full price spectrum, appetite will be ravenous for moments of shareable wish-fulfillment.

Establishing ROC . Customers will not engage for free. There will be no stigma attached to filling a friend's social feed with commissioned images and product recommendations, but social capital rentiers will ask for valuable, personal and imaginative returns on their investment. Moreover, they will understand that their online endorsements are valuable, and will expect reward from brands. They will expect their networked influence to command better deals, upgrades, cashback, discounts on fares and reduced prices in dutyfree stores, early-bird access, VIP services. They will favour direct (fare reductions, cashback) over indirect (discounts, perks) forms of remuneration, unless this reward is particularly imaginative and, in itself, network-enhancing (producing an ideal feedback loop from brand to consumer).

Everywhere connectivity. They will be attached to devices, with an eye on what is happening (and how their adventures are being followed) back home. The basic precondition of this behaviour is connectivity. Wi-Fi must be easy to access anywhere, it must be affordable or free, and it must allow sufficient bandwidth to post without delay multimedia files and messages.

Integrating social media with tech touchpoints. "Geonetworking" (popularised by Foursquare, now integrated into most platforms) means that while a user might pass through check-in only once, while at the airport they will "check-in" to many locations online. Tech touchpoints and paypoints along the journey - retail stores, restaurants, digital maps and flightboards should allow users to share their activity with their networks.

On arrival and at destination

Co-creation. A cultural artefact is not something to be treated with silent reverence. Personalisation will be expected of cabin options, hotel rooms, forms of entertainment and diversion, structured experiences. More broadly, this tribe will volunteer their feedback willingly, but expect to see complaints and recommendations to brands result in visible change.

4. Persona Reward Hunters

Celine, 60, French, Business Executive

Celine is an entrepreneur who has recently sold a successful business and continues to consult in her chosen field of financial services; she is also a member of a luxury travel club. What began as a way to inject some tranquillity into her ever-hectic, jet-setting working week, evolved into what she and her new friends jokingly refer to as a "cult", informing every aspect of her travel, and providing her with a way of experiencing the most indulgent and self-centred activities the world has to offer. After all she's earned it.

A few years ago, a retreat opened in the Huayhuash cordillera in Peru, set in stunning landscape only selectively opened up to tourists. It commands a high premium as a result, but Celine feels it is worth it. Her total-life-tracking app, weighing up the volume of her work commitments, her stress levels, her sleeping patterns, pops up with a notification one Thursday afternoon: "Tough week? You have a free weekend ahead (is that correct?). Peru?" She confirms that that is correct to her knowledge, she contacts her personal concierge service, outlines her requirements and they book her usual first-class overnight flight for the next day, to arrive on Saturday morning.

Skipping the normal baggage and check-in processes, she meets her airline VIP personal escort in the lounge who arranges for her to proceed to security. She shares her bio-ID, naturally, which lets her pass through security as quickly as possible using a password encoded from real-time heartbeat data, the maximally- "invasive" but minimally time-consuming option for travellers. The data also helps the physiotherapists in the first-class wellness spa to understand her pressure points (and to know to be careful of her collarbone – she's still fragile after a clavicle fracture last year) when applying her complimentary de-stressing "departure massage" after check-in. She takes a spacious seating option and arranges to take a light meal, but opts out of any entertainment options.

During the flight, she tells her wellness app to monitor her sleep, lies in the foetal position and watches the window-display projecting an enhanced image of a perfect skyscape. She sleeps.

She touches down at a small airport 3 miles from the retreat as the crow flies. Her concierge has arranged for a luxury limousine to collect her directly from the rear of the airport where the VIP travellers are able to exit smoothly and quickly. Her baggage is automatically shipped to her hotel.

When she arrives, she is greeted by a staff-member who knows her (and without the need of any sycophantic gadgetry!) by name, sets her up with her complimentary foot rub and takes her to her room, with all her settings – lighting, climate, preferred water temperature – pre-installed. She sets her smartwatch to "ambient" – with tracking enabled, but no notifications from the outside world, except from prespecified contacts and only in emergencies – and prepares to unwind.

Feeling "locked in" to a tariff gives seriously bad vibes – all talk of the vulgar world of money and business is strictly taboo and is left at the door, so she pays cashlessly as she consumes by scanning her smartband against connected hotspots, such as the entrance to the sauna. Whilst at the retreat,

Celine undertakes a 'full diagnostic' scan from the registered on-site doctor to ensure she is completely fit and healthy; fortunately she passes with flying colours.

After her medical assessment, Celine decides to take a helicopter trip to a nearby mountain, where she disembarks with her personal drone. The drone is able to capture her sightseeing and relay the images back to her personal cloud. On the way back to the retreat, she calls her concierge and asks for some travel options fo next month, when she prefers gastronomic indulgence and to sample the five top Michelin-starred restaurants in Europe.

At the airport

VIP living. Much of what drives the Reward Hunter is the indulgence of being unique, having an experience others do not. At the airport this is likely to result in an increasing drive toward VIP experiences, being taken directly to the aircraft, without the check-in, baggage or security process and accompanied by a personal escort. This tribe will seek to mimic the treatment politicians and royalty experience when at the airport today, by-passing the standard processes most are familiar with.

In flight

Zero-connectivity zones. As we explain below, wellness-oriented holidaymaking does not necessarily rule out the selective-application of tech-driven efficiencies. The Reward Hunter is not strictly looking for a "Digital Detox" experience throughout their travel. However, they are likely to demand sophisticated demarcation of "zones" in which technology appears to play little part in their journey. In-flight may be one such restive space in which the advantages of constant connectivity are not so readily apparent and the flier has an opportunity to indulge in quieter activity.

Uber Comfort. Reward Hunters are likely to seek first-class experiences, open to the increasing sophistication of airline offers for in-flight products such as spa treatments, gym usage and flatbeds.

On arrival and at destination

Spa on arrival. For all its new efficiencies and amenities, long-haul air travel will continue to carry its stresses and discomforts. These will be felt particularly acutely by Reward Hunters. Spas and fitness studios will spring up at various points in the consumer journey, be it post-check-in in customer lounges, or immediately on arrival, offering jetlag remedies and recirculation treatments. The "spa-on-arrival" develops into a mainstream, even potentially complimentary, offering first for VIPs, and then more broadly.

5. Persona Obligation Meeters

Seonyeon, 26, South Korean, PR Manager

Seonyeon decides to earn some brownie points with her new client by attending the meeting in person – the teleconferencing system in the office is good, but it is no substitute for a face-to-face conversation as a starting point for partnership. She knows the procedure by now. She logs into her mobile workplace app – which keeps her timesheet, contains a messaging hub just for the employees at her office, currently scattered all over Asia on business, and allows her to track and validate expenses with her office manager – to log her engagement, and is soon messaged by an online travel agent with the best deal within the automatically allocated budget, and takes her through the standard customisable features and contingencies.

She is allocated a hotel room close to the airport, which she feels is a shame as she has never seen much of Tianjin. She decides to use some of her vacation allowance and improvise a half-day excursion around the city. But not until the meeting is out of the way – she could never enjoy herself with that on her mind.

The app maps out the quickest route to the airport, which happens to be by train, but she scales up the "scenic" coefficient for the return journey, and contracts a service to deliver her car to the airport on her return – she likes to drive, and one rarely has time to these days.

A few hours before her flight, a severe weather warning stalls all flights from the airport. She receives a notification, with details of the contingency plan. She is irritated, and worried about her punctuality but by way of an apology for the inconvenience she is put on the first plane taking off when the weather clears, her seat upgraded with more leg room, and her contact notified at intervals of her progress. As it happens, she is not too late, and her client is sympathetic.

She spends the waiting time working on the airport Wi-Fi and shopping at unmanned duty-free stores. She creates and selects a scent using an olfactory sensing interface, builds a model of a bottle to be 3D printed, and sends it to be delivered on the morning of her daughter's birthday next week, paying with a swipe of her smartphone.

At the airport

Time-saving and reassuring check-in options. By 2030, advanced forms of technology will exist making large claims in this area, but already systems exist, though they are not widely used, which will reduce waiting time and communicate with passengers when things go wrong. Push messaging to proprietary airport apps, or even old-fashioned texts, will be vehicles to help Obligation Meeters know where they need to be precisely when, reducing waiting time, and "paperless" boarding will quickly become mainstream. Boarding might, in 2030, be as simple as presenting a smartwatch, or even displaying the vein pattern in your wrist, to a smart sensor. Connected luggage, such as the BlueSmart Carry-On Bag, will be widely available and affordable, and rapidly adopted by Obligation Meeters. Smart suitcases will allow travellers to weigh their luggage without a scale, locate it when lost, and receive a notification to a companion app if it is accidentally left behind.

Fluid airport systems. Integrated airport and airline systems will increase the speed of passage through check-in, security checks and gates. No time will be spent waiting unnecessarily. Though roaming scheduling and transport management apps will allow travellers to improvise new arrangement when things go wrong and connections are missed, Obligation Meeters will often be on tight schedules and will have a low tolerance for delays.

Automated contingency planning. Flexible journey management. These contingencies will "activate" automatically once the system receives indication that the journey has been disrupted (by flight, baggage or linking transport delay/ cancellation for example). This could entail automatically researching and booking alternative forms of transport, negotiating with transport providers for refunds or concessions, or simply contacting anyone affected by the delay. The criteria for making contingency plans will adapt to preferences and schedules. On some occasions, for example, business travellers on a tight schedule who miss their flight might be willing to take the sting of a more expensive alternative rather than opt for a less expensive but slower one.

Smart boredom. Obligation Meeters will often travel regularly, and spend much of their time in airports. To avoid frustration, airport processes can be made quicker, but the logistical complexity and security rigour needed in getting passengers from check-in to take-off means that flying will always involve, to some extent, waiting around. The onus is on airports then to convert this from a chore to a treat. For busy people, this "dead" time can be transformed into an efficient opportunity to work, shop and conduct other life business from the airport.

In flight

Automated payment flexibility. Business expenses will be recorded and reimbursed automatically. "Company time" will be carefully distinguished from leisure time. Travellers will want to keep track of spending in each at all times, but without any fiddly accountancy. The setting of spending limits, or systems which automatically select the appropriate payment channel according to certain criteria (size of spend, spending category, etc.) may be an option here. App-based cashless payment systems will be necessary here – the hassle of switching between debit cards will be an outdated concern. Time and money-saving, for some, will within companies be a gently competitive, gamified activity mediated through life-tracking apps.

6. Persona Ethical Travellers

Stan, 35, American

For Stan, holidays are not bought, they are earned. He rigorously monitors his ecoimpact using a total life-logging app which plots his lifestyle against an index of eco-ideal behaviours, taking in everything from his transport choices to his electricity consumption to the mileage on the food he eats, and rewards him for his greenness with a payments in a crypocurrency, KindCoin, an initiative financed by a Corporate Social Responsibility drive at his workplace. He likes this – he gets paid for behaviours which are good for the world, and he finds it satisfying to know that, when he travels, his negative impacts can be offset elsewhere in his life.

To cut down on this negative impact, he creates links with connected communities within the app to arrange group travel, and receives notifications regularly about seats on planes which would otherwise go unfilled. Because he is flexible and impulsive, and his work for a tech start-up allows him a degree of flexibility in his working, he can afford – both financially and ethically – to travel by air more than most, an idea that his non-initiated friends find strange given that he is so ecoaware. He explains that it is about a mixture of app-enhanced awareness, and a willingness to make micro-compromises on his holiday time and on travel luxuries that allows him to travel so regularly and so guilt-free. For example, he charges his devices by cycling or using solar power. He earns KindCoins by microvolunteering his IT skills in local communities when he is away, or by evangelising the eco-cause on his networks. This isn't too time-consuming, and it helps him sleep better at night.

D. Requirements of each traveller tribe

Simplicity Searchers	Cultural Purist	Social Capital Seeker	Reward Hunter	Obligation Meeter	Ethical Traveller
Need for direct travel; avoiding layovers, connections and changes during the journey	Resistance to impersonality and cyber mediated service, need for more sophisticated travel agent recommendations	Following the trends, need for modern, up-to-date services, providing a 'Feed-friendly' experience	Anti-technological sentiment, nostalgia to the old times; need for zero-connectivity zones	Need for time-saving and reassuring check-in options, "paperless" boarding and fluid airport systems	Need for economical compromise (e.g. packing as light as possible) and sharing economy
Need for user-friendly forms of technology and interfaces	Sharing economists, need for services like e.g. Uber & AirBnB	Need for social media booking agents	Need for wealthy VIP living, spa on arrival and extreme comfort	Need for holistic booking systems and efficient agency interactions	Proactive transparency apps which validate brand claims
Health and mobility needs	Need to discovery and adventure	Need for strong brand presences	Earnt the right to indulge, need for no personal effort	Need for automated contingency planning	Micro-volunteerism
Need for real time translation apps	Need for flexibility in all the options	Need for connectivity (Wi-Fi) everywhere		Need for smart use of waiting time and strong connectivity (Wi-Fi)	
	Price sensitivity: need for cheap prices	Need for tangible and shareable journey outputs		Flexibility with baggage arrangements and payment	

E. Workshop 'Generating insights'

Introduction
Firstly I introduced my friend and nephew of Liong; Vitto Bonnemayers (second year student Industrial Design engineering). He joined me in this workshop to help guiding the groups in the design case and to make photographs. Secondly I explained what the goal was of this workshop and that it not only interesting for my thesis, but also a fun activity with the whole office. The planning was drawn on a flip-over like is shown below.

Warming up the brain
Two weeks before this workshop I did a presentation at the firm for my client and all colleagues about the research results so far. Now I referred to that presentation and two questions;
- What do I exactly mean with a waiting area?
- What change in behaviour?

I explained that they are free to interpret the area within the airport as they want. It could be a small room with lots of chairs just before the boarding to the plain, or a big open space in the centre of the airport with less chairs, where people can also wait. As long as it is some sort of area where you can wait at an airport.

Secondly I explained that the change in behaviour must be from a negative mood to a positive mood. More information about this will follow after the 'brain warming up'. This warming up is an exercise to get all ideas that first come to mind on paper, in order to really start thinking out of the box. This exercise is very simple, every idea is great. They should not think about money, if it'd realistic or not, etcetera; just write and draw everything down that pops into their head on the post it's. I told everybody to try to do it on their own, think about some ideas yourself. They wrote down lots of ideas on the post-its and sticked them on a pillar in the office as shown below.

Design case

After the warming up, I provided them with more information about the transformation in mood. As I was standing there, they were listening to while I talked. Everyone however perceives this experience in a different way, even though the external environment is the same. I explained that although we all touch the table, smell the coffee, hear the sound of my voice, everyone has biological and psychological filters who filter our perceptions through our senses. These filters form your mood and this mood results in behaviour. So the point is that with the external environment we can indirectly influence our behaviour.

I divided everyone in 3 teams, every team needed to design a waiting area for people with an extreme negative mood. Team A got the assignment to design something for extremely bored people at an airport, team B needed to design something for people that are totally stressed out and team C something for the so-called 'mummies': exhausted people at an airport.

Every negative mood was pictured in a collage to provide inspiration.

Busy looking for the right ideas, applicable in their design

Finishing and concluding my explanation, the requirements were made clear;
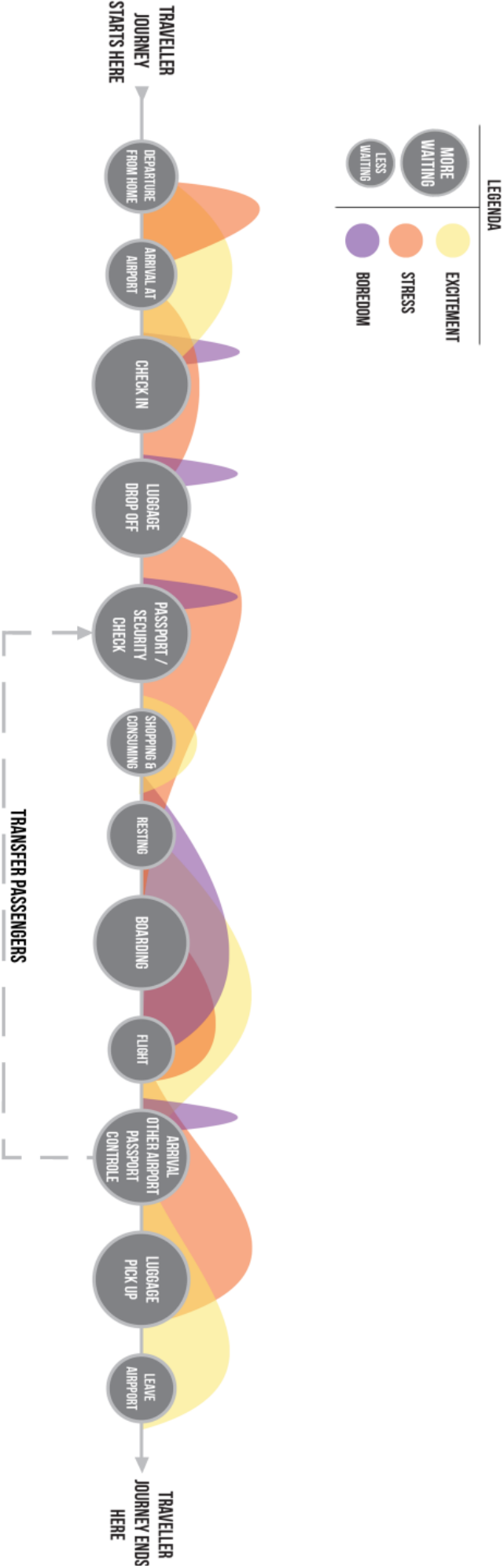
1. Transformation to a positive mood
2. Try to design something that includes interaction design.
   (I explained what I mean with interaction design; the interaction between people and something from the waiting area. So the person does not only react to the design of the waiting area, but the waiting area somehow responds to the person as well. I also provided them with an example to clarify it).
3. Don't forget about the five human senses, what senses do you want to trigger with the (interaction) design and why?
4. Final idea made in 3D, use some of the materials I scattered around on the tables.
5. You have one hour

Lastly I explained that I learned at Industrial Design Engineering that there are two approaches to a design case like this, that they can try both of them or choose which one they prefer.
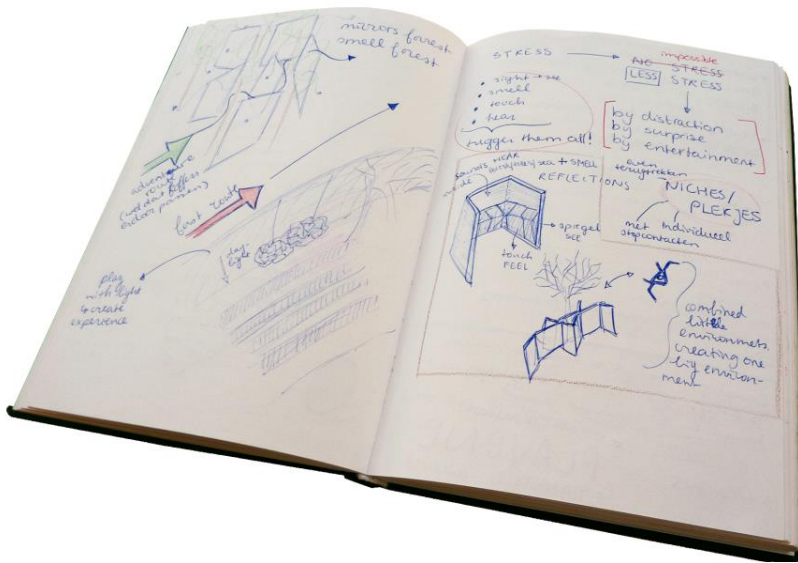
- Take materials as a starting point; let them speak to you, give you creative ideas and work from that to the concept as a whole
- Materials as end presentation; Sketch and brainstorm together about what you want to do, and only make the end idea with some materials

After my explanation they formed the groups and the brainstorm began. Vitto and I walked around, helping with brainstorm thinking and inspiring them to look at things another way, remind them about the requirements etc. Their final designs will raise questions with me I can use in my design process.

F. Customer Journey

TRAVELLER JOURNEY STARTS HERE

DEPARTURE FROM HOME

ARRIVAL AT AIRPORT

CHECK IN

LUGGAGE DROP OFF

PASSPORT / SECURITY CHECK

SHOPPING & CONSUMING

RESTING

BOARDING

FLIGHT

ARRIVAL OTHER AIRPORT PASSPORT CONTROLE

LUGGAGE PICK UP

LEAVE AIRPORT

TRAVELLER JOURNEY ENDS HERE

TRANSFER PASSENGERS

LEGENDA

MORE WAITING
LESS WAITING

EXCITEMENT
STRESS
BOREDOM

G. Sketchbook pictures of ideas

These were some ideas to create an experience while walking through a long concourse with lots of time; designing for example the feeling as if you walk through the forest. Also different possibilities to sit, in order to fulfil the different needs of people.
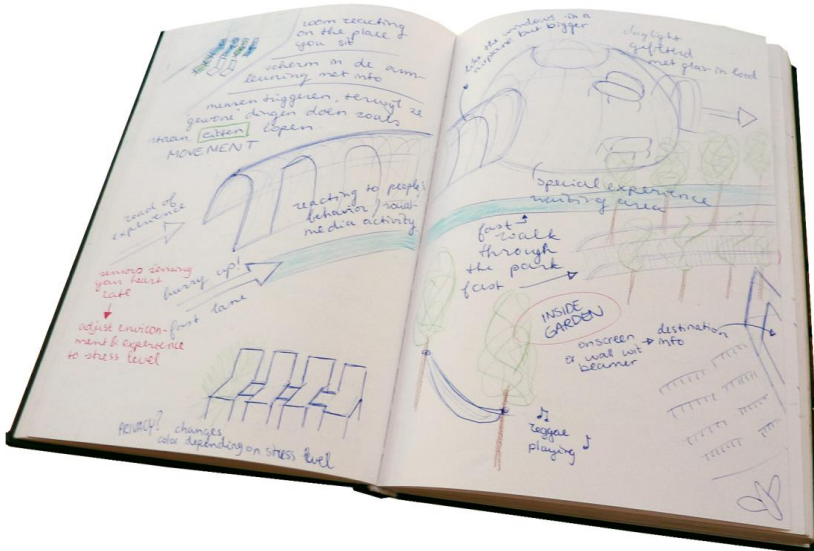
These ideas arose when I was at the airport and needed to hurry but could not pass through all the people around me going slowly. Clear routing with a fast lane for people in a hurry and an experience route for people that have time and want entertainment. Again, there are influences from nature to relax.

Here are a couple more ideas of influencing the senses shown: the feeling of subtle wind already gives people the feeling of being outside, even if it is a warm blow of soft wind inside. Another inspiration from Meetingmoods is the higher furniture; as mentioned before people like to have overview of the whole area, it makes them feel more in control.