

Enhancing customer experience in Geneva International Airport through Augmented Reality

**Bachelor Project submitted for the degree of
Bachelor of Science HES in International Business Management**

by

Catherine CHAPPUIS

Bachelor Project Advisor:

Mr. Nicolas MONTANDON, HES Lecturer

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Haute école de gestion de Genève (HEG-GE)

International Business Management

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Declaration

This Bachelor Project is submitted as part of the final examination requirements of the Haute école de gestion de Genève, for the Bachelor of Science HES-SO in International Business Management.

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Geneva, 9th August 2018

Catherine CHAPPUIS

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Executive Summary

This research provides an analysis to assess how customer experience at Geneva Airport can be enhanced through Augmented Reality by the formulation of two hypotheses. The first assumption is that passengers encounter difficulties to navigate inside Geneva Airport; there is a need to increase passenger satisfaction. The second assumption is that passengers travelling with their family, lack entertainment at Geneva Airport. The end goal is to make recommendations to Geneva Airport, on enhancing passengers' experience during their journey at the airport through AR.

The number of passengers increases yearly and thus, Geneva Airport needs to keep its expansion to accommodate the increasing number of travellers and offering them the best in terms of innovation. Augmented Reality is predicted to have the most immediate potential in the air transport industry, positively impacting the travel experience on the ground compared to virtual reality or mixed reality (FUTURE TRAVEL EXPERIENCE, 2018).

The research methods include data collection through interviews, observation days and an online survey, to collect various information on travellers' demographic, behaviours, travelling profile, knowledge on AR, technology profile and to test the two hypotheses.

The results of the data analysis show that navigation is not an issue at Geneva Airport. Therefore, for the moment there is no need to implement navigation with AR. The findings also show that passengers mostly use their phone during their journey at the airport, and the majority uses it for entertainment purposes. Thus, there is a real interest from Geneva Airport passengers to be entertained during their waiting time.

The recommendations for Geneva Airport are: to create a mobile prototype of the treasure hunting game to be tested during summer holidays among travellers and create a partnership with Geneva Tourism, to extend the game to different areas inside Geneva, offering new episodes.

In order to fully understand passenger experience at Geneva Airport, a broader study including more international travellers (living outside Switzerland) and a bigger sample of people from different ages, to gather more data and more insights from what travellers would want to see improved at Geneva Airport.

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Abbreviations and Acronyms

| | |
|--------------|--|
| AR | Augmented Reality |
| VR | Virtual Reality |
| MR | Mixed Reality |
| GPS | Global Positioning System |
| IT | Information Technology |
| T1 | Terminal 1 |
| T2 | Terminal 2 |
| OFAC | Office Fédéral de l'Aviation Civile - <i>Federal Office of Civil Aviation</i> |
| EU | European Union |
| PSIA | Plan Sectoriel de l'Infrastructure Aéronautique - <i>Aeronautical Infrastructure Sector Plan</i> |
| IATA | International Air Transport Association |
| GVApp | Geneva Airport application |
| EMBA | Executive Master in Business Administration |
| HEG | Haute Ecole de Gestion – <i>School of Business Administration</i> |
| BMC | Business Model Canvas |
| VPC | Value Proposition Canvas |
| AI | Artificial Intelligence |
| IoT | Internet of Things |
| iOS | iPhone operating system |
| App | Application |

| | |
|--------------|---|
| UK | United Kingdom |
| GVA | Geneva |
| GVApp | Geneva Airport application |
| VPC1 | Value proposition canvas for customer segment 1 |
| VPC2 | Value proposition canvas for customer segment 2 |
| CS1 | Customer segment 1 |
| CS2 | Customer segment 2 |
| Pax | Passengers |
| PRM | Persons with reduced mobility |

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1 Introduction

The main purpose of this research paper is to assess if customer experience at Geneva Airport can be enhanced with Augmented Reality technology. Augmented Reality, also called “AR” is a direct or indirect real-time view of the real-world environment where elements within, are augmented by being computer generated or by extracting real-world sensory such as sound, video, graphics or GPS data (MORGAN, Blake, 2017). To not confuse with Virtual Reality (VR) which substitutes the real-world environment with a simulated one, Augmented Reality is enhancing users’ perception of reality (JOHNSTON TAYLOR, Susan, 2018).

In November 2017, Geneva Airport presented some of its digital innovations to the public during the Digital Day at Cornavin train station. The airport has a strong innovation strategy to serve the increasing number of passengers that are using Geneva Airport each year. They are continuously striving to offer the best services and premises possible to their clients. The IT airport innovation department is organised around two strategic axes: The first is about the technology that can enhance customer experience and anticipate their needs. The second is to innovate by deploying technologies with the aim of optimising the processes within the Airport (CHAVANNE, Yannick, 2017).

The Aeronautical Infrastructure Sector Plan (PSIA) has forecasted that passenger numbers would reach 25 million by 2030 at Geneva Airport (BERNET, Christian, ROSSIER, Roland and RUETSCHI, Pierre, 2016). Hence, it is important for Geneva Airport to find solutions to accommodate the increase in passenger arrivals.

Augmented Reality is promising to change the travel experience, to improve airport operations and to enhance passengers’ journey. Thus, this project is going to assess if AR technology can be implemented at Geneva Airport, by formulating two hypotheses and take into consideration various factors such as:

- the airport environment (security, stringent regulations, captive environment)
- the project stakeholders
- the overall constraints that must be defined for this specific project
- the technological innovations available on the market

1.1 Geneva International Airport

1.1.1 Brief introduction

Geneva International Airport, also called Cointrin Airport was created in 1919 and is the unique airport of Geneva city with two passenger terminals. Terminal one (T1), is the main terminal welcoming passengers all year round. Then, Terminal two (T2), which was the former main Geneva Airport terminal, welcomes passengers only during the weekends for the charter season which takes place in winter. The airport has only one runway that can handle an aircraft every 90 seconds, between 6 am and midnight (GENEVE AEROPORT, 2018) conforming to OFAC regulations (Office Fédéral de l'Aviation Civile).

In addition, Geneva Airport is an important economic actor of the Swiss economy and foremost, Geneva's economy. Geneva is considered an important freight hub for the European Union, even if Switzerland is not a member of the European Union (EU).

1.1.2 Current situation

Key figures for the year 2017 (GENÈVE AEROPORT annual report 2017, p.3)

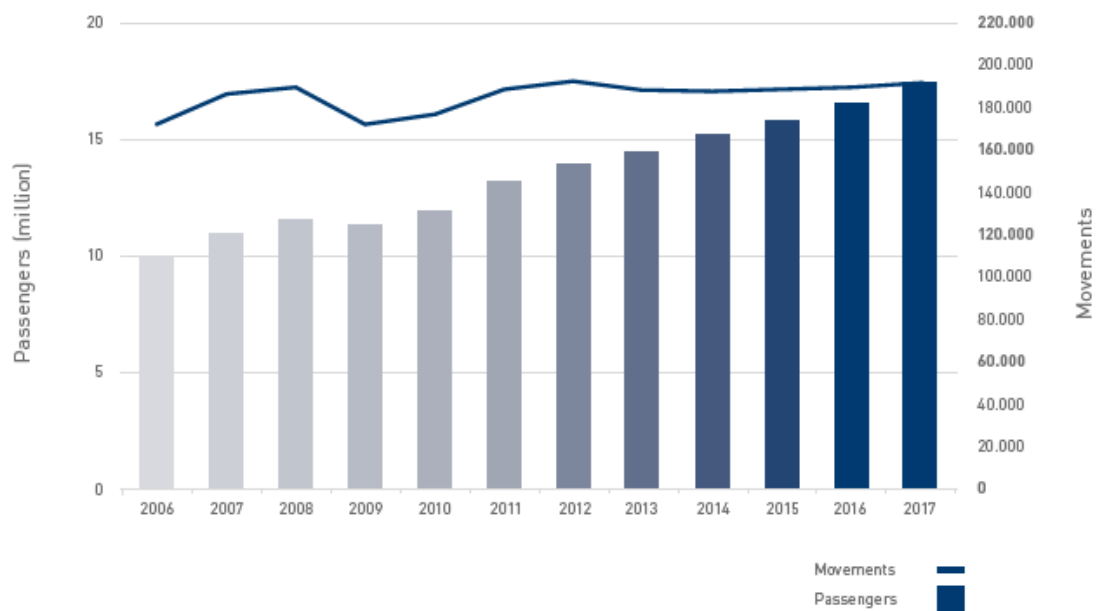
- CHF 466,4 million in turnover
- CHF 78,9 million in profit
- CHF 125,2 million in investments
- 141 destinations with 58 airline companies
- 1'037 employees

In 2017, Geneva Airport has seen an increase in the number of passengers by **4.95%** from the year 2016. Thus, the airport welcomed 17,4 million passengers (GENEVE AEROPORT annual report 2017, p.8). The number of passengers' increases yearly and thus, Geneva Airport needs to keep its expansion to accommodate the increase number of travellers and offering them the best in terms of innovation.

Then, looking at the airline companies that operate at Geneva Airport, Easy Jet Switzerland is still the number one client with **44.9%** of market share, followed by Swiss International Airlines with **12.1%** (GENEVE AEROPORT annual report, p.17).

In the year 2017, Geneva Airport undertook some changes for the expansion of Terminal 1, by 1'600 square meters, including renovation of different areas such as the departure hall, new restaurants, duty free shops, new waiting room for Geneva Assistance, the creation of new security checkpoints (ready in July 2018), business corners near the different boarding gates and the construction of a new check-in area (BEZAGUET, Laurence, 2018). These changes aim to increase passengers' comfort, to accommodate the increasing flux of passengers travelling through Terminal 1, and to increase operational efficiency by accelerating security control and decreasing passengers' waiting time.

Figure 1- Evolution of the number of passengers and movements at Geneva Airport, 2006-2017 (All types of traffic)



Source: GENÈVE AÉROPORT, Annual report 2017, p.15

The graph above is illustrating the evolution of the number of passengers and movements at Geneva Airport from the year 2006 to 2017. Since 2009, the number of passengers is always increasing while the number of movements is stabilising since 2013. This phenomenon is due to two reasons; new generation of aircrafts purchased by airline companies are bigger, less noisy and less fuel-intensive. Thus, aircrafts such as Bombardier CSeries, Airbus A320neo, A350 and Boeing 787" Dreamliner" allow the accommodation of more passengers. In addition, airlines use alliances with other airline companies to optimise the filling of plane seats (GENÈVE AÉROPORT, Annual report 2017, p.14).

1.2 Problem statement

In 2014, the Aeronautical Infrastructure Sector Plan (PSIA)¹ has forecasted that passenger numbers would reach 25 million by 2030 (BERNET, Christian, ROSSIER, Roland and RUETSCHI, Pierre, 2016). Geneva Airport welcomed 17,4 million passengers in 2017 (GENÈVE AÉROPORT annual report 2017, p.8) meaning that the forecast of the Swiss Confederation for Civil Aviation might be transcended earlier than 2030. Hence, it seems important for Geneva Airport to find solutions to accommodate the increase in passenger arrivals while considering the opinion of the different stakeholders. Indeed, some stakeholders do not see the increase of passengers and airplane movements at Geneva Airport as being positive for the local community and the environment such as generating greater noise and air pollution from increasing airplane traffic. (MOULIN, Marc, 2018)

There is a need for Geneva Airport to find solutions to accommodate and offer a great customer experience to passengers during their journey at the airport, which will increase their satisfaction while using the airport facilities. Nowadays, with the emerging of new technologies, Augmented Reality is promising to change the whole travelling experience and improve indoor navigation in an airport to help passengers find their way quicker. Thus, this project is going to assess if Augmented Reality can enhance passengers' experience and be implemented at Geneva Airport.

¹ The Aeronautical Infrastructure Sector Plan is the planning and coordination instrument of the Swiss Confederation for Civil Aviation. It sets binding targets for the authorities, for the objectives and requirements of the Swiss civil aviation infrastructure. (CONFEDERATION SUISSE, 2018)

1.3 Research question

Augmented Reality is promising to change the travel experience and improve indoor navigation in an airport to help passengers find their way quicker. Thus, this project is going to assess if AR technology can be implemented at Geneva Airport.

This research paper is going to focus on the core question framed below which will include different sub-questions;

***How can customer experience be enhanced with
Augmented Reality at Geneva International Airport?***

In addition, the project evaluates if Augmented Reality can be implemented at Geneva Airport depending on the constraints, possibilities and cost, with the following two hypotheses:

First hypothesis: passengers encounter difficulties to find their way inside Geneva Airport which are causing stress and dissatisfaction due to poor signs, lack of airport staff to guide and poor navigational system to assist passengers during their journey.

- How could customer experience be enhanced with Augmented Reality Navigation at Geneva International Airport?
 - Are passengers satisfied of their navigation experience at Geneva Airport?
 - If they find some difficulties, what are the reason(s)?
 - Do they use their phone during their journey at Geneva Airport and what features do they use?
 - Do they use GVApp (the application of Geneva Airport)?
 - Would they be interested to use navigation with AR?
 - Is it worth implementing navigation with AR at Geneva Airport?
 - If yes, who would oversee the implementation of navigation with AR and who would be interested in contributing financially to the project?

Second hypothesis: passengers travelling as a family lack entertainment during their journey at the airport which are decreasing patience and satisfaction of family travellers due to the lack of facilities aimed to welcome and entertain children and parents, during their journey at the airport.

- How could customer experience be enhanced with a Treasure Hunting application with Augmented Reality at Geneva International Airport?
 - How satisfied are passengers from their experience at Geneva Airport?
 - Would passengers be interested to play a Treasure Hunting game at Geneva Airport?
 - What would be passengers' expectations for a Treasure Hunting game at Geneva Airport?
 - Would passengers be willing to download a Treasure Hunting game to play at Geneva Airport and would they be willing to pay for such a game?
 - What would be the incentive(s) to play a Treasure Hunting game at Geneva Airport?
 - Would passengers be interested to play a Treasure Hunting game with AR at Geneva Airport?

1.4 Research objectives

All within the scope of enhancing passengers' experience at Geneva Airport, while responding to their needs and expectations, to ensure the adaptation of any product or service; this study must go through different steps, to state the opportunities and impacts of implementing Augmented Reality technology at Geneva Airport.

The first part of this project is to go through diverse literature review sources to identify and define what already exists in terms of AR technology. Then, analyse how these technologies could be applied to Geneva Airport. With this clear view of existing applications, this study then assesses passengers' satisfaction of their most recent experience at Geneva Airport, identifies and assesses how Augmented Reality can be implemented at Geneva Airport and assesses the implementation of AR through two hypotheses. These two hypotheses are tested on the passengers of Geneva Airport to assess their interest and see if it can enhance their experience. Moreover, this study analyses the feasibility and viability of these two hypotheses and determines possible impact(s) on business activities for Geneva Airport (and other stakeholders) without having unnecessary costs.

This study involves various stakeholders such as: Geneva Airport management, Geneva Airport IT and Innovation department, Geneva Airport Security department, passengers, airline companies and commercial dealerships (shops, restaurants and banks/change offices). Indeed, AR technology can boost their business activities through the collection of real time information and other precious data, which can interest the stakeholders cited above.

1.5 Methodology

A preliminary study consisting of interviews with key people at Geneva Airport, allowed me to clarify the scope of this study and better identify relevant research methods. The objectives of these meetings were also to secure access to precious information for my project. After having a brainstorming session with Geneva Airport; the approach to this project is to use the Lean Start-up method to identify hypothesis around the research question “How can customer experience be enhanced with Augmented Reality at Geneva International Airport”. Then, come the creation of a business model canvas and a value proposition canvas for the two hypotheses formulated.

After that, comes two observation phases, one the 14th of April 2018 and the other one the 9th of June 2018, which enables to explore and observe for 1 hour the area after the security check-point. During these two days, the collection of precious data through pictures and notes who enabled me to complete this study and to better understand this stressful and dynamic environment. In addition to these observation phases, I was fortunate enough to have the opportunity to take part in two EMBA modules done in collaboration with Geneva Airport. One of them, which took place the 13th, 14th and 21st of April 2018 aimed to enhance the retail experience of Geneva Airport (EMBA HEG Geneva). Using a Lean Start-up method. This allowed me to gather more information on Geneva Airport. Then, the second opportunity was to take part in the Executive MBA of the HES-Valais specialised in Tourism's project; a project which aimed to create a location-based game for Geneva Airport. This project, has let me collect information for the second hypothesis I have formulated for this study.

After that, comes the test of two hypothesis and the assessment of customers' satisfaction from their last travel experience at Geneva Airport through an online survey directed to people who have recently travelled from or to Geneva Airport. The results from this survey enables to pivot or to pursue the initial strategy. From the results, it helps to reshape the business model canvas and value proposition canvas and to finally chose only one feasible hypothesis to recommend to Geneva Airport.

Finally, the data from the survey would be prepared on an Excel file and analyse through Tableau software to make some comparisons between relevant questions and Stata software to identify possible correlations between the different questions and answers given by respondents.

1.6 Structure of the study

After this introduction, this thesis contains a literature analysis which aims to get more insights of airports around the world nowadays, the challenges they are facing and the trends for technology incorporation in airports. One of these technologies is Augmented Reality; some airports have already implemented AR to optimize their ground and air operations to enhance passengers' journeys. In order to better illustrate AR implementation in airports, Gatwick and Heathrow airport will be used as examples to determine and identify the reason for the use of this technology. Then, issues on Augmented Reality technology are briefly discussed, to understand and determine what influence AR would have if it would be implemented at Geneva Airport.

The analysis part, which is the third part of this research paper, consists in presenting the data collection of this study. To collect various information on travellers' demographic, behaviours, travelling profile, knowledge on AR, technology profile and to test the two hypotheses, data collection through interviews, observation days and an online survey were undertaken. The data collected are explained, relevant questions to the two hypotheses are compared and contingency tables were made to find correlations between each variables of the online survey. Thus, this part is detailing the various sources of data collection, with a focus on the online survey results and findings which are extensively detailed. The online survey data are presented by section; the sample, experience at Geneva Airport, technology, Augmented Reality, Navigation and Treasure Hunt.

Then, the fourth part aimed to detail the implementation of AR at Geneva Airport to solve the two hypotheses. The first hypothesis would be solved through AR navigation and the second hypothesis with an AR treasure hunt. This part presents for the two solutions, the value proposition canvas, the business model canvas, the comparison with the existent means, the test results, the key learnings and modifications, the recommendations and the summary of findings.

Finally, the conclusion chapter summarises the findings and limitations of the study, to formulate recommendations. References to appendices, which are available at the end of this document, are added in relevant sections to give more detail to the reader.

2 Literature Analysis

2.1 Today's airports around the world

For six consecutive years, Singapore's Changi Airport has won the world's best airport award which is based on a customer satisfaction survey directed to millions of passengers by the Skytrax World Airport Awards² (SKYTRAX WORLD AIRPORT AWARDS, 2018). Surprisingly, this airport has almost no human presence during the traveller's journey. Passengers are mostly interacting with machines and artificial intelligence (AI). Moreover, the Airport offers a large range of amenities to accommodate its international clientele such as large choices of retail and dining options, two dozen lounges to welcome frequent flyers and holders of premium credit cards, two 24-hour free movie theatres with the latest blockbusters movies, a rooftop swimming pool, on-site sunflower garden and the Crowne Plaza Changi, awarded in 2018 as the World's Best Airport Hotel. (SKYTRAX WORLD AIRPORT AWARDS, 2018). In 2017, Changi Airport welcomed 62,2 million passengers and operates 24 hours a day, meaning approximately a plane take-off every 85 seconds (BISHOP, Jordan, 2018).

Figure 2 - Fast and seamless travel at Changi Airport



Source: BAKER, Joe, 2018

² Skytrax World Airport Awards is an annual global airport passenger satisfaction survey which is considered as being a benchmark for airport excellence. (Skytrax World Airport Awards, 2018)

The transport of passengers and freight are the main functionality of an airport. Airports are also major economical players for their countries and they contribute to the worldwide trading of freight by air. The main sources of revenue for an airport are landing royalties, passenger royalties, other aeronautical royalties, non-aeronautical revenues (retailing), parking lots and other sources of revenue depending on the country, the size and infrastructure of the airport (DOSHI, Vinit, 2017). However, passengers are becoming increasingly demanding and airports are becoming more than just infrastructures to move passengers or goods to another destination. Some airports are now striving to offer a great customer experience within their infrastructure. Because of that, there is a need for airports around the world to diversify their revenue to offer the best infrastructure possible and accommodate the increasing growth of passengers travelling by air (DOSHI, Vinit, 2017).

On the edge of technology, airlines and airports need to improve and innovate according to customers' needs and expectations. Travellers expect to get their way through the airport as fast and less stressed as possible (Shankman, 2013). Thus, airports are using technology to support their operations, facilitate passengers' journey, increase in efficiency and enhance customer experience. These technologies allow to remove some stressed points in airports, that have some direct impacts on customer experience. Indeed, in most of the airports (mostly international airports) around the world, technology is present at every step that passengers must go through (example: Terminal 4 at Changi Airport, Singapore). With the increasing use of technology, some airports are removing more and more human personnel. Interactions with technology in airports are pushing passengers towards more self-service. By 2020, IATA is willing to push to the complete automation of the traveller's journey in airports by delivering a total self-service option of airports' processes (DOSHI, Vinit, 2017). Thus, passengers interact less with humans and more with machines (SILLERS, Paul, 2017). For instance, certain airports have replaced humans for more automation such as:

- Self-check-in counters
- Automated check-in systems with facial recognition
- Self-service bag-tagging
- Self-service bag-drop
- Biometrics (automated passport control and self- service boarding gates)
- Chatbot applications (on social media such as Facebook Messenger)

2.1.1 Today's airports challenges

Nowadays, the travel industry faces many challenges, resulting in airports' need for transformation to better accustom customers' end-to-end travel experience. Nearly 3/4 of airports worldwide are not-profitable, thus another challenge for them are to keep a high customer experience by maintaining a quality of infrastructure and diversifying their sources of revenue (DOSHI, Vinit, 2017). Some airports are working in renewing customers' retailing experience which is for some of them, the second most important source of revenue. In addition, an airport is a special environment where passengers have different types of buying behaviours, preferences, needs, cultures and incomes.

Moreover, the number of travellers is growing each year, as more people have the opportunity to travel. One of the reasons is that, in general, around the globe, personal disposable income has increased, enabling more people to travel and some more often than others. This is especially true for air transportation (DOSHI, Vinit, 2017). Moreover, due to many companies' entry in the airline industry as low-cost companies for short and long haul, the market is now offering fair airplane tickets pricing to satisfy different segments of customers (ROGERS, Alexandra, 2018). Thus, there is a wider offering for every budget, which enables more people to travel by plane. In addition to that, airports must also face the increasing number of fleet of airline companies and various constraints, such as infrastructure or different schedules. Indeed, some countries have set special time frames for landings and take-offs, while others are operating the whole day without interruption.

Then, as it takes time and money to build new infrastructures and with the increasing number of travellers to accommodate, come infrastructure limitations or constraints for some airports. Thus, at some peak moments of the year, airports can struggle to properly accommodate travellers, impacting heavily on passengers' time in airports which are mostly spent in queuing, watching and waiting (DOSHI, Vinit, 2017). In addition to infrastructure constraints, airports and airlines must comply with security regulations that are constantly strengthened to continue to provide the safest means of transportation as possible to passengers.

2.2 Trend for technology incorporation in Airports

In this era, many industries are influenced and are willing to search and develop technology to satisfy various needs. Airlines and airports worldwide are in permanent research to identify new technologies that would improve passenger experience and augment operational efficiency on the ground and in-flight. The article “10 technology trends for airlines and airports in 2018” extracted from the website futuretravelexperience.com, is highlighting the technologies that are expected to play a key role in reshaping the air transport industry.

The 10 technologies to be exploited in an airport (FUTURE TRAVEL EXPERIENCE, 2018) and by airline companies are:

- biometrics (fingerprint and facial recognition technology),
- blockchain (for baggage, retail, distribution, loyalty use cases and single source for flight data)
- artificial intelligence (AI) (chatbots, real-time predictive pricing, predictive aircraft maintenance and operational efficiency on the airfield)
- robotics (on-the-spot assistance to passengers, transport of luggage, identify potential security issues and cleaning)
- baggage (re-usable electronic bag tag, self-service bag drop, baggage handling, check-in, delivery and tracking)
- start-ups and scaleups (innovation labs or programs which allow collaboration between airline companies and airports with start-ups and scaleups)
- translation technology (earphones support for live translation in 40 languages, smartphone- based signage translation)
- augmented reality (wayfinding tool)
- Internet of Things (IoT, devices interconnected to the network allowing communication between them)
- cyber security (to keep systems secure with the more and important use of technology within the air transport industry)

These technologies are going to change the air transportation industry and travellers' experience on the ground and in-flight. To continue with this study on how to enhance customers experience in Geneva Airport, the focus of the ongoing pages is on one of the previously cited technologies as a possible helping tool, which is Augmented Reality.

2.3 Augmented Reality technology

With the progress of AR technology in terms of object recognition or adding computer vision, information from the real world is becoming interactive and digitally manipulatable. Thus, it is possible today, to overlay digital data atop the physical world including the environment and its objects, which can be viewed by the users through smartphones or tablet devices' cameras (MORGAN STANLEY, 2017). Thus, the camera is becoming a fundamental element for input and output functions of smartphones, by enabling users to conceive and experience images and video special effects. Recently, Augmented Reality is becoming more accessible to the public as most smartphones are conceived to support this technology. Nowadays, both Android and iOS devices (iPhone 6 with iOS 11 and iPad pro first generation and more current devices) have the capacity to support and run Augmented Reality applications (LEE, Seung, 2017).

The first public user experience of Augmented Reality began with social media and e-commerce. At that moment, the public can enjoy AR through their smartphones which relies on the standard rear-facing cameras. Taking the example of Snapchat users who are enjoying the 3D effects on their face or Ikea, which develops AR to help their customers to virtually display and arrange furniture before their purchase (MORGAN STANLEY, 2017).

Following the massive success and popularity of the game Pokémon GO, which was launched in July 2016, many industries found an interest in using AR to enhance their business activities. Smartphone makers, retailers and tech companies are believing that Augmented Reality is going to be a disruptive technology which will drive the upgrade of smartphones, the demand for applications and trigger a new age for e-commerce (MORGAN STANLEY, 2017). Nowadays, different companies are using this technology which is incorporated in their own application. Thus, AR is proven to not only be suitable for the entertainment industry but also for industries such as fashion, travel, finance, health, education, real estate and retail. Businesses are using Augmented Reality technology with the aim to engage new customers or to provide a unique customer experience (JAVORNIK, Ana, 2016). Thus, some people see Augmented Reality as being able to increase incremental revenue for services companies.

2.3.1 How Augmented Reality is used today in airports

However, Augmented Reality is predicted to have the most immediate potential in the air transport industry, positively impacting the travel experience on the ground compared to virtual reality or mixed reality (FUTURE TRAVEL EXPERIENCE, 2018).

Here are some examples of how Augmented Reality is used nowadays in airports around the world:

- deliver real-time narrative assistance to low vision and blind passengers during their journey at the airport, using an Augmented Reality dashboard combined with smart glasses (MEMPHIS INTERNATIONAL AIRPORT, 2017)
- indoor navigation, helping passengers to find their way during their journey in airport terminals, using Augmented Reality wayfinding tool (YOUR LONDON AIRPORT GATWICK AIRPORT, 2017)
- children entertainment, to keep even the tiniest travellers occupied and help them to explore airport terminals in a funny way, with Augmented Reality games (HEATHROW MEDIA CENTRE, 2017)
- baggage and cargo loading, helping ground handlers to speed up their operations, using Augmented Reality combined with smart glasses at Singapore Changi Airport (COCONUTS SINGAPORE, 2017)

To conclude, AR technology is used nowadays in airports as a tool to optimise airports ground operations, entertain and assist a wider range of customers. Few examples are cited here, as the adoption by the mass market is relatively recent and only the latest mobile devices are able to run this technology. In the future, if AR technology was used with success in these different activities, more airports would try to implement this technology to enhance customers' journey and optimize their airport operations.

2.3.2 Gatwick Airport example

The second largest airport of the United Kingdom, Gatwick Airport serves more than 228 destinations in 74 countries with 45,6 million for short and long-haul passengers (YOUR LONDON AIRPORT GATWICK AIRPORT, 2017). Like most of the airports, Gatwick is a major economic driver for its country contributing directly by generating £1,6 billion for the UK economy, while providing employment to around 30'000 staff and 12'000 indirect jobs. Gatwick Airport forecasts to welcome nearly 53 million by 2023 (YOUR LONDON AIRPORT GATWICK, 2018).

In 2017, Gatwick Airport considers itself as being the first airport to deploy Augmented Reality. This implementation was enabled due to the transformation programme system project initiated by Gatwick Airport with a budget amounting to £2,5 billion (YOUR LONDON AIRPORT GATWICK, 2017), which includes an amount to contribute to the development of new technology. The aim of the transformation program is to create a more convenient access and navigation within the different terminals of Gatwick airport and avoid missing flights. Thus, the airport deployed 2'000 indoor battery powered navigation beacons across two terminals and launched a free application that incorporates Augmented Reality technology. Battery powered beacons were chosen for their reduced cost and complexity. This system was favoured as offering a more reliable indoor navigation than GPS, Google or Apple maps, which are lacking satellite signals and making the road-based navigation system inaccurate indoors. Thus, the airport decided to deploy a beacon-based positioning system to allow reliable blue dot navigation on indoor maps. This system was set up to be used by different airport entities such as airline companies or other third-party applications. Hence, with the combination of beacons and Augmented Reality incorporated in the airport application, passengers are receiving personalised flight alerts, real-time queue updates for check-in and security, shopping and restaurant offerings. Moreover, Augmented Reality is used as a wayfinding tool by showing directions in the camera view of mobile devices to passengers and making it easier to locate certain areas. This application is directed to be highly practical and easy to use to enhance travellers' journey within Gatwick Airport (YOUR LONDON AIRPORT GATWICK, 2017).

2.3.3 Heathrow Airport example

The largest airport of the United Kingdom, Heathrow Airport welcomed 78 million of passengers in 2017 and serves 204 destinations in 85 countries (HEATHROW AIRPORT, 2017). Heathrow Airport employs 76'500 people. The airport is owned and run by Heathrow Airport Holding Limited.³

In summer 2017, Heathrow Airport decided to launch an app using Augmented Reality to boost traveller engagement. Heathrow Airport is the second UK airport to offer an Augmented Reality application for their passengers. However, Heathrow and Gatwick are not targeting the same audience for their application. The application incorporating Augmented Reality was directed to a specific segment of customers which are children (HEATHROW MEDIA CENTRE, 2017). Heathrow Airport wanted to reach beyond business travellers and become a more family focused airport by engaging both children and their parents in this Augmented Reality app (HILLS-DUTY, Rebecca, 2017). The name of the application is "Around the World with Mr. Adventure", which is a free app available on iOS and Android devices (FEDERENKO, Sasha, 2018). This app was created in partnership with Ads Reality, which is a UK-based company. Children that use this application can play around Heathrow terminal with their parents. This game allows children to take pictures with different characters by scanning markers that are placed in each terminal with the help of their smartphones. This is a fun and interactive way to get children to explore the terminal and have an activity with their parents. In the first month, 3'600 travellers downloaded the app on their devices and spent almost 800 hours. (MATTHEWS, Tobias, 2018).

³ Heathrow Airport Holding Limited is owned by FGP Topco Limited (25%), Qatar Investment Authority (20%), Caisse de dépôt du Québec (12.62%), GIC (11.20%), Alinda Capital Partners of the United States (11.18%), China Investment Corporation (10%) and Universities Superannuation Scheme (10%).(HEATHROW AIRPORT, 2018)

2.3.4 Issues on Augmented Reality technology

Different aspects such as ethical, legal and social impacts accompanying AR technology and applications should be closely considered by these different stakeholders: policy makers, technology producers, consumers and the public in general (RANEN, Matt, 2017). These aspects are discussed in the following lines; Augmented Reality can be perceived as being a valuable tool, but it can also be seen as an encouraging distraction and confusion that can cause raising barriers within society. One of the social impacts of AR technology and applications is, it is going to change the way people are interacting with each other, their environment and surroundings, which can have an impact on everyday life (RANEN, Matt, 2017). Having many people on their mobile devices instead of looking around them raise social and security issues in the airport, which is a very busy environment. People carry their bags and if they are constantly looking on their mobile devices, they can be less attentive to personal belongings and less reactive to airport staff security indications.

As the concept of modern AR is the ability of the device to register and analyse the environment in real time, it raises some concerns about privacy. The constant recording of an Augmented Reality tool can create difficulties by also recording out of the public domain (ROESNER, Franziska, 2017). In terms of individual privacy and the ease of access to information on an individual; AR technology could later, recognize people and objects, which can make questions about the idea of anonymity that can be threatened. Different consequences could happen if AR is going to use facial recognition technology; if all the information that passes automatically about each individual, any kind of personal data such as criminal record, marital status and social media, that the AR user will see through his device (RANEN, Matt, 2017). The airport is a public area where security is a priority. Multiple security measures are in place to protect the people on the premises. In addition, privacy will become an issue since nowadays, people tend to use the public Wi-Fi, where the data passing through can be seen. Which is why the data passing through the Wi-Fi needs to be protected. To add to the data issue, other points of concern for the public are that organisations can track people's movements, and the use that businesses can make of this information can make the public feel uncomfortable to use AR. Thus, Geneva Airport has to tackle these issues by reinforcing security of data passing through the Wi-Fi and ask passengers if they consent to share information to the airport and assuring that there is no third-party access to the data collected.

2.4 Summary of the literature analysis

Nowadays, airports are striving to offer a great customer experience within their infrastructure. Because of that, there is a need for airports around the world to diversify their revenue to offer the best infrastructure possible and accommodate the increasing growth of passengers travelling by air (DOSHI, Vinit, 2017). Thus, airports are using technology to support their operations, to facilitate passengers' journey, to increase in efficiency and to enhance customer experience. Interactions with technology in airports are pushing passengers towards self-service. In this era, many industries are influenced and are willing to search and develop technology to satisfy various needs. Airlines and airports worldwide are in permanent research to identify new technologies that would improve passenger experience and augment operational efficiency on the ground and in-flight. Augmented Reality is predicted to have the most immediate potential in the air transport industry, positively impacting the travel experience on the ground compared to virtual reality or mixed reality (FUTURE TRAVEL EXPERIENCE, 2018).

AR technology is in continuous development (JAVORNIK, Ana, 2016). Recent AR technology is using dual cameras and 3D sensors to establish an even more real experience. For the year 2019, Apple is aiming to include in their newest iPhones, front-facing 3D sensors which project infrared light into the real environment to enhance in-depth perception and recognize image patterns (WEBB, Alex and NAKAMURA, Yuji, 2017). Other experts, companies and institutions are expected to develop similar technology which is intending to boost both smartphones and applications markets.

Hence, AR technology can raise issues for the airport which is a public area where security is a priority. Having many people on their mobile devices instead of looking around, the use of the public Wi-Fi, where the data passing through can be seen and the movement tracking of travellers, can raise security and privacy concerns which should be tackled by Geneva Airport in order to implement this technology.

To conclude, AR technology is used nowadays in airports as a tool to optimise airports' ground operations, entertain and assist a wider range of customers. Augmented Reality is promising to change the travel experience and improve passengers' journey in airports. Thus, this project is going to assess if AR technology can be implemented at Geneva Airport.

3 Analysis

3.1 Research questions & hypotheses

This research has, for main objective, to determine how customer experience at Geneva Airport can be enhanced through Augmented Reality by the formulation of two hypotheses. The end goal is to make recommendations to Geneva Airport on enhancing passengers' experience during their journey at the airport through Augmented Reality.

The first assumption is that passengers encounter difficulties to navigate inside Geneva Airport; there is a need to increase passenger satisfaction. By implementing a navigation system with Augmented Reality, difficulties navigating indoors will be removed. Therefore, the first hypothesis is: passengers encounter difficulties to find their way inside Geneva Airport which are causing stress and dissatisfaction due to poor signs, lack of airport staff to guide and poor navigational system to assist passengers during their journey.

The second assumption is that passengers travelling with their family, lack entertainment at Geneva Airport. Thus, there is a need to increase passengers' satisfaction by entertaining the whole family during the waiting time at the airport, by offering an AR Treasure Hunting game application. Therefore, the second hypothesis is: passengers travelling in family lack entertainment during their journey at the airport which are decreasing patience and satisfaction of family travellers due to lack of facilities aimed to welcomed and entertain children and parents during their journey at the airport.

Thus, there is a need to determine passengers satisfaction about their last experience at the airport and find if the implementation of AR technology can be a solution to increase travellers' satisfaction.

3.2 Research methodology

To collect various information on travellers' demographic, behaviours, travelling profile, knowledge on AR, technology profile and to test the two hypotheses, data collection through interviews, observation days and an online survey were undertaken.

- **Interviews**

During the preliminary study, two interviews were conducted with Mr. BRENTINI and Mr. HUQ who work in the IT and innovation department of Geneva Airport. These two interviews were the opportunity for me to clarify the scope of this study and better identify relevant research methods. The objectives of these meetings were to secure access to precious information to conduct this study. Moreover, these meetings enabled me to present my ideas and ask for their professional feedbacks. After these brainstorming sessions with Geneva Airport, the approach to this study would be to use the Lean Start-up method. Indeed, two hypotheses were identified around the research question "How can customer experience be enhanced at Geneva Airport through Augmented Reality?". Then, for each hypothesis, a value proposition canvas and a business model canvas were created. Then, the two hypotheses were tested through the online survey.

- **Observations**

After that, comes two observation phases, one on the 14th of April 2018 and the other one the 9th of June 2018, which allows to explore and observe for one hour the area after the security check-point, called airside. These observations which were at different times of the day, the 14th of April 2018 at lunch time and the 9th of June 2018 in the afternoon, around 3 pm.

During these two days, the collection of precious data through pictures and notes enabled me to complete this study and to better understand this stressful and dynamic environment. Hence, in this study, it was not possible to add every note and picture that were taken during these days. Thus, all this information is spread in the document through the presentation of the two hypotheses, to point-out passenger behaviour at the airport.

In addition to these observation phases, I had the opportunity to take part in two EMBA modules done in collaboration with Geneva Airport. The first opportunity, which took place on the 13th, 14th and 21st of April 2018 aimed to enhance the retail experience of Geneva Airport by using a Lean Start-up method. This allowed me to gather more information on Geneva Airport and access to data from the marketing department on travellers' profile during the year 2017. Hence, this document is not added to this study for confidentiality purpose. Only a few figures are available in this study. Moreover, this document on "Profil des Pax" was a benchmark to compare with the results of the online survey. What was found is that the data collected from the online survey, which covered a sample of 226 participants and the one done in 2017 by Geneva Airport, which covered a sample of 3'838 passengers were relatively close; as for the percentage of passengers travelling for leisure purpose, the percentage of male and female respondents and the percentage of frequency of travels per traveller at Geneva Airport. Then, the second opportunity was to take part in a project, which aimed to create a location-based game for Geneva Airport. This project, has given me the opportunity to collect information for the second hypothesis I have formulated for this study.

- **Online survey**

The data collection was done through an online survey on Google Forms, addressed to people who have recently travelled at Geneva Airport and translated in French and English. The first question asked, "When was your last time taking the airplane from or to Geneva Airport?", enables respondents that have never travelled from or to Geneva Airport to exit the survey. The questionnaire was sent to as many respondents as possible from the 21st of May 2018 to the 11th of June 2018. 226 answers were collected during this period. The results from this survey enables to pivot or to pursue the initial strategy. From the results, it helps reshape the business model canvas and value proposition canvas and to finally chose only one feasible hypothesis to recommend to Geneva Airport.

3.3 Data collection

The survey has thirty-four questions divided in the following eight sections:

- Last travel experience at Geneva Airport

The aim of this section is to build a respondent's travelling profile through different criteria related to their last travel experience at Geneva Airport as such as the date of their last coming, the purpose of their last trip, if they were accompanied or not and the past year frequency at which they have taken the airplane at Geneva Airport.

- Last check-in experience at Geneva Airport

The purpose of this section is to estimate the respondents' satisfaction from their last check-in experience through the rating of the queuing time length and the airport staff behaviour at Geneva Airport.

- Last experience at the security check-point at Geneva Airport

The aim of this section is to estimate respondents' satisfaction about the queuing time and airport staff behaviour that happened during their last experience at the security check-point at Geneva Airport.

- Last experience at the passport control at Geneva Airport

The aim of this section is to estimate respondents' satisfaction from their last experience at the passport control with the airport staff and the queuing time at Geneva Airport.

- Last retail experience after the security control at Geneva Airport

The aim of this section is to estimate the respondents' satisfaction from their last retail experience which includes their satisfaction on the food and beverage offering, shops choice and airport staff behaviour after the security control at Geneva Airport.

- Navigation at Geneva Airport

The aim of this section is to determine the navigation experience of respondents at Geneva Airport. Meaning the easiness with which respondents are finding their way inside the airport and the reason(s) for finding it difficult to navigate indoors.

- Technology and Augmented Reality

The aim of this section is to determine the technological use during respondents' journey at the airport and on their level of knowledge on Augmented Reality. Technological use includes identifying respondents' smartphone operating system, the use of the phone during their journey and the reason(s). If they use GVApp, the application of Geneva Airport. In addition, it assesses also the willingness of users to purchase an AR application and how much respondents that would have answered yes would have been willing to pay. Then, comes some questions on the two hypotheses formulated in the case of this study. Concerning the solution of hypothesis one on navigation with AR, two questions were asked; the navigational screen they would prefer to have on their smartphone to help indoors navigation without saying which one is the already existing map on the GVApp, or the navigation with AR. Then, another question is to understand for what reason(s) respondents choose one screen over the other. Concerning the solution of hypothesis two on the treasure hunt with AR, five questions were asked. Interests and expectations of respondents to play a Treasure Hunting game after having passed the security control at Geneva Airport. Then, if respondents are willing to download a treasure hunt application, why they would download or not the game and how much they would be ready to spend for such an application.

- Personal information

The aim of this section is to create a demographic profile of respondents. The personal information section asked the sex, age, number of children and living area of respondents. Based on these and the last travel experience section, different profiles can be established to see how the answers can be influence with these demographic variables.

The data was then consolidated on an Excel sheet. Once consolidated, the data were used to compare relevant questions on Tableau software which are available in appendices 10 and 11. Then, the Excel sheet was adapted to suit the analysis on Stata software to find influences between different variables from the data set through correlations which are available on appendix 3.

3.4 Survey results and findings

3.4.1 The sample “Travellers profile”

226 people who have recently travelled at Geneva Airport answered this online survey on Google Forms. Section 1 and Section 8 of the survey aimed to build the respondents travelling profile through different criteria related to their most recent travel experience at Geneva Airport. These sections show the most recurrent behaviours of travellers. To better shape the profile of people travelling at Geneva Airport, different factors were taken into consideration such as demographic characteristics, travelling profile, technology and AR knowledge. The last two factors are developed in the following sections. Building such a profile allows to create contingency tables in order to identify influences between the traveller's profile of respondents who recently travelled at Geneva Airport and other variables.

The table on the next page regroups answers of the online survey that enables the creation of a traveller's profile of survey respondents through the demographic, the geographic and the behaviour. This survey was in majority answered by women **(57.08%)** and by people aged between 21 to 30 **(63.27%)**. Few people of the age range 15 to 20, 51 to 60 and 60+ were reached by this online survey. Thus, in the recommendations for further study, the questionnaire needs to better reach these age categories to have a better insight of their behaviour, needs and wants. Hence, as the age group 21 to 30 is the most represented, **76.99%** of respondents have no children. Concerning the geographic dimension, **51.77%** of respondents live in Geneva, without surprise that the majority of respondents are local people, as the main traveller group of the airport is Geneva citizens. The behavioural dimension of the table shows that the majority of respondents last travelled at Geneva Airport in the last 1 to 6 months (44.69%), for tourism purpose (60.18%) and unaccompanied (27.88%). Then, when respondents were asked about the past year travel frequency, 53.98% of survey people said to have travelled 1 to 2 times at Geneva Airport. In the following pages of the survey results and findings part, the satisfaction about the last experience at Geneva Airport, the navigation, the AR knowledge, the technology, the treasure hunt and travellers profile are discussed and analysed through contingency tables (appendix 3) and compared through comparative analysis for each solution formulated for hypothesis 1 and 2 (appendix 10 and 11).

Table 1 – The sample “Travellers profile”

| Repondents profile | | | | | | | |
|--------------------------|--------|--------------------|--------|-------------------------------|--------|----------------------------|--------|
| Demographic | | | | | | Geographic | |
| Sex | | Age | | Have children | | Living area | |
| Female | 57.08% | 15-20 | 3.10% | 1 child | 8.41% | Geneva | 51.77% |
| Male | 42.92% | 21-30 | 63.27% | 2 children | 10.62% | Other Swiss Cantons | 29.65% |
| | | 31-40 | 15.04% | 3 children | 3.10% | France | 15.93% |
| | | 41-50 | 10.18% | 4 children | 0.88% | Asia | 1.33% |
| | | 51-60 | 7.52% | No children | 76.99% | Other European C. | 0.88% |
| | | 61 or more | 0.88% | | | UK | 0.44% |
| Behaviour | | | | | | | |
| Purpose of the last trip | | Accompanied or not | | Travel frequency in past year | | Last time travelled at GVA | |
| Tourism, Leisure | 60.18% | Alone | 27.88% | 0 time | 2.21% | This week | 5.75% |
| Visiting family/ friends | 29.65% | With my partner | 24.78% | 1-2 times | 53.98% | Less than 1 month | 18.58% |
| Business | 7.08% | With my family | 24.34% | 3-5 times | 30.97% | Between 1 to 6 months | 44.69% |
| Erasmus/ Language | 1.77% | With my friends | 19.03% | 6-10 times | 11.95% | More than 6 months | 30.97% |
| Volunteer | 0.88% | With my colleagues | 3.98% | More than 10 times | 0.44% | | |
| Martial Art competition | 0.44% | | | More than 50 times | 0.44% | | |

3.4.2 Experience at Geneva Airport

From sections 2 to 5 of the online survey, respondents had to answer various questions concerning each step that they had to go through during their last journey at Geneva Airport. A complete summary of the survey answers is available under “Survey results” in appendix 2. Below, some comments are made followed by some tables that contain a summary of questions and answers referring to the satisfaction rate of respondents who have recently travelled at Geneva Airport. The purpose of all these sections which can be regrouped under “Experience at Geneva Airport” is to assess satisfaction and identify pain points during passengers’ journey at the airport.

Here are some of the different steps of a traveller’s journey, which were selected to rate passengers’ satisfaction at Geneva Airport:

- Check-in
- Security check-point
- Passport control
- Retail experience after the security check-point

By doing an appreciation of these steps, it helps track travellers’ satisfaction of their journey at Geneva Airport.

3.4.2.1 Last CHECK-IN experience

Referring to the table below, the first question for this section is to rate the queuing time from respondents' last check-in experience at Geneva Airport. **57.96%** of respondents are globally satisfied from their queuing time, while **5.75%** are not satisfied at all. **36.28%** of respondents answered to have done the online check-in from home to probably avoid long queue at the check-in. From the contingency table 1 of appendix 3, not having a smartphone and the age of respondents, influence passengers' satisfaction of the queuing time at the check-in.

The second question for this section is the rating of airport staff. **61.85%** of respondents have found their experience positive while being in contact with airport staff at the check-in. **35.19%** of respondents did the online check-in. **2.96%** of respondents found airport staff unhelpful or unfriendly. Indeed, respondents found their last check-in experience with the airport staff in majority positive.

In conclusion, respondents' experience at the check-in are satisfying and few respondents seem to have encountered unsatisfying experience either from the queuing time length or from the airport staff. Also, to note, **36.28%** of the respondents use online check-in to probably hasten the check-in process and spend less time queuing if it is not necessary. Even with online check-in, some respondents have been in contact with airport staff. Indeed, if some people do not have any luggage to check-in but only carry-ons, this option helps them to hasten their journey at the airport by allowing them to go directly at the security check-points.

Table 2 – Last CHECK-IN experience

| Last Check-In experience at Geneva Airport | | | |
|--|-------------------------------------|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| Rate for the Queuing Time | Excellent | 10 | 4.42% |
| | Good | 47 | 20.80% |
| | Satisfying | 74 | 32.74% |
| | Unsatisfying | 9 | 3.98% |
| | Awful | 4 | 1.77% |
| | I did the online check-in from home | 82 | 36.28% |
| Rate for the Airport Staff | Helpful | 86 | 31.85% |
| | Unhelpful | 2 | 0.74% |
| | Friendly | 81 | 30% |
| | Unfriendly | 6 | 2.22% |
| | I did the online check-in from home | 95 | 35.19% |

3.4.2.2 Last experience at THE SECURITY CHECK-POINT

On the table below, respondents were asked about their satisfaction on the queuing time at the security check-point at Geneva Airport. What can be observed is that at this step of the traveller's journey, dissatisfaction increases for the queuing time among respondents rating. Indeed, **20.8%** of them rated queuing time at the security check-point at Geneva Airport as unsatisfying and awful. **79.21%** of respondents find satisfying to excellent the queuing time at the security check-point. In reference to the contingency table 1 in appendix 3, the age of respondents and if they have children is influential on their satisfaction of the queuing at the security check-point.

From the second question, respondents definitely find airport staff helpful (**46.45%**) and friendly (**39.01%**) at the security check-point. However, what can also be point-out here is that the satisfaction for the airport staff at the security check-point decreases with **4.26%** of respondents find the staff unhelpful and **10.28%** find the staff unfriendly, comparing to the rating of the last check-in experience.

In conclusion, this step of travellers' journey is to be watched-out by Geneva Airport and should be considered as a stressed point for passengers. Overall, what can be said is that an important percentage of respondents are satisfied of the queuing time (**79.21%**) and of the airport staff (**85.46%**) at the security check-point.

Table 3 – Last experience at THE SECURITY CHECK-POINT

| Last experience at the Security check-point at Geneva Airport | | | |
|---|-------------------|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| Rate for the Queuing Time | Excellent | 15 | 6.64% |
| | Good | 65 | 28.76% |
| | Satisfying | 99 | 43.81% |
| | Unsatisfying | 40 | 17.70% |
| | Awful | 7 | 3.10% |
| Rate for the Airport Staff | Helpful | 131 | 46.45% |
| | Unhelpful | 12 | 4.26% |
| | Friendly | 110 | 39.01% |
| | Unfriendly | 29 | 10.28% |

3.4.2.3 Last experience at THE PASSPORT CONTROL

In reference to the table below, the rating of the queuing time at the passport control at Geneva Airport, in majority, respondents' satisfaction rate for the queuing time ranges from satisfied to excellent (**83.19%**). However, **16.81%** of respondents still found the queuing time unsatisfying and awful during their last experience at the passport control at Geneva Airport. Referring to the contingency table 1 in appendix 3, travellers' satisfaction of the queuing time at the passport control is influenced by travellers travelling with their family, with friends or with colleagues.

Concerning the rating of the airport staff at the passport control, **85.61%** of respondents are happy with their latest interaction with the airport staff with **49.08%** of respondents rating the staff as helpful and **36.53%** as friendly. Some respondents probably had a bad experience in their last travel at Geneva Airport with **2.95%** finding the passport control staff unhelpful and **11.44%** found them unfriendly. Meaning that **14.39%** of respondents were unhappy of the airport staff's behaviour at the passport control at Geneva Airport. In reference to the contingency table 1 of appendix 3, travellers satisfaction of the airport staff at the passport control is influenced by the frequency of travels and sex of respondents.

To conclude, what can be said from this table summarising respondents' last experience at the passport control at Geneva Airport, is the decreasing satisfaction of respondents with the airport staff at this step of a traveller's journey.

Table 4 – Last experience at the passport control

| Last experience at the Passport Control at Geneva Airport | | | |
|---|-------------------|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| Rate for the Queuing Time | Excellent | 16 | 7.08% |
| | Good | 73 | 32.30% |
| | Satisfying | 99 | 43.81% |
| | Unsatisfying | 29 | 12.83% |
| | Awful | 9 | 3.98% |
| Rate for the Airport Staff | Helpful | 133 | 49.08% |
| | Unhelpful | 8 | 2.95% |
| | Friendly | 99 | 36.53% |
| | Unfriendly | 31 | 11.44% |

3.4.2.4 Last retail experience AFTER THE SECURITY CONTROL

Below, a table shows the satisfaction rate of the food and beverage offering by respondents, only **2.21%** rated the food and beverage offering as very good value for money. In majority, respondents are not satisfied and rated the food and beverage offering as poor value for money with **53.98%** and **43.81%** rated as fair value for money. The age and frequency of travels influence travellers' satisfaction of the food and beverage offering (referring to table 1 of appendix 3).

On the second question, which aimed to see the satisfaction rate for the shops; a bigger number of respondents answered to find the choice of shops sufficient (**57.52%**), while **27.43%** of respondents find the choice of shops very poor and **15.04%** has rated that the airport offers a good variety of choice of shops. Satisfaction of the shops' offering is influenced by respondents age (referring to table 1 of appendix 3).

Then, the third question which is, the rating for airport staff after the security control. Respondents are quite satisfied as they rated helpful by **55.71%** and friendly by **37.50%**. However, **2.14%** of people still found the airport staff unhelpful and **4.64%** still found the airport staff unfriendly after the security control. Satisfaction of airport staff after the security control is influenced by respondents' age (referring to table 1 of appendix 3).

In conclusion, it can be said that respondents are clearly unhappy about the food and beverage offerings (**53.98%**) and for the shops they are in majority satisfied (**57.52%**). Finally, airport staff is the best rated experience after the security control at Geneva Airport. Indeed, respondents said to have found airport staff helpful by **55.71%** and friendly by **37.50%**.

Table 5 – Last retail experience AFTER THE SECURITY CONTROL

| Last retail experience AFTER THE SECURITY CONTROL at Geneva Airport | | | |
|---|-----------------------------------|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| Rate for the FOOD & BEVERAGE offering | Very good value for money | 5 | 2.21% |
| | Fair value for money | 99 | 43.81% |
| | Poor value for money | 122 | 53.98% |
| Rate for the SHOPS | A good variety of choice of shops | 34 | 15.04% |
| | Sufficient choice of shops | 130 | 57.52% |
| | Poor choice of shops | 62 | 27.43% |
| Rate for the Airport Staff | Helpful | 156 | 55.71% |
| | Unhelpful | 6 | 2.14% |
| | Friendly | 105 | 37.50% |
| | Unfriendly | 13 | 4.64% |

3.4.2.5 Summary on passengers' satisfaction about their last experience at Geneva Airport

To recap this section, a summary table on passengers' satisfaction about their last experience at Geneva Airport is regrouping the four steps that a passenger goes through during his/her journey. This table was made on purpose to enable an overview of the evolution of a traveller's satisfaction based on their journey at the airport. For this table, the answer "I did the online check-in from home" was removed to better track and have a measurable scale.

Evolution of queuing time satisfaction rate: What can be said is that, overall, passengers are satisfied of the queuing time at the check-in, at the security check-point and at the passport control. But if observing carefully, after the check-in, some respondents moved to be more unsatisfied when it comes to their queuing time at the security check point. People rating awful for the queuing time would increase **(+0.32%)** from the check-in experience to the security check-point. Concerning the queuing time at the passport control, the evolution from the security check-point even if the number of people feeling satisfied stays the same, is going to a more positive rating, meaning a better experience at the passport control. Unsatisfied respondents decrease **(-4.87%)**, while awful rating is slightly increasing **(+0.88%)**. However, respondents rating good **(+3.54%)** and excellent **(+0.44%)** concerning their last experience at the passport control has increased.

Evolution of airport staff satisfaction rate: Respondents of the survey are quite satisfied of their experience with airport staff at various steps of the travel journey at Geneva Airport. What can be seen in this table is the decrease of satisfaction from passengers in contact with airport staff at the security check-point compared to their previous interaction with airport staff at the check-in. Indeed, respondents rated airport staff at the security check-point as being unfriendly **(10.28%)** and unhelpful **(4.26%)**. Then, comes the rating of airport staff at the passport control, compared to the experience with the airport staff at the security check-point, some respondents found staff at the passport control more unfriendly **(+1.16%)**. Then, after the security control, respondents rated their experience with airport staff more positively, rating them helpful **(55.71%)** and friendly **(37.50%)**.

Table 6 – Summary table on passengers' satisfaction about their last experience at Geneva Airport

| Different steps of travellers journey at Geneva Airport | Queuing time | | | | | | | | | | Airport staff | | | | | | | | Food & Beverage offering | | | Shops | | |
|---|--------------|-----------|--------|-----------|------------|-----------|--------------|-----------|-------|-----------|---------------|-----------|-----------|-----------|----------|-----------|------------|-----------|---------------------------|----------------------|----------------------|-----------------------------------|----------------------------|----------------------|
| | Excellent | Evolution | Good | Evolution | Satisfying | Evolution | Unsatisfying | Evolution | Awful | Evolution | Helpful | Evolution | Unhelpful | Evolution | Friendly | Evolution | Unfriendly | Evolution | Very good value for money | Fair value for money | Poor value for money | A good variety of choice of shops | Sufficient choice of shops | Poor choice of shops |
| Last check-in experience | 6.94% | 0% | 32.64% | 0% | 51.39% | 0% | 6.25% | 0% | 2.78% | 0% | 49.14% | 0% | 1.14% | 0% | 46.29% | 0% | 3.43% | 0% | | | | | | |
| Last experience at the security check-point | 6.64% | (-)0.3% | 28.76% | (-)3.88% | 43.81% | (-)7.58% | 17.70% | (+)11.45% | 3.10% | (+)0.32% | 46.45% | (-)2.69% | 4.26% | (+)3.12% | 39.01% | (-)7.28% | 10.28% | (+)6.85% | | | | | | |
| Last experience at the passport control | 7.08% | (+)0.44% | 32.30% | (+)3.54% | 43.81% | 0% | 12.83% | (-)4.87% | 3.98% | (+)0.88% | 49.08% | (+)2.63% | 2.95% | (-)1.31% | 36.53% | (-)2.48% | 11.44% | (+)1.16% | | | | | | |
| Last retail experience after the security control | | | | | | | | | | | 55.71% | (+)6.63% | 2.14% | (-)0.81% | 37.50% | (+)0.97% | 4.64% | (-)6.8% | 2.21% | 43.81% | 53.98% | 15.04% | 57.52% | 27.43% |

3.4.3 Technology

This section regroupes questions related to technology that were addressed to the 226 respondents of the survey. These questions help to understand travellers' behaviour toward technology, which are:

- the operating system of respondents' smartphone,
- the use of their phone to help during the journey at the airport,
- the use of GVApp (the application of Geneva Airport),
- the reason they use their phone for their travel.

What can be said from these results is that, Android (**48.23%**) and Apple iOS (**47.79%**) users are the most represented groups in this survey. Followed by Windows phone (**3.10%**) and not smartphone users (**0.88%**).

In reference to the table on the next page, most respondents (**65.49%**) answered that they use their phone during their journey at the airport, while **34.51%** said to no use it. From the contingency table 4 in appendix 3, passengers travelling as a family is influential for the use of the phone during the journey. Even if **65.49%** of respondents answered, that they use their phone during their travel, **71.24%** of respondents replied to not use GVApp during their journey at the airport. Only **28.76%** of respondents use the GVApp application. It can be assumed that respondents living in Geneva and other Swiss Cantons frequently use Geneva Airport, thus they are more willing to download and use GVApp. Indeed, referring to the contingency table 4 in appendix 3, the living areas of Geneva and other Swiss Cantons are influential for the use of GVApp.

Then, when the survey asked respondents what they use on their phone for when travelling, the majority use it for entertainment purposes (**24.38%**). Followed by respondents who use their phone to have their electronic boarding pass (**20.19%**), to check flight(s) information (**19.25%**) and to do the online check-in (**18.94%**). It means that technology is taking an important part in travellers' journey. Indeed, these answers show that nowadays travellers are using their phone more and more to smooth their journey at the airport. Only **4.50%** of respondents answered to not use their phone to manage their travel journey. This shows a high rate of travellers being dependent of their smartphone while travelling. Few respondents answered to use their phone to navigate in the airport terminal (**1.71%**), to navigate outside the airport (**0.16%**), to get information on connections with trains or taxi (**0.16%**) and for business communications (**0.16%**).

From the contingency table 4 in appendix 3, Apple iOS users are the most influenced to use their phone while travelling, due to the fact that iOS users have an application called “Wallet” for the electronic boarding pass, for the online check-in and to entertain themselves. Then, the frequency of travels influences the use of their phone for travelling, to entertain themselves and for the electronic boarding pass. The sex of respondents influences on the use of the phone while travelling, to check flight information and for the online check-in. The age of respondents influences the use of the phone while travelling, to entertain themselves, for the electronic boarding pass and to do online check-in.

Below, the table is summarising the data collected for the different questions related to technology.

Table 7 – Technology

| Technology | | | |
|---|---|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| What is the operating system (OS) of smartphone? | Android | 109 | 48.23% |
| | Apple iOS | 108 | 47.79% |
| | Windows phone | 7 | 3.10% |
| | BlackBerry OS | 0 | 0% |
| | Not a smartphone | 2 | 0.88% |
| Do you use your phone to help you during your journey at the airport? | Yes | 148 | 65.49% |
| | No | 78 | 34.51% |
| Do you use GVApp (the application of Geneva Airport)? | Yes | 65 | 28.76% |
| | No | 161 | 71.24% |
| Why do you use your phone for your travel? | Entertain (games, social, media, chat, news) | 157 | 24.38% |
| | Electronic boarding pass | 130 | 20.19% |
| | Check flight(s) information | 124 | 19.25% |
| | Online Check-in | 122 | 18.94% |
| | Manage my booking | 68 | 10.56% |
| | I do not use my phone to manage my travel journey | 29 | 4.50% |
| | Navigate in the Airport terminal (map) | 11 | 1.71% |
| | To navigate outside the airport | 1 | 0.16% |
| | Information on connection with train and taxi | 1 | 0.16% |
| | Business communication | 1 | 0.16% |

3.4.4 Augmented Reality

In this section, respondents were asked a few questions on Augmented Reality to determine their knowledge on this technology, if they are willing to purchase an Augmented Reality application and how much they would be willing to pay for in Swiss Francs.

The knowledge of respondents on AR is the following: **53.06%** of respondents answered to have read some articles, heard from relatives or watched something related to AR. It is a bit more than half of the respondents who have already heard about Augmented Reality. **18.78%** of respondents answered to have downloaded or played an AR game. While **28.16%** of respondents have never heard about Augmented Reality before. Thus, it can be observed that the majority of respondents are well aware about this technology.

When respondents were asked if they would be willing to buy an AR application, **11.95%** answered to be willing to spend money for such an application. **43.36%** of respondents answered to be willing to spend money for an Augmented Reality application with the condition that it offers an extraordinary experience to them. This question allows to see if people are willing to pay because the application is offering an Augmented Reality experience. However, **44.69%** of respondents said that they would not purchase an AR application, but this answer can also mean that they would rather acquire this kind of application for free. Moreover, this willingness is verified by the contingency analysis in table 5. We observe that the knowledge of the respondents on AR is influential for their willingness to purchase an AR application. This influence is particularly strong for the respondents who have already heard about AR and those who have never heard about it before.

Then, the following question asked to respondents is what amount they are willing to spend for an Augmented Reality application. The range of prices formulated by the respondents to the survey are between CHF 0 to CHF 20. In majority, people are willing to spend CHF 1 as a maximum amount (**30%**), followed by people willing to spend a maximum of CHF 5 (**27.69%**), maximum of CHF 2 (**21.54%**), maximum of CHF 3 (**13.08%**), maximum of CHF 4 (**5.38%**), maximum of CHF 10 (**1.54%**) and maximum of CHF 20 (**0.77%**).

To conclude, more than half of the respondents are aware about AR technology, more than half of the respondents are also willing to spend money for an AR application and 130 people over the 226 people surveyed are willing to pay an amount ranging between CHF 0 to CHF 20 to live an extraordinary experience while using an AR application.

Below, the table is summarising the data collected for the different questions related to Augmented Reality.

Table 8 – Augmented Reality

| Augmented Reality | | | |
|--|--|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| What do you know about Augmented Reality? | I read some articles about it, heard from relatives or watched something related to AR | 130 | 53.06% |
| | I have downloaded/ played some Augmented Reality games | 46 | 18.78% |
| | I have never heard about Augmented Reality | 69 | 28.16% |
| Will you be willing to purchase an Augmented Reality application? | Yes | 27 | 11.95% |
| | Yes, if offering an extraordinary experience | 98 | 43.36% |
| | No | 101 | 44.69% |
| If you answered yes to the previous question, how much are you willing to pay? | Max. CHF 1 | 39 | 30% |
| | Max. CHF 2 | 28 | 21.54% |
| | Max. CHF 3 | 17 | 13.08% |
| | Max. CHF 4 | 7 | 5.38% |
| | Max. CHF 5 | 36 | 27.69% |
| | Max. CHF 10 | 2 | 1.54% |
| | Max. CHF 20 | 1 | 0.77% |

3.4.5 Navigation

Concerning the navigation at Geneva Airport, people were surveyed around four questions. One of the questions was asking respondents to express if they find it easy to navigate inside Geneva Airport. **41.15%** of respondents answered to find it easy and **22.12%** found it very easy to navigate indoors. Then, **30.53%** of respondents answered to find the navigation at Geneva Airport satisfying, while **6.19%** found navigation difficult. From contingency table 2 in appendix 3, frequency of travels influences on the easiness to navigate inside Geneva Airport.

Then, to understand the reason why some respondents found the navigation at Geneva Airport difficult, some suggestions were proposed as possible difficulties that could prevent passengers to navigate with comfort in the airport. In majority, people found that there is a lack of signs to guide inside the airport (**31.88%**), that terminal signs are confusing or unclear (**30.43%**), that not enough staff is available to inform and guide (**27.54%**), that confusing explanations are delivered by airport staff (**5.80%**) and due to the language barrier (**4.35%**).

Two additional questions related to the first hypothesis were asked to respondents:

One of the questions asked to respondents was, which screen they would prefer to see on their device to help navigate inside Geneva Airport. In majority, with **80.53%** of the respondents answering to prefer screen A while **19.47%** would prefer screen B on their device to help navigate inside Geneva Airport. On purpose, I did not add any legend under each picture, to not influence their decision to one image or another. Thus, they had two pictures showing two different tools to help navigate indoors. In fact, screen A (Figure 4) is navigation with Augmented Reality technology while screen B (Figure 5) is the existing map display in GVApp, the application of Geneva Airport. This preference for one screen over another is influenced by the knowledge on AR. From the contingency table 3 in appendix 3, passengers that have never heard about AR and that have downloaded or played some AR games has an influence on their preferred navigation screen.

Then, the second question asked why respondents chose image A or B. They were able to choose multiple answers to show the reason behind why they would prefer one screen over another. In majority, respondents choose one over another because of the clarity (**26.48%**), for the simplification (**19.14%**), for the real environment aspect (**18.50%**), for the visibility of the surroundings (**14.04%**), for the design (**12.60%**) and for the information conforming the view through the smartphone (**9.25%**).

Below, the table is summarising the data collected for the different questions related to navigation.

Table 9 – Navigation

| Navigation | | | |
|---|---|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| How easy is to navigate inside Geneva Airport? | Very easy | 50 | 22.12% |
| | Easy | 93 | 41.15% |
| | Satisfied | 69 | 30.53% |
| | Difficult | 14 | 6.19% |
| | Very difficult | 0 | 0% |
| If your answer as difficult or very difficult, please tell why. | Not enough signs | 22 | 31.88% |
| | Confusing or unclear Terminal signs | 21 | 30.43% |
| | Not enough staff available to inform & guide | 19 | 27.54% |
| | Confusing explanation of airport staff | 4 | 5.80% |
| | Language barrier | 3 | 4.35% |
| Between these 2 images, which one would you prefer to see on your screen to help your navigation inside Geneva Airport. | A | 182 | 80.53% |
| | B | 44 | 19.47% |
| From your previous choice, please tell why you choose either image A or B | For the clarity | 166 | 26.48% |
| | For the simplification | 120 | 19.14% |
| | For the real environment aspect | 114 | 18.50% |
| | For the visibility of my surroundings | 88 | 14.04% |
| | For the design | 79 | 12.60% |
| | For the information conforming my view through my smartphone camera | 58 | 9.25% |

3.4.6 Treasure Hunt

This section is helping to survey possible interest of respondents about a treasure hunt at Geneva Airport that is the solution offered in hypothesis two.

The first question asked to respondents was if they would be interested to play a Treasure Hunting game after having passed the security control at Geneva Airport. **34.96%** of respondents answered to not be really interested, while **23.89%** said to not be interested at all in such a game. Still, **26.55%** of people surveyed answered to be interested and **14.60%** were very interested. This willingness is influenced by respondents' knowledge on AR. Indeed, from the contingency table 6 in appendix 3, to have read some articles about AR and not knowing anything about AR influenced respondents' willingness to play such a game.

The second question which allows multiple choices, asked to respondents what kind of expectations they would have from a treasure hunt at Geneva Airport. In addition to expectations formulated as possible answers, respondents were able to write in the option an expectation that they would have but that is not displayed in the list of possible answers. **20.10%** of respondents said to not expect anything about a treasure hunt as they are not interested, while the rest of respondents expressed the following answers: to win some coupons for the different retailers after the security check-point at Geneva Airport (**19.38%**), to be able to win a special present (**19.38%**), a treasure hunt for adults and children (**16.75%**), to have updated questions every time they come at Geneva Airport (**10.77%**) and a treasure hunt for children only (**3.11%**). In addition, some respondents answered additional expectations as to be entertained (**0.72%**), to feel distress (**0.24%**) and expecting a quiz (**0.24%**). **0.48%** of respondents answered to be afraid to not have time to play a Treasure Hunting game after the security control at Geneva Airport.

The third question asked if respondents would be willing to download a treasure hunt application to play during their free time at Geneva Airport. **50.4425%** of respondents answered to be willing to download this application while **49.5575%** would not download. The willingness to download the game is influenced by respondents' knowledge on AR and their age. Indeed, from the contingency table 6 in appendix 3, to have read some articles about AR and not knowing anything about AR influenced respondents' willingness to play such a game.

The fourth question aimed to see if people answering, willing to download a Treasure Hunting game, would be ready to spend money to purchase this application. **51.94%** said to not be willing to pay by answering CHF 0. The other respondents who answered to be willing to purchase a Treasure Hunting game to play at Geneva Airport said to be ready to spend a maximum of CHF 2 (**27.91%**), a maximum of CHF 3 (**27.91%**), a maximum of CHF 4 (**2.33%**), a maximum of CHF 5 (**10.08%**) and a maximum of CHF 10 (**0.78%**). The willingness to pay for such a game application is influenced by the frequency of travels which can be observed on the contingency table 6 in appendix 3.

The fifth question was asked to understand and identify the reason for respondents to download or not download the treasure hunt application. This question was a multiple choice, which also allows respondents to formulate additional reasons to download or not download a treasure hunt application in the field. The reasons to download or not download the treasure hunt application, as expressed by the respondents from the survey are the following: respondents who would download the treasure hunt application said to be willing to download the application to entertain during the waiting time (**15.55%**), because the application is free (**15.05%**), to win airplane tickets (**12.54%**), to win some coupons for the different shops and restaurants in the airport (**10.70%**), to win special prizes (**9.70%**), to be interested to play a Treasure Hunting game with Augmented Reality (**8.03%**), to play with their children (**5.69%**), to have a unique experience at Geneva Airport (**4.35%**) and to prefer to play treasure hunt directly from GVApp (**2.17%**). Then, the reason for respondents to not be willing to download the treasure hunt application are the following: because they don't see any interest in downloading a Treasure Hunting game to play at Geneva Airport (**11.87%**), they don't like to play Treasure Hunting games (**3.85%**), then as additional answers, some respondents told to be too stressed to play in the airport (**0.17%**) and that they would not be ready to pay, nor install an application for this (**0.17%**).

On the following pages, the tables are summarising the data collected for the different questions related to treasure hunt.

Table 10 - Treasure Hunt (1/2)

| Treasure Hunt | | | |
|---|---|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| Would you be interested to play a treasure hunting game after having passed the security control at Geneva Airport? | Very interested | 33 | 14.60% |
| | Interested | 60 | 26.55% |
| | Not really interested | 79 | 34.96% |
| | Not interested | 54 | 23.89% |
| What would you expect from this treasure hunt at Geneva Airport? | I don't expect anything. I am not interested. | 84 | 20.10% |
| | To win some coupons for the different retailers after the security check-point at Geneva Airport. | 81 | 19.38% |
| | To be able to win a special present. | 81 | 19.38% |
| | A treasure hunt for adults and children. | 70 | 16.75% |
| | To have updated questions every time I am coming at Geneva Airport. | 45 | 10.77% |
| | To answers questions on different themes related to Switzerland. | 36 | 8.61% |
| | A treasure hunt for children only. | 13 | 3.11% |
| | To entertain. | 3 | 0.72% |
| | I am afraid to not have time to play. | 2 | 0.48% |
| | To distress. | 1 | 0.24% |
| | Expecting quiz. | 1 | 0.24% |
| Would you download a treasure hunt application to play during your free time at Geneva Airport? | Yes | 114 | 50.4425% |
| | No | 112 | 49.5575% |
| If you answered yes to the previous question, how much are you willing to pay? | CHF 0 | 67 | 51.94% |
| | Max. CHF 2 | 36 | 27.91% |
| | Max. CHF 3 | 9 | 6.98% |
| | Max. CHF 4 | 3 | 2.33% |
| | Max. CHF 5 | 13 | 10.08% |
| | Max. CHF 10 | 1 | 0.78% |

Table 11 - Treasure Hunt (2/2)

| Treasure Hunt (2) | | | |
|---|--|-------------------|------------------|
| Questions | Possible answers | Nb of respondents | % of respondents |
| Why would you download or not download the treasure hunt application? | To entertain during the waiting time. | 93 | 15.55% |
| | Because the application is free. | 90 | 15.05% |
| | To win airplanes tickets. | 75 | 12.54% |
| | I don't see any interest in downloading a treasure hunting game to play at Geneva Airport. | 71 | 11.87% |
| | To win some coupons for the different shops and restaurants at Geneva Airport. | 64 | 10.70% |
| | To win special prizes. | 58 | 9.70% |
| | I would be interested to play a treasure hunting game with Augmented Reality. | 48 | 8.03% |
| | To play with my children. | 34 | 5.69% |
| | To have a unique experience at Geneva Airport | 26 | 4.35% |
| | I don't like to play treasure hunting games. | 23 | 3.85% |
| | I would prefer to play treasure hunt directly from GVApp. | 13 | 2.17% |
| | Too stressed | 1 | 0.17% |
| | I don't want to pay for this, nor install an application for this. | 1 | 0.17% |

3.4.7 Summary of comparative tables findings

Below, a summary of findings from appendix 10 and 11 that helps compare relevant questions for hypothesis 1 and 2:

- **Comparative tables for hypothesis 1**

To summarise the analysis done through comparative tables for hypothesis 1, the majority of people from each different living locations find navigation relatively easy or satisfying inside Geneva Airport. Again, it means that the navigation is quite clear for passengers inside the airport. Respondents that have travelled more than 10 times at Geneva Airport in the past year have not encountered any difficulties to navigate, same for those who did not travel in the past year. However, respondents that have travelled 1 to 2 times in the past year is the group category to encounter the highest percentage of difficulties with **3.54%**, followed by the ones that travel between 3 to 5 times with **1.77%** and the ones to travel 6 to 10 times with **0.88%**. However, **93.80%** of respondents are satisfied or find it easy to navigate. Thus, navigation at Geneva Airport seems to be relatively easy for almost everyone.

Respondents that use or do not use their phone to help them during their journey at the airport would have a strong preference for screen A which is the navigation with AR. In general, people tend to use their smartphones more and more to help them with their journey and technology is taking an important place in the travel industry. Both female and male passengers preferred screen A over screen B at almost a similar percentage. Meaning that passengers of both sex would prefer to navigate with AR inside the airport.

Most respondents stated using their smartphone to help them during their journey at the airport. However, **40.27%** are still not using GVApp but they are probably using other applications that might be from airline companies, booking websites for hotels, transportation or flights. Thus, further research should be done to understand why passengers are in majority (**71.24%**) not downloading GVApp and if one of the reasons is the use of an application of an airline company or other applications. Most of the respondents do not use GVApp. Respondents from Geneva are people with the highest usage rate of the Geneva Airport application while some respondents from other locations such as the UK and other European countries have no respondents using the application. However, as a reminder the sample of answers is very restrictive with slightly more than half of the respondents who live in Geneva.

Apple smartphone users are the ones to be the most represented as having downloaded GVApp. However, an important part of the respondents (**71,24%**) do not use GVApp. Meaning that few people who answered this survey use the Geneva Airport application. Supposedly, a majority of Android users do not have enough incentives to download the application or that the application might not be adapted to Android devices. Further research should be done to understand why most Android users do not download the application and why few people have the application in general.

- **Comparative tables for hypothesis 2**

To summarise the analysis done through comparative tables for hypothesis 2, both male and female respondents would be interested to purchase an AR application. Indeed, **27.87%** of women respondents and **27.43%** of the men respondents would be willing to purchase an AR application. Women tend to be more willing to pay for an AR app if the experience is extraordinary. If the application is not offering something special, women respondents stated that they would refuse to pay. In general, men respondents tend to be somehow more willing to pay for an AR application. However, it is not totally accurate as there are less men respondents than women for this survey.

People living in Geneva, other Swiss Cantons and Asia would be the most interested to play a Treasure Hunting game after having passed the security control at Geneva Airport. The least convinced are those who live on the French border and other European Countries. However, it should be kept in mind that the sample of answers for other European Countries, Asia and the UK were very limited and only few answers have been collected. Thus, this is only an assumption from the answers collected in this survey.

People travelling alone, with their families, with their colleague or their partner tend to be more willing to download a treasure hunt application to play during their free time at Geneva Airport. However, if they are travelling with their friends they are less willing to download such a game.

Respondents who are travelling for tourism and leisure purposes are more willing to download a Treasure Hunting game than others (**30.97%**). It can be assumed that because they are more relaxed and happy to go on holidays, they are also seeking for entertainment, to spend their free time at the airport.

Respondents that stated to be willing to download a Treasure Hunting game to play during their free time at Geneva Airport, are mostly not ready to pay anything. Those

who are willing to pay an amount are fine to pay various amounts. Thus, this game should be considered as a new source of diversification and maybe a small source of revenue from for Geneva Airport.

In majority, if people have never heard about AR they tend to be less interested in downloading a Treasure Hunting game after having passed the security control at Geneva Airport. In addition, people that have some knowledge about AR or have experience in AR games would tend to be more favourable to download an AR application. Nonetheless, in all, they would not be really interested to play a Treasure Hunting game after having passed the security check-point at Geneva Airport. However, a deeper search should be done to establish if people who are not really interested are needing extra incentives, such as receiving rewards when playing a game.

3.4.8 Summary of survey results and findings

226 people who have recently travelled at Geneva Airport answered this online survey on Google Forms. What can be said is that, overall, passengers are satisfied of the queuing time and are quite satisfied of their experience with airport staff at various steps of the travel journey at Geneva Airport.

Most respondents (**65.49%**) answered that they use their phone during their journey at the airport. The majority uses it for entertainment purposes (**24.38%**), followed by respondents who use their phone to have their electronic boarding pass (**20.19%**), to check flight(s) information (**19.25%**) and to do the online check-in (**18.94%**). It means that technology is taking an important part in travellers' journey. Indeed, these answers show that nowadays travellers are using their phone more and more to smooth their journey at the airport.

More than half of the respondents are aware about AR technology, more than half of the respondents are also willing to spend money for an AR application and 130 people from the 226 people surveyed are willing to pay an amount ranging between CHF 0 to CHF 20 to live an extraordinary experience while using an AR application.

Moreover, from respondents' answers, navigation is not an issue at Geneva Airport. Indeed **41.15%** of respondents answered to find it easy and **22.12%** found it very easy to navigate indoors. Then, **30.53%** of respondents answered to find the navigation at Geneva Airport satisfying, while **6.19%** found navigation difficult.

Concerning the preferred navigational screen, in majority, with **80.53%** of the respondents answering to prefer screen A while **19.47%** would prefer screen B on their device to help navigate inside Geneva Airport. The two pictures show two different tools to help navigate indoors. In fact, screen A is navigation with Augmented Reality technology (Figure 4) while screen B is the existing map display in GVApp, the application of Geneva Airport (Figure 5).

Then, respondents were asked on their interest to play a Treasure Hunting game after having passed the security control at Geneva Airport. **34.96%** of respondents answered to not be really interested, while **23.89%** said to not be interested by such a game at all. Still, **26.55%** of people surveyed answered to be interested and **14.60%** were very interested. Hence, when respondents were asked if they would be willing to download a treasure hunt application to play during their free time at Geneva Airport. **50.4425%** of respondents answered to be willing to download this application while **49.5575%** would not download. Thus, what can be said, is that the move from people not interested to be willing to download the treasure hunt game can be related to the rewards that the game would offer to the players, which can be a strong incentive to attract passengers to play during their free time at Geneva Airport.

4 Implementation of AR at Geneva Airport

4.1 Navigation with AR

4.1.1 Brief introduction

Navigation with AR which aims to ease the navigation indoors, is a suggested additional service to incorporate to GVApp, the application of Geneva Airport. This service was suggested with the assumption that passengers encounter difficulties to navigate inside Geneva Airport; there is a need to increase passenger satisfaction. By implementing a navigation system with Augmented Reality, difficulties navigating indoors will be removed. Thus, in the following lines, the value proposition canvas and the business model canvas were designed for the navigation with AR, as an additional service offered through GVApp.

To verify hypothesis one and see if the navigation with AR will be a solution to enhance passenger satisfaction at Geneva Airport, questions were asked to determine if during their last travel experience, they have encountered any difficulties to navigate indoors. Moreover, if they answered to have found navigation difficult or very difficult, they had to select one of the answers or complete with an additional answer, of what would be the reason to make navigation at Geneva Airport difficult. These data are precious, as they can really indicate why navigation with AR can be an added value or not. Then, after asking questions about their last experience at Geneva Airport, respondents were asked about the preferred screen they would like to see on their mobile devices to navigate. On purpose, respondents have to choose either image A or image B, without indicating that image A is the navigation with AR and image B the existent map of GVApp. Thus, to not influence respondents' answers by indicating the nature of each image. From preference, which image would they perceive to be the best to orientate themselves in the airport terminal. After having chosen one answer, they would have to state the reason of their choice. This can help determine why one screen was preferred over the other. All these questions aimed to determine if the sample of the survey, which recently travelled at Geneva Airport, would be interested in navigation with AR.

For visually impaired passengers, no testing was done. However, in the recommendations session, a test is recommended to ensure that this segment of passengers would be interested and willing to use navigation with AR combined with smart glasses. Indeed, smart glasses can be considered as a barrier for people who would not be at their ease to travel in the airport with such a tool on them.

Thus, to develop navigation with AR for visually impaired passengers, what is suggested is a collaboration with a company such as Aira, which is specialised in offering software and hardware solutions to visually impaired passengers. They offer a subscription service to individuals, public sector and companies to help visually impaired people in their every day life. The concept is that Aira offers a smartphone application which is combined to video-equipped smart glasses that have a button on the side to facilitate the access to immediate assistance. Visually impaired people have access to trained professional agents that can assist and guide them during their every day life. Indeed, with the smart glasses combined to the application on the mobile phone, these agents can see in real time the view of the visually impaired person at any time, from anywhere. These agents have a special software, giving them the possibility to connect with the visually impaired person to assist them in their journey. Visually impaired people can subscribe to Aira on their website, to get access to assistance from the trained agent and to receive the Aira kit, which consists of smart glasses and the insurance coverage for the hardware, training session and access to trained agents.

Figure 3 - Aira smart glasses to help blind and visually impaired to become more mobile and independent.



Source: AIRA, How it works, 2018

4.1.2 Value proposition canvas

The value proposition canvas helps to understand customers' needs in order to create a service that can match their wants. This canvas is composed of two parts which are the customer profile and the value map. Below, the value proposition canvas is addressed to two customer segments: customer segment 1, passengers travelling at Geneva Airport and customer segment 2, visually impaired passengers travelling at Geneva Airport. As some part of the VPC are similar for both customer segments, a unique VPC is presented and information that are different for each segment are differentiated as follows: customer 1 in green and customer 2 in blue.

The value proposition offered to **customer segment 1** is a personalised assistance helping to navigation indoors with Augmented Reality at Geneva Airport.

The value proposition offered to **customer segment 2** is more independence with this personalised assistance helping to navigation indoors with Augmented Reality at Geneva Airport.

*** CUSTOMER PROFILE ***

1. CUSTOMER JOBS

*This aims to explain what travellers try to get done during their journey at the airport.
These jobs are the same for both customer segment 1 and 2.*

- **Check-in**

All the situations are dependent on the airline companies. Some companies are offering online check-in for their passengers and some passengers did not apply for online check-in. Thus, passengers that need to check-in at the airport must have to go to the check-in counters of their airline company. Some passengers have already checked-in online, have their boarding pass, can skip this process at the airport.

- **Register luggage/ Drop special bags**

Passengers who have bags to check-in, must drop their bags at the airline company's check-in or baggage drop counter. Some passengers have special bags to check-in (animals, big size package, sports equipment) must go to a special counter which is exclusively taking special bags in T1.

- **Pass the security check**

Passengers must pass the security control with their boarding pass to reach their gate. They must comply with the aviation rules concerning security issues, to be allowed in the Airside (zone after the security check).

- **Pass the customs control**

Some passengers must pass customs control depending on the country they are going to visit or their nationality. Some countries, part of the Schengen zone has the free movement of people agreement. Thus, people can use their identity card or passport and may not have to pass any customs control at their departure.

- **Go to the boarding gate**

Passengers can reach their boarding gate, after having done their check-in, dropped their luggage, if any, and having gone through the security control.

- **Board the plane**

Finally, after doing every step of their travel, they can enjoy their flight on the airplane while reaching their destination.

- **Lack of amenities for visually impaired passengers**

Visually impaired passengers can travel accompanied or non-accompanied. Some passengers can request to have assistance during their journey, but some others would rather preferred to keep their autonomy. Thus, when visually impaired passengers are at the airport, they need to be able to go throughout all the different steps as well as other passengers. Thus, if the airport infrastructure is not arranged to give enough autonomy to visually impaired passengers, it can really be troublesome.

2. PAINS

Pains, to be interpreted as problems and barriers, that could prevent passengers to get their jobs done. Risks can also arise from not getting the job done.

- **Difficulties in finding a specific place or service**

Passengers need to find a specific place or service but have difficulties to.

- **Lack of information/ wrong/ inaccurate information**

During their journey, passengers need some information relative to different aspects of their travel (flight information, check-in counters). Thus, lack of visibility or access to information or receiving wrong or inaccurate information can cause great trouble to passengers and make them unsatisfied of their travelling experience. From the various sources of information available, there can be some misguidance or lack of information interfering through these different means of communication, available to inform and advise passengers.

- **Delays of flights/ cancellation of flights/ missing flights**

Due to different circumstances, it happens that some airline companies must cancel their flights or there are some delays. Passengers must deal with these problems that impact their journey negatively. It happens during the high season, when the airport is very crowded, traffic jam on the road or due to bad weather, passengers are missing their flights.

- **Long queuing time at the check-in counter/ security check/ customs control**

During the high season (winter and summer holidays) and weekends, the airport can be very crowded. Thus, the waiting time at the check-in counter can be very long and tiring for passengers. To wait a long time at the security check can be very frustrating for passengers and get stressed to miss their flights. To wait a long time at the customs control can be very frustrating for passengers.

3. **GAINS**

Positive outcomes that passengers experienced from getting jobs done or because it goes beyond their expectations.

- **Be informed of airport situation**

Passengers are kept updated with the airport situation (flight information, boarding gate).

- **Receive/ find the right information**

Passengers receiving accurate information during their travel can ease their journey at the airport and increase their satisfaction.

- **Indications/ information in Braille**

Visually impaired passengers that would travel with autonomy during their journey need to be able to find indications and information in Braille or any other format that would help them to be informed about the airport situation or any other relevant information they would need to know.

- **Assistance during the journey**

Visually impaired passengers should have the possibility to either ask to a person to assist them during their journey at the airport or have the possibility to use a tool that help to assist and guide which enable them more independency.

- **Find a place easily**

Passengers get to their place easily with good directions and information.

- **Less waiting & queue**

Less waiting and queue, as travellers prepare what they need to and get to know easily where they must go.

VALUE MAP

4. SERVICE

This personalized assistance offers a new user experience during travellers' journey with AR navigation inside Geneva Airport. This new service is offered through the GVApp application which is supported by Android and iOS mobile devices. In addition, users receive customized offers and real-time information about the Airport situation which are superposed on the real-environment.

This personalized assistance offers a new user experience to visually impaired passengers through AR navigation combined with smart glasses to help during their journey inside Geneva Airport. This new service is offered through the GVApp application which is supported by Android and iOS mobile devices. In addition, users receive customized offers and real-time information about the Airport situation which are superposed on the real-environment.

5. PAIN RELIEVERS

- **Accurate information**

Passengers get accurate information from reliable sources.

- **Updated information**

Passengers get updates and real-time information about the Airport situation.

- **Accurate location indications**

Passengers get accurate location indications to ease their indoor navigation.

6. GAINS CREATORS

- **Real-time information**

Passengers receive real time information about the Airport situation.

- **Simplified navigation**

A clear navigation with accurate indications to get from point A to point B.

- **Find way quickly and easily**

Passengers find their way quickly and easily, with propositions of ways to go through, to arrive at their final destination.

- **Itinerary suggestions**

Itineraries are suggested to passengers that want to go from point A to point B.

- **Narration assistance with smart glasses and AR app**

The navigation with AR combined with smart glasses enable visually impaired passengers to travel inside Geneva Airport with more independency. An agent from GVAssistance would provide the smart glasses to the travellers. A partnership with Aira allows visually impaired passengers to get an Aira agent that would provide real-time narrative through an AR dashboard.

4.1.3 Business model canvas

This business model canvas presents the service that would be added to GVApp. Offering the navigation with Augmented Reality technology would relieve from different pains that were previously identified in the value proposition canvas, which can be encountered by passengers during their journey at the airport.

1. CUSTOMER SEGMENT

Navigation with AR aims to enhance indoor navigation in Terminal 1 at Geneva Airport. This additional service which would be added to GVApp, the application of Geneva Airport, which is free to download by Android and iOS users. This service is addressed to two types of customer segments, which are passengers travelling at Geneva Airport and visually impaired passengers, that have a smartphone or tablet running under Android or iOS able to support Augmented Reality technology.

The first customer segment which is: passengers travelling at Geneva Airport, are aged between 18 to 55. They have recent smartphones and embrace technological progress in their everyday life. They are part of the middle and upper income class. They use their phone a lot during the day, they carry their phone charger or have a phone case combined to an additional battery. This customer segment travels once to twice a year and take their flight at Geneva Airport. They use their phone to help them during their journey at the airport. They manage their flights, bookings in hotels, restaurants, activities or transportation for their vacations, all from their smartphone. It is more convenient for them to check on their phones rather than use their laptop. They prefer to do the online check-in, so they can queue at the bag drop counter, which should accelerate their journey at the airport or if they do not have any bags they can directly go to the security control. These passengers prefer having their boarding pass on their phone as they find it more convenient during their travel. They like to make comments on various websites allowing them to do so, such as TripAdvisor, Google review and social medias. Indeed, they will not hesitate to express their disappointing customer experience on social networks and think that this a good way to express when something goes wrong.

The second customer segment is: visually impaired passengers travelling at Geneva Airport, aged between 18 to 60. They are part of the middle to upper income class and use recent smartphones, which have applications and features to help them in their everyday life. These passengers are comfortable with technology progress which can help them have more autonomy. They are often travelling alone and sometimes with their family. When a member of their family is travelling with them, they do not need to ask for assistance. Otherwise they need to ask the airline company to provide assistance during their journey at the airport. This customer segment would like to have more independency throughout their journey in airports. They take the airplane once to twice a year.

2. VALUE PROPOSITION

When passengers are using the GVApp application and running the navigation with Augmented Reality, they experience a fun and interactive way to navigate indoors. Indeed, the application is guiding passengers through the airport with AR technology, giving a totally new user experience with their mobile devices.

Moreover, users have a personalised help to indoor navigation with this additional service on GVApp. Passengers can be guided to specific locations within the terminal via on-screen arrows. Indeed, passengers can see directions in the camera view of their mobile devices (tablet or smartphone). This personal assistant helps to locate check-in counters, departure gates, baggage belts, lounges, priority lanes, security control, shops, restaurants, business corners, children areas, restrooms, other facilities and areas of Geneva Airport's Terminal 1.

This offers suggestions of itineraries to users that need to find a specific place, by using the travellers' position and displaying some arrow with AR technology to show the way to go, through the mobile device.

Then, with Augmented Reality and using the camera of the users' device, the application is overlaying directions and informative signs on a real-time view atop the airport surroundings, offering a realistic experience.

In addition, passengers who use the navigation with AR and that accepted to receive offers through the application, would see through their devices some offering pop-ups displayed atop the real-world. These offers are adapted to the customers' needs and preference.

Finally, to help visually impaired passengers during their journey at the airport, navigation with AR, which consists of the combined use of smart glasses and the Aira application, allowing to access a network of trained professional agents for narration, enabling them to have greater mobility and more independency.

3. CUSTOMER RELATIONSHIP

Offer a self-service option that assists and guides passengers all along their journey within Geneva Airport

- **Passengers travelling from or to Geneva Airport**

The **“GET” strategy** to put in place, in order to attract this customer segment for this new service, is through advertising campaigns. Advertising can help inform and promote this service added in GVApp on social media platforms where Geneva Airport is present such as Facebook, Instagram, Twitter and YouTube. As for example an image and short video explaining how to use this new service which is the navigation with AR. In addition, some information should be displayed on Geneva Airport’s website to promote this additional service from GVApp. Advertising on this website can be on the page where GVApp is presented and on the homepage of the airport’s website for the launch of this service, during summer and winter vacation periods (school holidays period in Geneva).

The **“KEEP” strategy** to put in place is by offering a good and updated AR navigation service adapted to smartphone upgrades, technological advancement and following the infrastructure change at Geneva Airport. Moreover, happy users of this service will share their experience to others. Indeed, recommendations that people receive from their entourage is a powerful tool that the airport should carefully observe and use.

The **“GROW” strategy** would be through positive word-of-mouth of users of this service. In addition, some periodical advertising campaigns reinforcement on social media during the high peak of travellers, during holidays and on the largest screen at the check-in area and after the security control, in the airside. Thus, the objective is to inform, promote, remind and reinforce the use of the navigation with AR through GVApp.

- **Passengers with visual impairment travelling from or to Geneva Airport**

The **“GET” strategy** to help attract this segment of travellers would be to have Geneva Assistance staff offering them to download the GVApp application, helping them to run the navigation with AR feature and lending them smart glasses that they would have to give back to airport staff at boarding time. In addition, a collaboration can be built with the two companies providing Geneva Airport with ground and cargo handling service, which are Swissport and Dnata. Indeed, staff working at the check-in can inform passengers with visual impairment that the navigation with AR combined with smart glasses which can be borrowed from the Geneva Assistance counter, can assist them during their journey at the airport and help them to be more independent without feeling overwhelmed. In addition, this additional service offered through the GVApp application should be presented on the Geneva Airport website on the GVApp page and on the page explaining the services offered to persons with reduced mobility (PRM). Thus, even relatives of visually impaired passengers can inform them about options that can deliver them assistance at Geneva Airport.

The **“GROW” strategy** is to offer narration in additional languages to reduce language barriers and increase comfort for passengers with visual impairment. This feature should be done in collaboration with the company Aira, which is specialized in providing an application to simplify everyday life to visually impaired people, giving them more independency. In addition to this, Geneva Airport could offer passengers who do not have smartphones to borrow one combined in addition to the smart glasses at GVAssistance. Thus, even non-smartphone users would be able to use navigation with AR. Then, positive word-of-mouth from users can help attract more passengers that would be not aware or at first not willing to try the navigation indoors with AR, which consists of combining smart glasses and the Aira app during their journey at Geneva Airport.

The **“KEEP” strategy** is to continuously improve navigation with AR and update the application according to technology progress.

4. DISTRIBUTION CHANNELS

Navigation with AR is an additional service offered in GVApp, which can run on iOS and Android phones. The application is available for download on Apple and Android application stores. Then, to promote this new service being the navigation with AR, information would be displayed on Geneva Airport's website and Geneva Airport's social media (Facebook, Twitter, Instagram, LinkedIn, YouTube). Then, on advertising screens inside Geneva Airport some promotion can be done to inform travellers about this new service in GVApp. An advertising of the application with the different features offered, can be published on the Geneva Tourism website. Thus, people who would like to visit Geneva, would also be informed that Geneva Airport has an application to ease the navigation and find relevant information with AR technology. Positive recommendations of trusted friends, family, colleagues can promote the new service as well as GVApp.

Visually impaired passengers can be provided with all the necessary kit to navigation with AR at GVAssistance. GVAssistance staff lend smart glasses and, if necessary, a smartphone with the applications already pre-installed. If the visually impaired passengers did not already install both GVApp and the Aira application, the staff would kindly assist them to get them ready to navigate with AR.

5. REVENUE STREAMS

To generate some revenue, when key partners want to promote their products. The promotion can be done through the application and displayed atop of the real-environment while travellers run the navigation with AR. Thus, a commission on the % of sales that comes from the application can be taken. In addition, for impaired passengers, an annual fee can be asked to airline companies for the assistance offered to passengers with visual impairment in order to finance smart glasses updates and maintenance of the navigation with AR service. Then an initial amount can be asked from all airline companies to finance the creation of this new service.

6. KEY ACTIVITIES

The main activities of the navigation with AR service are, the development and update of GVApp, to allow this additional service. Then, to suggest attractive and personalised offers to travellers, it is necessary to create and maintain partnerships with different entities located in Geneva Airport (commercial dealerships, airline companies) and Aira, a company which is specialized in helping visually impaired people to find more autonomy. In addition, to build and maintain partnership with Swissport and Dnata; thus, their staff at the check-in can inform passengers with impairment about this new service that can assist them during their journey. Moreover, concerning all the different flight information, it is important to closely work with airline companies to get the most updated information. In addition to that, there is the purchase, deployment and maintenance of beacons. Also, not forgetting about the smart glasses, which are at the disposal of low vision and blind passengers at Geneva Assistance. Finally, create some content to promote this new service is needed.

7. KEY RESOURCES

AR technology is a key resource where elements within, are augmented by being computer generated or by extracting real-world sensory such as sound, video, graphics or GPS data. For this technology, battery powered beacons are needed. These beacons can help display an accurate indoor navigation system, while enabling the use of an Augmented Reality app; this navigation system will be a based positioning system. These beacons, when installed, can communicate with mobile devices to pinpoint locations, it is however, necessary to have access to Wi-Fi to use this service. Another key resource is the various types of information put at the disposal of travellers, while running the navigation with the AR service are: real-time information, signs for directions, retail and airline offers, customs duties information, flight information, security information and other important information displayed to help passengers during their travelling journey. Moreover, data collected from the use of this service can be a source for further development of this service or other services to help enhance customer experience at Geneva Airport.

Visually impaired passengers use navigation with AR under the form of GVApp combined with smart glasses. Thus, smart glasses are essential for them. Also, the partnership with Aira helps to get trained professionals to assist through narration for visually impaired passengers. Finally, not forgetting the employees to create, maintain and update the navigation with AR; they are also important resources to deploy beacons in the terminal, to promote this service and help visually impaired passengers get ready to start their navigation with AR.

8. KEY PARTNERS

Geneva Airport Management would have an eye on the approval and development of the navigation with Augmented Reality in GVApp. The IT and Innovation department of Geneva airport would oversee the strategy, the development, the creation and the deployment of the navigation with AR. This department is supervising the whole project from the beginning until the end. Geneva Airport security should also be involved in the project to ensure that the beacons' deployment and the navigation with AR, do not cause any security issues. Indeed, security is very important, and some stringent regulations should be followed by airports. Then, the Marketing and Communication departments of Geneva Airport would oversee the promotion and customer relationship, to capture value from them in return. But also, surveys and analysis of the customers' satisfaction on navigation with AR. Moreover, Airline companies are very important, as passengers are using airline companies to travel. Thus, it is necessary to partner with these companies to help travellers during their journey. This partnership can positively impact passengers' experience within the airport. If passengers have a positive experience at the airport, they will come back again and spread a positive image around them. Airline companies can pay annual fee for the navigation with AR that aids visually impaired passengers. In addition, Geneva Airport has to build and maintain a partnership with Aira, a company which is specialised in providing service (subscriptions) and products (smart glasses, application) to give more independency to visually impaired people. Some partnerships should also be developed with commercial concessions, to display personalised and attractive offers to travellers. From the commercial concessions side, it helps them to promote their business to passengers. Additionally, the two ground and cargo handling companies, Swissport and Dnata are important partnerships that can help promote and inform about this service to low vision or blind passengers.

9. COST STRUCTURE

The different cost structure related to the navigation with AR additional service are the staff for the creation, maintenance and deployment of this new service, the purchase of battery powered beacons and smart glasses. The cost of release of an updated version of GVApp incorporating navigation with Augmented Reality and the fees to pay to Aira to use their service and technology. Finally, advertising campaigns cost to present the navigation with Augmented Reality, newly added in GVApp.

4.1.4 Compare to what already exists

The navigation with Augmented Reality incorporated in GVApp can guide and assist passengers through Geneva Airport. Now, this section is comparing what is already offered to passengers at Geneva Airport to help them navigate indoors. Briefly starting with small introductions on each existent service at the disposal of passengers who need assistance at Geneva Airport.

- **GVApp application**

The first way to help travellers inside Geneva Airport is the GVApp application. This free application is available on iOS (also on Apple Watch), Android devices and translated in French, German and English. In this application passengers can find flight information, parking information (costs calculations, real-time number of free spots in the different car parks, track where the vehicle is parked), an interactive map showing your location in real-time, transportation information from or to the airport, commercial dealerships directory, weather information and Free Wi-Fi access from the smartphone (GVAPP, GENEVE AEROPORT, 2018).

- **Staff in a red shirt written “Information”**

Inside Geneva Airport in Terminal 1 and 2 (during Charter season), staff in a red shirt, written “Information” on their back, are employed to guide and assist passengers. In addition, they manage the queue depending on the number of passengers waiting in the area.

- **Information stand (at arrival and main hall, after security check)**

A permanent information stand, part of the Visitors Centre area, is located in front of the arrival area at Geneva Airport. This stand's opening hour is from 7 am to 11 pm. and gives practical information about Geneva Airport and flight information to people. In addition, there is also an information stand in the main hall after the security check point, where passengers can interact with airport staff dedicated to assist and inform travellers.

- **Airport staff**

Airport staff working, for example in the check-in, interacts a lot with passengers. Thus, when travellers need some information concerning their flight or practical information about Geneva Airport, they asked for help. If passengers are in the departure area or other areas, they would ask airport staff that they meet on their way for information.

The comparison table on the next page helps compare each service offered to passengers in Geneva Airport. It helps understand if the implementation of navigation with AR, can be an added value to assist passengers during their journey. This comparison is based on the perspective of a passenger who needs assistance at Geneva Airport, what mean is at his/ her disposal. Thus, this table is comparing four existing means that help assist passengers at Geneva Airport and the solution offered in hypothesis one, which is navigation with Augmented Reality incorporated in GVApp.

Table 12 - Comparison table of existing means to navigate and AR Navigation

| | <i>GVApp</i> | <i>Staff in a red shirt</i> | <i>Information stand</i> | <i>Airport staff</i> | <i>AR Navigation</i> |
|----------------------|--|---|---|---|---|
| Advantages | <ul style="list-style-type: none"> - Free application - Mobile, can be carried everywhere - Whole journey assistance - Real-time information | <ul style="list-style-type: none"> - Free service - Human interaction - Help PMR | <ul style="list-style-type: none"> - Free service - Human interaction - Help PMR | <ul style="list-style-type: none"> - Free service - Human interaction - Help PMR - Almost everywhere in GVA Airport | <ul style="list-style-type: none"> - Free service - Mobile, can be carried everywhere - Whole journey assistance - Real-time information - Accurate navigation - Help PMR |
| Disadvantages | <ul style="list-style-type: none"> - Need internet access - Bugs encountered by Android users with the map - Not intuitive use of the map - App in 3 languages - Not accessible for PMR | <ul style="list-style-type: none"> - Wrong/ inaccurate information - Can be not able/ available to answer queries - Limited area covered - Language barrier | <ul style="list-style-type: none"> - Can be not able/ available to answer queries - Located in one area - Few people to answer queries - Language barrier | <ul style="list-style-type: none"> - Can be not able/ available to answer queries - Wrong/ inaccurate information - Language barrier | <ul style="list-style-type: none"> - Need internet access - Battery consumption - Language barrier |

To sum-up the comparison with the existing means to help to navigate in Geneva Airport and the AR navigation, the following can be said: Augmented Reality navigation seems to be similar in some aspect of what is already offered in GVApp. However, what makes the difference is the additional assistance that provide AR navigation, combined with smart glasses, will allow more independency to visually impaired passengers which is a public that is not reached by GVApp. This was thought according to the regulation (CE) n°1107/2006 on Rights of passengers with disabilities or reduced mobility travelling with air transportation, which is a text aiming to protect PMR passengers and guaranteeing them an assistance, free of charge, all along their journey (OFFICE FEDERAL DE L'AVIATION CIVILE, 2018). With the deployment of beacons in the terminal, it allows passengers to navigate indoors easily, showing in real-time their positioning. The itinerary is displayed atop the real environment, as arrows, to indicate the way to users on their mobile devices. A disadvantage of AR navigation is the battery consumption. However, inside the airport, many business corners with power outlets are deployed after the security check point, which can reassure users that are afraid to not have enough battery for the rest of their journey. The map of GVApp has some issues concerning the positioning accuracy of users and itinerary clarity. Hence, all other features to assist travellers' journey such as flight information and other information are very accessible to travellers from anywhere and at any time.

Concerning the staff in a red shirt with "information" written on their back, they are able to assist PMR passengers. However, it happens from time to time that they are unable to answer passenger queries on places inside Geneva Airport, and that they give wrong or inaccurate information. This information was collected during 5 months, when I worked at Geneva Airport, during the two observation phases and related from people of my entourage. All were dissatisfied about the experience of this free service offered to passengers. In addition, the deployment of the staff in a red shirt is limited to certain areas and the number of employees is relatively small compared to the number of passengers travelling each day at Geneva Airport and that would need assistance. Thus, this solution cannot be efficient alone, meaning that this mean would not be able to be the unique mean of assistance inside Geneva Airport.

The two information stands of Geneva Airport, one located in the arrival area and the other one after the security check-point in the main hall. This service is able to assist and guide PMR passengers. However, these stands are permanent and only at one place. Few people are working in this information point, thus for the number of passengers this mean of assistance is not efficient as the unique mean of guidance to travellers.

Airport staffs are everywhere in the airport terminal. Thus, when passengers need information to navigate indoors; a valuable human interaction that can help PMR passengers during their journey at the airport. However, some of the airport staff can be unable to answer queries from travellers or can give wrong or inaccurate information. Moreover, they can also be overloaded with their own tasks and unavailable to answer to passengers.

4.1.5 Test of hypothesis 1

After having formulated the first hypothesis, designed the value proposition canvas and the business model canvas to see if the additional service that I would like to propose would suit the two customer segments identified, a comparison between the existent means to help assist travellers at Geneva, to see if there is any added value by suggesting navigation with AR. After, a survey was created and addressed to people that have recently travelled at Geneva Airport. This data collection helps to test the two hypotheses. However, in this section, the focus is on a few questions that help test hypothesis 1 assuming that passengers encounter some difficulties to navigation inside Geneva Airport, thus navigation with AR would solve this problem and enhance customer satisfaction.

The data collection of the survey was previously presented, thus here, only a summary will be done relating to hypothesis 1. The question asked to passengers concerning the easiness they navigate inside Geneva Airport concludes that respondents have no navigational problem. Indeed, only **6.19% (14 people)** said to find navigation difficult. In the following question, which helps identify the reasons, the top 3 answers were not enough signs, confusing or unclear terminal signs and not enough staff available to inform and guide. Only few respondents (**28.78%**) use GVAPP which is a mean to help travellers during their journey.

Then, from the data collection, only **1.71%** of respondents answered to use the map on their phone to navigate indoors during their travel.

The previous questions show that in general people are satisfied of their navigation indoors. Very few people use the different means to help navigation inside Geneva Airport (GVApp and GVApp map). One question that pushes to further investigation is the reasons to find navigation difficult, which helps determine, what change can be undertaken in order to enhance passenger journey in the airport.

Table 13 - How easy is to navigate inside Geneva Airport?

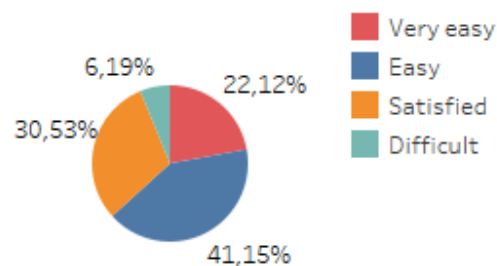


Table 14 - If you answer was difficult or very difficult, please tell why.

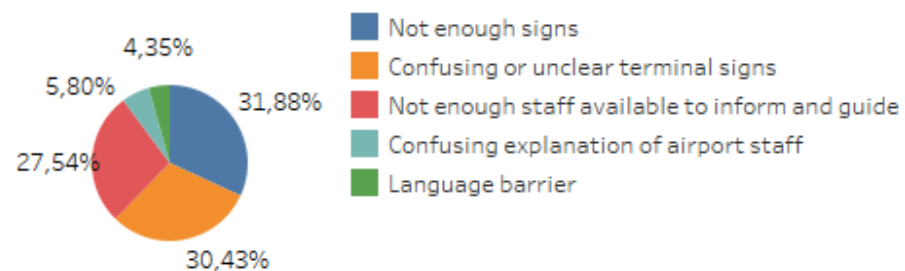
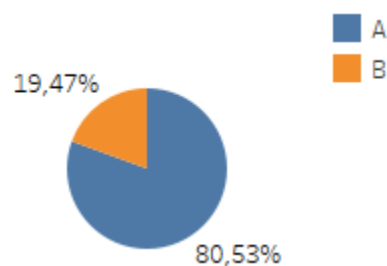


Table 15 - Between these two images, which one would you prefer to see on your screen to help your navigation inside Geneva Airport?



Then, in the survey, the question asked respondents which screen they would prefer to help their navigation inside Geneva Airport, a majority of respondents answered to prefer screen A **(80.53%)** which is navigation with AR over screen B **(19.47%)**, which is the existent map of GVApp. The top three reasons for respondents to prefer one screen over another are clarity **(26.48%)**, simplification **(19.14%)** and the real environment aspect **(18.50%)**.

Figure 4 - Screen A, navigation with AR



Source: GBKSOFT.com

Figure 5 - Screen B, map of GVApp



Source: GVAPP

A test was also done the 28th of July 2018 at Geneva Airport with one Android user and one iOS user that try to find GVAssistance with the map in GVApp. This test aimed to see how easy people use the map to navigate to find a specific place inside the airport. The detail and results of this test is available in the appendices 6 and 7. To summarise in a few lines, both users do not find the interface user friendly. The Android user was the one to encounter the most difficulties as the map was not displaying his location. Thus, he had to search manually to add the location where he was standing in, in order to have the itinerary to GVAssistance. Then, for the iOS user the explanation for the itinerary was not clear enough and the point representing where the user was standing was not following accurately. Thus, for both users this map was disappointing and unsatisfying.

4.1.6 Key learnings and modifications

To summarise the research done for hypothesis one, the business model canvas and value proposition canvas are the latest version. Indeed, after having done the comparison between the existent means to assist and guide passengers inside Geneva Airport, some modifications were implemented in the BMC and VPC. The first draft of the BMC and VPC were to offer this service to only one segment of passengers. Then, after having done the comparison analysis, the second segment, visually impaired passengers, was added. This idea came from the literature analysis done on how AR is implemented in today's airports, and also due to the fact that there are no existent means offered by Geneva Airport to encourage independency of PMR passengers, without having to ask for assistance with a person from GVAssistance. Both versions of the BMC and VPC are available in the appendices 4 and 5, for more details if needed.

Then, the data collection through the survey also helps to understand passengers' opinion concerning their experience at Geneva Airport. However, the sample was only of 226 respondents and in majority local people aged between 21 to 30 years old. Thus, further research should be done by having more international travellers (living outside Switzerland) and a bigger sample of people from other ages, to gather more data and more insights from what travellers would want to see improved at Geneva Airport.

4.1.7 Recommendations to Geneva Airport

Hence, with this sample, few people were finding navigation difficult. What can be said is that navigation with AR can be an added feature to GVApp and should be considered for the future development of the airport as a guiding tool for passengers. Indeed, from this research, a majority of respondents seem to be more interested to use navigation with AR to find their way inside Geneva Airport. What needs to be considered is that in the coming years, more passengers would travel to Geneva Airport and with the infrastructure extension of Geneva Airport (future opening of the international building in the year 2020), the need would be to have an effective tool to assist and guide passengers. The existent means to help passengers are not effective enough and some could be cut-off with the implementation of AR navigation, which would reduce some expenditures for Geneva Airport and lower the risk of having a bad image due to human mistakes. Then, another reason is that the existent mobile application GVApp is not optimized enough for Android users and should be considered by Geneva Airport as something to improve in the future. From the data collection, there were as much Android users (48.23%) as iOS users (47.79%), thus if a tool/ service to assist passengers should

be created, it should be optimized for both Android and iOS devices and not only for one operating system which is the case for the existent GVApp map. Thus, navigation with AR would be a valuable travelling companion for travellers during their journey at Geneva Airport.

In this study, navigation with AR was also thought for visually impaired passengers to help them get more independency without waiting for human assistance to guide them during their journey at the airport. This solution should be tested, in order to determine the interest of visually impaired passengers travelling at Geneva Airport. By offering navigation with AR through GVApp and the Aira app, combined with smart glasses, passengers can access to narration which assists them during their journey. This can lower the burden to GVAssistance staff and offer another option to visually impaired passengers who would like to be more independent and still feel reassured during their journey. The investment for the implementation can be consequent and a partnership with the company Aira, can help to develop and maintain a good service quality.

4.1.8 Summary of findings

To conclude the study that was done on the possible implementation of Navigation with AR, as the result of the online survey, navigation is not a critical point that can be considered here as having a significant negative impact on passengers' experience at Geneva Airport. Hence, this additional service should be considered in the future as a mean to assist and guide passengers inside Geneva Airport, as the number of passengers is forecasted to be of 25 million for the year 2030. This mobile service, by implementing beacons over the terminal to indicate the different locations accurately indoors, can assist passengers throughout their whole journey at the airport. In addition, this can be an additional service to assist visually impaired passengers travelling at Geneva Airport, which can help them get independency during their journey at the airport. In the future, this additional service that can be implemented in GVApp, can help navigation at a bigger scale without having to require to more personnel, giving more independency to travellers and reassuring them during their journey accompanied by a discrete companion, which is their navigation with AR, a service offered by Geneva Airport and available in GVApp for both Android and iOS users.

4.2 Treasure Hunting game with AR

4.2.1 Brief introduction

Passengers travelling with their family, lack entertainment at Geneva Airport. Thus, there is a need to increase passengers' satisfaction by entertaining the whole family during the waiting time at the airport, by offering a Treasure Hunting game application with AR.

After the second observation phase done on the 9th of June 2018 at Geneva Airport, what was seen is: after the security control, people tend to go in the main hall, observe the screens showing the departure flights with the boarding gate numbers and then, they go to the gate. It happens that between the moment they have seen the gate number on the screen and before reaching their boarding gate, they have the need to purchase something to eat, drink or any other items. Otherwise, they would go to the boarding gate and sit there waiting for the call to board on the plane. Hence, the game would push both children and parents travelling at Geneva Airport to explore the terminal through an immersive game that is going to be extensively explained in the following lines, through the game presentation, the value proposition canvas and the business model canvas. A comparison of this new AR game, and other existent services/ products offered by Geneva Airport to entertain passengers from all ages. This comparison is to determine if the game would be an added value for attracting a segment of passengers that was not reached before, but that would interest Geneva Airport. To verify the possible interest of passengers travelling at Geneva Airport for such a Treasure Hunting game, an online survey was addressed to recent travellers of the airport, asking various questions which includes questions around their interests and expectations for a Treasure Hunting game application to be played at the airport.

Figure 6 - Main hall after the security control, 9th of June 2018



4.2.2 The game presentation

The Treasure Hunting game with AR which is addressed to passengers travelling as a family with their children at Geneva Airport, is developed in more detail in the following lines:

- **GAME CONCEPT**

The aim of the game is for players to collect the ten gold coins with aviation artefacts designed on them, to be able to find and open the treasure chest from the episode “The theft of the Queen’s gold - A Geneva Airport story”.

The game objectives are to entertain children above 12 and their parents travelling during their waiting time at Geneva Airport and explore Geneva Airport’s terminal after the security check-point through “The theft of the Queen’s gold – A Geneva Airport story”.

The story: In 1980, Queen Lisabeth 2 from Leonland landed in Geneva Airport with her own private jet. Her Majesty stayed one week to participate in UN conference and visit different institutions, to build partnerships to finance the production of alternative renewable energy for her country. One week passed, she went back to Geneva Airport. The airport staff welcomed Her Majesty and helped her with luggage. However, 3 thieves were disguised as airport employees and stole her treasure chest. They were arrested by policemen, but the treasure chest was never found. Still today, people say that the treasure chest is hidden somewhere in the airport terminal.

Main characters: Players can choose between two different characters in this episode of “The theft of the Queen’s gold – A Geneva Airport story”.

Poppy, a girl aged 14, travelling with her parents and her brother Yohan. She is curious but very clumsy. She likes to take her brother’s phone as she is quickly left with no battery on her phone. When she took Yohan’s phone, she saw the article about the Queen robbery and said to want to find the treasure chest.

Yohan, a boy aged 16, travelling with his sister Poppy and his parents. He likes to play video games and was the one to find an article about the robbery of Queen Lisabeth 2. He wants to find the treasure chest.

- **GAME EXPERIENCE**

Mechanics: The treasure hunting game is a single player game, which allows players to enter at any time.

Feedback: Players must collect gold coins with aviation artefacts designed on them. Each time they succeed, they would receive the gold coin and different characters will appear during the quest to ask riddles and interact with the user. On the top right of the screen, players are kept informed on the time left before boarding.

After, having collected 3 gold coins, players receive a present, 30 mins of free additional access to Geneva Airport Wi-Fi. After having collected 5 coins, a free story telling episode about Geneva Airport history from year 1920 to 2020. After having collected 7 gold coins, players receive coupons to spend in the different Geneva retail shops after the security control (ex. 7% discount on Lindt & Sprungli chocolates, one free bottle of water at Montreux Jazz cafe, 7% discount on Duty free products, except alcohol and cigarettes). After having collected 10 gold coins, players can customize their own postal card that can be sent on their email or they can print it at the postal card booth near the Dnata Sky Lounge.

Rules: Players have to collect the 10 gold coins if they want to find the treasure chest of Queen Lisabeth 2, robbed by the thieves. The game starts with a first riddle to guess the first location. 10 markers are displayed in the different areas where they can collect the gold coins. Players have to use their mobile device and point it on the marker to collect the virtual coin and get the next riddle for the next location.

- **GAME LOCATIONS**

Game space and places: The game is taking place after the security check-point, in this area called airside, players have to collect the 10 gold coins that are hidden. On the player's smartphone, a map is showing their position and is detailed with the different areas names (shops, restrooms, food court, business corners, boarding gates and other facilities that welcome passengers). 10 markers are displayed in this area which have to be triggered by players' phones in order to collect the coin and get the riddle for the next location. Here are some ideas of areas where to hide the 10 items; the children's playground, Aelia duty free, Food court, GVAssistance area, business corner, the Statue "la Joie", Swissport Horizon lounge, kiosks, money exchange counter.

Atmosphere: The ambiance of the game is adventurous, explorative and fun. Players would have to guess where to find the different coins and they can help themselves with the map, which shows the location with the different areas and facilities at Geneva Airport.

4.2.3 Value proposition canvas

The value proposition canvas helps understand customers' needs to create a product that can match their wants. This canvas is composed of two parts which are the customer profile and the value map. Below, the value proposition canvas is addressed to two customer segments: **customer segment 1**, children travelling with their parents at Geneva Airport and **customer segment 2**, parents travelling with their children at Geneva Airport. As some part of the VPC are similar for both customer segments, a unique VPC is presented and information that are different for each segment are differentiated as follows: **customer 1** in green and **customer 2** in blue.

The value proposition offered to **customer segment 1** is an immersive game to explore the terminal in a funny way through an AR Treasure Hunting game.

The value proposition offered to **customer segment 2** is an immersive entertainment for the family, during the waiting time through the terminal exploration with an AR Treasure Hunting game.

* CUSTOMER PROFILE *

1. CUSTOMER JOBS

This aims to explain what travellers try to get done during their journey at the airport. These jobs are the same for both customer segment 1 and 2. As customer jobs are the same as identified in the VPC for the navigation with AR, only key words will show the steps that both segments have to go through. In addition, what would be developed under this section are the needs to satisfy and the problems to solve.

- **Check-in**
- **Register luggage/ Drop special bags**
- **Pass the security check**
- **Pass the customs control**

- **Go to the boarding gate**
- **Board the plane**
- **Entertainment for children**

During the journey at the airport, parents are busy dealing with all the different steps to go through. When they travel, they need to take care of their children and keep them entertained, so they would be waiting silently without bothering them.

- **Find enough seat places in the airplane next to each other**

One of the main concern of family travellers are to have seats next to each other in the aircraft. In addition, this type of behaviour is the same when travellers go to sit at the boarding gate, families prefer to sit next to each other.

2. PAINS

Pains, to be interpreted as problems and barriers, that could prevent passengers to get their jobs done. Risks can also arise from not getting the job done. Some of the pains were already described in the previous value proposition canvas on Navigation with AR. Thus, here, they are only presented in bullet points.

- **Difficulties in finding a specific place or service**
- **Lack of information/ wrong/ inaccurate information**
- **Delays of flights/ cancellation of flights/ missing flights**
- **Long queuing time at the check-in counter/ security check/ customs control**
- **Lack of facilities for children**

Parents travelling in family search for some means to entertain their children and keep them occupied during the waiting time. Besides keeping their children occupied, parents need to be able to change diapers and/or clothes and the mother might need to breastfeed her baby in an area that allows her a bit of privacy.

- **Many carry-on luggage**

Family travellers tend to have many bags with them, not only the registered luggage but also backpacks or other type of bags that they keep with them. The reason is that they have medicines, tablets, toys for their children, change of clothes, diapers and baby/children food that they need to keep with them on the airplane.

- **Need charging station for their devices**

Many parents use their mobile devices (smartphones and tablets) to keep their children occupied. Thus, one concern for parents is to take their device back with no battery left. Parents can also use their devices a lot during their journey, as many application help travellers nowadays during their journey. Thus, they need to find a charging station.

- **Lack of entertainment**

Children find the waiting time at the airport very boring. Thus, they need something to distract them and that can keep them entertained at the airport and on-board.

3. CUSTOMER GAINS

Positive outcomes that passengers experienced from getting jobs done or because it goes beyond their expectations.

- **Be informed of airport situation**
- **Receive/ find the right information**
- **Find a place easily**
- **Less waiting & queue**
- **Family friendly environment**

Areas are arranged to welcome families with children, such as play areas, restrooms addressed to parents to change or breastfeed children and seats for small children in food and beverages areas.

- **Interactive and fun experience at the airport**

Children can play in various ways inside the airport which keeps them entertained and have a fun and memorable experience of their journey.

VALUE MAP

1. PRODUCT

A Treasure Hunting game with Augmented Reality to get into an immersive exploration of Geneva Airport terminal after the security control.

2. PAIN RELIEVERS

- **Entertainment for children to keep them occupied**

This game can keep children occupied while waiting to board on the airplane. Children are entertained and explore the terminal through a treasure hunt game with Augmented Reality.

3. GAINS CREATORS

- **Indication of time left before boarding**

While playing the Treasure Hunting game, players can see the time left before the call to board on the plane.

- **Spend the waiting time to play in family**

During the waiting time, parents and children can play together and explore the terminal through an immersive Treasure Hunting game with Augmented Reality.

- **Entertain adults and children**

The game entertains both adults and children. This game targets a larger audience with questions and rewards adapted to the player.

- **Exploration of the terminal through an immersive game**

Children discover the airport terminal after the security check-point, through the immersive Treasure Hunting game. Children must identify different spots where they can collect a virtual gold coin. Each time they would like to collect an item, they have to identify the different areas where they can collect the 10 gold coins.

4.2.4 Business model canvas

This business model canvas presents the product that I would like to propose to Geneva Airport which is, a Treasure Hunting game application with Augmented Reality. I believe that offering the Treasure Hunting game application with AR, would relieve from the lack of entertainment that passengers travelling with their family encounters at Geneva Airport.

1. CUSTOMER SEGMENT

This product is aimed to entertain passengers travelling with their family in Terminal 1 of Geneva Airport. The first customer segment, which would be the primary player of the game application, are children travelling with their family at Geneva Airport, aged between 12 to 17. These children/ teenagers are students and like to be on their smartphones to chat on social medias, take pictures with friends or of their everyday life, watch videos on YouTube, listen to music and play games. They like to play games, be challenged and get rewarded, they are proud to show on social media platforms what they have done, to share with their friends. For holidays, this segment travels once to twice a year with their parents, brothers and sisters, if they have any. When come holidays, this customer segment wants to have fun, make new experiences, make friends and enjoy relaxing holidays. They live in Geneva and take the airplane at Geneva Airport for leisure purposes during school holidays (Easter holidays, Christmas holidays, Summer holidays).

The second customer segment would be parents of children travelling with their family at Geneva Airport, as a secondary player of the game application. Parents are very busy dealing with all the processes they have to go through during the journey at the airport. They need to take care of their children; thus, this can be a very stressful start of holidays for many families. The airport environment is crowded, they have a lot of luggage, they must figure out if they did not forget anything to bring on vacation. They live in Geneva and travel once to twice a year. They are seeking to feel relaxed and they are, most of the time, very patient. They like to seek discounts and coupons to spend on food and beverages. They are less connected than their own children but use their smartphone to get flight information and manage their holiday bookings. As they are on a budget they tend to not spend money in commercial concessions, except in the food court for beverages and snacks.

They, in general, find prices at Geneva Airport too high and that commercial concessions are more addressed to travellers with high income. Once they have passed the security control, they prefer to go at the boarding gate directly to wait, as they have carry-ons and want to board the plane first with their children.

2. VALUE PROPOSITION

Treasure Hunting game with Augmented Reality is a geo-catching and location-based game addressed to passengers travelling at Geneva Airport. The game is offering an entertainment for both adults and children aged above 12. The application is free to download and available on Android and iOS mobile devices that support AR technology. The aim of the game is to collect 10 gold coins that are hidden in different locations after the security control at Geneva Airport. Markers are displayed in the different locations and players have to scan the markers with their mobile device. A riddle would appear in order to find the next location where to collect a gold coin. Thus, players explore the airport terminal and get entertained during the waiting time. They have to collect the 10 gold coins in order to discover the hidden Treasure from the story of **“The theft of the Queen’s gold – A Geneva Airport story”**. This game would be created and launched in the occasion of the 100 years anniversary of Geneva Airport and addressed to entertain families during their journey at the airport. Children get to explore the airport terminal through this immersive Treasure Hunting game at Geneva Airport. For both parents and children, this game allows to spend the waiting time in family. Depending on the number of coins that players have been able to collect, they would receive a gift under the form of coupons, a postal card or free complementary minutes to the Wi-Fi access at Geneva Airport.

Players are able to play without worrying to miss their flight, as the time left to boarding the plane would be indicated on the game screen. Indeed, when players are creating their profile, a question would ask passengers to give their flight number. The system would then count the time before the boarding, which helps players identify the playing time they can allocate. This game offers a map which displays the different name of shops, restaurants, restrooms and boarding gates after the security control, to help users identify the different areas where they would find a marker which can be triggered to collect a treasure hunt item.

3. CUSTOMER RELATIONSHIP

Offer a self-service type of relationship with customers through the FAQ of the game and the Fan page of the game on Facebook.

- **Children travelling with their parents at Geneva Airport**

The **“GET” strategy** to put in place to attract players of the game, is to offer the Treasure Hunting game as a free application. Children would then be more willing to download and test the game if the application is free. Then, advertising of the game can be displayed in different areas of Geneva Airport such as the Check-in area, Departure area, near the food court and restrooms under the form of markers which players can trigger to download the game. During summer holidays and Christmas holidays for Geneva schools, characters of the game would be interacting with children and helping them find the different markers inside the terminal. During this time, characters would offer free candies and goodies about the Treasure Hunting game.

The **“KEEP” strategy** to put in place is to offer new episodes in the Treasure Hunting game, which offers new episodes in other themes and new rewards. Moreover, a partnership can be created with the CFF as the building is connected to Geneva Airport, in order to extend the game on a bigger area and add more fun for passengers taking the train and airplanes.

The **“GROW” strategy** is through the word-of-mouth spread by happy players of the Treasure Hunting game. Indeed, when people are satisfied, they tend to share with their relatives about their great discovery. In the game a ranking of players would be displayed to see who gets the highest score. In addition, offering different episodes of the game that are only available during a short time can attract new players that would be curious to test the game. In addition, on the Facebook page, the player community can discuss with each other to suggest ideas to improve the existing game or about new episodes to be played at Geneva Airport. On this Facebook page an annual contest online can be done and asks participants to create their own Treasure Hunting episode. The 20 best Treasure Hunting episodes will be proposed on the Facebook page and a vote would be run during 2 weeks on Facebook. The 3 episodes which have collected the most of the audience's votes would get different rewards such as coupons for free lounge access at Geneva Airport and free priority lane access (for the third place), a voucher of CHF 100 to be spent in different shops at Geneva Airport (for the second place) and a voucher of CHF 200 to be send on your next flight with Swiss (for the first place). Then, to get more

players and also to keep the existent player base, the game has to be absolutely extent to new areas where players would be able to play different episodes of the Treasure Hunting game, such as Cointrin CFF train station, Cornavin CFF train station, Palexpo and when travelling with the bus 10 (with markers at each bus stop).

- **Parents travelling with their children at Geneva Airport**

The **“GET” strategy** to put in place to attract players of the game is to offer the Treasure Hunting game as a free application. If the application’s free, parents would easily let their children play the game. In addition, advertising inside the airport and on social media can give the idea to parents to download the application and play with their children during their waiting time at Geneva Airport.

The **“KEEP” strategy** to put in place is to offer new immersive episodes of the Treasure Hunting game in an extended area. Thus, parents and children can explore different locations inside Geneva Airport and other areas of Geneva city.

The **“GROW” strategy** to put in place is through positive word-of-mouth of child players and parents. Satisfied people tend to share around them. In addition, offering different episodes of the game that are only available during a short time can attract new players that would be curious to test the game. As for example, during school holidays, special episodes are launched and available during a limited time. The game should offer episodes that would help children grow intellectually, through interesting themes to be explored which would make them learn new things in a fun way.

4. DISTRIBUTION CHANNELS

The Treasure Hunting game with Augmented Reality, is an application offered by Geneva Airport, which can run on iOS and Android phones. The application is available for download on Apple and Android application stores. To promote this new Treasure Hunting game application with AR, information would be displayed on Geneva Airport's website and Geneva Airport's social media (Facebook, Twitter, Instagram and YouTube). Then, on advertising screens inside Geneva Airport, some promotion can be done to inform travellers about this new entertaining application. Another way to advertise on site, is to put QR stickers inside the terminal. The QR code allows users to download the game directly and it is a mean to get attention of potential players of the game. The day of the launch of the application, which would be best during summer holidays or winter holidays (which are student holidays in Geneva), the airport can recruit staff that would represent the two main characters of the game, to go see the public and give adults and children candies and chocolate, with the name of the game on top and a QR code to download it. In addition, an advertisement of this game, can be published on the Geneva Tourism website. Thus, people who would like to visit Geneva, would also be informed that Geneva Airport has a game application, addressed to small and adult travellers, to entertain them during their journey at the airport through an immersive Treasure Hunting game, which allows users to get rewards. Finally, positive recommendations of trusted relatives can promote the game application.

5. REVENUE STREAMS

The Treasure Hunting game with AR can be a good advertiser for the key partners of Geneva Airport, which are commercial concessions, car rental and airline companies. Travellers playing the game can get various rewards depending on the number of gold coins collected and how many episodes they have completed. Indeed, in the future, the game would offer different episodes, always under a treasure hunt with AR format but on other themes. This fee can be under the form of a percentage from the sales of products or services. In addition, Geneva Airport gets a percentage on the sales of commercial concessions. Meaning that the more they sell, the more the airport gets non-aeronautical revenue. In addition, this game will build an emotional link with children, which are future adult travellers of Geneva Airport. This game can offer a special and memorable experience for these children/teenagers. Memory from childhood which are emotionally linked are very strong bindings to build a loyal customer base. Moreover, even if children or teenagers do not have a big budget to spend in shops, as they might

not have a salary, they can be the one to influence their parents to purchase goods or services. Then, Geneva Airport can ask for a fee for the markers that are displayed on certain commercial concessions. These markers are QR codes with the name of the game, which have to be scanned by players to get the virtual item, which will be rewarded only if they have answered the question well. Players would be attracted to move around the terminal and be lead in front of various commercial concessions, which can attract more potential customers inside the shop and lead to increasing purchases. From one of the observation phases made after the security check point at Geneva Airport, people tend to massively go in the main hall to look at the flight information screens. After that, they would go to the boarding gate and sit there. They would not move unless they really have a need (go to the restroom, eat or drink).

6. KEY ACTIVITIES

The Treasure Hunting game with Augmented Reality needs to be created, this can be done by a start-up specialised in the development of AR games. The IT and Innovation department would lead the project and collaborate with the start-up to oversee the whole development until the finished product and for further updates of the game. The Marketing and Communication departments of Geneva Airport would be in charge of creating the advertising strategy and promote the game to the public but also test their satisfaction about this new game. The maintenance of the application can be done by the start-up and the maintenance of the beacons should be taken care of by the IT and innovation department.

7. KEY RESOURCES

One of the key resources for this service is AR technology, where elements within, are augmented by being computer generated or by extracting real-world sensory such as sound, video, graphics or GPS data. To create the game, Geneva Airport needs to recruit developers. They can mandate a start-up specialised in the development of Augmented Reality games, to create the Treasure Hunting game application. This start-up would have a team composed of developers and graphic designers. Then, in some areas, markers would be set, and children can trigger them with a mobile device in order to get the question to answer and collect the item from the Treasure Hunting game. A map is integrated in the game in order to help players identify the different places in Terminal 1, after the security control. Thus, beacons would be needed in order to give accurate

positioning to players. One key element in the game is to have friendly characters that will guide players throughout the game.

8. KEY PARTNERS

The Treasure Hunting game at Geneva Airport would be created and updated by a start-up specialised in the development of Augmented Reality games. Geneva Airport Innovation and Technology department would be collaborating with the start-up to follow the project, to elaborate the strategy, from the creation to the final product of the Treasure Hunting game application and, oversees future updates of the application. Then, the Marketing and Communication departments of Geneva Airport would oversee the promotion and customer relationship, to capture value from them in return and test their satisfaction. In addition, a partnership can be developed with Geneva Tourism to advertise this Treasure Hunting game addressed to travellers of Geneva Airport on their own website. Partnerships are essential in order to offer interesting rewards to passengers, such as commercial concessions, car rental companies and airline companies. For Geneva Airport partners, it helps them advertise through the application and this audience can be future potential clients (even indirect clients which would be the one to push the direct client to buy the product or service) for their business.

9. COST STRUCTURE

Different costs are incurred as the development and maintenance of the Treasure Hunting game application, which would be developed by a start-up specialised in games with AR. To advertise the game, some marketing expenses are necessary for the promotion, during the launch period of the game and, from time to time, advertising about this game to attract and increase the community of players. To offer accurate positioning to users on the game map, beacons have to be purchased and maintained, which are additional expenditures for Geneva Airport.

4.2.5 Compare to what already exists

This section is comparing the different means to entertain young and adult travellers at Geneva Airport. For instance, Geneva Airport has not released any game application addressed to travellers. Hence, this section is briefly introducing what is in place to entertain travellers during their journey. Part of the transformation program of the infrastructure of Geneva Airport, two areas were recently arranged to welcome and entertain young travellers accompanied of their parents. Both of them are located after the security control of Terminal 1 at Geneva Airport.

- **Children area**

This area welcomes children up to age 5 accompanied with one parent for free. This area is open every day from 8a.m to 8p.m and is located in the Transit zone, called mezzanine near lounges. This children area is arranged with games, kitchen and rest area for children. There are colouring tables, books, armchairs, swings and a baby-changing corner. (GENEVE AEROPORT, Children's area, 2018)

- **Playground area**

This area welcomes children aged 3 to 12 for free. This area is located after the security check near the boarding gates A5 and A8. This playground is arranged around the theme of the airport. Children can watch cartoons, play with tablets and toys made of wood. (GENEVE AEROPORT, Aire de Jeux, 2018)

- **Football world cup: screens**

When there is a special occasion, such as, the recent football world cup, some screens are displayed in different spots (near food and beverages and kiosks) enabling travellers to follow this special event. This kind of entertainment targets a more adult audience and older children.

The comparison table, displayed on the next page, helps compare each service offered to entertain passengers in Geneva Airport. It helps understand, if the implementation of the Treasure Hunting game with AR, can be an added value to entertain travellers. This comparison is based on the perspective of a passenger who seek entertainment during their journey at the airport.

This table compares three existing means to entertain travellers and the solution offered in hypothesis two, which is a Treasure Hunting game application with AR.

Table 16 - Comparison table of existent means to entertain and Treasure Hunt with AR

| | <i>Children area</i> | <i>Playground area</i> | <i>Football world cup: screens</i> | <i>Treasure Hunt with AR</i> |
|-----------------------------|---|---|--|---|
| <i>Advantages</i> | <ul style="list-style-type: none"> - Parents can keep an eye on their children (close area) - Entertain children during the waiting time | <ul style="list-style-type: none"> - Parents can keep an eye on their children (open area) - Entertain children during the waiting time - Parents can keep an eye on their luggage | <ul style="list-style-type: none"> - Follow the world cup without having to watch on their devices (Big screen) - Entertain all the family | <ul style="list-style-type: none"> - Game for adults and children - Mobile application - Walk around to explore the terminal |
| <i>Disadvantages</i> | <ul style="list-style-type: none"> - Addressed to a specific age range - Children stay in one place - Opening hours - Limited to 1 adult to stay with children - Cannot enter with luggage | <ul style="list-style-type: none"> - Children area located only near gate A5 and A8 - Children stay in one place | <ul style="list-style-type: none"> - Only located in areas where there are food and beverages - Non-permanent entertainment | <ul style="list-style-type: none"> - Only after security control - Needs a mobile device supporting AR - Battery consumption - Need Internet - Luggage |

To sum-up the comparison between the existent means to entertain and the Treasure Hunting game with AR. The children area, which is for children up to 5 years old is very-well arranged to welcome small-passengers accompanied of one parent. Indeed, as the area can accommodate a limited number of people, Geneva Airport allows only one parent to play with their children in this closed area, which frustrated the second parent or other family members. Then, the parent that would like to play with his/her child has to leave his/her luggage outside the closed area, which can be a source of concern. The area location can be a constraint for travellers that would prefer to stay near their boarding gate. Thus, travellers that came early enough and are not stressed to not be seated at their boarding gate would enjoy playing with their kids in this area.

The playground area located near gates A5 and A8, is addressed to children aged 3 to 12. It helps entertain children during the waiting time and parents can keep an eye both on their children and luggage. However, this children playground area is located in one area, thus travellers that are not coming early enough or that find this playground area too remote from their boarding gate would not be willing to enjoy this service with their children. These two children areas are addressed to a range of children from age 0 to 12. Treasure Hunt with AR can be played by a larger public as children, teenagers and adults during their free-time at Geneva Airport. The game is pushing passengers to explore the terminal through a fun and interactive game. However, this game would only start after the security control and travellers need to have a mobile device that can support AR technology. In addition, playing such a game can consume the battery of the device and needs internet access. Hence, Geneva Airport have opened Business corners to plug devices and offer a Free Wi-Fi access for 120 minutes. If travellers have carry-ons, they can find the walk with their luggage around the terminal not convenient. Thus, leading them to not play the game.

During special sports events, such as the Football world cup, Geneva Airport displays screens in different areas where travellers can enjoy refreshments and watch the games. This entertainment is addressed to an older public but can suit children as well. Hence, this type of entertainment is non-permanent and located in areas where passengers can consume food and beverages inside the airport. Thus, the treasure hunt can be an application which can offer regular updates and rewards to keep entertaining adults during their free time and make them enjoy the exploration of the terminal through the game with their children.

4.2.6 Test of hypothesis 2

The online survey helps identify the possible interest and determine expectations of a Treasure Hunting game at Geneva Airport from a sample of travellers. The question order of the survey to test hypothesis two was made on purpose to see if respondents' interests evolves throughout the questionnaire. The first question was to understand if travellers would be interested to play a Treasure Hunting game after the security check-point at Geneva Airport. **41.15%** of respondents answered to be either very interested and interested to play such a game while more (**58.85%**) replied to not be very interested and not interested. Hence, after the first question travellers have in majority replied to have no real interest to play such a game.

To further the study and determine what expectations passengers would potentially have for a Treasure Hunting game, the top three answers of respondents are taken into account; the top three are that they don't expect anything as they are not interested in such a game (**20.10%**), respondents would be interested because they can win some coupons to spend in different retailers after the security check point at Geneva Airport (**19.38%**) and because they can win a special present (**19.38%**). From this question, **21.30%** of respondents still replied negatively about such a game. The rest of the respondents' answered to be interested because of the reward, because this is a game addressed to both adults and children, and because of the update of the questions. Meaning that what interests the users most, is the possibility to get a reward at the end of the game.

After having asked their expectations for such a game, the respondents were asked on their willingness to download a game to play during their free time at Geneva Airport. Now, **50.4425%** of respondents are willing to download such a game while **49.5575%** would not download. After these three questions some respondents change their mind and more people would be willing to play this game at the airport, meaning that incentives play an important role to attract and keep players of the game.

Then, another aspect is to determine what incremental revenue can be generated and one of the option is to ask users to pay for the application. Thus, when respondents were asked how much they would be ready to spend, **51.94%** of respondents said that they would not pay for such an application while the rest of the respondents are willing to spend money to acquire this game.

Finally, concerning the question to determine why respondents would download or not the treasure hunt application, the top three answers for the reason to download the game are to be entertained during the waiting time (**15.55%**), then because the application is free (**15.05%**) and to be able to win airplanes tickets (**12.54%**). The top three reasons to not download the game are because respondents do not see any interest in downloading a Treasure Hunting game to play at Geneva Airport (**11.87%**), respondents don't like to play Treasure Hunting games (**3.85%**) and because they would be too stressed to play a game at the airport (**0.17%**).

Thus, from this online survey, it is possible to determine that there is an interest from a certain segment of passengers and one of the most important features that this game should have is offering attractive rewards.

Table 17- Would you be interested in a Treasure Hunting game after having passed the security control?

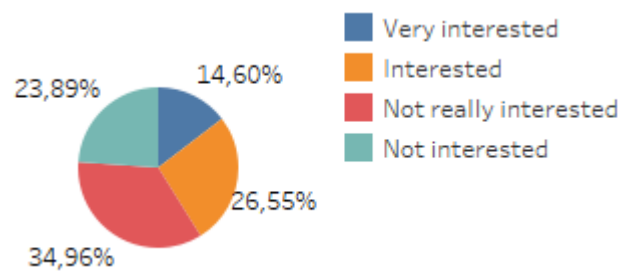
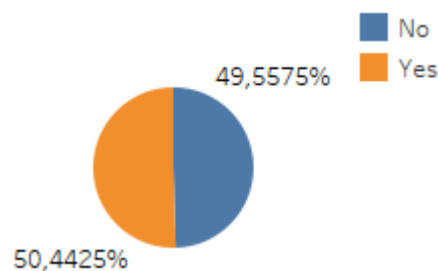


Table 18 - Would you download a treasure hunt application to play during your free time at Geneva Airport?



4.2.7 Key learnings and modifications

From the data presented in a document that was created by Geneva Airport, it indicates some figures about “Profil Pax”, which is some information about passengers’ profile at Geneva Airport.⁴ **62%** of passengers are travelling for leisure purposes at Geneva Airport. This, game would be addressed to this percentage of passengers, more precisely, those travelling for leisure purposes as a family and with children. In addition, **62%** of passengers are coming more than **1h30** before their flight departure. This percentage of passengers would be more able to play during their waiting time as they come earlier to the airport. However, during the summer holidays and winter holidays period, the airport is very crowded and long queuing is everywhere. Thus, when they have passed the security check point, they might not have enough free time to play. Nowadays, airline companies ask passengers to come at least 3 hours before at the airport. This can help make passengers feel less stressed to do the check-in, security control and passport/ visa control. If travellers come 3 hours before, these travellers would definitively have the time to enjoy playing and be entertain at Geneva Airport.

In addition, the online survey has helped find a customer segment that would also be potentially interested to play such a Treasure Hunting game and who was not initially thought about when creating this game. Indeed, the Treasure Hunting game would interest the age range of 21 to 30, as in this survey online has not been able to reach younger travellers.

Thus, for further research, two things would be to create a storyboard and to design a prototype of the game with a few screens, as the first screen with the name of the Treasure Hunting game, the introductive story of the game and three other screens that shows how the game would be presented (find a clue screen, the question screen, reward screen). This prototype can be a paper prototype but what would be best is one created on Marvel which is a free platform to design a digital product. Thus, this allows to test the prototype on a smartphone and see how potential users react while pushing the buttons on the prototype and how they find the game presentation. This part is an

⁴ This document was kindly sent from Geneva Airport to help in this study to have more precise data. This document contains figures about passengers profile at Geneva Airport in the year 2017. The panel was composed of 3’838 passengers and done during the waiting time at the boarding gate. For confidentiality purpose the document was not added in the appendix.

important one in the testing phase of the hypothesis, which can help users have a real view of what is meant by a Treasure Hunting game with AR.

Also, one of the modifications that could be done for this Treasure Hunting game is to extend this game at a larger scale. Indeed, one of the ideas is to build a partnership with Geneva Tourism to create a joint treasure hunt application. This application is a location-based game that would be addressed to travellers visiting Geneva and passing by Geneva Airport. The reason to extend the game to a larger geographical area is after the test of the hypothesis done through the survey. Some people are interested to be entertained during their free time at the airport, but others find the airport environment too stressful. Hence, allowing travellers to already play the Treasure Hunting game before coming to the airport can build a community of potential users. These ideas were generated from the test of hypothesis 2, which underlined some potential barriers to the implementation of the treasure hunt game only after the security control and from the groupwork session with the EMBA Valais, which enables to get more insight on the pre-phase creation of a location based-game.

In addition, Geneva Tourism and Geneva Airport can make the Geneva area even more attractive with a Treasure Hunting game with AR by offering different episodes to keep people entertained. As for example, the episode “Geneva Old Town”, where people have to collect specific objects in key locations by triggering markers with their smartphones. By collecting, all the objects for this episode in “Geneva Old Town”, people would be able to unblock a video explaining one historical event that happened in Geneva Old town. Then, if travellers play the game at Geneva Airport which would be named “Geneva Airport in the 1960s” and collect all the items after the security control, travellers can receive, as a reward, a post card by email or by post free of charge.

4.2.8 Recommendations to Geneva Airport

What seems to be interesting is to create the Treasure Hunting game as a partnership between Geneva Airport and Geneva Tourism, to extend the game to different areas even inside Geneva city and offering new episodes. Indeed, Geneva Tourism and Geneva Airport have some customer segments that are similar. By creating this game application in a collaboration, they would be able to entertain a wider public of international travellers while they land at the airport, when they are discovering Geneva and when they take off at the airport. Thus, they would be able to enhance and entertain travellers' journey. The game can be a companion for travellers and help them discover new areas and a bit of history. This entertainment is made for family, adults and children that would love to explore new areas and get rewarded at the end of each mission completed or depending on the number of items collected.

Then, another suggestion would be to launch a prototype of the game and test during the summer holidays (from June to end August). At that time many travellers are taking their flights as a family and enjoying summer holidays in other countries. The game would take place after the security control of Geneva Airport and would follow what was detailed in the value proposition canvas and business model canvas. This can help see if people are enthusiastic and play the game. Also, what is important is to collect feedback in order to understand what needs to be improved and what is very appreciated by the public.

This game application helps attract a customer segment that was not really targeted or not reached before by Geneva Airport. Indeed, from the online survey results, the customer segment of people aged between 21 to 30 would be interested to play such a game and to receive rewards. From the Geneva Airport survey results of 2017, **23%** of passengers travelling in the airport are aged between 26 to 34. This segment is also the one to spend less in commercial concessions. Thus, this game could attract this relatively important passenger segment for Geneva Airport. Indeed, this game aims to entertain a wider public. In addition, through the exploration of the terminal, travellers get to know new areas that they might have never seen before. After collecting a certain number of items, they can be rewarded. One of the rewards are some coupons to spend in different shops at Geneva Airport after the security control. This can push this customer segment to spend money in shops while being at the airport. From the online survey, people answered by 53.98% to find food and beverage offering poor value for money and 57.52% found the choice of shops sufficient at Geneva Airport. Thus, offering coupons can be a way to attract more customers in shops and enhance customer satisfaction.

They receive these coupons once they have played and collected the right number of items to unlock special rewards. Indeed, some people like to be challenged while playing, and they like to be rewarded once they have accomplished their missions. They would feel very excited and proud to be able to receive a little something during their journey at Geneva Airport. Moreover, as this game is after the security check point, it can help passengers to feel more relaxed and enjoy a good moment as a family. It is better to start a game after the security check point as most of travellers would feel less stressed to have gone through all the different steps before waiting to board on the plane. Meaning that moment would fit best to entertain passengers as they have some time.

4.2.9 Summary of findings

The Treasure Hunting game with AR is a game application addressed to passengers travelling as a family to entertain them during their waiting time at Geneva Airport. Both adults and children above 12 can enjoy this form of entertainment, available on both Android and iOS mobile devices that support Augmented Reality technology. Players have to collect 10 gold coins with aviation artefacts designed on them, to be able to find and open the treasure chest from the episode “The theft of the Queen’s gold - A Geneva Airport Story”. This game would be a mean to entertain both adults and children, which can enhance their customer experience at Geneva Airport.

This game would be an additional mean to entertain passengers at Geneva Airport. From the comparison made with the three other means to entertain travellers at Geneva Airport, this game shows the possibility to target a wider range of travellers by allowing both parents and children to have fun together while exploring the terminal. Moreover, with the possibility to update the game through new episodes and extending the area coverage of the game through partnerships, the application would be even more attractive to tourists and passengers of Geneva Airport. Also, the different episodes can also be aimed to different segments of passengers with different level of difficulties to make the game feel more challenging.

However, one of the biggest barriers to play the game would be if passengers have many carry-ons with them. An important parameter comes from the game experience environment, which is very special. Airport environments can be very crowded, stressful for passengers, long queuing times, all of that in a closed place. Thus, one of the recommendations made and addressed to Geneva Airport, is to make a partnership with Geneva Tourism to create different episodes which enable travellers to discover Geneva and learn more about the history. Then, when they take the airplane, they can entertain themselves during their waiting time after the security control.

Another aspect to take into consideration is, how much time passengers come in advance to take their plane at Geneva Airport. Indeed, if passengers are already in a hurry to take their plane they would not have time to play.

One of the biggest incentives for players of the game is to be rewarded with coupons and special prizes. Thus, this aspect should be carefully thought out, in order to attract, keep and grow the player community. Another aspect to consider is: passengers can be stressed from all the steps they have to go through during their journey at the airport. They might be afraid to miss their flight if they play the game or if their children play the game. Thus, to reassure them, the time left before boarding must absolutely appear on the game screen, to keep passengers informed about the time they have to play without missing their flight.

5 Limitations of the study

Hence, at the end of this study, this section summarises the limitations of this research paper. The online survey enabled to collect the answer of 226 respondents, in majority, local people aged between 21 to 30 years old which amounts to 63.27%. Thus, further research should be done by having more international travellers (living outside Switzerland) and a bigger sample of respondents from other ages, to gather more data and more insights from travellers at Geneva Airport. Indeed, the majority of respondents were people living in Geneva and other Swiss Cantons. Also, one issue of the questionnaire was the length, with 34 questions, it was not easy to ask people to answer the survey. Due to this constraint the questionnaire was not directly done in the airport, as the format was not adapted. Hence, this survey helps collect many relevant data to analyse and understand travellers of Geneva Airport, which was complemented by several observation days with passenger interactions. Another important question that was not asked to respondents is how much time they come in advance to take their flight at Geneva Airport. This would have helped for the solution of hypothesis 2, to see if people would have enough time to be entertained and how much of their time the entertainment at the airport should take them in average.

For the hypothesis 1 solution testing, the customer segment of visually impaired passengers, the study did not test the solution to survey their interest about navigation with AR. Indeed, this customer segment was thought after the online survey was released. Thus, due to time constraints, this segment was not reached in this study.

Concerning hypothesis two, the online survey should not have suggested a Treasure Hunting game directly but ask respondents first on what kind of game would they be interested in; would they be interested to be more entertained during their waiting time at the airport and then work from there; asking their expectations about this game and what kind of reward they would be interested to receive. By suggesting Treasure Hunting game, the issue was to close the door to other games that would be preferred by passengers at Geneva Airport. In addition, due to time constraints no prototype on paper or on screen were tested with passengers of Geneva Airport. This part would have been very important to see if visually, people would appreciate the treasure hunting game as they would really see what the idea was.

Concerning the analysis of the data collection, what could have been improved is to make regressions, due to the volume of answers, of variables of questions and the time constraints, the analysis was limited to determine influences through contingency tables. These tables showed that there were some influential aspects for respondents in their decisions. By doing the regressions it would have made possible to define if these influences were positively impacting or negatively impacting their choices.

This study focuses on a service and a product solution to have a direct impact on passengers' experience at Geneva Airport. However, for further research on Augmented Reality technology, solutions having an indirect impact (handling bags, waste recycling, stock management) on travellers' experience during their journey at the airport should also be considered.

6 Recommendations

Based on the results of this study, a few recommendations can be made in order to improve further research on the subject of enhancing customer experience at Geneva Airport through Augmented Reality.

The implementation of AR technology can raise security and privacy issues, which should be considered carefully and tackled before implementation. The airport is a public area where security is a priority. Multiple security measures are in place to protect the people on the premises. In addition, privacy will become an issue since nowadays, people tend to use the public Wi-Fi, where the data passing through can be seen. Which is why the data passing through the Wi-Fi needs to be protected. To add to the data issue, other points of concern for the public are that organisations can track people's movements and the use that businesses can make of this information can make the public feel uncomfortable to use AR. Thus, Geneva Airport has to tackle these issues by reinforcing security of the data passing through the Wi-Fi and ask passengers if they consent to share information to the airport and assuring no third-party is accessing or collecting the data.

Concerning the navigation with AR, the solution suggested for hypothesis one, for visually impaired passengers, which was the second segment formulated, has not been tested. Thus, a test is recommended to ensure that this segment of passengers would be interested and willing to use navigation with AR combined with smart glasses. Indeed, smart glasses can be considered as a barrier for people who would not be at their ease

to travel in the airport with such a tool on them. Also, this solution can allow GVAssistance staff to be more available for other cases of assistance at the airport. This proposed solution gives more independency for visually impaired passengers to enjoy their journey at the airport by having a mobile companion, allowing them to move indoors like any other passenger.

For hypothesis two, what was lacking in this study is the mobile or paper prototyping test to the passengers of Geneva Airport. The aim of this test is to observe passengers' reactions and get on-field feedback. Indeed, being in the airport and trying to play the game and answering a questionnaire are completely different. The prototype testing is more visual and can better identify the real interest of passengers. Hence, the online survey was a pre-phase to the prototype on mobile or paper, to already have some feedbacks and insights of passengers. Due to time constraints, no mobile nor paper prototype were tested. Thus, a prototyping test could be released during the summer holidays (from June to the end of August). At that time many travellers are taking their flights with their family. The game testing would take place after the security control of Geneva Airport and would follow what was detailed in the value proposition canvas and business model canvas. This can help see if people are enthusiastic and play the game. Also, what is important is to collect feedback in order to understand what needs to be improved and what is very appreciated by the public.

In addition, for hypothesis two's solution, what seems to be interesting is to create the Treasure Hunting game as a partnership between Geneva Airport and Geneva Tourism, to extend the game to different areas inside Geneva, offering new episodes. Indeed, Geneva Tourism and Geneva Airport have some customer segments that are similar. By creating this game application as a collaboration, they would be able to entertain a wider public of international travellers while they land at the airport, when they are discovering Geneva and when they take off at the airport. Thus, they would be able to enhance and entertain travellers' journey. The game can be a companion for travellers and help them discover new areas and a bit of history. With this game Geneva Airport would be able to increase satisfaction and keep a wider range of customer segments, both adults and children, entertained. Thus, the hypothesis two solution should be the one to develop in order to become a more family friendly airport and offer more entertainment diversity to users during their waiting time at Geneva Airport.

7 Conclusion

In 2014, the Aeronautical Infrastructure Sector Plan (PSIA) has forecasted that passenger numbers would reach 25 million by 2030 (BERNET, Christian, ROSSIER, Roland and RUETSCHI, Pierre, 2016). Geneva Airport welcomed 17,4 million passengers in 2017 (GENÈVE AÉROPORT annual report 2017, p.8) meaning that the forecast of the Swiss Confederation for Civil Aviation might be transcended earlier than 2030. Hence, it seems important for Geneva Airport to find solutions to accommodate the increase in passenger arrivals, while considering the opinion of the different stakeholders.

To conclude this study, which provides an analysis to assess how customer experience at Geneva Airport can be enhanced through AR by the formulation of two hypotheses. The first assumption tested is that passengers encounter difficulties to navigate inside Geneva Airport; there is a need to increase passenger satisfaction. By implementing a navigation system with Augmented Reality, difficulties navigating indoors will be removed. However, this study shows that navigation is not an issue at Geneva Airport. Indeed, only **6.19% (14 people)** said to find navigation difficult. Thus, for the moment, there is no need to provide passengers with a new tool to assist their indoor navigation at Geneva Airport. However, this additional service should be considered in the future as a mean to assist and guide passengers inside Geneva Airport, as the number of passengers is forecasted to be of 25 million for the year 2030 and the existing means in place to help navigation would not be sufficient to assist the additional number of passengers.

The second assumption is that passengers travelling with their family, lack entertainment at Geneva Airport. Thus, there is a need to increase passengers' satisfaction by entertaining the whole family during the waiting time at the airport, by offering an AR Treasure Hunting game application. This study shows that passengers travelling alone, with their families, partner or friends at Geneva Airport would be interested to play such a game during their free time because of the rewards, which are important incentives. Indeed, most respondents (**65.49%**) answered that they use their phone during their journey at the airport. The majority uses it for entertainment purposes (**24.38%**). Respondents who are travelling for tourism and leisure purposes are more willing to download a Treasure Hunting game than others (**30.97%**). It can be assumed that because they are more relaxed and happy to go on holidays, they are also seeking for entertainment at the airport to spend their free time. Thus, this second hypothesis should be pursued by Geneva Airport and re-tested through a survey to have a bigger sample of respondents from all ages and from different living locations. If after having tested on a bigger sample, respondents are in majority interested to play such a game, then, Geneva Airport can test a mobile prototype of the game to see passengers' reaction and collect feedbacks.

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Appendix 1: Survey questions

GOALS OF THIS SURVEY:

- Identify passengers' needs while travelling at Geneva Airport
- Determine the current customer satisfaction of passengers using Geneva Airport
- Determine what are the weak (stressed) points and strong points that passengers are experiencing at Geneva Airport
- Determine if there is an interest in AR from passengers
- Determine what type of passengers would use AR
- See how Augmented Reality can be useful and helpful
- Identify pain/good points of Geneva Airport
- Determine if any airport operations could be improved
- Identify the right problem before solving it

OUTPUTS OF THIS SURVEY:

- Enhancing passengers' travelling experience
- See if there is an opportunity to implement Augmented Reality
- Categorize the different profiles of passengers using Geneva Airport

SURVEY INTRODUCTION:

This questionnaire is addressed to people who have recently travelled at Geneva Airport. If you have never travelled at Geneva Airport, please exit this survey.

My name is Catherine Chappuis, I am studying International Business Management at the Haute Ecole de Gestion de Genève.

For my Bachelor thesis, I am analysing how to enhance customer experience at Geneva International Airport with Augmented Reality. Augmented Reality is a mobile application that overlays visual information on images of the physical world.

Thank you in advance for taking the time to fill out my survey. There are 34 questions which will take you approximately 10 minutes.

Have a nice day!

This survey was written independently from Geneva International Airport and all the information collected will only be used for my Bachelor thesis and not in any other form.

If you have any questions, please contact me at catherine.chappuis@etu.hesge.ch

SECTION 1: YOUR LAST TRAVEL EXPERIENCE (5/5)

The aim of this section is to build the respondents travelling profile through different criteria related to their last travel experience at Geneva Airport as when was their last coming, the purpose of their last trip, if they were accompanied or not and the past year frequency at which they have taken the airplane at Geneva Airport.

QUESTION 1: WHEN WAS THE LAST TIME YOU TRAVELLED BY AIRPLANE FROM OR TO GENEVA AIRPORT?

Possible answers **1 answer possible:*

☐ Today ☐ This week ☐ Less than 1 month ☐ Between 1 to 6 months ☐ More than 6 months ☐ Never (end the questionnaire)

Aim: This question is allowing to define the last time the person took the airplane from or to GVA airport. This allows to categorize the different passengers' experience depending on how recent the visit is. Also, we can consider that if their experience was too many months ago, the information given in the survey can be biased or not that accurate due to the fact they might not remember everything very well. On the other hand, if the experience was quite recent, it means that in the memory of the passengers, they would remember better and give more accurate answers.

Also, it helps to end the questionnaire to a person that would have no experience at Geneva Airport.

QUESTION 2: THE DATE OF YOUR MOST RECENT TRAVEL EXPERIENCE AT GENEVA AIRPORT.

Possible answers **1 answer possible:*

☐ Before June 2017 ☐ June 2017 ☐ July 2017 ☐ August 2017 ☐ September 2017
☐ October 2017 ☐ November 2017 ☐ December 2017 ☐ January 2018
☐ February 2018 ☐ Mars 2018 ☐ April 2018 ☐ May 2018 ☐ June 2018

Aim: Depending on the period of the year, the airport is more crowded. For example, during Christmas holidays, Summer holidays, Easter holidays. Thus, it can impact customer experience a lot at Geneva Airport.

QUESTION 3: WHAT WAS THE PURPOSE OF YOUR LAST TRIP FROM OR TO GENEVA AIRPORT?

*Possible answers *1 answer possible:*

- ☐ Tourism/Leisure ☐ Business ☐ Erasmus, Language Travel ☐ Commuting
☐ Visiting Family or friends ☐ Volunteer ☐ Other: _____

Aim: It helps to construct the customers' profile by determining at their last visit what was their reason to travel from or to Geneva Airport. Because of the reason of their travelling, their experience can be affected differently, or they can have different types of behaviour.

QUESTION 4: DURING MY LAST TRAVEL, I WAS WITH....

*Possible answers *1 answer possible:*

- ☐ Alone ☐ My partner ☐ Family ☐ Friends ☐ Colleagues ☐ Other: _____

Aim: To determine if the customer is travelling accompanied or not. To categorize the various type of passengers using Geneva Airport.

QUESTION 5: IN THE PAST YEAR, HOW MANY TIMES HAVE YOU TRAVELLED BY PLANE AT GENEVA AIRPORT?

*Possible answers *1 answer possible:*

- ☐ 1-2 times ☐ 3-5 times ☐ 6-10 times ☐ Other: _____

Aim: Estimate if travellers at Geneva Airport are frequent travellers or occasional travellers.

SECTION 2: YOUR LAST CHECK-IN EXPERIENCE AT GENEVA AIRPORT (2/2)

The aim of this section is to estimate the respondents' satisfaction from their last check-in experience at Geneva Airport.

QUESTION 6: HOW WOULD YOU RATE THE QUEUING TIME AT THE CHECK-IN?

Possible answers **1 answer possible:*

☐ Awful ☐ Unsatisfying ☐ Satisfying ☐ Good ☐ Excellent ☐ I did the online check-in from home.

Aim: This question is to help understand if passengers were satisfied of their experience at the check-in. As an overall, a customer experience is already starting before they are coming at the Geneva Airport. Thus, this question will help to determine if there are any issues to solve there.

QUESTION 7: HOW WOULD YOU RATE THE AIRPORT STAFF AT THE CHECK-IN?

Possible answers **multiple answers possible:*

☐ Unhelpful ☐ Helpful ☐ Unfriendly ☐ Friendly ☐ I did the online check-in from home.

Aim: To help rate passenger satisfaction at the check-in of Geneva Airport.

SECTION 3: YOUR LAST EXPERIENCE AT THE SECURITY CHECK-POINT AT GENEVA AIRPORT (2/2)

The aim of this section is to estimate the respondents' satisfaction from their last experience at the security check-point at Geneva Airport.

QUESTION 8: HOW WOULD YOU RATE THE QUEUING TIME AT THE SECURITY CHECK-POINT?

Possible answers **1 answer possible:*

☐ Awful ☐ Unsatisfying ☐ Satisfying ☐ Good ☐ Excellent

Aim: This question to help rate passenger satisfaction of the security control at Geneva Airport.

QUESTION 9: HOW WOULD YOU RATE THE AIRPORT STAFF AT THE SECURITY CHECK-POINT?

Possible answers **multiple answers possible:*

☐ Unhelpful ☐ Helpful ☐ Unfriendly ☐ Friendly

Aim: This question to help rate passenger satisfaction of the security control at Geneva Airport.

SECTION 4: YOUR LAST EXPERIENCE AT THE PASSPORT CONTROL AT GENEVA AIRPORT (2/2)

The aim of this section is to estimate the respondents' satisfaction from their last experience at the passport control at Geneva Airport.

QUESTION 10: HOW WOULD YOU RATE THE QUEUING TIME AT THE PASSPORT CONTROL?

Possible answers **1 answer possible:*

☐ Awful ☐ Unsatisfying ☐ Satisfying ☐ Good ☐ Excellent

Aim: This question is to help rate passenger satisfaction of the passport control at Geneva Airport.

QUESTION 11: HOW WOULD YOU RATE THE AIRPORT STAFF AT THE PASSPORT CONTROL?

Possible answers **multiple answers possible:*

☐ Unhelpful ☐ Helpful ☐ Unfriendly ☐ Friendly

Aim: This question is to help rate passenger satisfaction of the passport control at Geneva Airport.

SECTION 5: YOUR RETAIL EXPERIENCE AFTER THE SECURITY CONTROL AT GENEVA AIRPORT (3/3)

The aim of this section is to estimate the respondents' satisfaction from their last retail experience after the security control at Geneva Airport.

QUESTION 12: HOW WOULD YOU RATE THE FOOD & BEVERAGE OFFERING?

Possible answers **1 answer possible:*

☐ Poor value for money ☐ Fair value for money ☐ Very good value for money

Aim: To determine if passengers are currently satisfied of the retail infrastructures after the security control.

QUESTION 13: HOW WOULD YOU RATE THE SHOPS?

Possible answers **1 answer possible:*

☐ Poor choice of shops ☐ Sufficient choice of shops ☐ A good variety of choice of shops

Aim: To determine if passengers are currently satisfied of the retail infrastructures after the security control.

QUESTION 14: HOW WOULD YOU RATE THE AIRPORT STAFF AFTER THE SECURITY CONTROL?

Possible answers **multiple answers possible:*

☐ Unhelpful ☐ Helpful ☐ Unfriendly ☐ Friendly

Aim: To determine if passengers are currently satisfied with their retail experience after the security control

SECTION 6: NAVIGATION AT GENEVA AIRPORT (2/2)

The aim of this section is to determine the navigation experience of respondents at Geneva Airport.

QUESTION 15: HOW EASY IS IT TO NAVIGATE INSIDE GENEVA AIRPORT?

Possible answers **1 answer possible:*

☐ Very difficult ☐ Difficult ☐ Satisfied ☐ Easy ☐ Very easy

Aim: This question is to help understand if passengers are finding it easy or not to navigate in Geneva Airport. This will allow to understand if there is anything that can be improved.

QUESTION 16: IF YOUR ANSWER WAS DIFFICULT OR VERY DIFFICULT, PLEASE TELL WHY.

Possible answers **multiple answers possible:*

☐ Confusing or unclear terminal signs ☐ Not enough signs ☐ Confusing explanation of airport staff ☐ Not enough staff available to inform and guide ☐ Language barrier
☐ Other: _____

Aim: To understand the reason why the navigation is difficult for passengers and maybe find some solutions in order to solve this issue.

SECTION 7: TECHNOLOGY AND AUGMENTED REALITY (15/15)

The aim of this section is to determine the technological use during their travel and the augmented reality knowledge of respondents.

QUESTION 17: WHAT IS THE OPERATING SYSTEM (OS) OF YOUR SMARTPHONE?

Possible answers **1 answer possible:*

- ☐ Android ☐ Windows phone ☐ Apple iOS ☐ BlackBerry OS
☐ Other: _____

Aim: Determine what type of operating system passengers are using the most. Moreover, it is also to determine what type of passengers are using a certain operating system.

QUESTION 18: ARE YOU USING YOUR PHONE TO HELP YOU DURING YOUR TRAVEL JOURNEY?

Possible answers **1 answer possible:*

- ☐ Yes ☐ No

Aim: To see if a specific passenger's profile would be bothered to use its phone during its travelling journey. Augmented Reality is needing the user to have a mobile device. Thus, if some passengers already are using their phone to help them during their travel journey it can be assumed that they will show more resistance to use AR.

QUESTION 19: DO YOU USE GVAPP (THE APPLICATION OF GENEVA AIPORT)?

Possible answers **1 answer possible:*

- ☐ Yes ☐ No

Aim: To estimate if travellers are using GVApp to navigate and get some information at Geneva Airport.

QUESTION 20: WHY DO YOU USE YOUR PHONE FOR YOUR TRAVEL?

Possible answers **multiple answers possible:*

- ☐ Online Check-in ☐ Electronic boarding pass ☐ Check flight information ☐ Manage your booking ☐ Navigate in the Airport terminal (map) ☐ Entertain (games, social media, chat, news) ☐ I do not use my phone to manage my travel journey ☐ Other: _____

Aim: To determine the type of behaviour that passengers have during their travel. If they are using technology to facilitate their journey at Geneva Airport.

QUESTION 21: WHAT DO YOU KNOW ABOUT AUGMENTED REALITY?

Possible answers **multiple answers possible:*

- ☐ I have downloaded/ played some AR games. ☐ I read some articles about it, heard from relatives or watched something related to AR. ☐ I have never heard about Augmented Reality.

Aim: To determine the current knowledge of respondents on Augmented Reality.

QUESTION 22: WILL YOU BE WILLING TO PURCHASE AN AUGMENTED REALITY APPLICATION?

Possible answers **1 answer possible:*

- ☐ No ☐ Yes ☐ Yes, if offering an extraordinary experience.

Aim: To determine the willingness of respondents to purchase an AR application.

QUESTION 23: IF YOU ANSWERED YES TO THE PREVIOUS QUESTION, HOW MUCH ARE YOU WILLING TO PAY?

Possible answers **multiple answers possible:*

- ☐ CHF 0-1 ☐ CHF 1-2 ☐ CHF 2-3 ☐ CHF 3-4 ☐ Max CHF 5 ☐ Other: _____

Aim: To determine the amount in CHF that respondents are willing to spend for an AR application.

QUESTION 24: WOULD YOU BE INTERESTED TO PLAY A TREASURE HUNTING GAME AFTER HAVING PASSED THE SECURITY CONTROL?

Possible answers **1 answer possible:*

- ☐ Very interested ☐ Interested ☐ Not really interested ☐ Not interested

Aim: In my Bachelor thesis, I have made different assumptions and one of my hypothesis was to launch a Treasure Hunting game after the security control. This question will help determine if the public would be interested to participate in this game, but even more precisely what type of passenger would appreciate this service.

QUESTION 25: WHAT WOULD YOU EXPECT FROM THIS TREASURE HUNT AT GENEVA AIRPORT?

Possible answers **multiple answers possible:*

- ☐ To win some coupons for the different retailers after the security check point at Geneva Airport.
- ☐ To have questions concerning different themes related to Switzerland.
- ☐ To be able to win a special present.
- ☐ To be updated every time you are coming at Geneva Airport.
- ☐ A treasure hunt for adults and kids.
- ☐ A treasure hunt for children only.
- ☐ Other suggestion: _____
- ☐ I don't expect anything. I am not interested.

Aim: To define passenger expectation concerning a Treasure Hunting game.

QUESTION 26: WOULD YOU DOWNLOAD A TREASURE HUNT APPLICATION TO PLAY DURING YOUR FREE-TIME AT GENEVA AIRPORT?

Possible answers **1 answer possible:*

☐ Yes ☐ No

Aim: To estimate how many people would be interested to be entertained with a game especially made for travellers at Geneva Airport.

QUESTION 27: IF YOU ANSWERED YES TO THE PREVIOUS QUESTION, HOW MUCH ARE YOU WILLING TO PAY?

Possible answers **multiple answers possible:*

☐ CHF 0 ☐ CHF 1-2 ☐ CHF 2-3 ☐ CHF 3-4 ☐ Max CHF 5 ☐ Other: _____

Aim: To estimate the amount in CHF that respondents who answered to be interested to be entertained with a game especially made for travellers at Geneva Airport would be willing to spend for such a game.

QUESTION 28: WHY WOULD YOU DOWNLOAD OR NOT DOWNLOAD THE TREASURE HUNT APPLICATION?

Possible answers **multiple answers possible:*

- ☐ Because the application is free.
- ☐ To entertain during the waiting time.
- ☐ To play with my children.
- ☐ To have a unique experience at Geneva Airport.
- ☐ To win some coupons for the different shops and restaurants.
- ☐ To win special prizes.
- ☐ To win airplanes tickets
- ☐ I don't like to play Treasure Hunting games.
- ☐ I don't see any interest in downloading a Treasure Hunting game to play at Geneva Airport.
- ☐ Other: _____

Aim: To determine the interest of passengers concerning a treasure hunt application that will be available only after the control check-point of Geneva Airport.

QUESTION 29: BETWEEN THESE TWO IMAGES, WHICH ONE WOULD YOU PREFER ON YOUR SCREEN TO HELP YOUR NAVIGATION INSIDE GENEVA AIRPORT?

Possible answers **1 answer possible:*

A)



B)



Aim: Determine if the public would be interested to use Augmented Reality indoors or they would prefer a map. Another assumption from my Bachelor thesis was to avoid congestion to certain area by implemented AR technology as a wayfinding tool to navigate indoor.

QUESTION 30: FROM YOUR PREVIOUS CHOICE, PLEASE TELL WHY YOU CHOOSE EITHER IMAGE A OR B.

Possible answers **multiple answers possible:*

☐ For the design ☐ For the clarity ☐ For the simplification ☐ For the real environment aspect ☐ For the layout ☐ For the visibility of my surroundings ☐ For the information conforming my view through my smartphone camera ☐ Other: _____

Aim: Determine why travellers would rather choose one or another form of navigation support.

SECTION 3: PERSONAL INFORMATION

The aim of this section is to build respondents profile demographically.

QUESTION 31: SEX

Possible answers **1 answer possible:*

☐ Male ☐ Female

Aim: To see if there can be any difference in the answers of this survey according to the gender of the person.

QUESTION 32: YOUR AGE

Possible answers **1 answer possible:*

☐ 15 – 20 ☐ 21 – 30 ☐ 31 – 40 ☐ 41- 50 ☐ 51 – 60 ☐ 61 or more

Aim: The age is to help segment the passenger profile.

QUESTION 33: HOW MANY CHILDREN DO YOU HAVE?

Possible answers **1 answer possible:*

☐ I have no children ☐ 1 child ☐ 2 children ☐ 3 children ☐ 4 children ☐ 5 children
☐ More than 5 children

Aim: The number of children is to help segment the passenger profile and see if they would be interested to use Treasure Hunting game with their children if they have any.

QUESTION 34: WHERE DO YOU LIVE?

Possible answers **1 answer possible:*

☐ Geneva ☐ Other Swiss Cantons ☐ France ☐ UK ☐ Other European Countries
☐ Africa ☐ Asia ☐ North/ South/ Central America ☐ Australia

Aim: This question is to know if the airport is mostly frequented by local people or by foreigners. This helps geographically segmenting the different types of travellers.

Appendix 2: Survey results

| Bachelor thesis survey results on “Enhancing customer experience at Geneva Airport with Augmented Reality” | |
|--|--|
| Support: Google Forms | Analysis done on Tableau 2018.1 software |
| Length: 34 questions | Duration: approx. 10 minutes |
| Survey open from 21 st of May 2018 to 11 th of June 2018 | Number of answers: 226 |
| International Business Management Haute Ecole de Gestion de Genève University of Applied Science (HES-SO) | Student: Catherine Chappuis catherine.chappuis@etu.hesge.ch cathichapp@hotmail.com |

| Section 1: Your last travel experience (5 questions) | | | |
|---|-----------------------------------|-----------------------|------------------|
| Questions | Answers | Number of respondents | % of respondents |
| Question 1: When was the last time you travelled by airplane from or to Geneva Airport? <i>* 1 answer possible</i> | Between 1 to 6 months | 101 | 44,69% |
| | More than 6 months | 70 | 30,97% |
| | Less than 1 month | 42 | 18,58% |
| | This week | 13 | 5,75% |
| | Today | 0 | 0% |
| | Never (end the survey) | | |
| Question 2: The date of your most recent travel experience at Geneva Airport. <i>* 1 answer possible</i> | Before June 2017 | 19 | 8,41% |
| | June 2017 | 3 | 1,33% |
| | July 2017 | 16 | 7,08% |
| | August 2017 | 17 | 7,52% |
| | September 2017 | 11 | 4,87% |
| | October 2017 | 7 | 3,10% |
| | November 2017 | 7 | 3,10% |
| | December 2017 | 20 | 8,85% |
| | January 2018 | 10 | 4,42% |
| | February 2018 | 22 | 9,73% |
| | March 2018 | 14 | 6,19% |
| | April 2018 | 38 | 16,81% |
| | May 2018 | 41 | 18,14% |
| | June 2018 | 1 | 0,44% |
| Question 3: What was the purpose of your last trip from or to Geneva Airport? <i>* 1 answer possible</i> | Tourism, Leisure | 136 | 60,18% |
| | Visiting family or friends | 67 | 29,65% |
| | Business | 16 | 7,08% |
| | Erasmus, Language Travel | 4 | 1,77% |
| | Volunteer | 2 | 0,88% |
| | Commuting | 0 | 0% |
| | Other: Martial Art competition | 1 | 0,44% |
| Question 4: During my travel, I was... <i>* 1 answer possible</i> | Alone | 63 | 27,88% |
| | With my partner | 56 | 24,78% |
| | With my family | 55 | 24,34% |
| | With my friends | 43 | 19,03% |
| | With my colleagues | 9 | 3,98% |
| | Other | 0 | 0% |
| Question 5: In the past year, how many times have you travelled by plane at Geneva Airport? <i>* 1 answer possible</i> | 0 times | 5 | 2,21% |
| | 1-2 times | 122 | 53,98% |
| | 3-5 times | 70 | 30,97% |
| | 6-10 times | 27 | 11,95% |
| | Other: More than 10 times | 1 | 0,44% |
| | More than 50 times | 1 | 0,44% |



| Section 2: Your last CHECK-IN experience at Geneva Airport (2 questions) | | | |
|--|-------------------------------------|-----------------------|------------------|
| Questions | Answers | Number of respondents | % of respondents |
| Question 6: How would you rate the QUEUING TIME at the CHECK-IN? * 1 answer possible | I did the online check-in from home | 82 | 36,28% |
| | Excellent | 10 | 4,42% |
| | Good | 47 | 20,80% |
| | Satisfying | 74 | 32,74% |
| | Unsatisfying | 9 | 3,98% |
| | Awful | 4 | 1,77% |
| Question 7: How would you rate the AIRPORT STAFF at the CHECK-IN? * Multiple answers possible | I did the online check-in from home | 95 | 35,19% |
| | Helpful | 86 | 31,85% |
| | Unhelpful | 2 | 0,74% |
| | Friendly | 81 | 30% |
| | Unfriendly | 6 | 2,22% |
| Section 3 : Your last experience at THE SECURITY CHECK-POINT at Geneva Airport (2 questions) | | | |
| Questions | Answers | Number of respondents | % of respondents |
| Question 8: How would you rate the QUEUING TIME at the SECURITY CHECK-POINT? * 1 answer possible | Excellent | 15 | 6,64% |
| | Good | 65 | 28,76% |
| | Satisfying | 99 | 43,81% |
| | Unsatisfying | 40 | 17,70% |
| | Awful | 7 | 3,10% |
| Question 9: How would you rate the AIRPORT STAFF at the SECURITY CHECK-POINT? * Multiple answers possible | Helpful | 131 | 46,45% |
| | Unhelpful | 12 | 4,26% |
| | Friendly | 110 | 39,01% |
| | Unfriendly | 29 | 10,28% |
| Section 4: Your last experience at THE PASSPORT CONTROL at Geneva Airport (2 questions) | | | |
| Questions | Answers | Number of respondents | % of respondents |
| Question 10: How would you rate the QUEUING TIME at the PASSPORT CONTROL? * 1 answer possible | Excellent | 16 | 7,08% |
| | Good | 73 | 32,30% |
| | Satisfying | 99 | 43,81% |
| | Unsatisfying | 29 | 12,83% |
| | Awful | 9 | 3,98% |
| Question 11: How would you rate the AIRPORT STAFF at the PASSPORT CONTROL? * Multiple answers possible | Helpful | 133 | 49,08% |
| | Unhelpful | 8 | 2,95% |
| | Friendly | 99 | 36,53% |
| | Unfriendly | 31 | 11,44% |

| Section 5: Your last retail experience AFTER THE SECURITY CONTROL at Geneva Airport (3 questions) | | | |
|---|--|-----------------------|------------------|
| Questions | Answers | Number of respondents | % of respondents |
| Question 12: How would you rate the FOOD & BEVERAGE offering? <i>* 1 answer possible</i> | Very good value for money | 5 | 2,21% |
| | Fair value for money | 99 | 43,81% |
| | Poor value for money | 122 | 53,98% |
| Question 13: How would you rate the SHOPS? <i>* 1 answer possible</i> | A good variety of choice of shops | 34 | 15,04% |
| | Sufficient choice of shops | 130 | 57,52% |
| | Poor choice of shops | 62 | 27,43% |
| Question 14: How would you rate the AIRPORT STAFF AFTER THE SECURITY CONTROL? <i>* Multiple answers possible</i> | Helpful | 156 | 55,71% |
| | Unhelpful | 6 | 2,14% |
| | Friendly | 105 | 37,50% |
| | Unfriendly | 13 | 4,64% |
| Section 6: Navigation at Geneva Airport (2 questions) | | | |
| Questions | Answers | Number of respondents | % of respondents |
| Question 15: How easy is to navigate inside Geneva Airport? <i>* 1 answer possible</i> | Very easy | 50 | 22,12% |
| | Easy | 93 | 41,15% |
| | Satisfied | 69 | 30,53% |
| | Difficult | 14 | 6,19% |
| | Very difficult | 0 | 0% |
| Question 16: If your answer as difficult or very difficult, please tell why. <i>* Multiple answers possible</i> | Not enough signs | 22 | 31,88% |
| | Confusing or unclear Terminals signs | 21 | 30,43% |
| | Not enough staff available to inform & guide | 19 | 27,54% |
| | Confusing explanation of airport staff | 4 | 5,80% |
| | Language barrier | 3 | 4,35% |
| | Other: | 0 | 0% |

| Section 7: Technology and Augmented Reality (14 questions) | | | |
|--|---|-----------------------|------------------|
| Questions | Answers | Number of respondents | % of respondents |
| Question 17: What is the operating system (OS) of your smartphone? <i>* 1 answer possible</i> | Android | 109 | 48,23% |
| | Apple iOS | 108 | 47,79% |
| | Windows phone | 7 | 3,10% |
| | BlackBerry OS | 0 | 0% |
| | Other: Not a smartphone | 2 | 0,88% |
| Question 18: Do you use your phone to HELP you during your JOURNEY at the AIRPORT? <i>* 1 answer possible</i> | Yes | 148 | 65,49% |
| | No | 78 | 34,51% |
| Question 19: Do you use GVApp (the application of Geneva Airport)? <i>* 1 answer possible</i> | Yes | 65 | 28,78% |
| | No | 161 | 71,24% |
| Question 20: Why do you use your phone for your TRAVEL? <i>* Multiple answers possible</i> | Entertain (games, social, media, chat, news) | 157 | 24,38% |
| | Electronic boarding pass | 130 | 20,19% |
| | Check flight(s) information | 124 | 19,25% |
| | Online Check-in | 122 | 18,94% |
| | Manage my booking | 68 | 10,56% |
| | I do not use my phone to manage my travel journey | 29 | 4,50% |
| | Navigate in the Airport terminal (map) | 11 | 1,71% |
| | Other: To navigate outside the Airport | 1 | 0,16% |
| | Information on connection with train and taxi | 1 | 0,16% |
| | Business communication | 1 | 0,16% |

| Questions | Answers | Number of respondents | % of respondents |
|--|---|-----------------------|------------------|
| Question 21: What do you know about Augmented Reality? <i>* Multiple answers possible</i> | I read some articles about it, heard from relatives or watched something related to AR. | 130 | 53,06% |
| | I have never heard about Augmented Reality. | 69 | 28,16% |
| | I have downloaded/played some Augmented Reality games. | 46 | 18,78% |
| Question 22: Will you be willing to purchase an Augmented Reality application? <i>* 1 answer possible</i> | No | 101 | 44,69% |
| | Yes, if offering an extraordinary experience | 98 | 43,36% |
| | Yes | 27 | 11,95% |
| Question 23: If you answered yes to the previous question, how much are you willing to pay? <i>* Multiple answers possible</i> | Max. CHF 1 | 39 | 30% |
| | Max. CHF 2 | 28 | 21,54% |
| | Max. CHF 3 | 17 | 13,08% |
| | Max. CHF 4 | 7 | 5,38% |
| | Max. CHF 5 | 36 | 27,69% |
| | Max. CHF 10 | 2 | 1,54% |
| | Max. CHF 20 | 1 | 0,77% |
| Question 24: Would you be interested to play a treasure hunting game after having passed the security control at Geneva Airport? <i>* 1 answer possible</i> | Very interested | 33 | 14,60% |
| | Interested | 60 | 26,55% |
| | Not really interested | 79 | 34,96% |
| | Not interested | 54 | 23,89% |

| Questions | Answers | Number of respondents | % of respondents |
|--|---|-----------------------|------------------|
| Question 25: What would you expect from this treasure hunt at Geneva Airport? <i>* Multiple answers possible</i> | I don't expect anything. I am not interested. | 84 | 20,10% |
| | To win some coupons for the different retailers after the security check-point at Geneva Airport. | 81 | 19,38% |
| | To be able to win a special present. | 81 | 19,38% |
| | A treasure hunt for adults & kids. | 70 | 16,75% |
| | To have updated questions every time I am coming at Geneva Airport. | 45 | 10,77% |
| | To answers questions on different themes related to Switzerland. | 36 | 8,61% |
| | A treasure hunt for children only. | 13 | 3,11% |
| | <i>Other:</i> <i>To entertain</i> | 3 | 0,72% |
| | <i>I am afraid to not have time to play.</i> | 2 | 0,48% |
| | <i>Too stressed to play.</i> | 1 | 0,24% |
| | <i>To distress</i> | 1 | 0,24% |
| | <i>Expecting quiz</i> | 1 | 0,24% |
| Question 26: Would you download a treasure hunt application to play during your free time at Geneva Airport? <i>* 1 answer possible</i> | No | 112 | 49,5575% |
| | Yes | 114 | 50,4425% |
| Question 27: If you answered yes to the previous question, how much are you willing to pay? <i>* Multiple answers possible</i> | CHF 0 | 67 | 51,94% |
| | Max. CHF 2 | 36 | 27,91% |
| | Max. CHF 3 | 9 | 6,98% |
| | Max. CHF 4 | 3 | 2,33% |
| | Max. CHF 5 | 13 | 10,08% |
| | <i>Other:</i> <i>Max. CHF 10</i> | 1 | 0,78% |

| Questions | Answers | Number of respondents | % of respondents |
|--|---|-----------------------|------------------|
| Question 28: Why would you download or not download the treasure hunt application? <i>* Multiple answers possible</i> | To entertain during the waiting time. | 93 | 15,57% |
| | Because the application is free. | 90 | 15,07% |
| | To win airplanes tickets. | 75 | 12,56% |
| | I don't see any interest in downloading a treasure hunting game to play at Geneva Airport. | 71 | 11,89% |
| | To win some coupons for the different shops and restaurants at Geneva Airport. | 64 | 10,72% |
| | To win special prizes. | 58 | 9,72% |
| | I would be interested to play a treasure hunting game with Augmented Reality. | 48 | 8,04% |
| | To play with my children. | 34 | 5,70% |
| | To have a unique experience at Geneva Airport. | 26 | 4,36% |
| | I don't like to play treasure hunting games. | 23 | 3,85% |
| | I would prefer to play treasure hunt directly from GVApp. | 13 | 2,17% |
| | <i>Other: Too stressed</i> | 1 | 0,17% |
| | <i>I don't want to pay for this, nor install an application for this.</i> | 1 | 0,17% |
| Question 29: Between these 2 images, which one would you prefer to see on your screen to help your navigation inside Geneva Airport. <i>* 1 answer possible</i> | A  | 182 | 80,53% |
| | B  | 44 | 19,47% |

| Questions | Answers | Number of respondents | % of respondents |
|---|--|-----------------------|------------------|
| Question 30: From your previous choice, please tell why you choose either image A or B. <i>* Multiple answers possible</i> | For the clarity | 166 | 26,48% |
| | For the simplification | 120 | 19,14% |
| | For the real environment aspect | 114 | 18,50% |
| | For the visibility of my surroundings | 88 | 14,04% |
| | For the design | 79 | 12,60% |
| | For the information conforming my view through my smartphone camera. | 58 | 9,25% |
| | Other | 0 | 0% |
| Section 8: Personal information (4 questions) | | | |
| Questions | Answers | Number of respondents | % of respondents |
| Question 31: Sex <i>* 1 answer possible</i> | Female | 129 | 57,08% |
| | Male | 97 | 42,92% |
| Question 32: Your age <i>* 1 answer possible</i> | 15 - 20 | 7 | 3,10% |
| | 21 - 30 | 143 | 63,27% |
| | 31 - 40 | 34 | 15,04% |
| | 41 - 50 | 23 | 10,18% |
| | 51 - 60 | 17 | 7,52% |
| | 61 or more | 2 | 0,88% |
| Question 33: How many children do you have? <i>* 1 answer possible</i> | 1 child | 19 | 8,41% |
| | 2 children | 24 | 10,62% |
| | 3 children | 7 | 3,10% |
| | 4 children | 2 | 0,88% |
| | I have no children | 174 | 76,99% |
| Question 34: Where do you live? <i>* 1 answer possible</i> | Geneva | 117 | 51,77% |
| | Other Swiss Cantons | 67 | 29,65% |
| | France | 36 | 15,93% |
| | Asia | 3 | 1,33% |
| | Other European Countries | 2 | 0,88% |
| | UK | 1 | 0,44% |

Appendix 3: Contingency Tables summary

Table 1 : Contingency summary table for the last experience of respondents at Geneva Airport

| | Knowledge on AR | | | Technology | | | | Travellers profile at Geneva Airport | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---------------|---------------|------------------|------------------|--------------------------------------|----------|--------------------------|-----------|-------------------------|--------------------|-----------------|----------------|-----------------|--------------------|----------------------------------|-----|-----|---------------|--------|---------------------|--------|--------------------------|------|
| | I read some articles about it, heard from relatives or watched something related to AR. | I have never heard about Augmented Reality. | I have downloaded/ played some Augmented reality games. | Smartphone OS | | | | Purpose of the last trip | | | | | Accompanied or not | | | | | Demographics | | | | | | | | |
| Android | | | | Apple IOS | Windows phone | Not a smartphone | Tourism, leisure | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Marital Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | Frequency of travels (past year) | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia |
| Satisfaction of the QUEUING TIME at the CHECK-IN | Yes | Yes | No | No | No | No | Yes | No | Yes | No | No | No | No | No | No | No | No | No | Yes | No | No | Yes | No | No | No | Yes |
| Satisfaction of the AIRPORT STAFF at the CHECK-IN | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No |
| Satisfaction of the QUEUING TIME at the SECURITY CHECK-POINT | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No | Yes | Yes |
| Satisfaction of the AIRPORT STAFF at the SECURITY CHECK-POINT | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | Yes | Yes | Yes | No | No | No |
| Satisfaction of the QUEUING TIME at the PASSPORT CONTROL | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | Yes | No | No | No | No | No | No | Yes | Yes |
| Satisfaction of the AIRPORT STAFF at the PASSPORT CONTROL | No | No | No | Yes | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | Yes | Yes | No | No | Yes | Yes | No | No |
| Satisfaction of the FOOD & BEVERAGE offering | No | Yes | No | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | Yes | No | Yes | No | No | No |
| Satisfaction of the SHOPS choices | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | Yes | No | Yes | No | Yes |
| Satisfaction of the AIRPORT STAFF after the SECURITY CONTROL | No | No | No | Yes | Yes | Yes | No | No | No | No | No | No | Yes | No | No | No | No | No | No | Yes | No | No | Yes | No | Yes | No |

Table 2 : Contingency summary table for the last navigation experience of respondents at Geneva Airport

| | | Knowledge on AR | | | Technology | | | | Travellers profile at Geneva Airport | | | | | | | | | | | | | | | | | | | | |
|--|--|---|---|---|---------------|-----------|---------------|------------------|--------------------------------------|----------------------------|----------|--------------------------|-----------|-------------------------|-------|-----------------|----------------|-----------------|--------------------|----------------------------------|-----|-----|---------------|--------|---------------------|--------|--------------------------|------|----------------|
| | | I read some articles about it, heard from relatives or watched something related to AR. | I have never heard about Augmented Reality. | I have downloaded/ played some Augmented reality games. | Smartphone OS | | | | Purpose of the last trip | | | | | Accompanied or not | | | | | Demographics | | | | | | | | | | |
| | | | | | Android | Apple iOS | Windows phone | Not a smartphone | Tourism, leisure | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Marital Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | Frequency of travels (past year) | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia | United Kingdom |
| Reason(s) to find navigation difficult inside Geneva Airport | Easiness to navigate inside Geneva Airport | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | Yes | No | No | Yes | No | No | No | No | No | No |
| | Not enough signs | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No |
| | Confusing or unclear Terminal signs | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No |
| | Not enough staff available to inform and guide | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No |
| | Confusing explanation of airport staff | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No |
| | Language barrier | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No |

Table 3 : Contingency summary table for the preferred navigation solution of respondents at Geneva Airport

| | | Knowledge on AR | | | Technology | | | | Travellers profile at Geneva Airport | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---------------|-----------|---------------|------------------|--------------------------------------|----------------------------|----------|--------------------------|-----------|-------------------------|-------|-----------------|----------------|-----------------|--------------------|----------------------------------|-----|-----|---------------|--------|---------------------|--------|--------------------------|------|----------------|----|
| | | | | | Smartphone OS | | | | Purpose of the last trip | | | | | Accompanied or not | | | | | Demographics | | | | | | | | | | | |
| | | I read some articles about it, heard from relatives or watched something related to AR. | I have never heard about Augmented Reality. | I have downloaded/ played some Augmented reality games. | Android | Apple iOS | Windows phone | Not a smartphone | Tourism, leisure | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Marital Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | Frequency of travels (past year) | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia | United Kingdom | |
| Reason(s) to choose either Image A or B | Preferred screen for navigation inside Geneva Airport | No | Yes | Yes | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No | No | No |
| | For the clarity | No | No | No | No | Yes | Yes | Yes | Yes | No | No | Yes | Yes | No | No | No | No | No | No | Yes | No | No | No | No | No | No | Yes | No | No | |
| | For the simplification | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| | For the real environment aspect | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | |
| | For the visibility of my surroundings | No | No | No | Yes | No | No | No | No | No | Yes | No | No | No | No | No | No | Yes | Yes | No | No | Yes | Yes | Yes | Yes | No | No | No | No | |
| | For the design | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | Yes | No | No | No | No | |
| | For the information conforming my view through my smartphone camera | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | |

Table 4 : Contingency summary table for the use of technology by respondents during their journey at Geneva Airport

| | | Knowledge on AR | | | Technology Smartphone OS | | | Purpose of the last trip | | | | | | | Travellers profile at Geneva Airport | | | | | | | | | | Demographics | | | | |
|--|---|---|---|---|--------------------------|-----------|---------------|--------------------------|------------------|----------------------------|----------|--------------------------|-----------|-------------------------|--------------------------------------|-----------------|----------------|-----------------|--------------------|----------------------------------|-----|-----|---------------|--------|---------------------|--------|--------------------------|------|----------------|
| | | I read some articles about it, heard from relatives or watched something related to AR. | I have never heard about Augmented Reality. | I have downloaded/ played some Augmented reality games. | Android | Apple iOS | Windows phone | Not a smartphone | Tourism, leisure | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Martial Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | Frequency of travels (past year) | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia | United Kingdom |
| Use of the phone to help during the journey at the Airport | | Yes | No | No | No | No | No | Yes | No | No | No | Yes | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | Yes | No | No |
| Use of GVApp (the application of Geneva Airport) | | Yes | Yes | No | Yes | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | Yes | No | No | No | No |
| Reason (s) to use the phone for travel | Entertain (games, social media, chat, news) | No | Yes | Yes | No | Yes | No | Yes | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | No | No |
| | Electronic boarding pass | Yes | No | No | No | Yes | No | Yes | No | No | No | No | No | No | Yes | No | Yes | No | No | Yes | No | Yes | No | Yes | Yes | No | Yes | No | No |
| | Check flight (s) information | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No |
| | Online Check-in | Yes | Yes | No | No | Yes | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | Yes | Yes | No | No | No | No | No | No | No |
| | Manage my booking | Yes | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No |
| | I do not use my phone to manage my travel journey | No | Yes | No | Yes | Yes | No | Yes | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | Yes | No | No | No | Yes | No | No | No |
| | Navigate in the Airport terminal (map) | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No |
| | To navigate outside the Airport | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No |
| | Information on connection with train and taxi | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No |
| | Business communication | No | No | Yes | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | Yes | No | No | No |

Table 5 : Contingency summary table for estimating the willingness of respondents to purchase an Augmented Reality application

| | Knowledge on AR | | | Technology Smartphone OS | | | | Travellers profile at Geneva Airport | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|-----------------------------|-----------|---------------|------------------|--------------------------------------|----------|--------------------------|-----------|-------------------------|--------------------|-----------------|----------------|-----------------|--------------------|----------------------------------|--------------|-----|---------------|--------|---------------------|--------|--------------------------|------|----------------|----|
| | I read some articles about it, heard from relatives or watched something related to AR. | I have never heard about Augmented Reality. | I have downloaded/ played some Augmented reality games. | Android | Apple iOS | Windows phone | Not a smartphone | Purpose of the last trip | | | | | Accompanied or not | | | | | Frequency of travels (past year) | Demographics | | | | | | | | | |
| Tourism, leisure | | | | | | | | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Marital Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia | United Kingdom | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Willingness to purchase an Augmented Reality application | Yes | Yes | Yes | No | No | No | No | Yes | Yes | No | No | No | No | Yes | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No |
| The maximum amount willing to pay in CHF for an Augmented Reality application | Yes | Yes | No | No | No | No | No | No | No | Yes | No | No | No | No | No | Yes | No | No | No | No | Yes | Yes | No | No | No | No | No | No |

Table 6 : Contingency summary table for estimating the willingness of respondents to play and download a treasure hunting game at Geneva Airport

| | Knowledge on AR | | | Technology | | | | Travellers profile at Geneva Airport | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---------------|-----------|---------------|------------------|--------------------------------------|----------------------------|----------|--------------------------|-----------|-------------------------|-------|-----------------|----------------|-----------------|--------------------|----------------------------------|-----|-----|---------------|--------|---------------------|--------|--------------------------|------|----------------|----|----|----|----|
| | | | | Smartphone OS | | | | Purpose of the last trip | | | | | Accompanied or not | | | | | | Demographics | | | | | | | | | | | | | |
| | I read some articles about it, heard from relatives or watched something related to AR. | I have never heard about Augmented Reality. | I have downloaded/ played some Augmented reality games. | Android | Apple iOS | Windows phone | Not a smartphone | Tourism, leisure | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Marital Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | Frequency of travels (past year) | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia | United Kingdom | | | | |
| Interest to play a treasure hunting game after having passed the security control at Geneva Airport. | Yes | Yes | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| Willingness to download such a treasure hunt application to play during free time at Geneva Airport. | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No |
| Willingness to pay for such a treasure hunt application. | No | No | No | No | No | Yes | No | No | No | Yes | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | Yes | No | No | No | No | No | No |

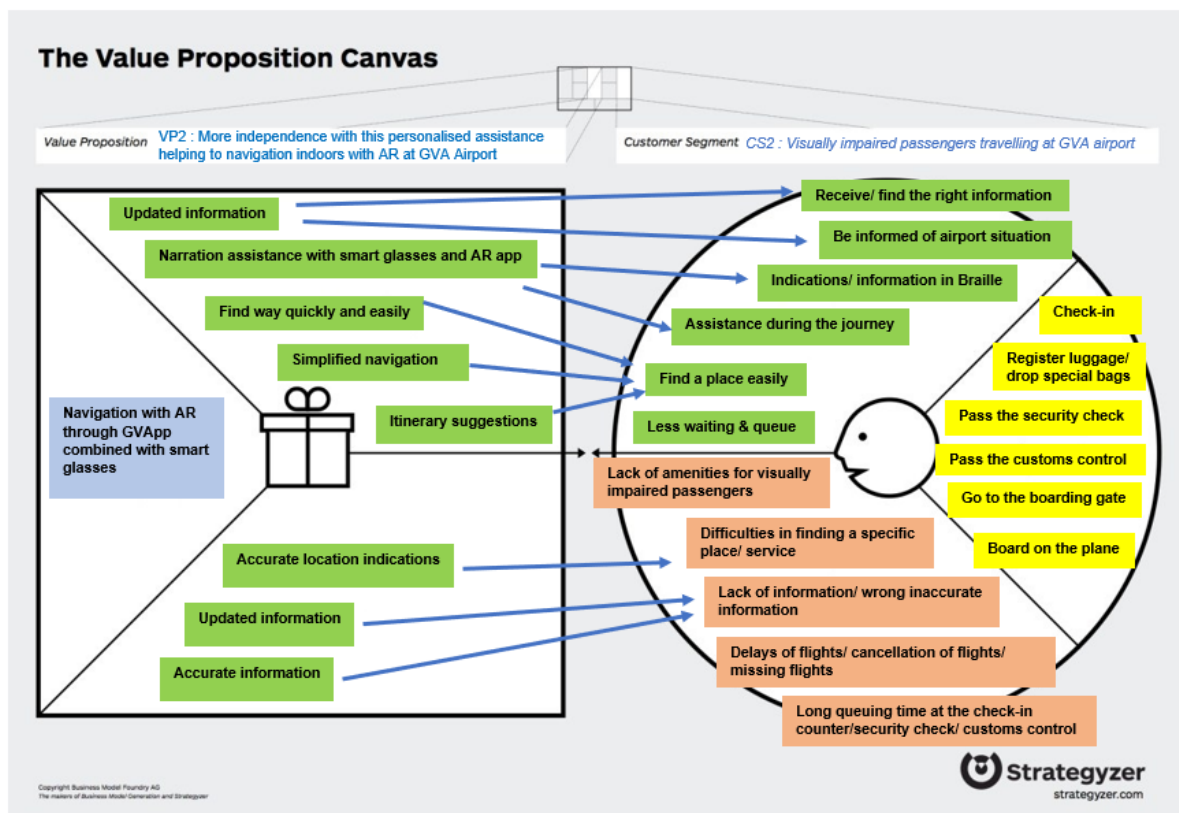
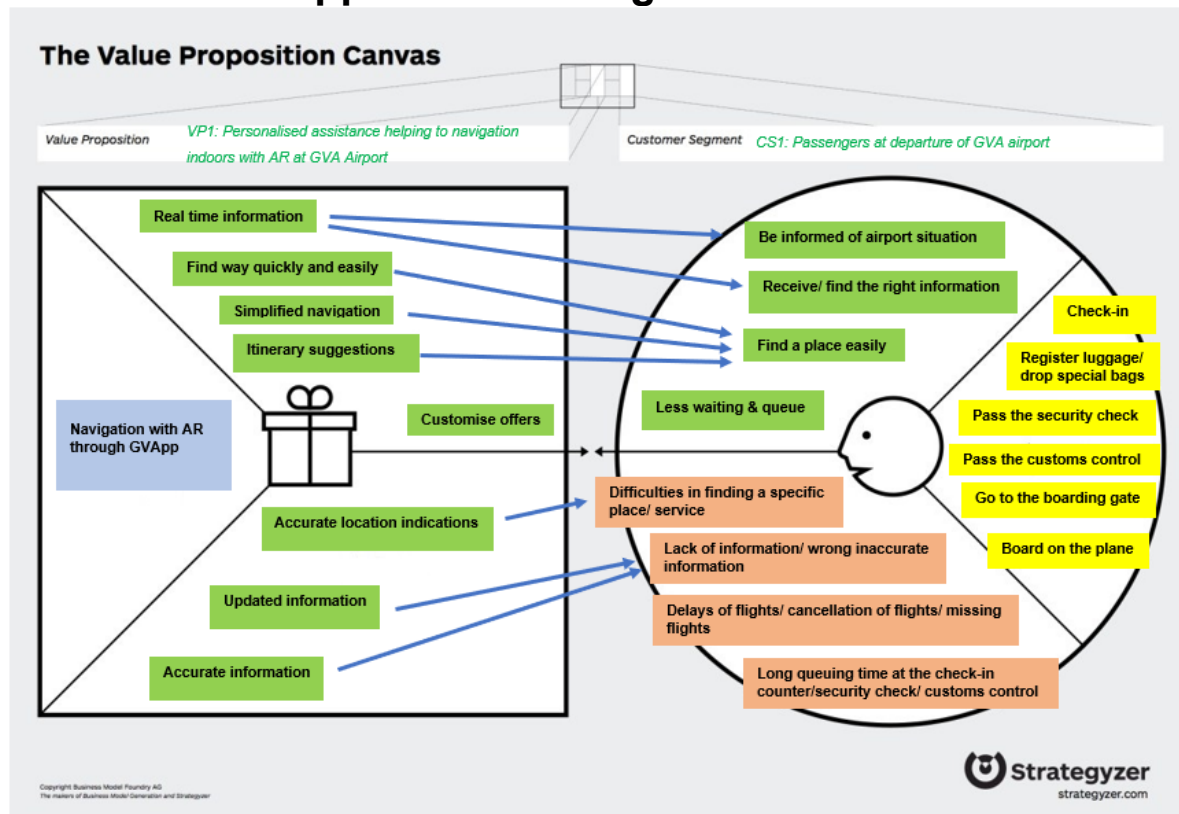
Table 7 : Contingency summary table to determine respondents' expectations from a treasure hunting game at Geneva Airport

| Expectation(s) from a treasure hunting game at Geneva Airport | Knowledge on AR | | | Technology | | | | Purpose of the last trip | | | | | | | | | | Travellers profile at Geneva Airport | | | | | | | | | |
|--|---|---|---|---------------|-----------|---------------|------------------|--------------------------|----------------------------|----------|--------------------------|-----------|-------------------------|--------------------|-----------------|----------------|-----------------|--------------------------------------|----------------------------------|-----|-----|---------------|--------|---------------------|--------|--------------------------|------|
| | I read some articles about it, heard from relatives or watched something related to AR. | I have never heard about Augmented Reality. | I have downloaded/ played some Augmented reality games. | Smartphone OS | | | | Purpose of the last trip | | | | | | Accompanied or not | | | | Demographics | | | | | | | | | |
| | | | | Android | Apple iOS | Windows phone | Not a smartphone | Tourism, leisure | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Marital Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | Frequency of travels (past year) | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia |
| I don't expect anything. I am not interested | Yes | Yes | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No |
| To win some coupons for the different retailers after the security Check-point at Geneva Airport | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No | No |
| To be able to win a special present | Yes | Yes | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | Yes | Yes | No | No | No | Yes | No |
| A treasure hunt for adults and children | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No |
| To have updated questions every time, I am coming at Geneva Airport | No | Yes | Yes | No | No | No | No | No | No | No | No | No | Yes | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No |
| To answers questions on different themes related to Switzerland | No | No | Yes | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No |
| A treasure hunt for children only | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | Yes | Yes | Yes | No | No | No | Yes |
| To entertain | No | No | No | No | Yes | No | Yes | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | Yes | Yes | No | No |
| I am afraid to not have time to play | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No |
| To destress | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No |
| Expecting quiz | No | No | Yes | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No |

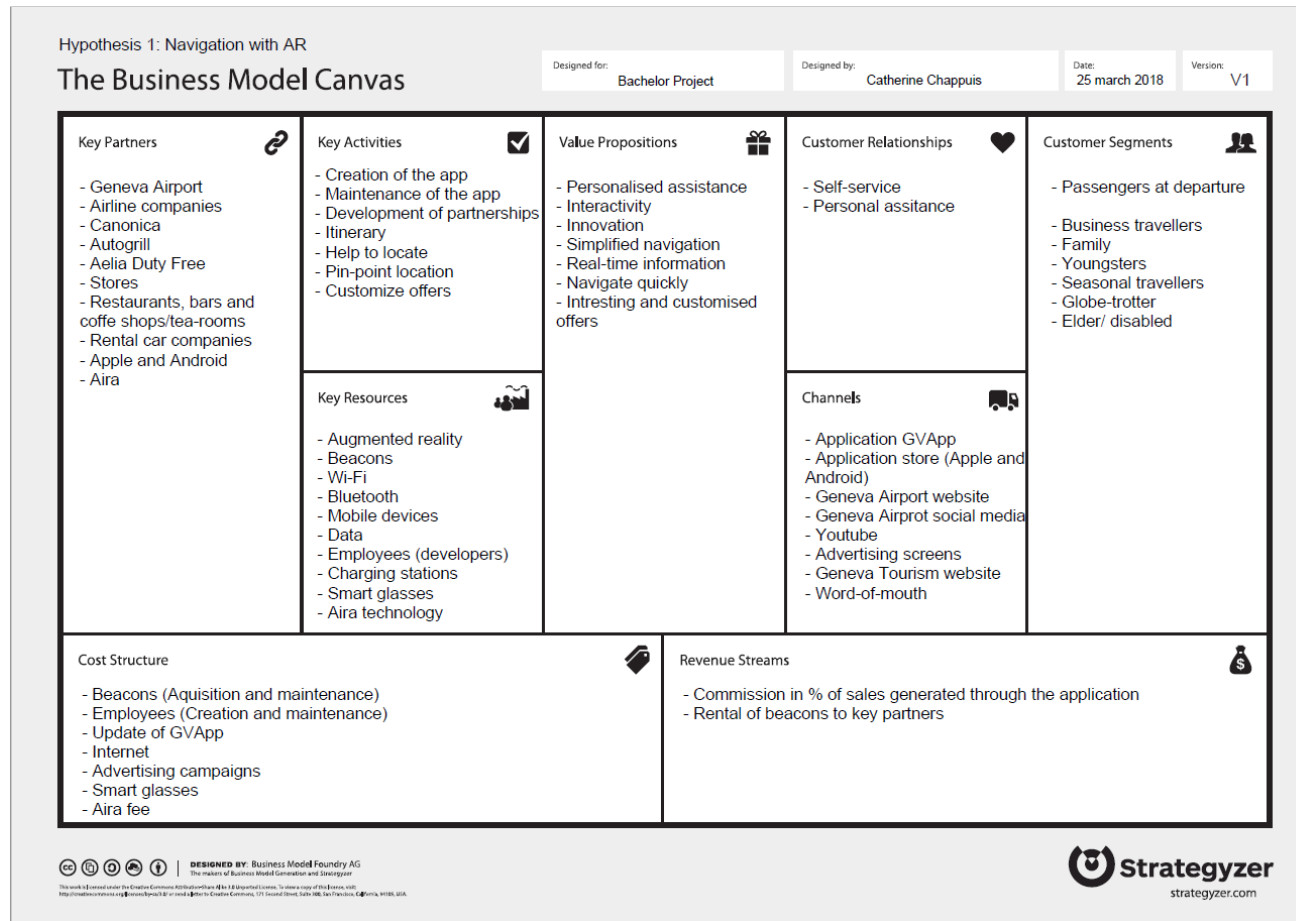
Table 8 : Contingency summary table of the respondents' reason(s) to download or not a treasure hunting game at Geneva Airport

| Reason(s) to download or not download the treasure hunt application | Knowledge on AR | | | Technology | | | | Purpose of the last trip | | | | | | Travellers profile at Geneva Airport | | | | | | | | | | | | | | | | |
|---|--|--|---|---------------|-----------|---------------|------------------|--------------------------|----------------------------|----------|--------------------------|-----------|-------------------------|--------------------------------------|-----------------|----------------|-----------------|--------------------|----------------------------------|--------------|-----|---------------|--------|---------------------|--------|--------------------------|------|----------------|----|----|
| | I read some articles about it, heard from relatives or noticed something related to AR | I have never heard about Augmented Reality | I have downloaded/played some Augmented reality games | Smartphone OS | | | | Purpose of the last trip | | | | | | Accompanied or not | | | | | | Demographics | | | | | | | | | | |
| | | | | Android | Apple iOS | Windows phone | Not a smartphone | Tourism, leisure | Visiting family or friends | Business | Erasmus, Language Travel | Volunteer | Marital Art Competition | Alone | With my partner | With my family | With my friends | With my colleagues | Frequency of travels (past year) | Sex | Age | Have children | Geneva | Other Swiss Cantons | France | Other European Countries | Asia | United Kingdom | | |
| To entertain during the waiting time | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No | No | No | Yes | No | No | No | No | No | No | |
| Because the application is free | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No | No | No | Yes | No | No | Yes | No | No | No | No |
| To win airplanes tickets | Yes | Yes | No | No | No | No | No | No | No | No | Yes | No | No | Yes | No | Yes | No | No | No | No | No | No | No | No | No | Yes | No | No | No | |
| I don't see any interest in downloading a treasure hunting game to play at Geneva Airport | Yes | Yes | No | No | No | No | Yes | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | |
| To win some coupons for the different shops and restaurants at Geneva Airport | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| To win special prizes | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | |
| I would be interested to play a treasure hunting game with Augmented Reality | Yes | Yes | No | No | No | No | No | No | No | No | No | No | Yes | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| To play with my children | Yes | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | Yes | No | Yes | No | Yes | Yes | No | No | No | No | No | No | |
| To have a unique experience at Geneva Airport | No | No | No | Yes | Yes | No | No | No | No | No | Yes | No | No | Yes | No | No | No | No | No | No | Yes | No | No | No | No | Yes | No | No | No | |
| I don't like to play treasure hunting games | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| I would prefer to play treasure hunt directly from GVApp | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| Too stressed | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| I don't want to pay for this, nor install an application for this | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | Yes | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |

Appendix 4: Navigation VPC



Appendix 5: Navigation BMC



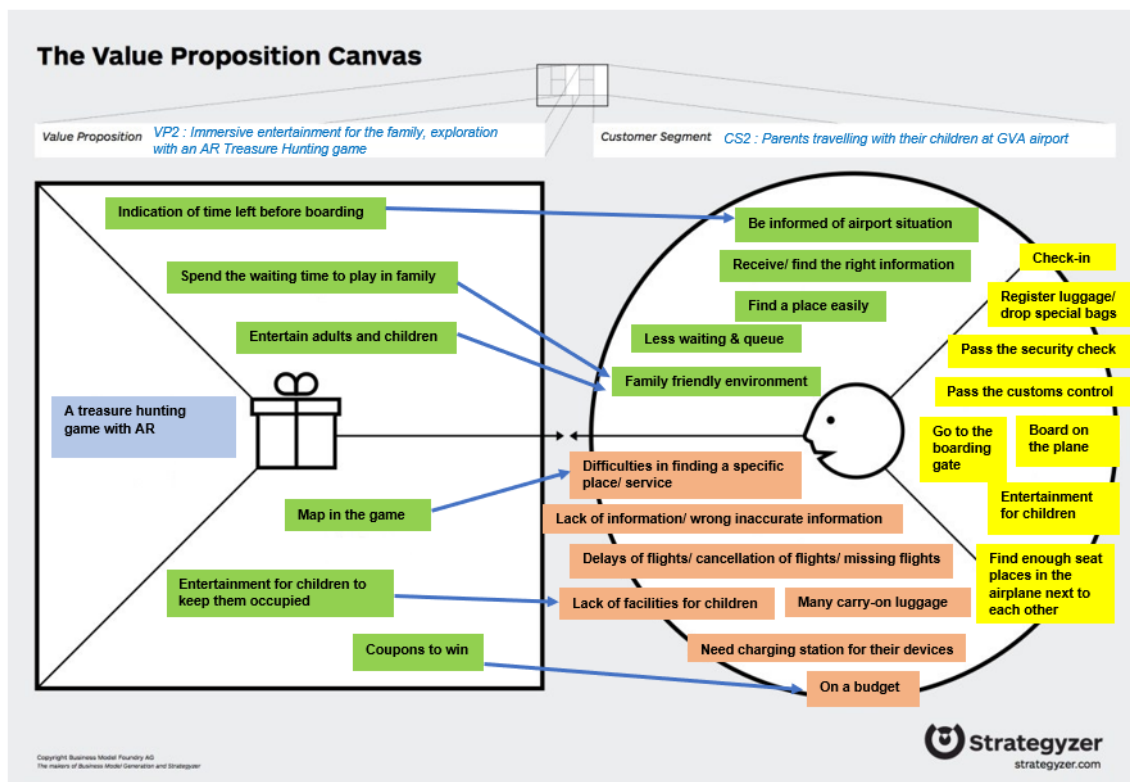
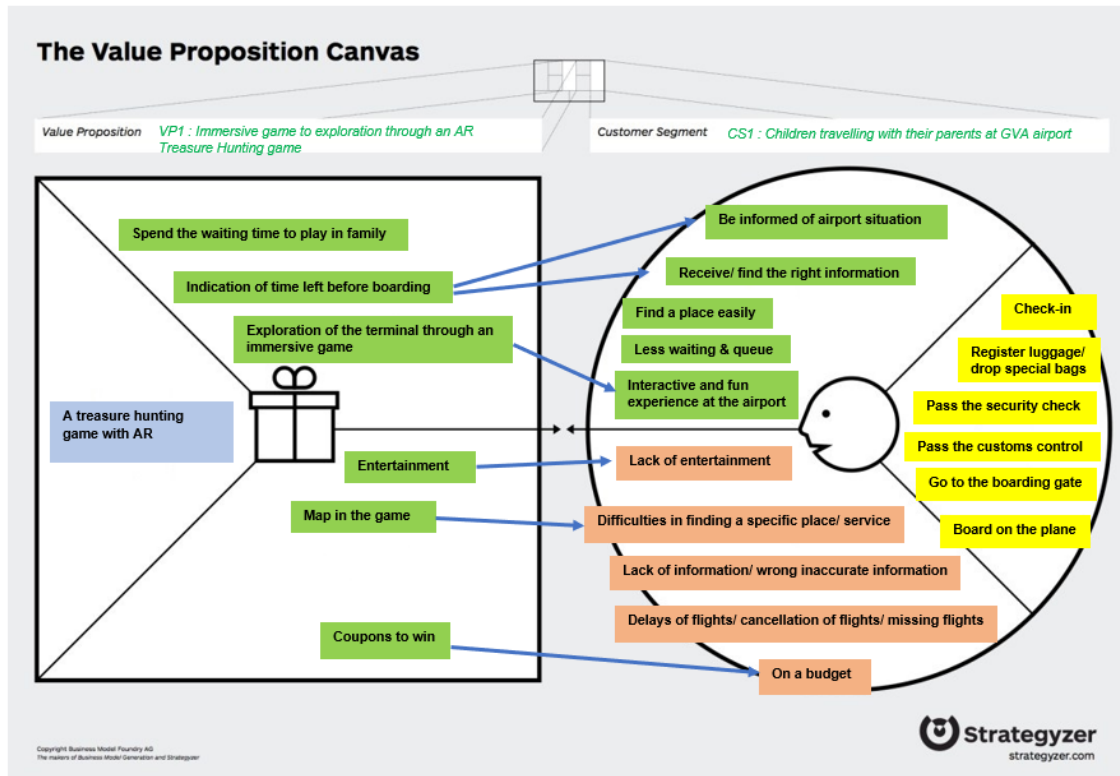
Appendix 6: Test iOS user

| Test grid: the map of GVApp | |
|---|--|
| Date : Saturday, 28th of July 2018 | Location: Geneva Airport, Terminal 1 |
| Itinerary: from the rental area to GVApp assistance | Operating system: iOS 11.4.1 |
| Profile of user Woman Age: 21 to 30 Living area: Geneva Travelling profile: <ul style="list-style-type: none"> o Long-haul flights o Travelling frequency: 3 to 4 times a year o GVApp user, but first time using the map | |
| Test on: | |
| Design | The design is fine |
| Indications | No telling to turn right or left. Explanation not clear enough. Hence, if looks attentively on the map there is a blue line showing the way but the explanation above is not indicating to go on your left or right. |
| Clarity | To find shop on the map, it is not very handy. Have to zoom in/ out to get the best angle/ view of the map. After using all the option on the map screen I saw that I can change the view level as check-in area / departure area. Also I can enter an area on the menu bar to ask for an itinerary. Take few minutes to test everything to see what would help me the most. |
| Positioning | The point that is representing the user is not very accurate. Error of few meters. |
| Responsiveness of the application | The map was loading quick enough and the various features were very responsive, no problem. |
| Language | Automatic detection of the phone language, no possibility to chose or switch to another language |
| Other: | Not very handy to use. I have to zoom in and zoom out in order to see the airport map with more detail. |
| Would you recommend the use of GVApp map to other people? | No. I would rather ask to an airport staff to indicate me the direction than use the map. |

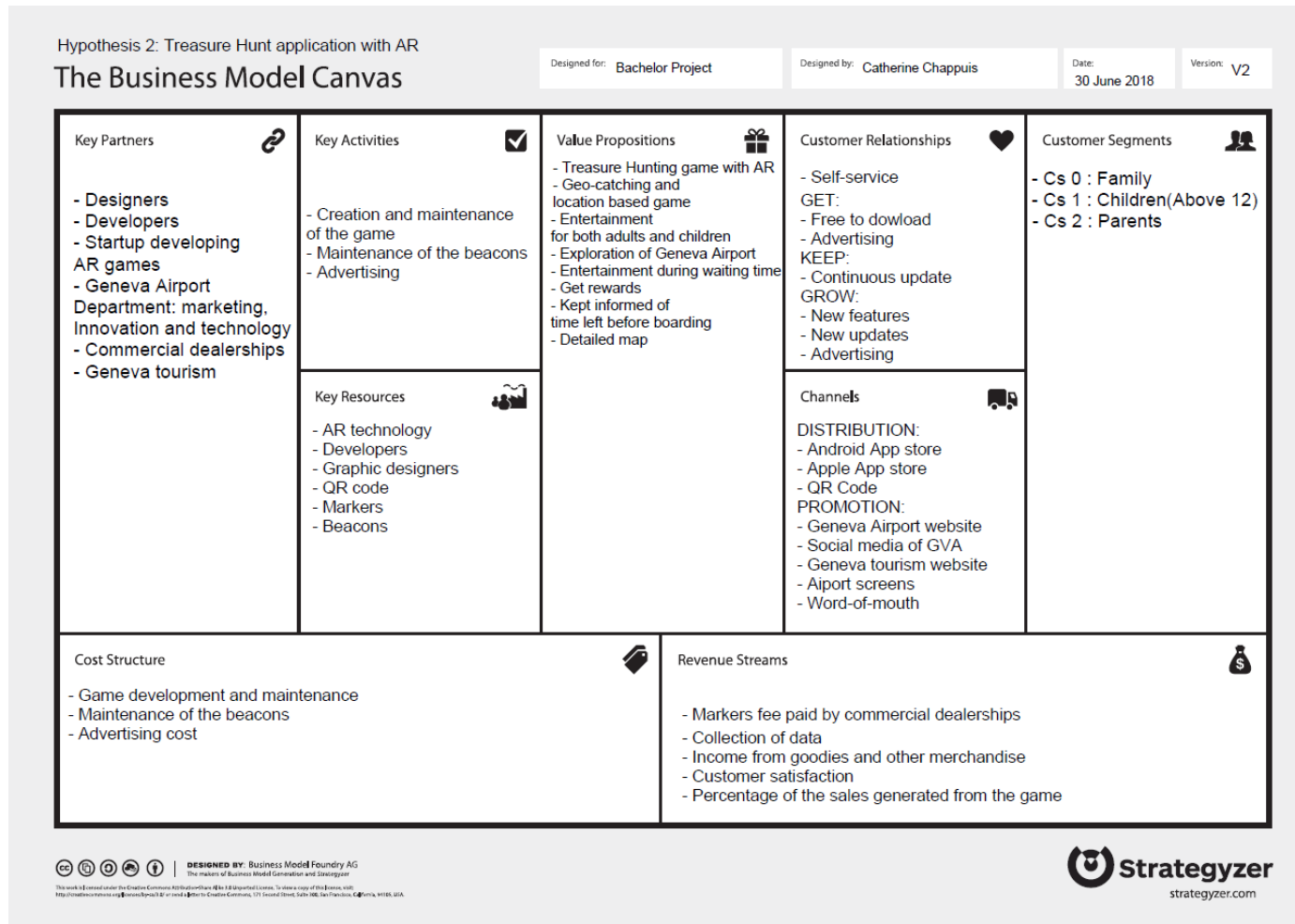
Appendix 7: Test Android user

| Test grid: the map of GVApp | |
|---|---|
| Date : Saturday, 28th of July 2018 | Location: Geneva Airport, Terminal 1 |
| Itinerary: from the rental area to GVApp assistance | Operating system: Android 8.0 |
| Profile of user Man Age: 21 to 30 Living area: Geneva Travelling profile: <ul style="list-style-type: none"> o Long-haul flights o Travelling frequency: 3 to 4 times a year o Non-GVApp user, first time using the application | |
| Test on: | |
| Design | Design is ok but confusing as it first shows the whole airport |
| Indications | Not clear, asks user to enter his own location |
| Clarity | Not clear, too much information at once |
| Positioning | Does not detect the user's position |
| Responsiveness of the application | The application responds to input well, and loading time is short |
| Language | No possibility to change the language, which is a negative point. Wanted to change the language of the application but did not have a choice. |
| Other: | |
| Would you recommend the use of GVApp map to other people? | No |

Appendix 8: Treasure Hunt VPC



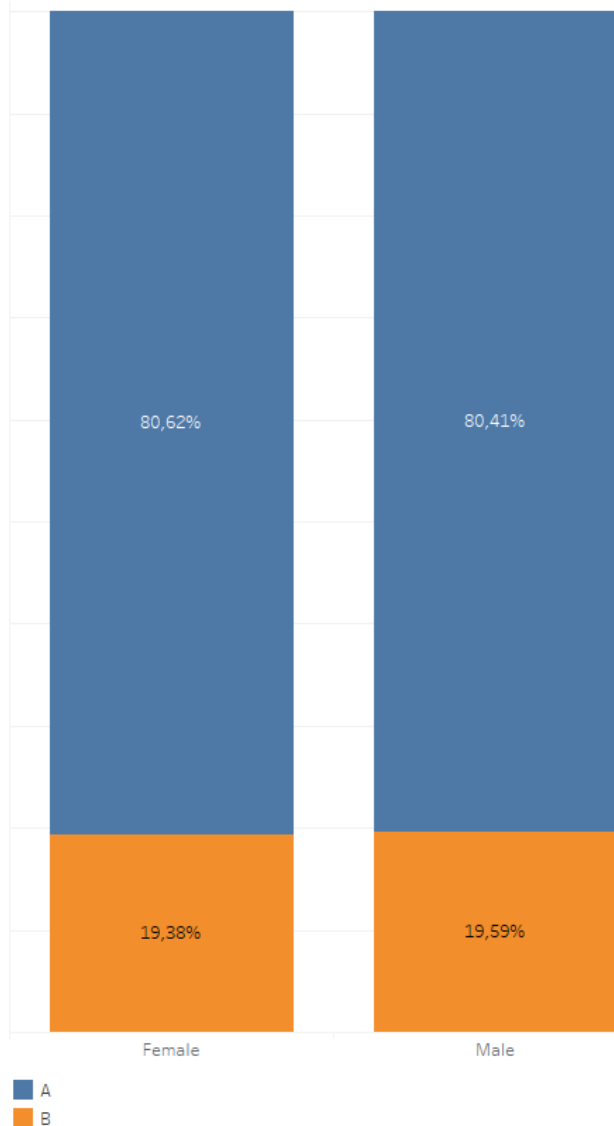
Appendix 9: Treasure Hunt BMC



Appendix 10: Comparative analysis for hypothesis 1

1. Demographic

Analysis 1: sex (Q31) and preferred screen to navigate (Q29)



This graph is showing the comparison between female passengers and male passengers and their preferred navigation screen. (picture A, navigation with AR and picture B, the map from GVApp).

Analysis & conclusion

Female passengers: 57.08% of respondents to this survey are women. 80.62% preferred to navigate inside Geneva Airport with screen A over screen B. Still 19.38% of female passengers would chose screen B to find their way.

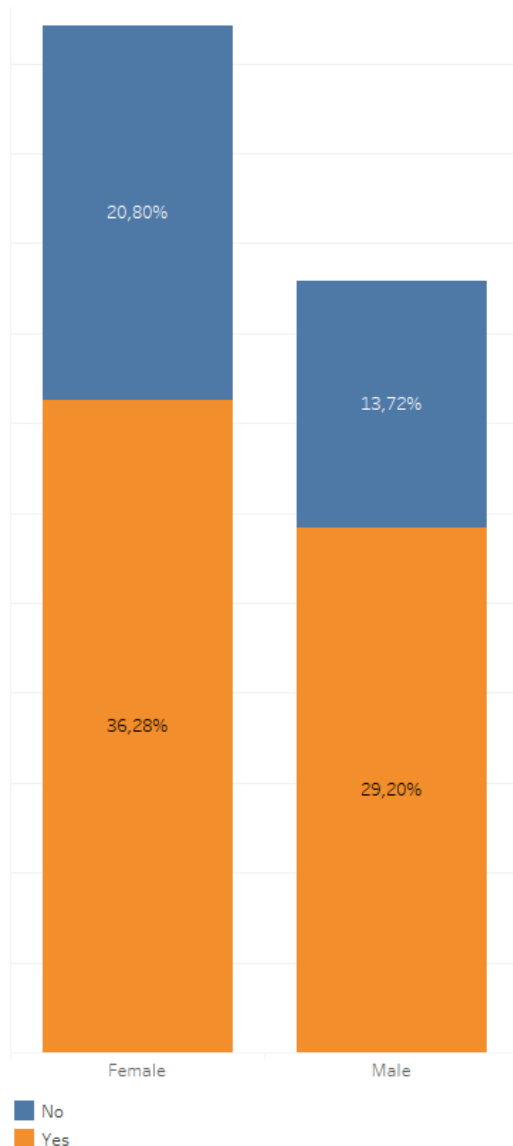
Male passengers: 42.92% are men answering to this survey. 80.41% of male passengers said to prefer screen A to navigate while 19.59% would choose screen B.

In conclusion, at one glance, it is possible to see that both female and male passengers preferred screen A over screen B at almost a similar percentage. Meaning that passengers of both sex would prefer to navigate with Augmented Reality inside the airport. However, an in-depth analysis should be done to establish why they have in majority chosen screen A over B.

Analysis 2: use the phone to help during the journey (Q18) and sex (Q31)

This graph is showing the comparison between people that use or do not use their phone to help during their journey at the airport and their sex.

Analysis & conclusion



Do not use their phone to help during their journey at the Airport: 20.80% of female respondents do not use their smartphone to help them while being at the airport and male respondents part is of 13.72%.

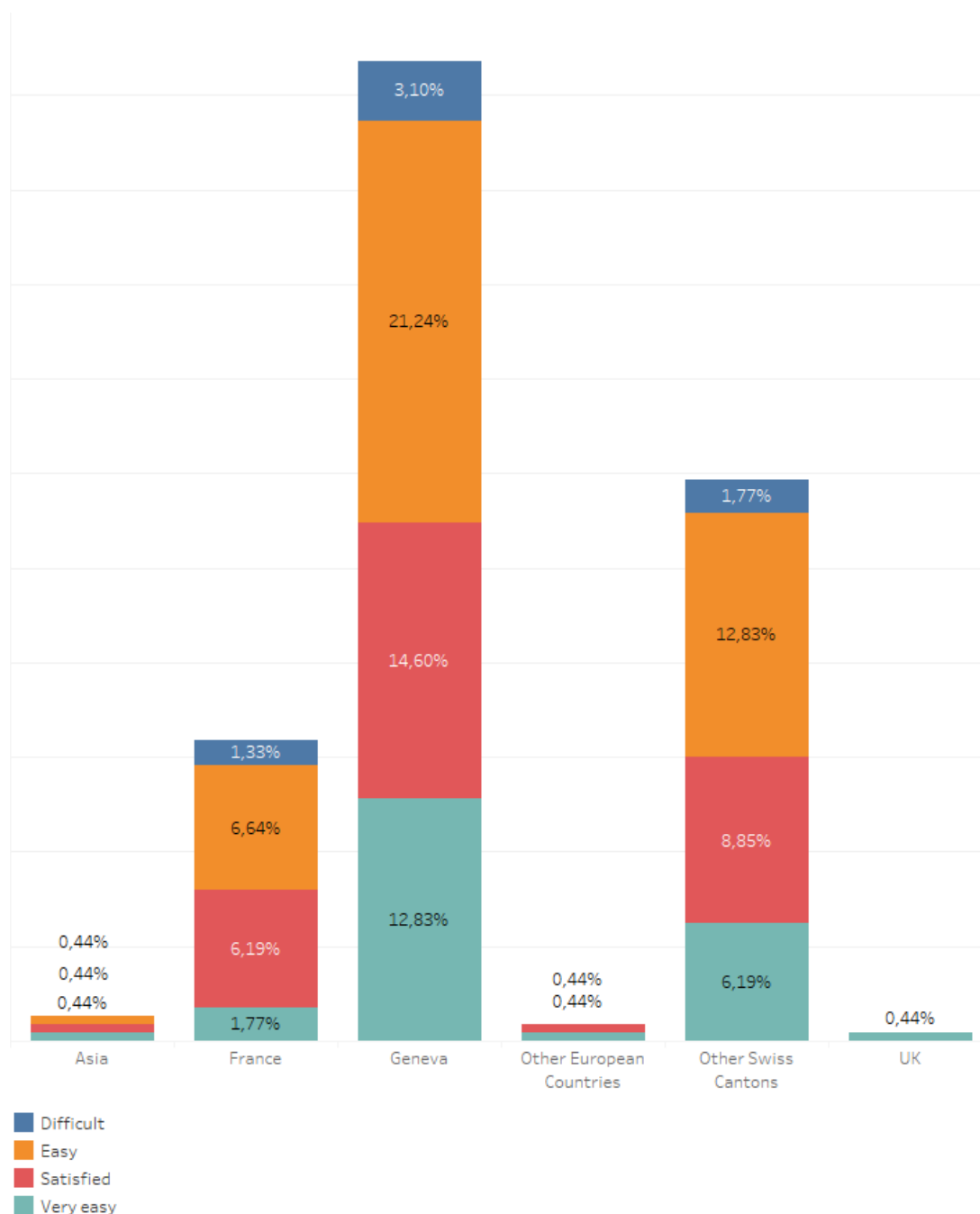
Use their phone to help during their journey at the Airport: 36.28% of women use their phone to help them during the journey at the airport and 29.20% for men.

To conclude, females were more responsive to this survey as they represent 57.08% of respondents. Nonetheless, from this sample of 226 answers, it enables to see that in majority, males and females tend to use their phone to help them during their journey at the airport. The difference of men or male respondents using or not using their phone in their journey at the airport is the same, representing 15.48%. Meaning, that males or females do not influence the fact that they tend to use their phone or not during their journey at the airport.

Analysis 3: living area (Q34) and navigation indoors (Q15)

This graph is showing the comparison between the location where the respondent lives and the easiness he/she navigates inside Geneva Airport.

Analysis & conclusion



Asia: **1.33%** of the respondents are living in Asia and have travelled at Geneva Airport. From their answers, **0.44%** find navigation easy, **0.44%** find navigation satisfying and

0.44% find navigation very easy. None of them seem to have encountered any difficulties related to navigation from their most recent trip at Geneva Airport.

France: **15.93%** of people surveyed are living in France. From their last travel experience at Geneva Airport, they are in majority finding their way easily inside Geneva Airport. Indeed **6.64%** find navigation easy, **6.19%** find navigation satisfying, **1.77%** find very easy. Still, **1.33%** find it difficult to find their way inside the airport.

Geneva: The biggest group of respondents from this survey with **51.77%**. They are mostly finding their way either easily. Indeed, **21.24%** are finding navigation easy, **14.60%** find navigation satisfying and **12.83%** find navigation very easy. Still, **3.10%** encountered some difficulties to navigate from their last travel experience at the airport.

Other European Countries: **0.88%** of respondents are living in other European countries. This group is satisfied of the navigation at Geneva Airport with **0.44%** and very satisfied at **0.44%**. None of the respondents from this group had experienced any difficulties in their last travel experience at Geneva Airport.

Other Swiss Cantons: The second biggest group of respondents from this survey with **29.65%** living in other Swiss Cantons are, in majority, finding navigation easy at **12.83%**, navigation satisfying at **8.85%** and navigation very easy at **6.19%**. Only **1.77%** of respondents find navigation difficult inside Geneva Airport.

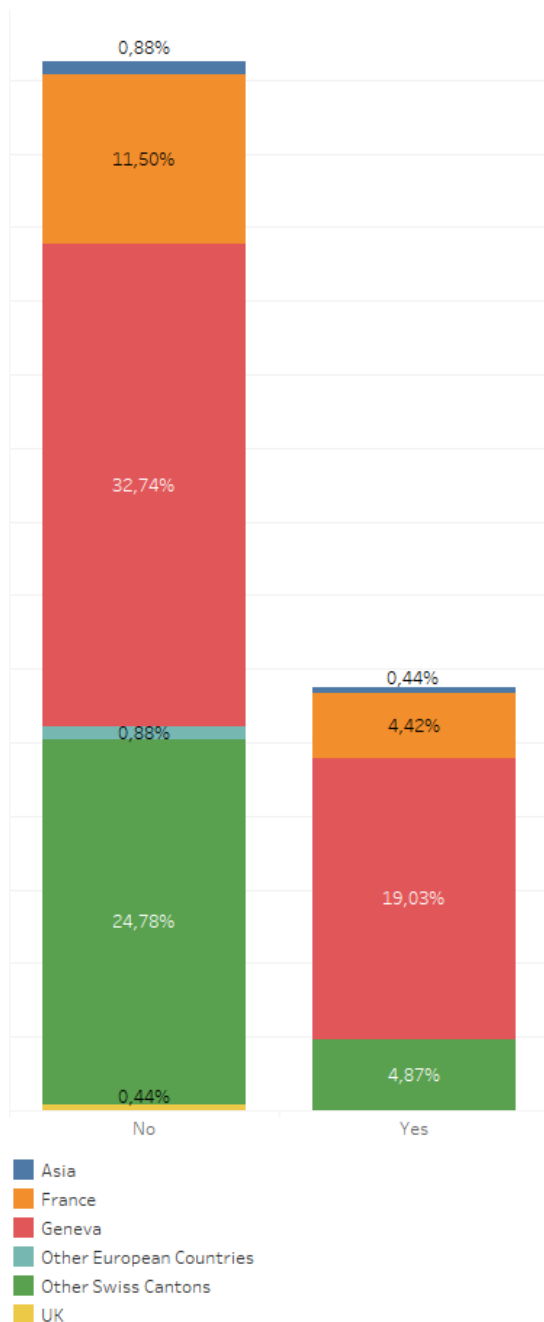
UK: **0.44%** of the respondents live in the UK and have travelled at Geneva Airport. They all find it very easy to navigate inside Geneva Airport.

In conclusion, the majority of people from each different living locations find navigation relatively easy or satisfying inside Geneva Airport. Again, it means that the navigation is quite clear for passengers inside the airport. Concerning the people who have experienced some difficulties during their last journey at Geneva Airport, they are mostly living in Geneva, followed by Other Swiss Cantons and France.

Analysis 4: living area (Q34) and GVApp (Q19)

This graph is showing the comparison between the living area of the respondents and the use or not of GVApp, the application of Geneva Airport.

Analysis & conclusion



Asia: **0.44%** of respondents living in this area said to use GVApp while **0.88%** do not use GVApp.

France: **11.50%** of respondents stated to not use GVApp and **4.42%** use the Geneva Airport application, GVApp.

Geneva: In majority with **32.74%** of respondents living in this location do not use GVApp and **19.03%** use GVApp.

Other European Countries: **0.88%** of respondents said to not use GVApp.

Other Swiss Cantons: In majority with **24.78%** of respondents saying to not use GVApp while only **4.87%** use the application to help them during their journey at the airport.

UK: With **0.44%** of respondents living in this area, do not use GVApp.

To conclude, most of the respondents do not use GVApp. Respondents from Geneva are people with the highest usage rate of the Geneva Airport application while some respondents from other location such as the UK and Other European Countries have no respondents using the application. However, as a reminder the sample of answers is

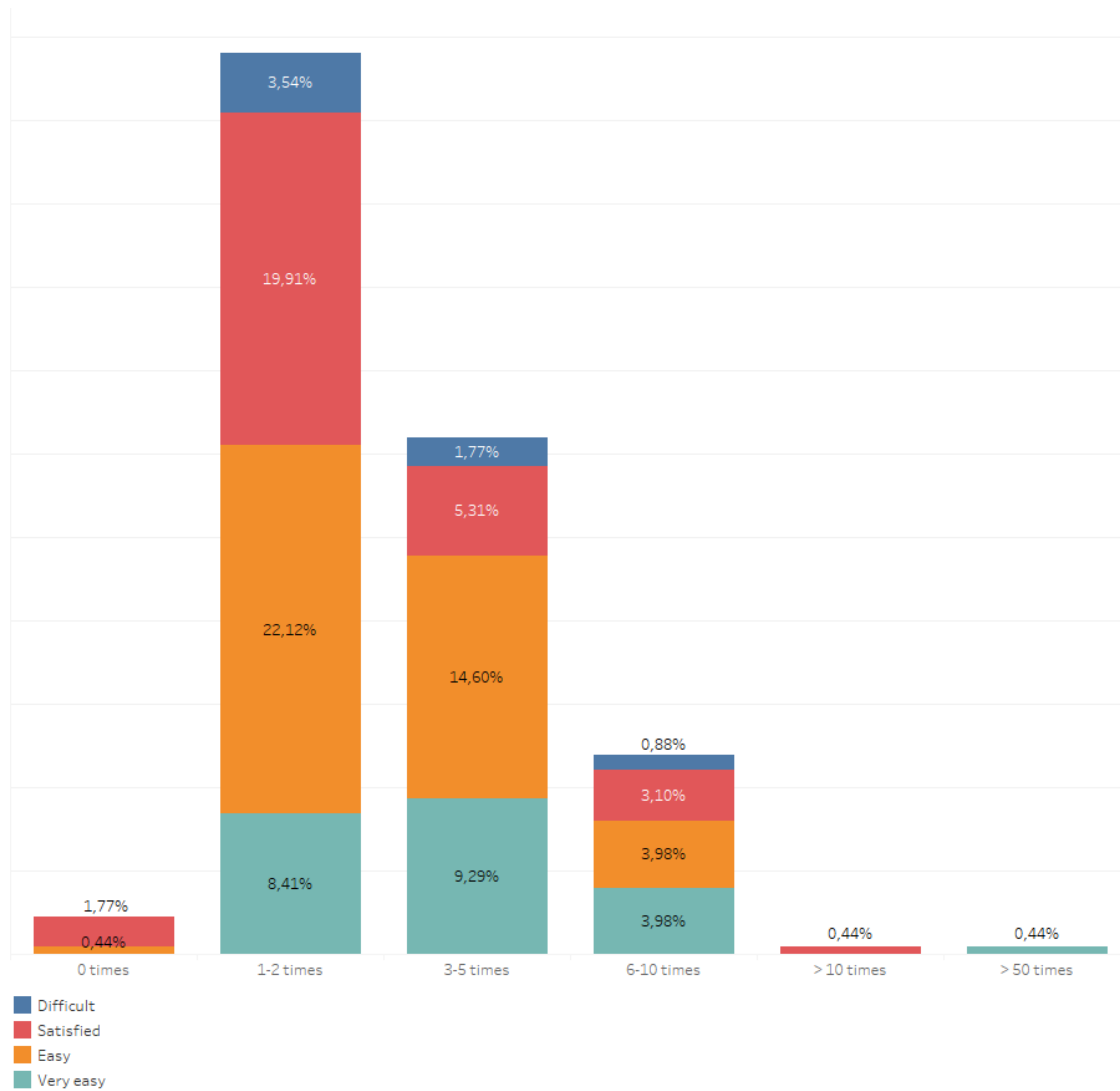
very restrictive with slightly more than half of the respondents who live in Geneva. This graph also shows that the GVApp application is used more by people living in the following locations: Geneva, Other Swiss cantons and France. Further search should be done to understand why people located in other areas do not use GVApp when they are travelling at Geneva Airport. In addition, some deeper search should be undertaken to understand why local, other Swiss Cantons and French border people are still not using the application while travelling at Geneva Airport, as they would represent travellers that are more likely to repeat their travel at Geneva Airport.

2. Travellers profile influence

Analysis 5: travelling frequency (Q5) and navigation indoor (Q15)

This graph is showing the comparison between the number of times that the respondents have travelled by plane at Geneva Airport in the past year and the easiness that they felt about navigating inside Geneva Airport.

Analysis & conclusion



0 times: **2.21%** stated that they did not travel at Geneva Airport in the past year. However, **1.77%** seem to have found the navigation satisfying and **0.44%** to have found it easy.

1-2 times: **53.98%** of respondents answered that they have travelled at Geneva Airport between 1 to 2 times in the past year. **22.12%** have found navigation easy, **19.91%** have

found very easy while **19.91%** have found navigation satisfying. Only **3.54%** have found navigation difficult at Geneva Airport in the past year.

3-5 times: With **30.97%** of respondents answering to have travelled at Geneva Airport in the past year, 3 to 5 times, still **1.77%** found navigation difficult. While **14.60%** found navigation easy, **9.29%** found navigation very easy and **5.31%** found navigation satisfying.

6-10 times: In the past year **11.95%** of respondents have travelled between 6 to 10 times at Geneva Airport. **0.88%** found navigation difficult while **3.98%** found it easy, **3.10%** found it satisfying and **3.98%** found it very easy.

>10 times: **0.44%** of respondents have travelled more than 10 times at Geneva Airport, which means that they are frequent travellers and they are satisfied at **0.44%** of the navigation indoors.

>50 times: **0.44%** of respondents have travelled more than 50 times at Geneva Airport and are in the category of frequent travellers. They have found it very easy to navigate inside Geneva Airport at **0.44%**.

In conclusion, respondents that have travelled more than 10 times at Geneva Airport in the past year have not encountered any difficulties to navigate, same for those who did not travel in the past year. However, respondents that have travelled 1 to 2 times in the past year is the group category to encounter the highest percentage of difficulties with **3.54%**. Followed by the ones that travel between 3 to 5 times with **1.77%** and the ones to travel 6 to 10 times with **0.88%**. However, **93.80%** of respondents are satisfied or find it easy to navigate. Thus, navigation at Geneva Airport seems to be relatively easy for almost everyone.

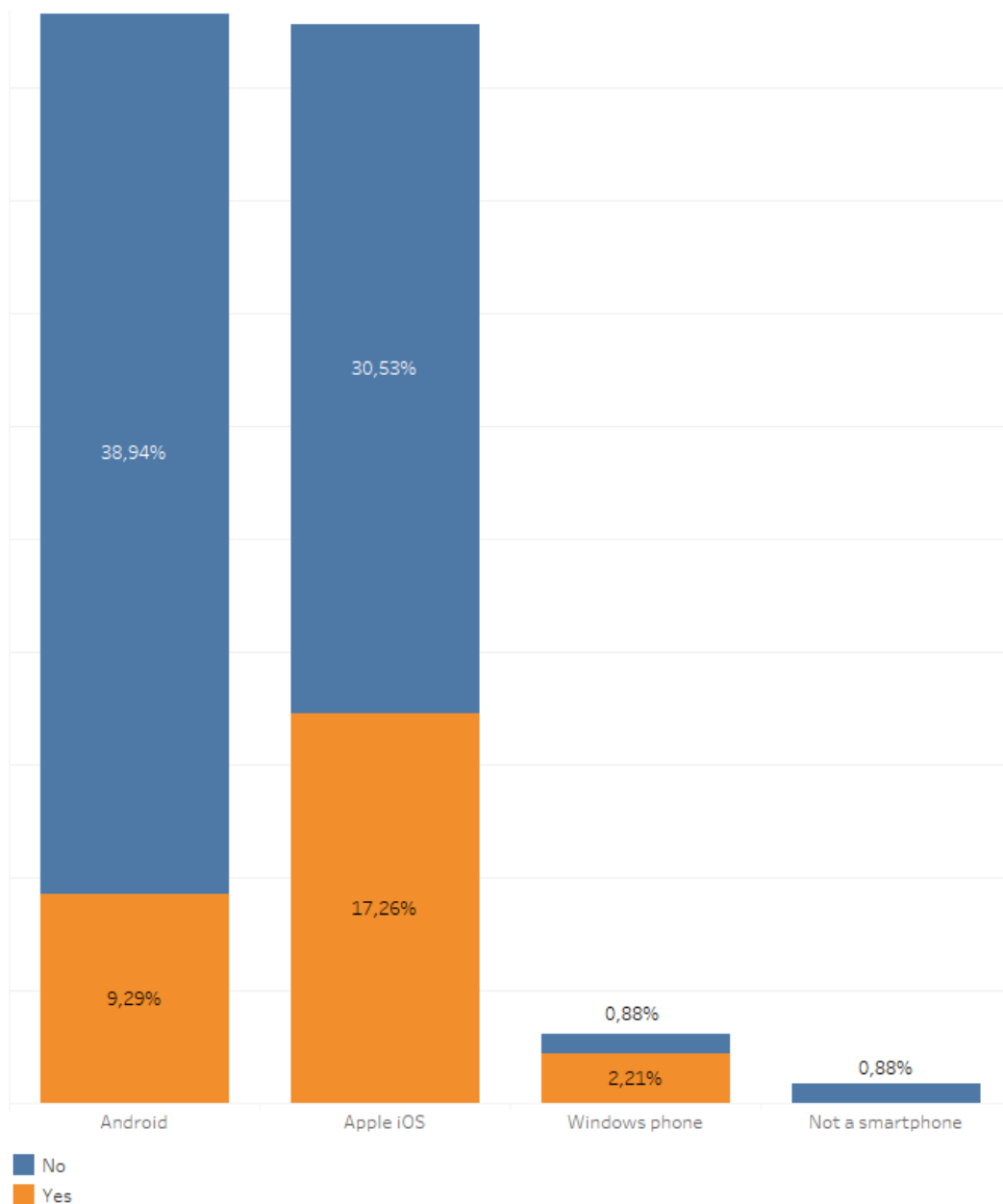
3. Technology influence

3.1. GVApp use

Analysis 6: GVApp (Q19) and phone operating system (Q17)

This graph is showing the comparison between people that have downloaded or not GVApp and the operating system (OS) of respondents' phone.

Analysis & conclusion



“No” GVApp: 38.94% of the respondents have an Android phone and do not use GVApp, followed by 30.53% of Apple users. In equal part of percentage non-smartphone and Windows phone users with 0.88%. Showing that the majority of respondents do not use GVApp with an important part of Android users.

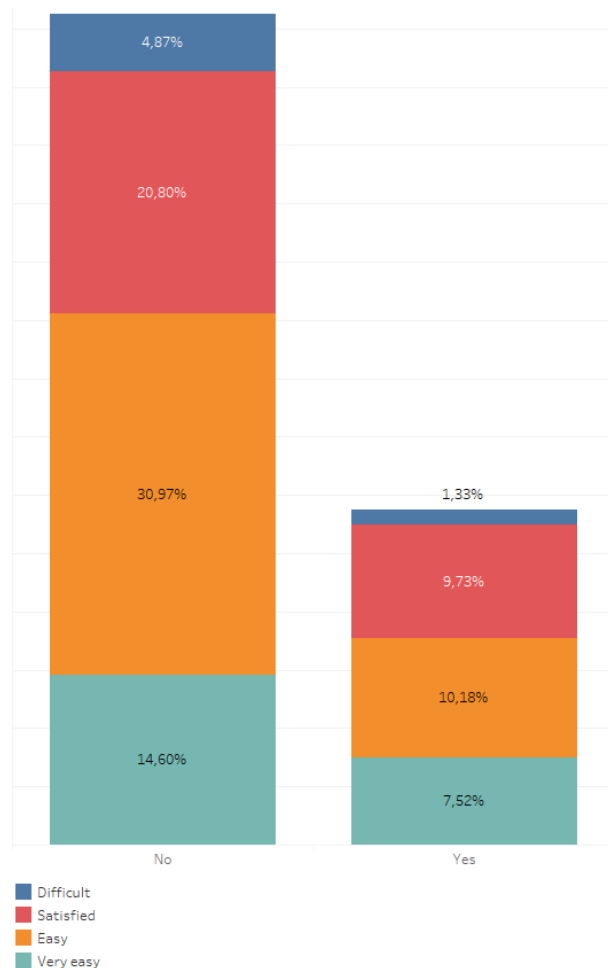
“Yes” GVApp:17.26% of passengers having an Apple device have GVApp, while 9.29% are Android users and 2.21% for Windows phone. This demonstrate that Apple users are mainly the “client” and the one to download the application of Geneva Airport.

To conclude, Android smartphones users are in majority not using GVApp. On the other hand, Apple smartphone users are the ones to be most represented as having downloaded GVApp. However, an important part of the respondents, 71,24%, do not use GVApp. Meaning that few people who answered this survey use the Geneva Airport application. Supposing also that a huge part of Android users do not have enough incentives to download the application or that the application might not be adapted to Android devices. Further research should be done to understand why most Android users do not download the application and why few people have the application in general.

Analysis 7: people with GVApp (Q19) and navigation indoor (Q15)

This graph is showing the comparison between people that have downloaded GVApp or not, and the easiness at which they are navigating through Geneva Airport terminal(s).

Analysis & conclusion



“No” GVApp: 71.24% of the surveyed people have not downloaded GVApp. From that, **66.37%** do not encounter any problems while navigating in Geneva Airport. What can be assumed is that they do not need to download any application to help navigate as they find their way easily. On the other hand, **4.87%** find it difficult and do not have the GVApp application. Thus, people entering in this category should be exploited in the case of further research to evaluate why they do not have the application and if it can enhance their experience at Geneva Airport.

“Yes” GVApp: Concerning the **34.51%** of people who have downloaded GVApp, **27.43%** find it easy to find their way inside the airport. On the other hand, still **1.33%** of users find it difficult to navigate even with GVApp. Further investigation should be done to understand why **6.2%** find it difficult to navigate and if for the ones who do not have GVApp, if it can remove this pain or on the contrary it won't.

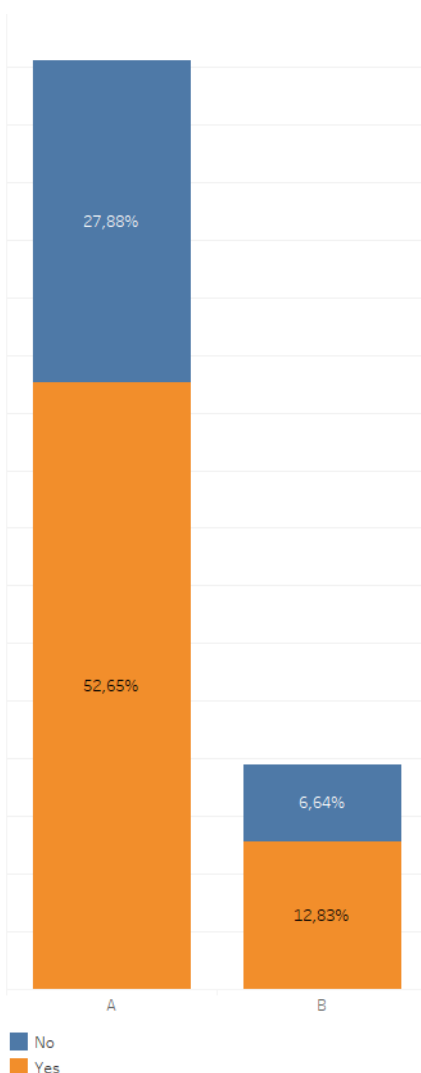
To conclude from this graph, **93.8%** can find their ways without difficulties inside Geneva Airport. However, there is a possibility to work on two groups of people, which are those finding it satisfying and those who find it difficult to navigate which represents **31.86%** of passengers.

3.2. Phone usage to travel influence

Analysis 8: phone to help during the journey (Q18) and preferred navigation screen (Q29)

This graph is showing the comparison between people that use or do not use their phone to help during their journey at the airport and their preferred screen to help navigate indoors at Geneva Airport.

Analysis & conclusion



Use their phone to help during their journey at the Airport: 65.49% of the participants of this survey use their phone to help during their journey at the airport. 52.65% would prefer screen A to navigate indoors whereas 12.83% would choose screen B which is the existing map on GVApp.

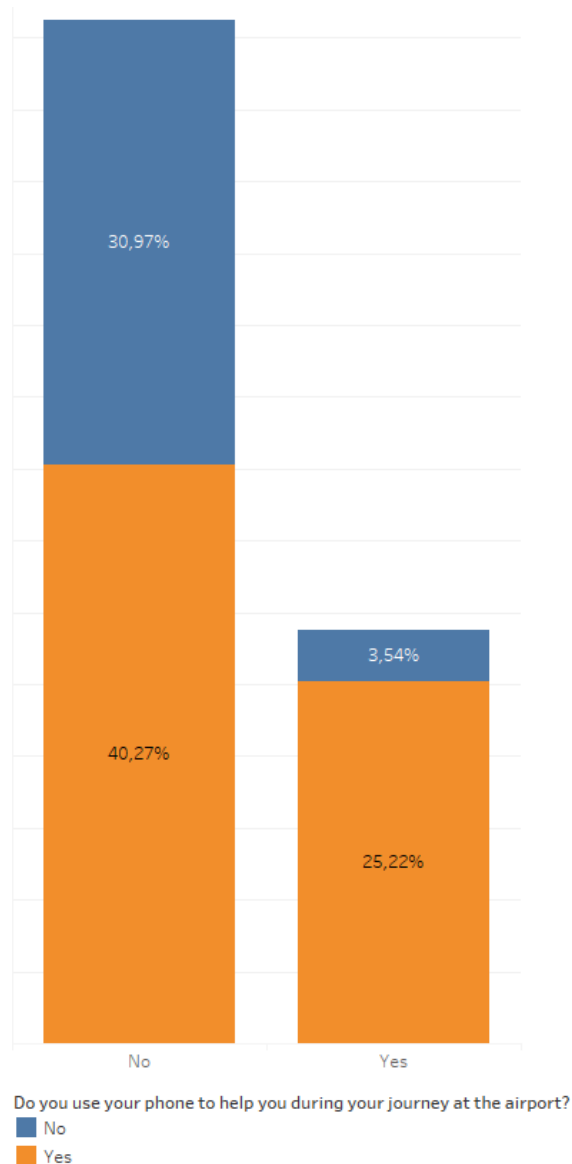
Do not use their phone to help during their journey at the Airport: 34.51% of respondents do not use their phone to help during their journey at the airport. Nonetheless, they would prefer screen A at 27.88% and screen B at 6.64%.

To conclude, respondents that use or do not use their phone to help during their journey at the Airport would have a strong preference for screen A which is the navigation with Augmented Reality. In addition, this graph is showing that in general, people tend to use their smartphones more and more to help them with their journey and that technology is taking an important place in the travel industry.

Analysis 9: use phone during the journey (Q18) and GVApp (Q19)

This graph is showing the comparison between the use or not of the phone to help during the journey at the airport and the use or not of GVApp, the application of Geneva Airport.

Analysis & conclusion



Do not use their phone to help them during their journey at the Airport.

34.51% of people who answered this survey stated to not use their phone to help them during the journey at the airport with **30.97%** who do not have GVApp. However, **3.54%** says to use GVApp, meaning that they are not using this application for their journey at the airport but maybe for other features and reasons. For example, Geneva Airport staff gets flight information for passengers or visitors, who need to take their relatives at the airport.

Use their phone to help during their journey at the Airport.

Even if **65.49%** of respondents admit using their phone to help them during the journey at the airport, **40.27%** do not have GVApp while **25.22%** have GVApp.

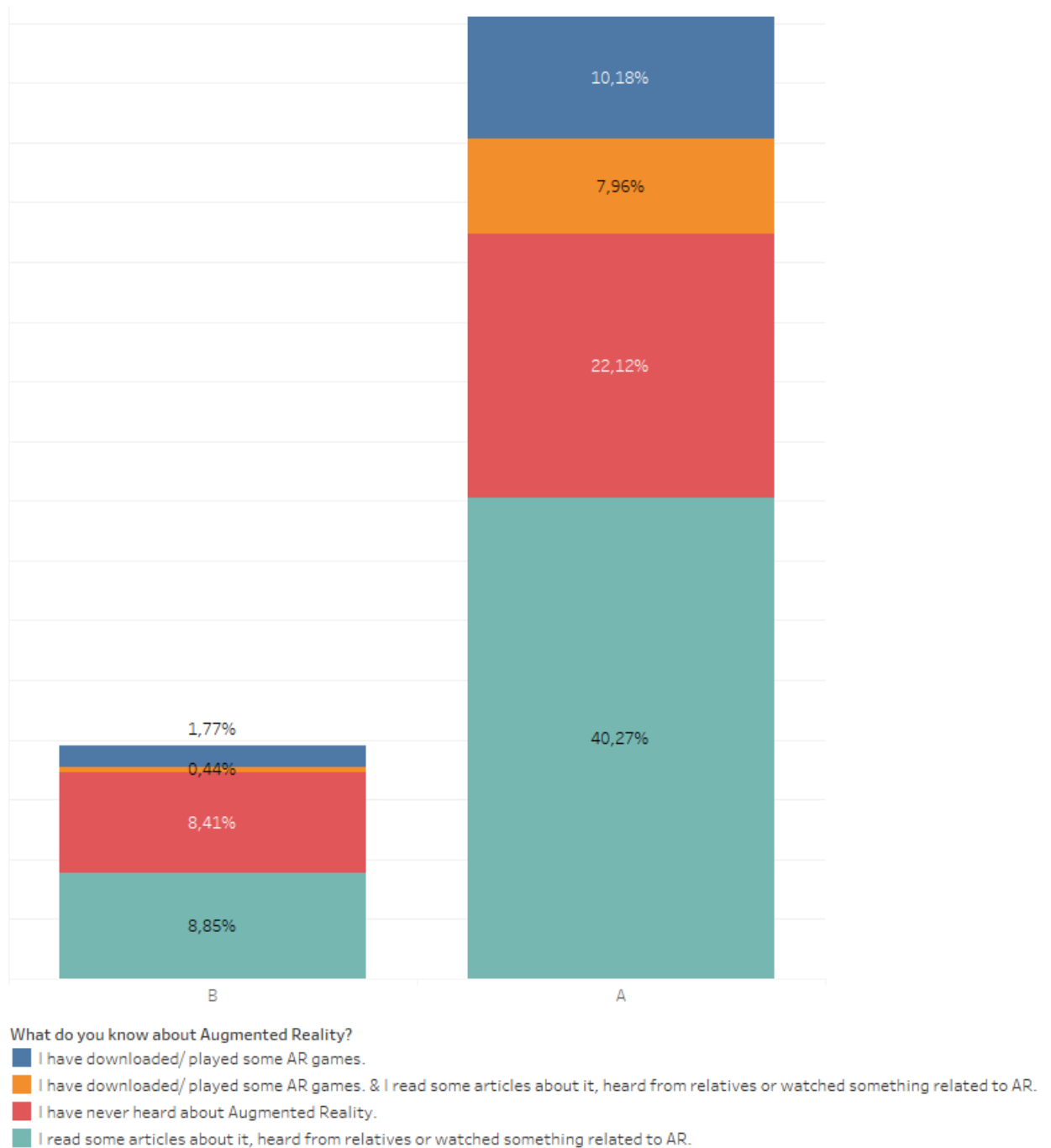
In conclusion, most respondents stated to use their smartphone to help them during their journey at the airport. However, **40.27%** are still not using GVApp but they are probably using other applications that might be from airline companies, booking websites for hotels, transportation or flights. Thus, further research should be done to understand why passengers are in majority (**71.24%**) not downloading GVApp and if one of the reasons is the use of an application of an airline company or other applications.

3.3. AR knowledge influence

Analysis 10: preferred navigation screen (Q29) and knowledge on AR (Q21)

This graph is showing the comparison between the preferred navigation screen and the knowledge of respondents on Augmented Reality.

Analysis & conclusion



Screen A: **80.53%** of the respondents would prefer screen A which is navigation with Augmented Reality. **40.27%** of them have read some articles about AR, heard from relatives or watched something related to AR. **22.12%** who have chosen this screen have never heard about Augmented Reality before this survey. **10.18%** have downloaded or played some AR games. Then, **7.96%** of the respondents have downloaded or played some AR games and read some articles, heard from relatives or watched something related to AR.

Screen B: **19.47%** of respondents would prefer screen B which is the existing GVApp map to navigate inside Geneva Airport. **1.77%** of respondents have downloaded or played some AR games. **0.44%** of respondents have downloaded or played some AR games and read some articles about it, heard from relatives or watched something related to AR. **8.41%** of respondents have never heard about Augmented Reality before doing this survey while **8.85%** have read some articles about AR, heard from relatives or watched something related to AR.

In conclusion, more than the half of the respondents have some knowledge about Augmented Reality, few of them have downloaded or played some AR games. However, it should also be considered that some people have experienced AR around them but did not know about it, meaning that there can also be a thin room for error in respondents' answers. It also means that in general, the public is getting to know more and more about AR, which can be easier for different industries to implement this technology. Thus, **71.84%** of respondents have experienced or heard about AR technology, meaning that the public is ready to get more and more in contact with AR technology in their everyday life.

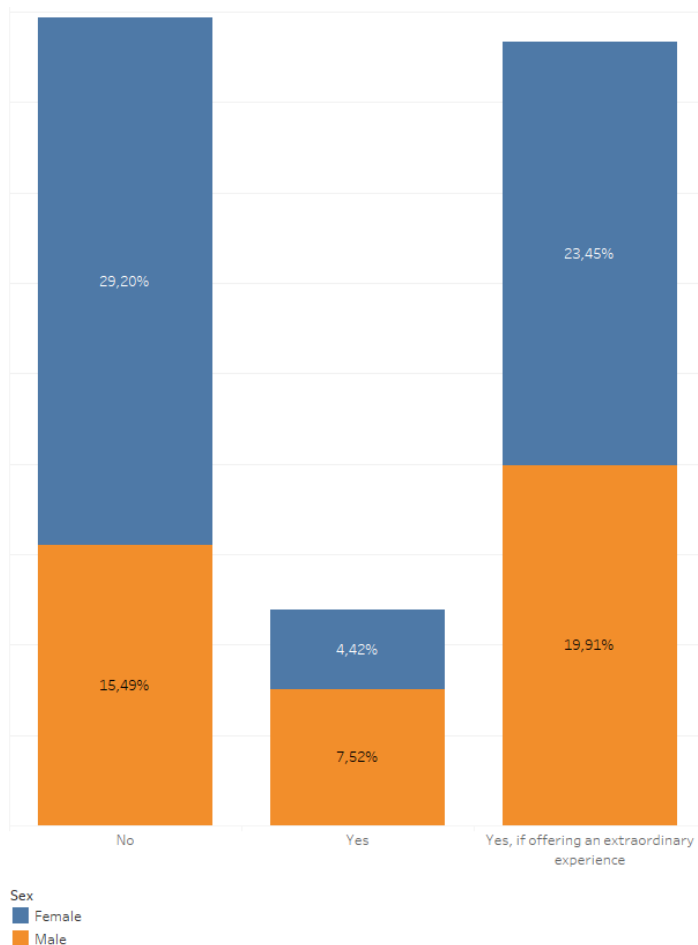
Appendix 11: Comparative analysis for hypothesis 2

1. Demographics

Analysis 11: willingness to purchase an AR application (Q22) & sex (Q31)

This graph is showing the comparison between respondents who would be willing to purchase an Augmented Reality application and the sex.

Analysis & conclusion



23.45% of women respondents would be willing to pay for an AR application which offers an incredible experience while men would be willing at **19.91%**. From this survey. Women are the least convinced with **29.20%**, who would refuse to pay for an AR application while for men it is **15.49%**.

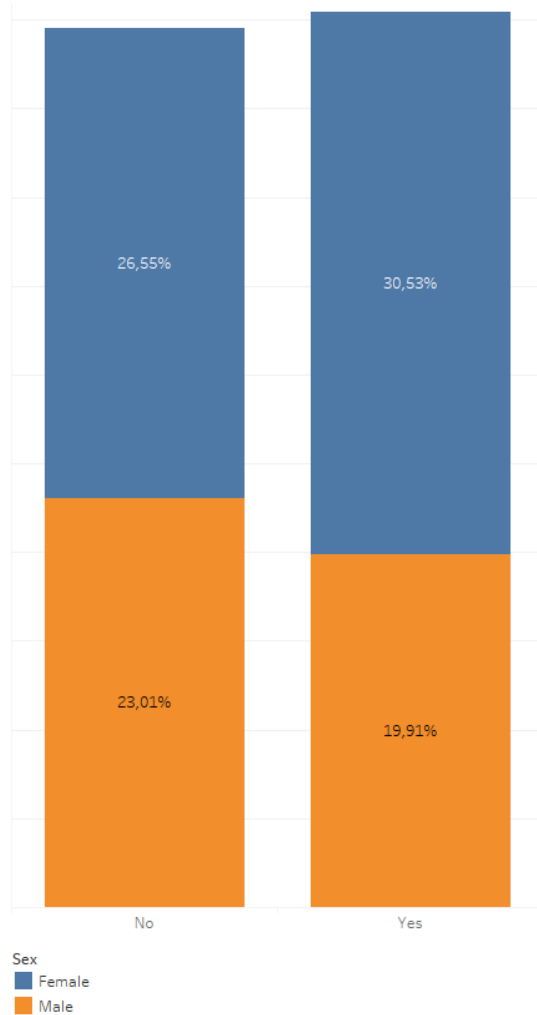
In conclusion both male and female respondents would be equally interested to purchase an Augmented Reality application. Indeed, **27.87%** of women respondents and **27.43%** of the men respondents would be willing to

purchase an AR application. Moreover, the graph shows that women tend to be more willing to pay for an AR app if the experience is extraordinary. If the application is not offering something special, women respondents stated that they would refuse to pay. In general, men respondents tend to be somehow more willing to pay for an AR application. However, it is not totally accurate as there are less men respondents than women for this survey.

Analysis 12: interest in a Treasure Hunting application (Q26) & the sex (Q31)

This graph is showing the comparison between respondents who would be interested to download a treasure hunt application to play during their free time at Geneva Airport and the sex.

Analysis & conclusion



49.5575% of respondents would not be interested to download a treasure hunt application to play during their free time at Geneva Airport, including **26.55%** of women and **23.01%** of men.

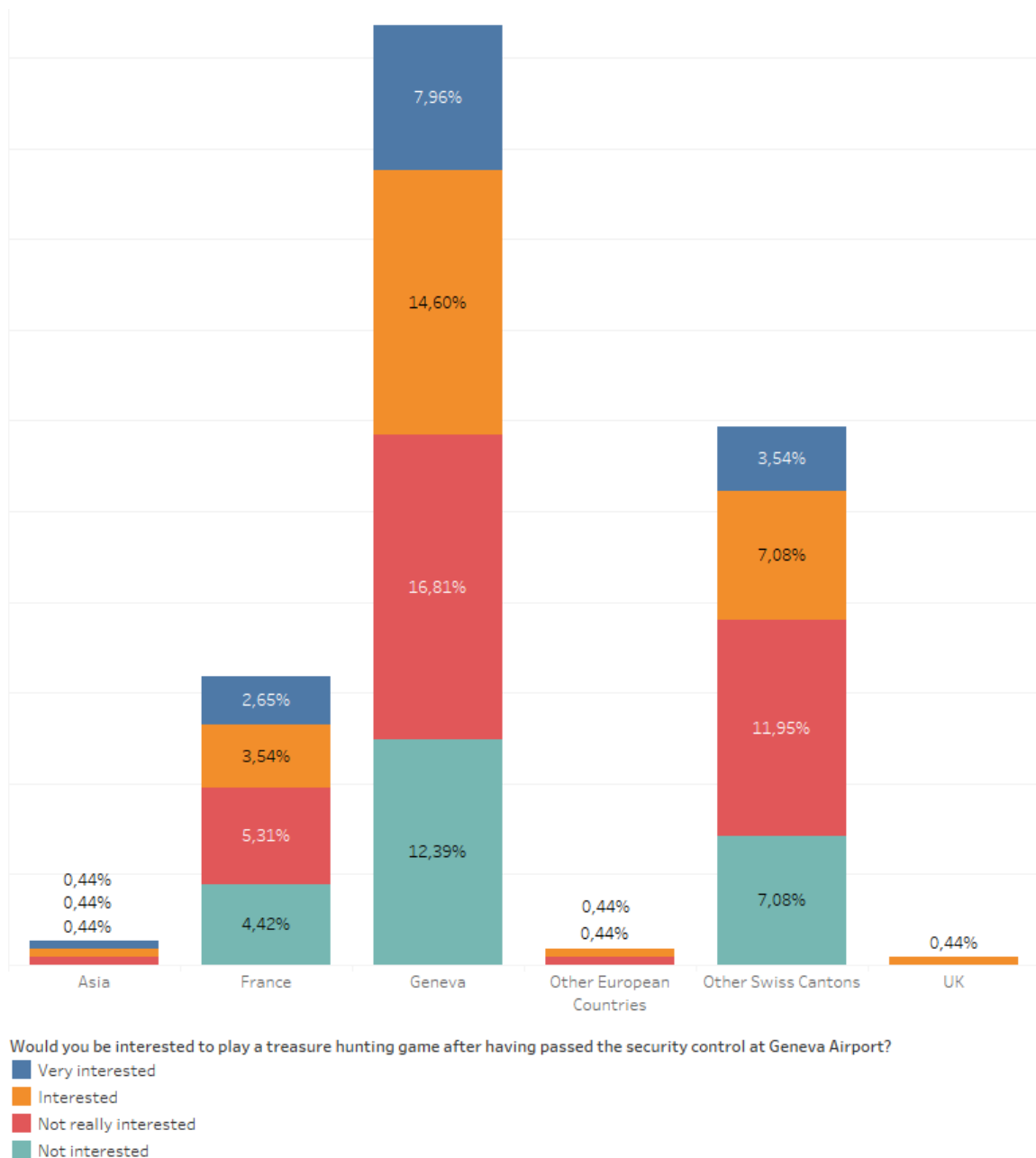
50.4425% of people who would be willing to download a treasure hunt application to entertain them during their free time at the airport, includes **30.53%** of female respondents and **19.91%** of male respondents.

In conclusion, females tend to be more willing to download a treasure hunt application to play during their free time at Geneva Airport. On the contrary, men respondents tend to be less willing to download such an application to play during their free time at the airport.

Analysis 13: interest to play a Treasure Hunting game (Q24) & living area (Q34)

This graph is showing the comparison between respondents who would be interested to play a Treasure Hunting game after having passed the security control at Geneva Airport and their living locations.

Analysis & conclusion



22.56% of respondents who live in Geneva would be interested to play a Treasure Hunting game after having passed the security control at Geneva Airport while **29.20%** would not be interested.

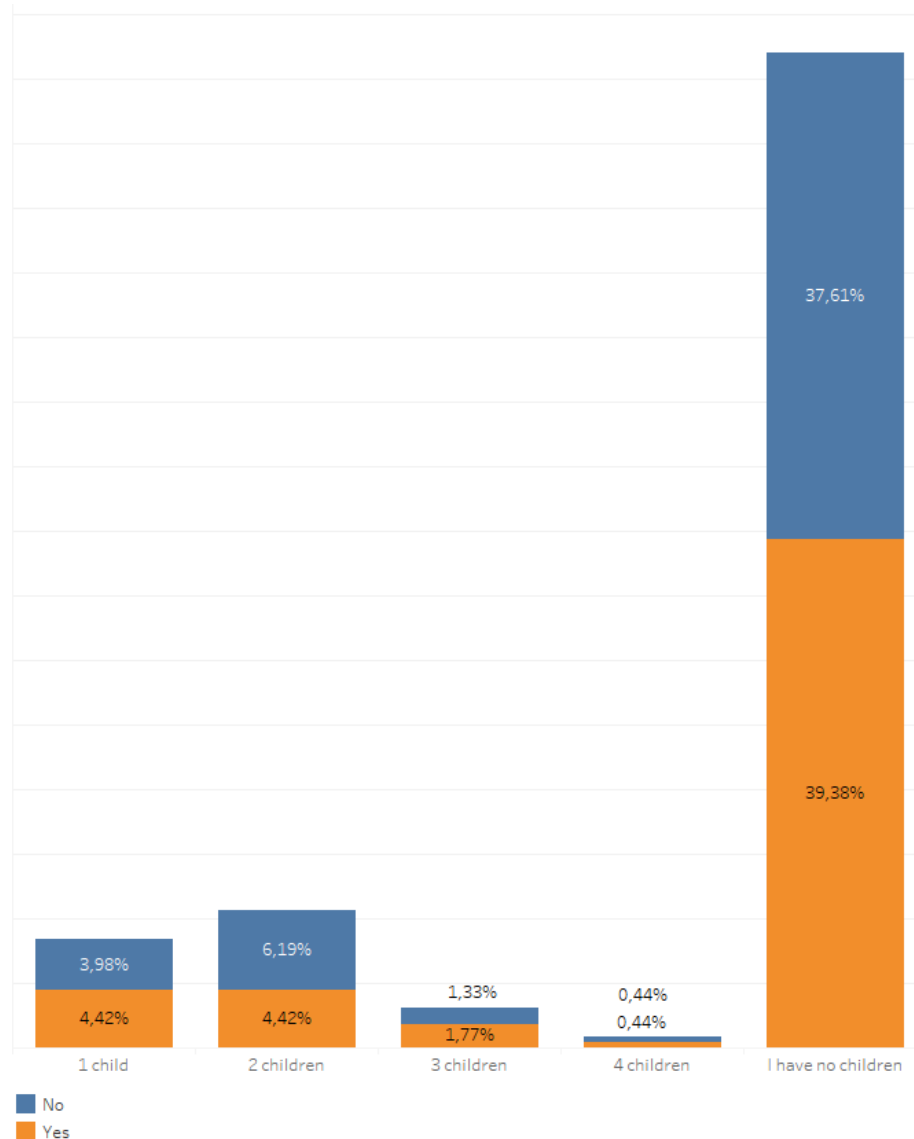
10.62% of respondents who live in other Swiss cantons would be interested while **19.03%** would not be interested to play a Treasure Hunting game after having passed the security control at Geneva Airport.

To conclude, people living in Geneva, Other Swiss Cantons and Asia would be the most interested to play a Treasure Hunting game after having passed the security control at Geneva Airport. The least convince are those who live in the French border and other European Countries. However, it should be keep in mind that the sample of answers for other European Countries, Asia and UK were very limited and only few answers have been collected. Thus, this is only an assumption from the answers collected in this survey.

Analysis 14: have children or not (Q33) and willing to download a treasure hunt app (Q26)

This graph is showing the comparison between if the respondents have children or not and their willingness to download a treasure hunt application to play during their free time at Geneva Airport.

Analysis & conclusion



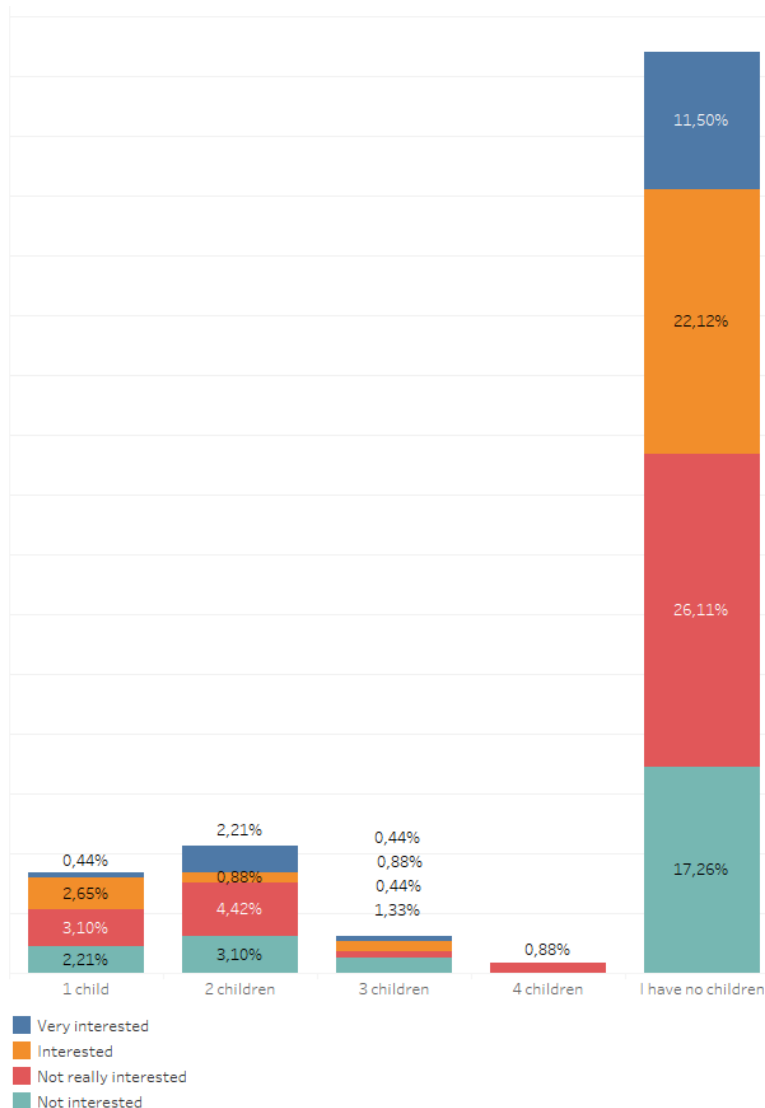
Respondents with no children are willing to download a Treasure Hunting game (**39.38%**) to play at Geneva Airport while **37.61%** would not be willing to download such a game.

In conclusion, respondents that have no children are more willing to play a Treasure Hunting game during their free time at Geneva Airport (**39.38%**). However, respondents with children tend to be in general less willing to download a treasure hunt application, meaning that maybe this would not be the target group but it might rather be their children.

Analysis 15: interest to play a Treasure Hunting game at GVA (Q24) and have children or not (Q33)

This graph is showing the comparison between, if the respondents would be willing to download a Treasure Hunting game application during their free time at Geneva Airport and if they have any children.

Analysis & conclusion



Respondents who stated to have no children are not really interested in playing such a game **(26.11%)** and interested **(22.12%)**.

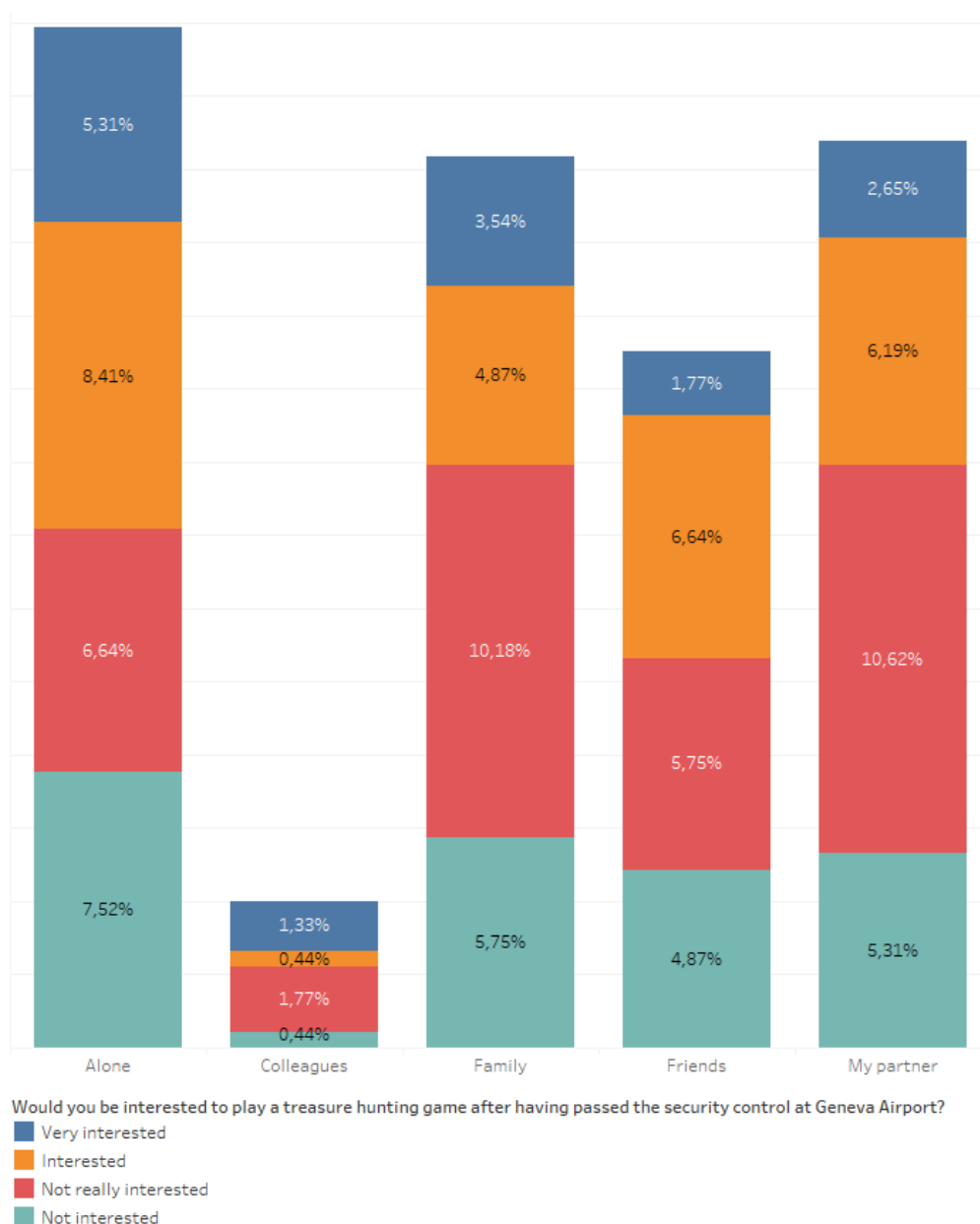
In conclusion, respondents who have no children are mostly not interested to play such a game. Respondents with children are not interested to play a Treasure Hunting game at Geneva Airport. However, deeper analysis should be done concerning people who have no children and children to see who the target group of a Treasure Hunting game can be.

2. Travellers profile

Analysis 16: interest in Treasure Hunting at GVA (Q24) & travelling accompanied or not (Q4)

This graph is showing the comparison between respondents who would be interested or not, to play a Treasure Hunting game after having passed the security control at Geneva Airport and if they were accompanied or not during their last travel experience.

Analysis & conclusion



41.15% of respondents are interested or very interested to play a Treasure Hunting game after having passed the security control at Geneva Airport. **13.72%** of respondents who recently travelled alone at Geneva Airport would be interested in such a game. Followed by **8.84%** of respondents who have travelled with their partner, **8.41%** who travelled with their family and by **1.77%** who travelled with their colleagues.

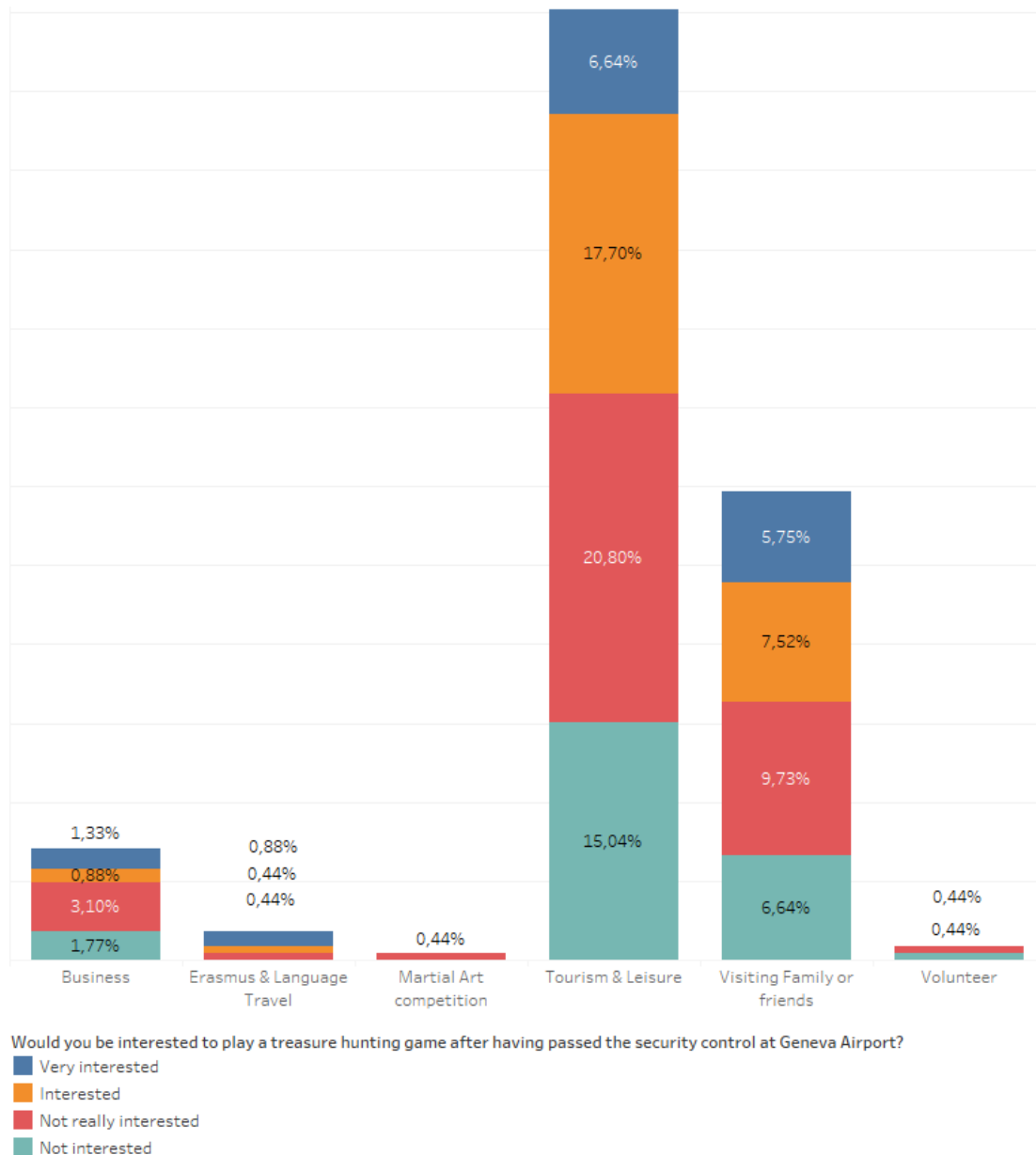
58.76% of respondents are not really interested or not interested to play a Treasure Hunting game after having passed the security control at Geneva Airport. **15.93%** were travelling with their partner, **15.93%** were travelling in family, **14.16%** were travelling alone, **11.4%** were travelling with their friends and **2.21%** were travelling with their colleagues.

In conclusion, more than half of the respondents would not be interested to play a Treasure Hunting game after having passed the security control at Geneva Airport. However, people who were travelling alone tend to be the ones to find an interest in playing a Treasure Hunting game after the security control at Geneva Airport. In addition, as this questionnaire was mostly reaching people older than 20 years old, maybe the children would have answered in another way and this should be tested to see if children of certain ages would be interested in playing a Treasure Hunting game after the security control at Geneva Airport.

Analysis 17: purpose of the last trip (Q3) & interest to play a Treasure Hunting game (Q24)

This graph is showing the comparison between the purpose of the last trip of respondents from or to Geneva Airport and their possible interest to play a Treasure Hunting game after having passed the security control at Geneva Airport.

Analysis & conclusion



Business travellers seems to be in majority not convinced (**4.87%**) and would not play a Treasure Hunting game at Geneva Airport. Volunteers and marital arts competitors

would not be interested to play such a game at Geneva Airport. Tourism and Leisure travellers would be the most interested with **24.34%** who would be willing to play a Treasure Hunting game after having passed the security control at Geneva Airport.

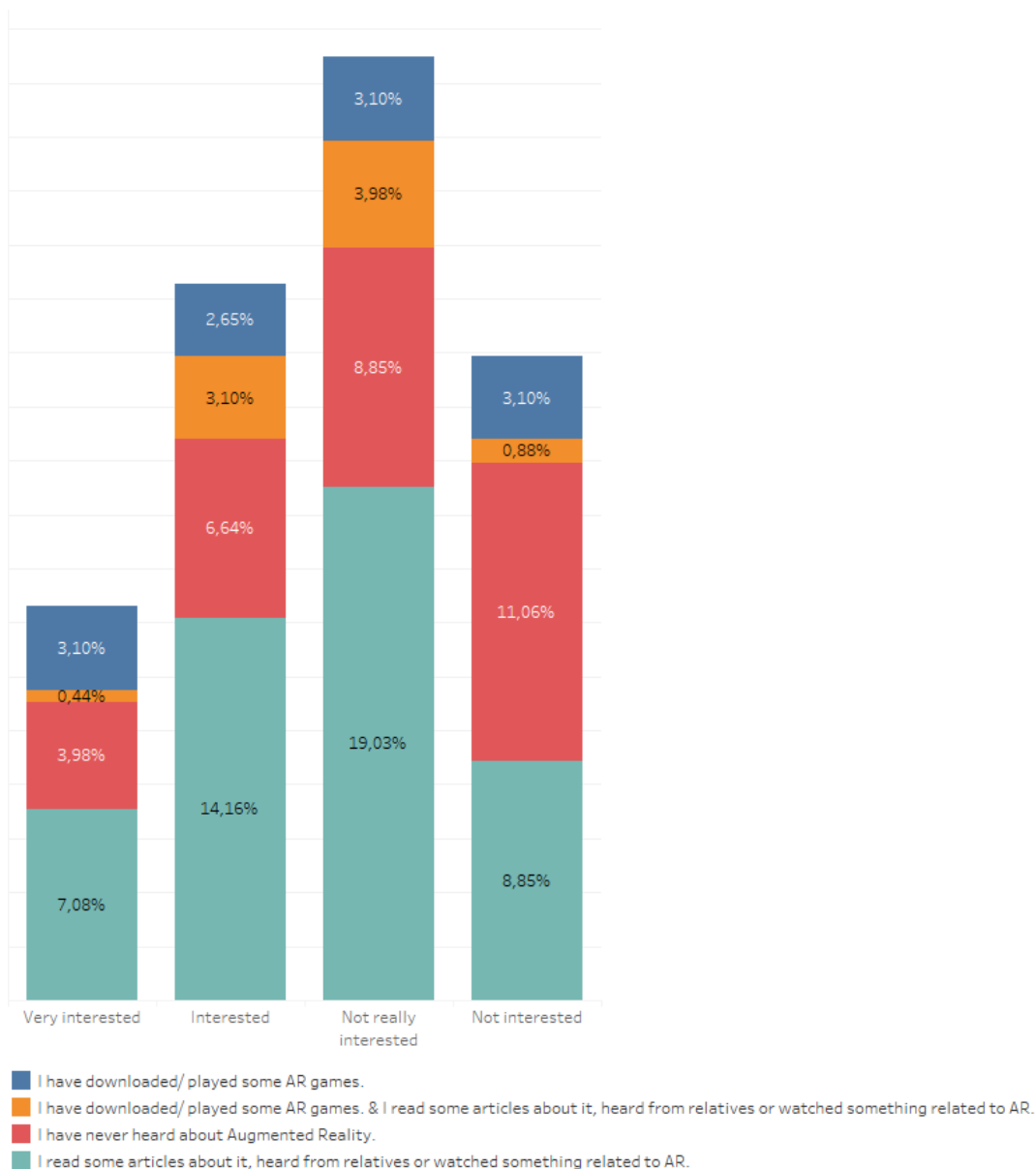
In conclusion, leisure and tourism travellers and travellers who visit their family or friends tend to be more willing to play a Treasure Hunting game after having passed the security control at Geneva Airport. On the contrary, business travellers, volunteers and martial artists would not be interested in such a game.

3. AR Knowledge

Analysis 18: knowledge on AR (Q21) & interest to play a Treasure Hunting game at GVA (Q24)

This graph is showing the comparison between the knowledge of respondents on Augmented Reality and their interest to play a Treasure Hunting game after having passed the security control at Geneva Airport.

Analysis & conclusion



Respondents who answered, “I read some articles about it, heard from relatives or watched something related to AR” stated to not be really interested (**19.03%**) to play a Treasure Hunting game at Geneva Airport after the security check-point.

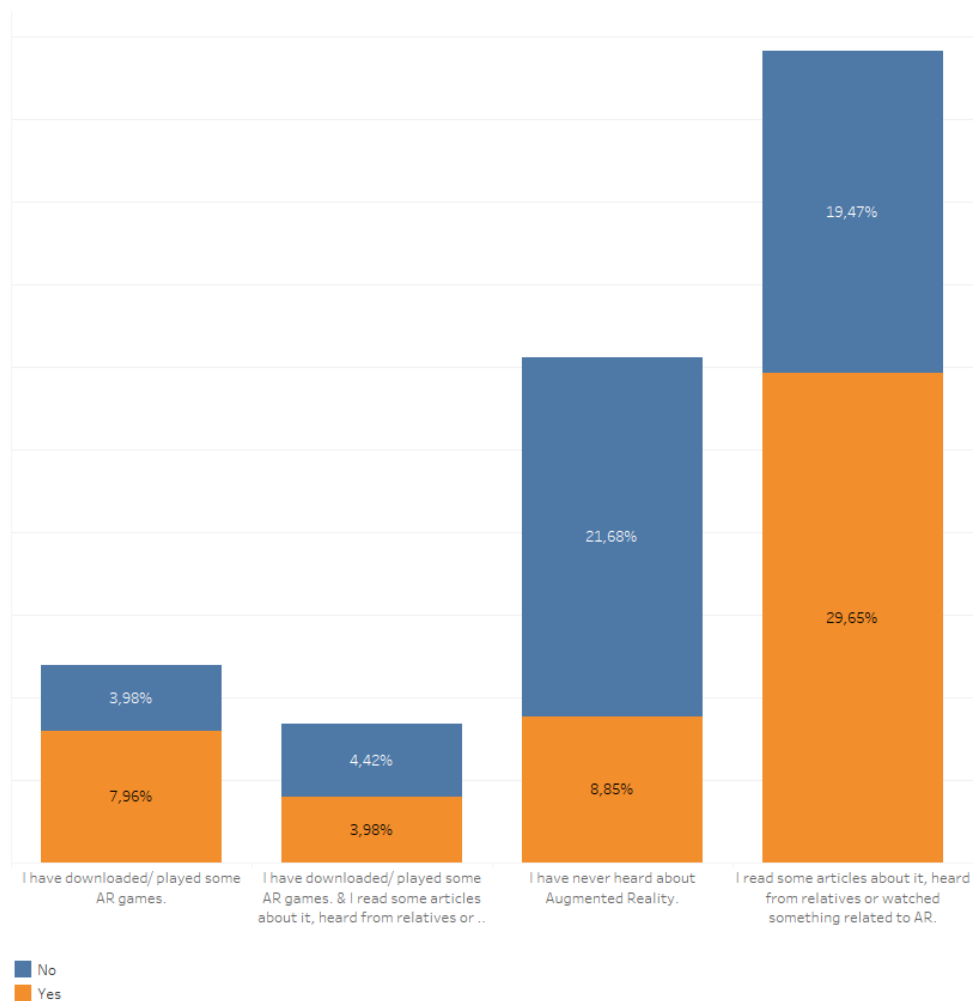
Respondents who have answered, “I have heard about Augmented Reality” stated to not be interested to play such a game after the security control at Geneva Airport (**11.06%**).

In conclusion, in majority, if people have never heard about Augmented reality they tend to be less interested in downloading a Treasure Hunting game after having passed the security control at Geneva Airport. In addition, people that have some knowledge about AR or have experience in AR games would tend to be more favourable to download an AR application. Nonetheless, in all they would not be really interested to play a Treasure Hunting game after having passed the security check-point at Geneva Airport. However, a deeper search should be done to established if people who are not really interested are needing extra incentives such as maybe receiving rewards when playing a game.

Analysis 19: knowledge on AR (Q21) and willingness to download a treasure hunt app(Q26)

This graph is showing the comparison between the knowledge of respondents on Augmented Reality and their willingness to download a treasure hunt application to play during their free time at Geneva Airport.

Analysis & conclusion



Respondents who have never heard about AR would be less willing to download such a Treasure Hunting game to play at Geneva Airport **(21.68%)**. Then, respondents who stated, “I have downloaded/ played some AR games” would be more willing to download a Treasure Hunting game to play at Geneva Airport **(7.96%)**.

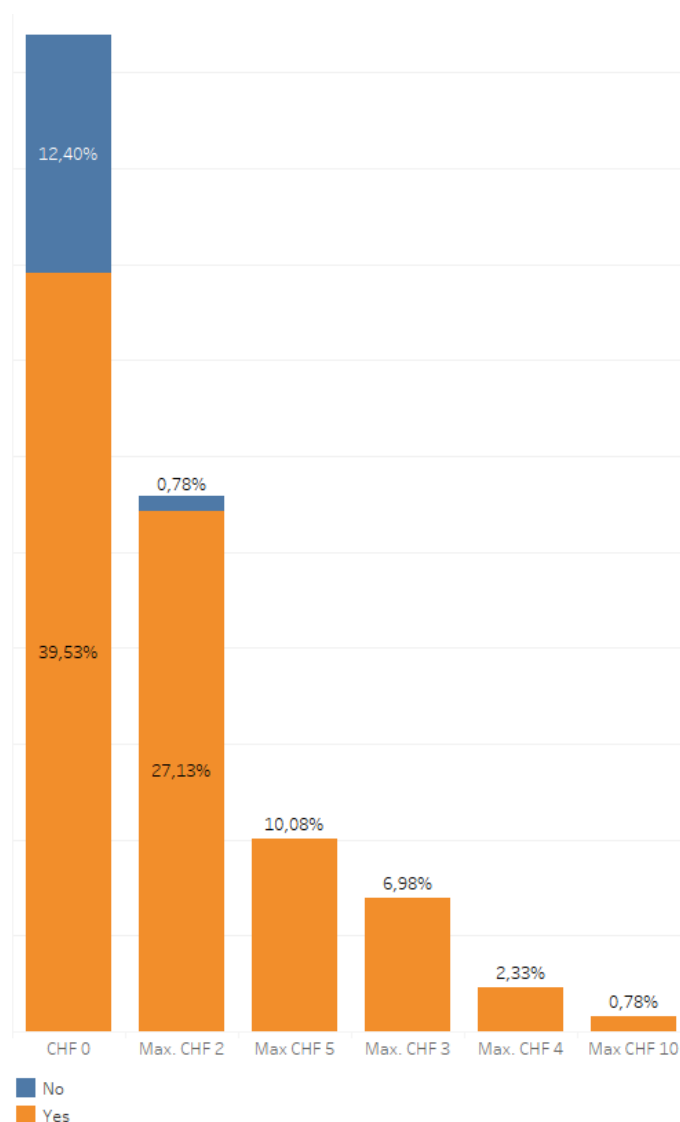
In conclusion from this graph, respondents who answered, “I read some articles about it, heard from relatives or watched something related to AR” are more willing to download a treasure hunt application to play during their free time at Geneva Airport. Meaning that in general people who have some knowledge on AR are more willing to download a treasure hunt application to play during their free time at Geneva Airport.

4. Willingness to download the treasure hunt game

Analysis 20: willingness to download a treasure hunt app (Q26) and amount ready to spend for the treasure hunt application(Q27)

This graph is showing the comparison between if the respondents who would be willing to download a Treasure Hunting game application during their free time at Geneva Airport and how much they are willing to pay.

Analysis & conclusion



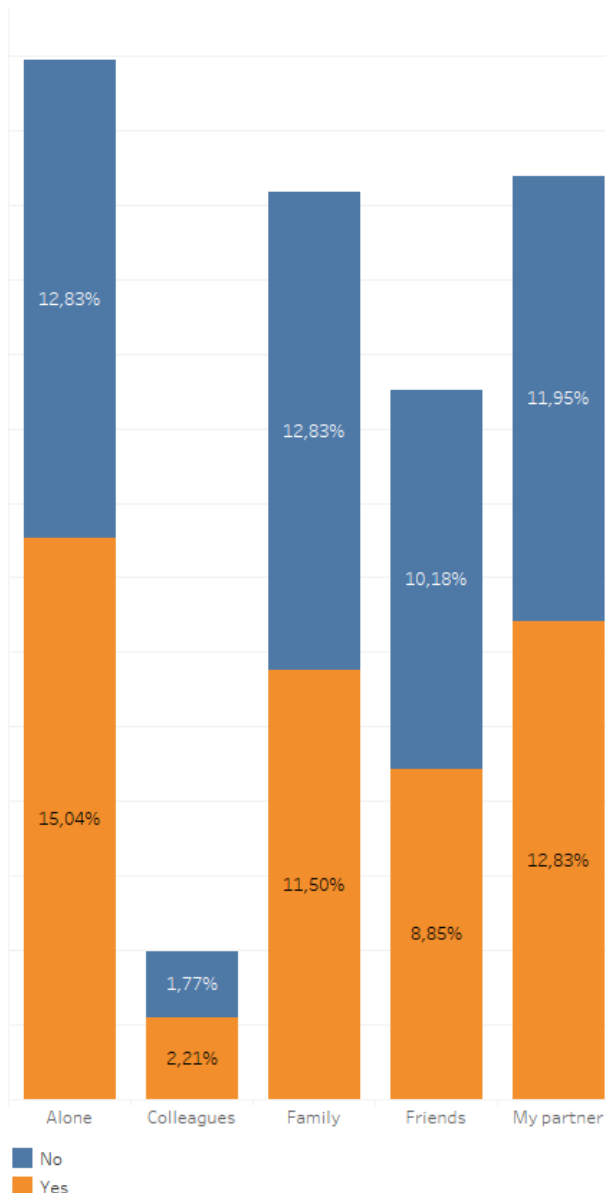
Respondents stated to be not willing to pay anything (**39.53%**) while **47.3%** of respondents are willing to pay between CHF 1 and CHF 10 for a Treasure Hunting game.

In conclusion, respondents that stated to be willing to download a Treasure Hunting game to play during their free time at Geneva Airport are mostly not ready to pay anything. Those who are willing to pay an amount are fine to pay various amounts. Thus, this game should be considered to find some sources of diversification and maybe a small source of revenue from a Treasure Hunting game at Geneva Airport.

Analysis 21: accompanied or not (Q4) and willingness to download a treasure hunt app (Q26)

This graph is showing the comparison between if respondents travelled alone or accompanied and if they would download a treasure hunt application to play during their free time at Geneva Airport.

Analysis & conclusion



Respondents who travel alone are willing to play a Treasure Hunting game (**15.04%**) and not willing (**12.83%**).

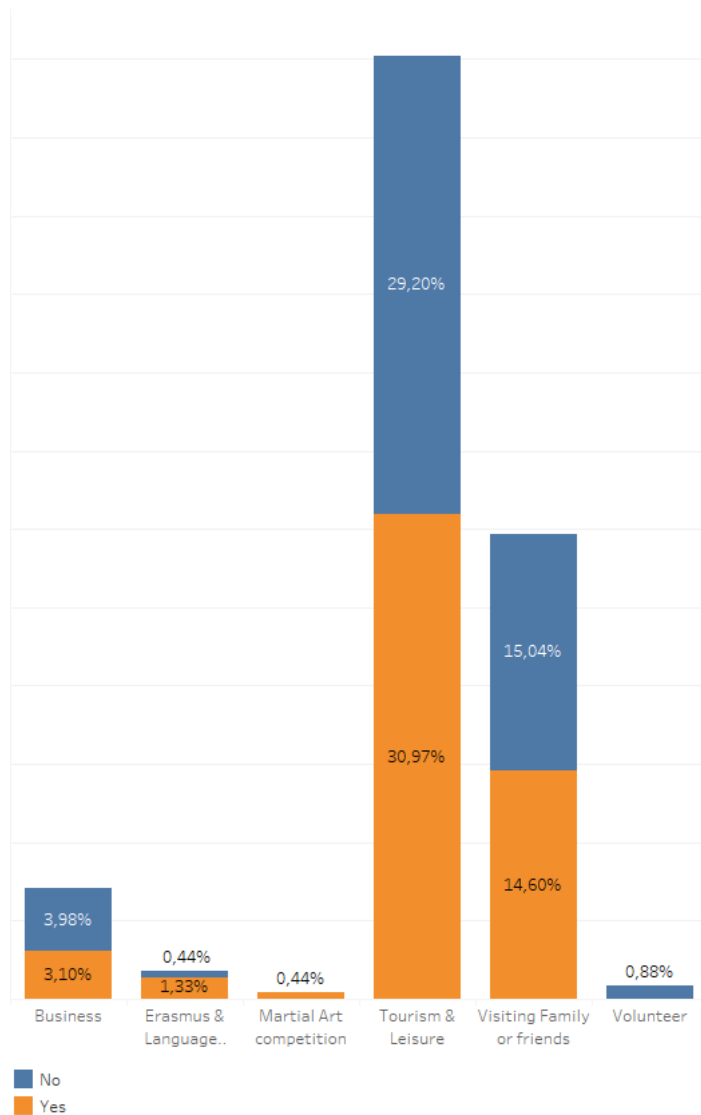
Respondents who travelled with their family would download a Treasure Hunting game (**12.83%**) and not download (**11.50%**).

In conclusion, people travelling alone, with their families, with their colleague or their partner tend to be more willing to download a treasure hunt application to play during their free time at Geneva Airport. However, if they are travelling with their friends they are less willing to download such a game.

Analysis 22: purpose of last trip (Q3) and willingness to download a treasure hunt app (Q26)

This graph is showing the comparison between the purpose of their last trip from or to Geneva Airport and their willingness to download a treasure hunt application to play during their free time at Geneva Airport.

Analysis & conclusion



Business travellers, Erasmus travellers, martial artist travellers and volunteers are less likely to download a Treasure Hunting game to play during their free time at Geneva Airport.

In conclusion, respondents who are travelling for tourism and leisure purposes are more willing to download a Treasure Hunting game than others (**30.97%**). It can be assumed that because they are more relaxed and happy to go on holidays, they are also seeking for entertainment at the airport to spend their free time.