Wayfinding at Heathrow Terminal 3

Inclusive design strategy to enhance passenger experience

DHRUVI JHAVERI

Student ID - 1827499

MA Design Strategy and Innovation

16,210 words

Supervisor : Ms Marjan Angoshtari

Brunel University London, 2018-2019

Table of Contents

Acknowledgements

I would like to express my gratitude to the people who helped inspire, lent advice and motivated me during turbulent times. To my supervisor Marjan Angoshtari for her academic rigour, motivation, patience and continuous questionning of my vision and ideas throughout this project. To all the interviewees who contributed to this project for their kindness, time and invaluable input. To my parents for their constant faith and support in me. To all my lecturers - Dr Busawayam Lam, Dr Youngok Choi, Chris Holt and John Boult who played a part in the making of this project. Lastly but most importantly, I would like to thank my friends and classmates for their constant motivation without whom this journey would be incomplete.

Abstract

This report investigates how Heathrow airport can enhance its wayfinding experience for passengers' travelling through Terminal 3. It understands how wayfinding plays a critical role meeting customer expectations and analysing their behaviour. It also investigates the role of design win influencing customer experience. Initially the research seeks a broad understanding of passenger experience at Heathrow Airport in order to narrow down the research scope. Initially a survey and customer interviews were conducted comprising of questions around the topic area, followed by literature review, case studies, expert interviews, and a workshop. The research found that not only is there a need to enhance wayfinding experience for passengers but also create a solution that fits everyone travelling through the airport. This means taking an inclusive approach to understanding and integrating a solution. This report aims to develop an inclusive design-led innovation strategy to enhance the wayfinding experience for passengers and make it a memorable experience for them. The core values of a wayfinding strategy include technology, architecture, functional signage and passenger experience. The conclusion implies the importance of wayfinding for customer experience at airports and states the limitations of the research.

Executive Summary

Having to navigate in an unfamiliar environment as complex as an airport can be a stressful activity. The underlying purpose of any airport experience and thereby passenger expectation is that they can easily get to and through the airport. The Global President for Customer Experience in New York describes airports as a 'utility'.That's what airports mean to him now, and this mindset is a threat to any successful airport (Carleton, 2016). Wayfinding is user experience in a built environment. Design thinking enables the development of a system that guides people from one place to the other. As evidence shows, it is becoming increasingly important for airports to meet the customer expectations and needs, especially those who were not included when the system was being designed.

This report investigates how strategic design-led innovation can enhance the wayfinding experience for passengers travelling through Heathrow Terminal 3. It aims to develop a design-led wayfinding strategy for Heathrow Terminal 3 to enhance the passenger experience. A range of primary and secondary sources were employed to understand existing studies as well as establish key insights. Secondary research comprising of literature review and case studies explored the factors that affect wayfinding and it's importance to customer experience. Primary research comprises of an online survey, customer interviews, expert interviews and a workshop. They were conducted to understand the current wayfinding service system and understanding the present wayfinding scenario from a passenger's point of view. The final step of the research was creating a wayfinding strategy and to demonstrate areas of improvement.

Although there is literature on Heathrow Airport, there is barely any that explains customer experience or wayfinding at the airport. In today's world, only a company that delivers great customer experience will sustain loyalty of the customers. As for airports, wayfinding is customer experience (Light On The Horizon, 2019). If people have a bad wayfinding experience, they are going to associate that experience with the brand.

The key aspect of the report is the concept of "inclusive design" which is essentially creating a wayfinding service that fits all passengers. To help Heathrow Terminal 3 identify the customer segments and archetypes travelling through the airport, a wayfinding design strategy was developed. The factors mentioned in the strategy directly influence wayfinding and customer experience. This strategy can be used by designers to improve the current situation. The report concludes that an excellent wayfinding strategy is one where the customer does not notice how he got from one point to the other. The research limitations are also mentioned.

1

Introduction

This section explains the area of research, thereby demonstrating key problems, challenges and opportunities

Airports are considered as one of the most complex structures in modern society (Kirk, 2013). They comprise of complex components (check-in, retail areas and security) and different elements of airport operations (landside operations, airside operations). Furthermore, there is often a clash in operational objectives about safety, efficiency and passenger experience. (Mengersen et al., n.d.). The stakeholders include people and organisations who have a vested interest in the airport, such as airport owners, airlines, shareholders, government bodies (customs and security), passengers, and agencies (International Air Transport Association [IATA] and other government agencies) (Popovic, Kraal and Kirk, 2019). Different stakeholders have different requirements and objectives that must be met. Airports are a vital source of revenue that contribute to the global economy to a great extent (Heathrow 2.0, 2018). Global research about outstanding customer experience recognises the factors of world-leading service as seamlessness and ease. Airports are not 'easy' places to navigate. It's more of a challenge for the airports and passengers since most of their passengers are infrequent fliers. It's difficult to adapt to an unfamiliar process in an unfamiliar setting. Also, time being a critical pressure adds to the 'cognitive load' on the passengers (Heathrow's Strategic Brief, 2018).

Therefore, the underlying purpose of any airport experience and thereby passenger expectation is that they can easily get to and through the airport. The Global President for Customer Experience in New York describes airports as a 'utility'. That's what airports mean to him now, and this mindset is a threat to any successful airport (Carleton, 2016).

Catering to an airport the size of Heathrow that has over 200,000 passengers each day, who speak over a 100 languages can be quite a challenge (Wayfinding & Navigation Expert, 2019). Heathrow is a gateway that connects the United Kingdom to more than 80 long-haul destinations, which helps British exporters to get the growing markets, as well as makes it easier for tourists, investors and students to come to the UK. (Heathrow's Strategic Brief, 2018). Heathrow has nearly 76 million passengers travelling through the airport each year (Heathrow 2.0, 2018). It is UK's sole hub airport that serves as a significant engine for economic growth (Sustainable Transport Plan, 2014).

There is a significant gap between what airports think and what passengers think. Andy Lester of Christchurch Airport very rightly said, "If you think like an airport you'll never understand your customers".

Poor experiences result in people choosing other airports the next time. They don't only compare it to what it was the previous time, but by how other airports are doing it. Not only does this have an impact on the airport's revenue, but it also has a commercial consequence for the airline partners. In today's time, people expect the airports to be efficient. Airports are raising the bar, and it simply means they are doing the right things well. The writer Alastair Campbell travelled through Heathrow Terminal 2 earlier this year, and tweeted this to this 285,000 followers :

Figure 1 (Alastair Campbell tweets about Heathrow, n.d.)

Heathrow's social media team tweeted this to their large number of followers. In a few minutes, this message reached over half a million people. This was simply because the experience was seamless and quick. Nothing more than that. It's about avoiding the wrong experiences and giving the right experience to the passengers every time they fly through Heathrow. Passengers are aware of it, more than anyone else. (Angrave, n.d.).

Passengers bring revenue to the airports, and are their main focus. Thus it is important for Heathrow to understand the needs and expectations of the passengers and try to deliver that. Giving them a seamless and stress-free experience will make the passengers happy and it will encourage them to use that airport more often. This will result in an increase in the value of Heathrow.

Customer experience

Businesses today need to provide more responsive, intuitive and personal services that respond to the customers needs. Outstanding services are those that connect all touchpoints that people have with a business in order to make the process seamless. In an airport context, a seamless experience will result in increased revenues, increase in efficiency, increased visits and the possibilities of more recommendations (Engine, 2018).

Customer experience comprises of every experience that the customers have with your company's products and services. This results in them forming a belief and perception about your brand. It is the holistic experience of a service (Customer Driven Transformation, 2018). It is important for airports to understand their passenger's experience in order to retain their loyalty and improve the airport profits. (Kirk, 2013). By offering more choice, opportunities and a more personalised experience will enable the airports to broaden their target market more mature and affluent customers. According to research, happy and content passengers will :

- Spend 10% more time at the airport
- Shop twice as much as before
- Increase in 7% spending on retail shopping
- Increase in 20% spending on duty free

According to the Airports Council International (ACI), "A. 1% increase in passenger satisfaction levels delivers an increase of 1.5% in non-aeronautical revenue". Airports that exceed the expectations of their customers gain a competitive edge, and that is important factor in regions where passengers can choose from several airports.(Knect365.com, 2016)

There has been a precedent rise in the number of passengers travelling through Heathrow in the past few years and it's due to the increase in the number of passengers taking long-haul flights. However, there has been a significant decline in the service level the airport provides to its passengers due to an increase in the number of passengers going through Heathrow as well as an increase in the number of flights operating from Heathrow.

The Civil Aviation Authority implemented some quality of service targets due to the increasing distress relating to Heathrow's service standards. According to London First, the likelihood to improve passenger experience in the near future is very less (Imagine a world class Heathrow, 2008).

London considers its international links as one of its greatest strengths. Therefore, it is important for London's airports, especially Heathrow to perform efficiently. A poor passenger experience can pose a serious threat to London's competitiveness and sustainability thereby affecting the country's global economy (Imagine a world class Heathrow, 2008).

According to Heathrow's service proposition, they aim to deliver a journey experience that reassures and excites them at the same time. They are aware that everyone is not the same, and that some people may be excited at the airport, while some may be anxious. Thus, their goal is to go beyond any airport to gain an understanding of what the needs and expectations of their passengers are (Heathrow's Strategic Brief, 2018).

"We need to start seeing the airport through the passenger's eyes."
- Michael Eggenschwiler, CEO of Hamburg Airport

London First conducted a survey with passengers to understand the factors that were considered significant in order to consider London Heathrow as a 'world class' airport. The factors are :

- Accessibility
- Business/ leisure facilities
- Information and way finding
- Range and reach of flight services
- Terminal quality
- Waiting times

(Imagine a world class Heathrow, 2008)

Wayfinding

During an airport journey, it is common for passengers who have not been to the airport before, to have questions about the location of the gate, retail stores are at the airport, places to eat before boarding, or to know whether the flight is on time. Having to navigate in an unfamiliar environment as complex as an airport can be a stressful activity. Poor wayfinding can result in passengers getting lost and missing their flight. Caves and Pickard (2001) believe, "wayfinding is one of the most important factors for passengers to appreciate at an airport". An efficient wayfinding experience can help passengers navigate through the airport, to where they want to go by providing them with the flight information, how long will they take to get to the gate, as well as shopping and restaurant options. This can reduce the passenger stress to a great extent (Airport Business, 2014) (Tezcan and Hiemstra-van Mastrigt, 2019). Society For Experiential Graphic Design (SEGD) defines wayfinding as an information system that helps people navigate their way through complex and unfamiliar physical environments such as airports, transport systems, hospitals (Brandculture, 2018).

People from different cultures and countries, who have different mother tongues need to navigate through these spaces. Planning a signage system in an airport can be a complex practice, and can be complicated with the fact that wayfinding is a "heuristic" activity (Symonds et al, 2017: 4.3). The signage is not only used by passengers to get through the key areas of the airport, but is also used to find restrooms, to look for a shop to buy souvenirs, or a restaurant

to eat food. Thus, it needs to be designed in a manner that helps the passengers navigate their way for the micro-processes with the macro-route. Symonds et al classify wayfinding as “the cognitive, social and corporeal process and experience of locating, following or discovering a route through and to a given space” (Symonds, 2017).

The question is how can an airport as complex as Heathrow make information accessible and useful to every passenger travelling without intimidating them ?

Research Opportunities

The subject of wayfinding had not been given much importance as far as airports are concerned, until recently. An airport needs to consider the situation of an infrequent traveller, who could have a traumatic experience if they are unable to get to the departure gate, or if they are not aware of where they are in the building at any given point.
Observations were conducted on the passenger flows at Heathrow Airport in 1996, and the results showed that a large number of passengers were uncertain of where they were within the airport building and did not know where they should go next. This demonstrates that wayfinding in an airport environment needs more attention than it has been given in the past (Fewings, 2001).

Heathrow is one of the most complex environments that anyone has come across. Over a million passengers from different nationalities and cultures use the airport on a daily basis. Most of the passengers are focused on the time process of their journey which often puts them under stress during several aspects of their route. Thus, wayfinding is a significant factor in any airport environment. Applied Wayfinding, an agency who worked towards improving Heathrow’s wayfinding stated that their maps lacked consistency, accessibility and legibility and were inaccurate (Applied Wayfinding, n.d.). This demonstrates that there is a scope of improvement for the wayfinding design system of Heathrow Airport.

Another aspect to consider is that not all passengers find their way in the same manner, and that there needs to be a universal wayfinding design system that enables each and every type of passenger at Heathrow to navigate through the airport with ease.
Of all the factors that have an influence on a passenger’s time in the airport terminal, a key factor is the passenger’s wayfinding experience. A departing passenger’s main aim is to get to the right boarding gate on time. This is important to the passengers as well the airports and airlines. Thus this research will focus on enhancing the wayfinding experience of a departing passenger.

Although wayfinding is not the most interesting aspect to design in an airport, it is one of the most significant factors that determines whether a passenger has had a seamless experience at the airport. Wayfinding is a strategy that enhances user experience. One will know the importance of wayfinding design when they’ve struggled to navigate their way through a complex building like Heathrow.

By incorporating design thinking to create a strategy to enhance the wayfinding experience, Heathrow will yield the following benefits :

- It will easily be able to guide the passengers, and help them discover their own space rather than struggling without assistance.
- It will help Heathrow differentiate itself from its competitors.
- A simple yet clear wayfinding design system will personalise experiences for passengers as well as make them a memorable one (Peate, 2018).

According to the ACRP report, information and wayfinding technologies are based the universal design principles. As airports become larger and more complex, all travelers benefit from intuitive design and presentation of information in multiple formats. Pictograms, for example, serve not just individuals with intellectual disabilities but also international travelers unfamiliar with the local language (Castiglioni, 2017).

A strategic wayfinding design can ensure your experience is just as good offline, as it is through a digital medium. The strategic use of symbols and text, when designed with focus will communicate to a universal audience. Wayfinding design is often taken for granted. By using innovative signage and graphics, airports will not only build a relationship with their passengers but also develop loyalty due to improved experiences and great customer service (Peate, 2018). At the end of the day, it’s all about giving passengers an experience that is effective and simple.

2

Key Research Question

This section explains the key research question, aim and objectives.

KEY RESEARCH QUESTION

Airports are still facing a challenge regarding wayfinding. The difference in language, culture and place of origin of each user at the airport often leads to misinterpretation of the information provided to them. In today's world. where seamless customer experiences can yield 400% conversion rates, the right wayfinding strategy can result in brand strength, consistency, create airport differentiation and most importantly enhance their journey experience to a great extent (Peate, 2018). This research is an attempt to understand the challenges passengers face with regard to understanding information, and navigating through an airport. There is no perfect wayfinding strategy designed for airports, since no one particular strategy has been tried and tested by all passengers. Furthermore, since neuroscientists have proved that consumers develop relationships with brands from the best experiences (Gad, 2016), it would be important to understand the aspects that drive a good user experience with the brand. Design thinking can be used as a tool to create human-centered, iterative, creative approaches to practical ideas and solutions. It is an approach to imagining experiences and giving them a desirable outcome (Brown, 2008).

How can design-led innovation enhance the wayfinding experience for passengers travelling through Heathrow Terminal 3?

AIM

To develop an inclusive design-led innovation strategy to enhance a passenger's wayfinding experience at Heathrow Terminal 3.

The research would focus on gathering data relating to a passenger's wayfinding experience at Heathrow Terminal 3 and understand their challenges and expectations and then understand the influence of design thinking in this context. Furthermore, market research and technology research will help gather meaningful information. This information will be analysed in order to recognise the potential outcome. Conceptual scenarios will be created which will then be used to develop a design thinking strategy.

To break the aim into different segments, a set of five objectives has been created. Each objective explores key aspects of the research.

OBJECTIVES

1. To gain an in-depth understanding of the current service system and solutions employed by Heathrow to improve their passenger experience
To identify which aspect at which terminal has scope of improvement

2. To review relevant theories in the wayfinding context at airports and other setting
To gain a thorough understanding of the problem

3. To critically investigate the current wayfinding experience for passengers at Heathrow Terminal 3 in order to identify pain points

To understand the current challenges that passengers face and their needs and expectations

4. To determine the use of strategic design thinking in improving a passenger's wayfinding experience and draw inference that would have a positive effect on Heathrow
"Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success."
- Tim Brown, CEO of IDEO. (IDEO | Design Thinking, n.d.)

5. To develop and assess a design thinking strategy to enhance the wayfinding experience for passengers travelling through Heathrow Terminal 3
After the data has been assessed, a design thinking strategy will be created in order to improve a passenger's wayfinding experience

Beneficiaries mainly include Heathrow Terminal 3, its airlines and the passengers travelling through the terminal.The other beneficiaries are all the other three terminals, the airlines, the stakeholders, government bodies, agencies like the International Air Transport Association and other government agencies.

The perspective and stages developed in the project are on the basis of the resources available to the researcher.

3

Review of Literature

This section presents an in-depth understanding of the current state of literature

3.1 BACKGROUND

3.1.1 COMPLEXITY AT HEATHROW

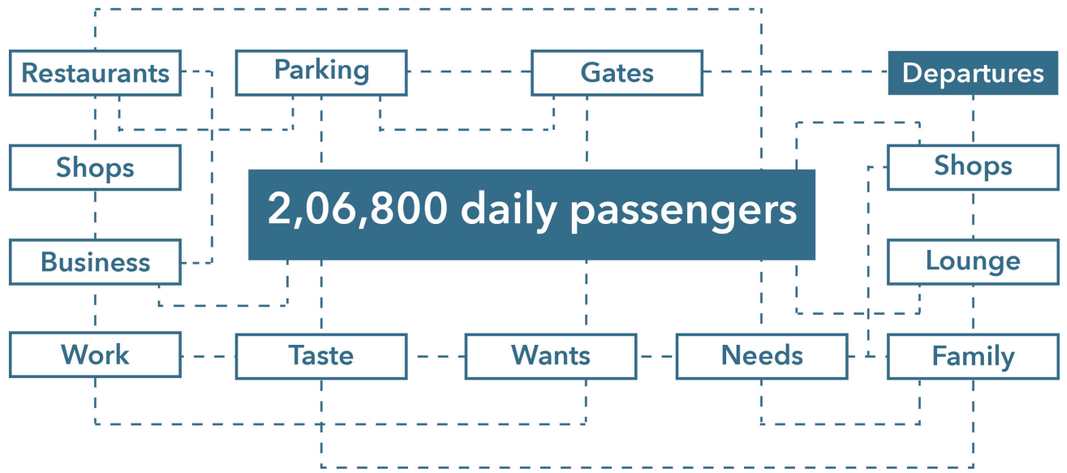


Figure 2 : Complexity of Heathrow Airport (Adapted from Acxiom, 2017)

Airports are a complex environment of people, processes, technology and information. Heathrow has a large volume of people - 2,06,800 daily passengers and the needs, wants, tastes and opinions of them vary greatly. The same person could want a different type of experience, depending on his purpose of travel. Another complexity is the number of separate businesses involved, each of whom have their own goals. These include the restaurants, shops, lounges, parking space, gates and not to forget, planes. Heathrow has to efficiently manage the different businesses, in a way that it meets the needs and wants of the passengers travelling through Heathrow (Inside Heathrow's Incredible Customer Experience Operation, 2017).

At present, 18 airlines operate at Heathrow Terminal 3 most of which are OneWorld alliance members and other non-affiliated airlines. These include American Airlines, Japan Airlines, Cathay Pacific, British Airways. It is the base for all Virgin Atlantic flights. Although the terminal is mainly for long haul flights, there are some flights to European destinations as well. As per Heathrow statistics, there were 19.5 million passengers on 94,019 flights at Heathrow Terminal 3 in 2018 (Heathrow.com, 2019) (Heathrow Airport Guide, n.d.).

3.1.2 WAYFINDING

There are several debates on the definition of wayfinding. According to Professor Per Mollerup, wayfinding is "what we do when finding our way in unknown quarters". Dr Hugo Spiers, an expert from the Institute of Behavioural Neuroscience at UCL, has a contrasting opinion. He believes there are different types of wayfinding, and that one needs to use different parts of the brain to understand this : "Finding novel paths between destinations" vs. Route Finding – "following well-learned paths between locations". Whereas, the Oxford dictionary states wayfinding as "the act of finding one's way to a particular place; navigation" (Girling, 2016).

Thus, wayfinding can be summarised as the process of finding your way in an environment that is familiar or unfamiliar (Farr et al., 2013). It's about understanding and interpreting the flow of a particular space and the human behaviour that takes place in that environment (Endpoint, n.d.). The above definitions establish the fact that wayfinding is more than just signage. It's about giving the users a right balance of information, navigation and orientation to find their way (Mijksenaar, 2017).

Airports are complex spaces that exist primarily for the purpose of allowing significant numbers of people to fly from and into, a specific location. In these spaces, wayfinding is an important process, given that these people need to be moved in a time effective and safe manner, to various locations within the airport. Trying to guide users to and through an airport is a particularly complex activity, especially around some of the large international airports, some of which might be thought of as mini-cities. (Symonds, 2017)

Wayfinding is an important process in a complex environment and transportation hub like Heathrow, given that passengers need to go through different processes or activities at various locations in the airport in a time effective manner (Symonds, 2017). The presence of separate business entities such as the parking space, train service, and retail areas at Heathrow are seen as one unit by the passengers. An effective wayfinding system at Heathrow can facilitate an easy flow of passengers through the terminal especially during a rush hour (Inside Heathrow's Incredible Customer Experience Operation, 2017) (De Barros et al. 2007; Churchill et al. 2008 in Farr et al., 2013).

The design of the airport is one of the most important steps to creating an effective wayfinding system. The signage and wayfinding elements are developed according to the airport environment. The airport layout, and the connection and synchronisation between different elements and systems at an airport have a major influence on the wayfinding experience of a passenger (Harding, 2011). Another opinion is that in order to make a wayfinding system work, one should start with understanding the people, their behaviour and the mental perception they have of an airport environment. Humans use the cues and clues in an environment to navigate through a space. The architecture of the environment, lighting, signage and the behaviour of people around us are factors that support wayfinding (CCD Design, n.d.)

An inefficient wayfinding system can increase a passenger's stress level, and it could take some time for the passenger to recover from the stress. This impacts the airport from a business aspect. Instead of visiting different restaurants or going to retail areas, the stressed passenger would rather reach his gate. This is because the passenger does not want the anticipation of not reaching the gate on time due to the inefficient wayfinding system (Harding, 2011).

3.1.2.1 Wayfinding at Heathrow

The purpose of Heathrow's signage is to provide directions to the passengers as well as represent a corporate image. Their signage favours black lettering on a yellow background. (Fewings, 2001) Triagonal, Pascall+Watson, theTeam, Clear Structures, Applied Wayfinding and Holmes Wood are a few agencies who have been assigned by Heathrow Airport to enhance the wayfinding either for a whole terminal, or for some sections of it.

The Team, a branding and communications agency was tasked with improving the security wayfinding for passengers at Heathrow. Their approach involved exploring the main aspects of security i.e safety, protection, and surveillance. Different colours and graphics were used to create a change in tone for the passenger experience. Two different design options were tested live at Heathrow Terminal 5 to find out which design was more effective. Users' gave their opinions, and the wayfinding system was then implemented in the security area. This demonstrates the use of signs, their placement, and light in order to create an effective wayfinding system (Coombes, 2018).

3.1.2.2 Heathrow Terminal 3

Similarly, Holmes Wood was contacted to improve Virgin Atlantic's airline customer experience. A map was created for passengers from outside the terminal till the check-in and bag drop, until the security and departure areas. Since Virgin had a kiosk-only check in process, it was key to direct the passengers to the kiosks and then to the bag drop and security area. Thus, stainless steel sheathed columns were used as beacons, and aluminium letters were used to identify the classes. An on-screen graphic was also designed to inform the passengers of the process they has to go through. Also, for non-English speaking passengers, Holmes Wood recommended the use of pictograms.(Matson Knapp, 2009).

3.1.2.3 Principal clues and elements of wayfinding

The principal clues used by passengers to navigate through an airport include landmarks, nodes, paths and edges. Space, light, colour and visual are seen as important elements of wayfinding. Intelligent spatial design reduces the use of signage at an airport. Light creates a sense of comfort in a stressful environment like an airport. Mainly artificial light is used as an element of wayfinding and is used as an effective indicator for finding one's way. Colour is a key aspect of wayfinding and its strategic use aids wayfinding thereby reducing the need for excessive signage. Lastly, visual includes the art and signage at the airports.

Techniques

The study conducted by (Harding 2011) highlighted that there are three techniques that passengers undertake when they navigate their way through the airport. They are described as follows :

1. Recreational wayfinding is when the passengers want to explore the different aspects at an airport without being in a rush, and see wayfinding as an element of satisfaction. Therefore, the wayfinding experience is a crucial aspect of their journey at the airport.
2. Resolute wayfinding is when the passenger's main aim is to find their way in the most efficient manner possible.
3. Emergency wayfinding is when the only aim of the passenger is to reach their destination as quickly and easily as possible. These kind of passengers are usually stressed, and therefore the wayfinding system should be easy to understand.

Out of the three techniques, most passengers undertake resolute wayfinding and thus it is the primary force behind the wayfinding design system. (Harding 2011) (RE:Think | Designing for Wayfinding, 2018)

3.2 PASSENGERS AT HEATHROW

Although passengers are the main focus of airports, they most often have a stressful experience. The service industry is progressing rapidly with personalised services for its customers, but the aviation industry is a step behind (Meyer, n.d.).

To fulfil passenger expectations, it is important to understand the demographics and segments of customers who travel through an airport. Not all passengers navigate through an airport in the same way (Managing Customer Expectations for Passenger Service at Airports, 2014). Moreover, they hail from different countries with different mother tongues (Symonds, 2017). The main passenger types at the airport include leisure passengers, business passengers and less-abled passengers. Business travellers prioritise reliability and efficiency. They want to spend the least amount of time at an airport whereas the leisure passengers prioritise the entertainment and facilities (Sykes and Desai, 2009). Less-abled people, especially those with vision impairment want the utmost efficiency with wayfinding through the airport. Surprisingly, in the UK alone there are over one million adults who have such poor sight that they cannot read the signs in an environment. Also, it is difficult for people with dyslexia or those who cannot read to interpret the information at an airport (Fewings, 2001). Thus, it is important to find common ground to develop a wayfinding system that works for all types of passengers. Heathrow's main aim is to enable their passengers to navigate their way through the airport as swiftly and smoothly as possible (Coombes, 2018) (Managing Customer Expectations for Passenger Service at Airports, 2014).

3.3 ROLE OF DESIGN

Wayfinding is customer experience. It connects the customers to the brand. Wayfinding signage is the most prominent design a customer looks at when they enter an airport environment. Outstanding and seamless wayfinding creates memorable experiences for the passengers and increases the brand loyalty and value. Similarly, poor wayfinding can lead to missed flights and a frustrating experience. (Diadem, n.d.)

Wayfinding as a system alone includes designing in a strategic manner to promote better user experience for brands. Wayfinding uses design to focus on effective orientation of points and landmarks, helps to declutter decision points and creates an opportunity for branding.(Peate, 2018) (check pictures of this website -https://fabrikbrands.com/the-wonders-of-wayfinding-design/)

(Newbery and Farnham, 2013) have defined design as "both a noun and a verb." Design as a noun can be interpreted as "the idea or outcome of a process" whereas as a verb, design is the process of planning and implementing an idea. Hence, businesses rely on design to ensure that their end result will meet customer expectations and create value (Newbery and Farnham, 2013).

According to the Service Design Network, service design is a "human-centered approach that focuses on customer experience" and prioritises the quality of service as a key aspect of success (Lockwood, 2009). Passengers are at the centre of the wayfinding service and their needs at each step should be understood by the airport. By gathering information about the users' needs helps the airport to deliver the right services. Airports that have a service design mindset use a design thinking and user-centred design approach to gain an empathetic understanding of their passengers (Polaine, Løvlie and Reason, 2013 in Huang, 2016).

Every design execution has the control to include or exclude customers. Using inclusive design for wayfinding at airports helps understand the passenger diversity in order to make informed decisions and to include every type of passenger (Inclusivedesigntoolkit.com, n.d.).

Wayfinding decisions are influenced by inclusive design. If the design is understood by less abled people, whether physical or mental, its means the solution will automatically work for everyone else too (Girling, 2016). Inclusive design in built environments aims to provide all users with sufficient information, sometimes even before they leave their house. Making environments easily accessible to all users means considering the signage, lighting, materials, and spatial layout (Fletcher, 2006)

Competition is becoming tougher and the customers are expecting more from the service industry (Sämäkari, 2018). It has become essential for brands to deliver great services and customer experiences. This is because customers now demand for services and experiences that are personalised, responsive and intuitive . The business needs to adapt to the shift in customer experience and expectations in order to create more value for the business by meeting customer expectations. (Engine Service Design, 2018). The challenge is to match customer expectations at Heathrow and create a seamless wayfinding journey for them.

Design thinking translates observations into insights which are then translated into services. By undertaking an empathetic approach, the airport understands the wayfinding experience through the eyes of the passenger (Brown, 2009).

What differentiates design from other forms of solving problems is that design is abductive thinking. It is the logic of what might happen or be possible. It is an educated guess about the human experience, and its relation with the design challenge. This enables ideation in the process, which leads to design and innovation (Stickdorn et al., 2018).

3.4 TECHNOLOGY

Airports are implementing digital technologies to enhance passenger experiences for different processes at the airport. It could be finding appropriate car-parking, navigating at the airport or finding baggage (Jaffer and Timbrell, 2014). Technology can be used for creating personalised experience for passengers (Anticipating and Designing for Change: Wayfinding for Evolving Airports, n.d.). Heathrow has implemented the following technologies to improve passenger experience and satisfaction :

3.4.1 Biometric boarding at Heathrow Terminal 5:

British Airways is the first UK airline to have initiated automated facial biometric technology through their launch of self-service boarding gates. All domestic flight passengers can board by using by using the technology. This has improved their punctuality on domestic flights by 10% (Cooper, 2018)

self-service biometric boarding gates

3.4.2 Wayfinding technologies :

'Positive Boarding' through pioneering technology at Heathrow Terminal 1 and 3 :

Heathrow is the first ever airport to use the pioneering technology to improve its passenger experience and mainly ensure the punctuality of the departing flight. 'Positive boarding' helps in giving passengers more accurate information and reduces the airlines' last minute check on the passengers or their bags. It helps to track at what departure stage the passenger is at, and gives them information to help them to make it to their flight on time. This system underpinning the technology is Passenger Authentication Scanning System (PASS). It starts before the security area where the passengers scan their boarding passes. This data is collected by the system to ensure the passenger enters the right terminal as well as determines their punctuality at the boarding gate. The passenger and airlines receive updates based on the information. This helps the passenger to have a smooth and well-informed journey at the airport. In the first week, 35,000 passengers used the technology during their departure journey. 44% passengers of Virgin Atlantic and Little Red flights could have delayed the departure, out of which 700 were updated by the automatic information display to start making their way to the departure gate to prevent missing the flight (Heathrow, 2013) (Lo, 2013).

Detailed Terminal Maps :

Heathrow has collaborated with Apple Maps to make terminal maps more detailed. Passengers can use the Apple maps with their IPhone or iPad which can help them navigate as well as find their areas of interest. The Apple Maps help to improve the digital experience of passengers by giving them the opportunity to plan their journey (Future Travel Experience, 2017).

Aira Application :

Heathrow has collaborated with the Aira, a technology company in order to provide personalised assistance to visually impaired people. It allows the passengers to independently navigate through the airport. The application's primary focus is to connect passengers to a trained agent who helps them find specific locations at the airport as well as providing them real time information. More than one million people required special assistance at Heathrow in 2017 alone, and the number is rising by 8% every year. Heathrow has also launched an application called 'SignLive' that helps passengers connect to British sign language translators on request (Future Travel Experience, 2018).

Living Map System :

Heathrow's maps lacked consistency, accessibility and legibility. They were also inaccurate. Thus, Applied Wayfinding were tasked with creating an efficient design that would help to eliminate passenger stress. Applied created a 'Living Map' system that geographically maps the entire airport, which includes the building routes and character. This map can be accessed through the website, through interactive maps on mobile phones and in the form of signs at the airport (Applied Wayfinding, n.d.).

3.5 EXISTING TOOLS TO IMPROVE THE WAYFINDING EXPERIENCE

At present, positive boarding system, detailed terminal maps, Aira application and the 'Living Map' system are the technology-led methods being implemented to improve Heathrow's wayfinding experience. Apart from the above, identification signs, informational signs, directional signs and regulatory signs, lighting and customer assistants assist in the wayfinding at Heathrow. The following images demonstrate the same.

3.6 RESEARCH OPPORTUNITIES

The review of literature proves that wayfinding is a strong determinant of customer satisfaction at Heathrow airport. Passengers travelling through Heathrow speak different languages, have different cultures and disabilities. Wayfinding is a significant element of understanding passenger behaviour and meeting their expectations. The literature explains wayfinding about different terminals at Heathrow as well as Heathrow Terminal 3 (Coombes, 2018). There is not much research that explains the wayfinding at Heathrow Terminal 3 or the current strategies that the terminal has adapted. It is also important to note the gap in the inclusivity element in the wayfinding system at Heathrow Terminal 3. Thus, it is important for this research to be carried out in order to identify an inclusive wayfinding design strategy for Heathrow Terminal 3.

3.7 CASE STUDIES

WAYFINDING AT AIRPORTS

Narita International Airport Terminal 3, Tokyo

Figure 3 (Narita International Airport Terminal 3, Tokyo, 2015)

Figure 4(Wayfinding at Narita International Airport Terminal 3, 2015)

Figure 5 (Pictogram, 2015)

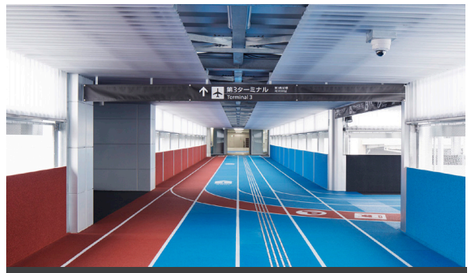


Figure 6 (Wayfinding, 2015)

Tokyo's Narita International Airport Terminal 3, was openeed in 2015 for low-cost carriers. The project was executed by Nikken Sekkei, Ryohin Keikaku, and creative lab Party. It was completed much before the Tokyo 2020 Olympics. Since it is a low cost airline terminal, the budget was half of the usual. Even then they were successful in creating a clever and minimal space that demonstrates witty and eye-catching design.

The terminal design is a combination of an Olympic theme with an ingenious wayfinding system. It is unlike any other terminal in the sense that it does not have illuminated signage. It has clear wall signs that comprise of large icons that have a simple design. The colour coded paths create an excitement amonst passengers and easily lead them throughout the terminal. Blue is chosen as the colour for the departure track "to express the color of the sky" and the earthy-red brown is chosen for arrival "to express the sense of relief." The other symbols and signs are printed on the tracks itself which makes navigation very clear. (ArchDaily, 2015) (Hohenadel, 2015)

Summary : This case study indicates that wayfinding can be effcient without complicating the design process or involving the use of technology too. Colours are an important element of wayfinding and has been used as the main enabler at Narita International Airport, Terminal 3. Passengers can easily navigate through the airport by following the colours as well as the subtle signs on the walls as well as tracks. This wayfinding design also creates a sense of place for passengers.

Schiphol Airport, Amsterdam

Figure 7(Wayfinding Schiphol, n.d.)

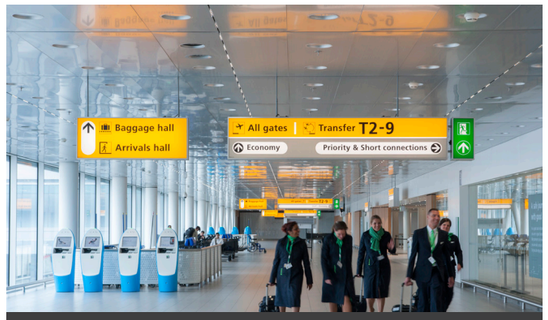


Figure 8(Wayfinding at Schipol Airport, n.d.)

Figure 9 (Wayfinding at Schiphol, n.d.)

Figure 10 (Signage at Schipol airport, n.d.)

In 1991, Mijksenaar set the new standard for wayfinding when they redesigned the signage for Amsterdamn Schipol Airport. The wayfinding system at Schipol comprises of maps, escape route signage, flight-information system and a spatial zoning advice. Schipol Airport is the ultimate example for airport signage in the world and has got several prizes for it.

It is easy for a passenger from any country to recognise the signs and pictograms,since they have used international signage. According to Paul Mijksenaar, it is of utmost importance to consider the psychology of the passenger. The information signs are placed in a way that they face the passenger whereas advertisements are placed on the side so they do not obstruct the view of the information signs. Another principal of psychology is to separate signs. For the wayfinding signage at Schipol, Mijksenaar devised clear colour signs. For example, blue signs were for shops and restaurants, yellow for arrivals and departures and green for emergency exits.

Summary :
This case study highlights the important aspects of good signage i.e **continuity** which means constantly repeating the information until the passenger has reached the destination, **conspicuity** which means that the signs should be eye catching, consistency which means the airport should stick to its terms and lastly clarity which means that the message should be communicated clearly (Mijksenaar, n.d.) (Mijksenaar.com, n.d.).

2 Technology
2.1 Wayfindr

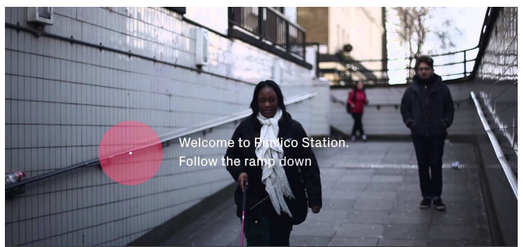


Figure 11(Wayfindr, 2015)

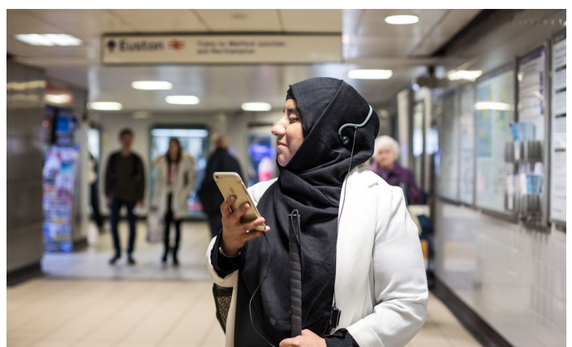


Figure 12(Wayfindr, 2016)

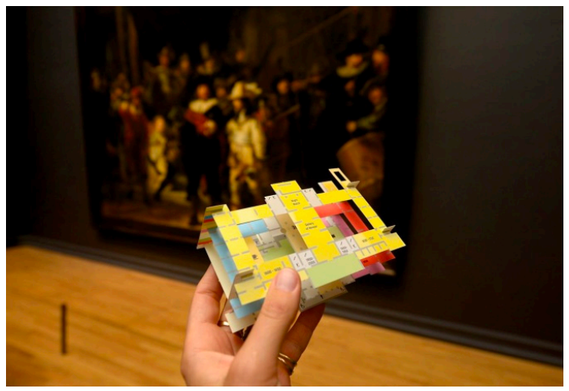
Wayfindr is the world's first Open Standard for audio based navigation and is a joint collaboration between ustwo, a global digital product studio and the Royal London Society for Blind People's Youth Forum. They investiagted the challenge of how vision impaired people can independently travel in the London underground with the help of a smartphone. The open standard, based on in-depth user research is in the form of a digital navigation system that helps to create seamless and reliable experiences for vision impaired people across different locations and platforms. It is comprised of a prototype aapplication that uses BLE beacons to experiment and validate inputs from real users in real situations and real time. It will encourage consistency to the experience that the vision impaired people have with dgital navigaion systems. It clearly states how distance should be communicated, what the audio clarity requirements should be, and what features will be recognised by the beacons.

A trial took place at Pimlico station in early 2015, in which audio directions were given to vision impaired people through the smartphone application that interacted with the beacons that were placed throughout the station

The trial guides participants through Euston Tube station, giving audio directions from a prototype smartphone app that interacts with beacons installed throughout the station. LU commissioned the trial to find out if the system can work reliably across the Tube network and to test and refine Wayfindr's standards for audio navigation. It builds on a pilot project at Pimlico station in early 2015, which led LU to invest in this full-scale demonstration at one of the busiest stations on the Tube network.

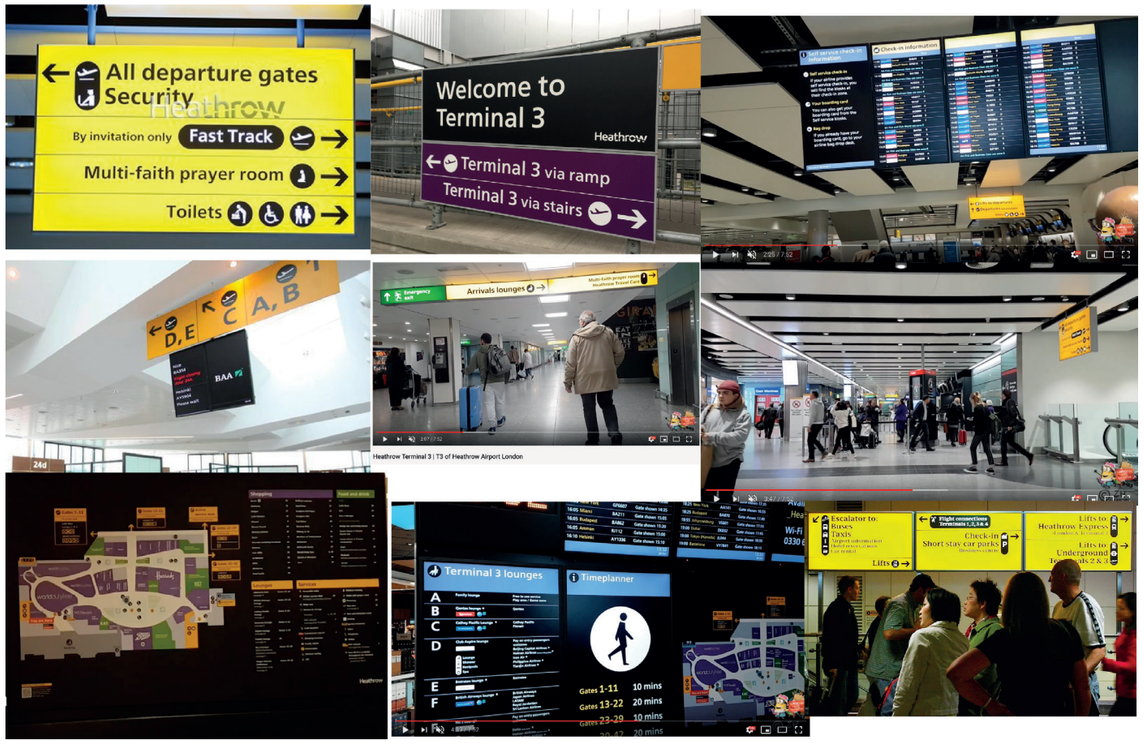
Summary :
Wayfindr built confidence amongst the 43% of vision impaired people in the UK who expressed that they would like to leave their home more often (Ustwo.com, n.d.) (Rsbc.org.uk, 2015), and Wayfindr gives them the ability to travel independently, have control over their journey and feel more like a Londoner.

A 3-D Museum Model for Interior Wayfinding



This is an example of an intricately cut paper used as a wayfinding tool for the Rijksmuseum museum. The museum has 100 rooms, with more than 8000 pieces of art. For visitors to be able to navigate efficiently, Dutch designer Marjin van Oosten created Paper Pathfinder , which is simple but still very functional. This map helps visitors look at the museum in three dimensions. This makes wayfinding less complicated. The pathfinder is easily foldable in a pocket or purse (Fastsigns, n.d.)

HEATHROW TERMINAL 3



4

Research Methodology

This section illustrates an overall research plan and gives a detailed explanation and justification for choosing the research methods

"The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study."
Professor Hua Zhao
Chair of the College of Engineering, Design and Physical Sciences Research Ethics Committee
Brunel University London

A funnel approach was used to define the research problem. The aim was to understand the key challenges faced by passengers travelling through Heathrow Airport. Surveys and interviews were conducted with passengers to identify a specific aspect at Heathrow Airport that prevented a good experience. The analysis of the above two research methods led to narrowing down the research problem to : enhancing the wayfinding experience for passengers travelling through Heathrow Terminal 3.

Thus, the research seeks to identify challenges faced by passengers with regards to their wayfinding experience at Heathrow Terminal 3. An in-depth study was conducted to understand the current service system for wayfinding employed by Heathrow and the factors that affect a passenger's wayfinding experience. The research focuses on all types of extreme passengers in order to make it an inclusive design solution. Design disciplines used to improve customer experience were looked into.

Framework :
The research onion framework was developed by Saunders et al. (2007) and has been adapted to explain the research methodology. Starting from the outermost layer to the innermost layer, it gives a detailed description of the research process (Saunders et al., 2007). The layers are philosophies, approaches, strategies, choices, time horizons and the innermost layer is techniques and procedures. Due to the limitations in the research, philosophies and time-horizons have not been used.

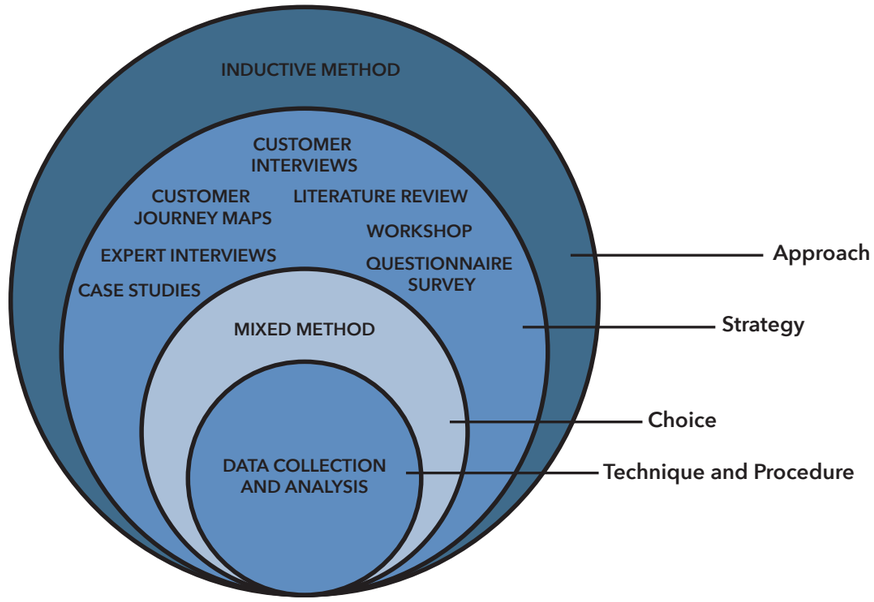


Diagram 1 Research Plan ; Adapted from the Research Onion (Saunders et al., 2007)

4.1 RESEARCH APPROACH

An inductive approach was adopted in order to understand the current wayfinding service system at Heathrow Terminal 3. The research mainly focuses on understanding wayfinding at Heathrow, the factors that affect a passenger's wayfinding experience and design strategies that can be employed to enhance the current situation. Therefore exploratory research was carried out to become familiar with the basic setting, facts and concerns (Choi, 2018). It also helped in gaining established as well as real-time information about the factors that hinder a passenger's wayfinding experience.

4.2 RESEARCH STRATEGIES

This layer demonstrates the methods that will be undertaken by the researcher to achieve the research objectives. The secondary research methods such as literature review and case studies were employed to understand existing knowledge and data of different aspects of my research project. Primary research methods undertaken to gather qualitative and quantitative data were surveys, semi-structured interviews, customer interviews, expert interviews and creative workshop.

Choices

Mixed methods were adopted in order to gather qualitative and quantitative data. According to researchers, a mixed methods research is the only way to be certain of your findings and interpretation(McKim, 2016). Quantitative data is important to understand the attitude and behaviours of the type of extreme passengers that travel through Heathrow Terminal 3. It helps the researcher to identify patterns and understand the areas of improvement. Whereas qualitative data is holistic and enables the researcher to gather rich and valid data (Choi, 2018) about the design as well as other aspects that are significant to the research.

Techniques and Procedures

Information for the research was collected through several sources such as books, journals, reports, websites and blogs. The purpose was to understanding the existing information and data, and compare it with the real time information in order to identify a theme or pattern. Archetypes, empathy maps and customer journey will be created in order to understand the problem in more detail.

4.3 RESEARCH PROCESS

The Double Diamond research process model has been adapted from the Design Council to explain the research process of this project. This model helps to understand how the exploration of a wide issue is narrowed down to then achieving the objectives to solve one specific problem. Different directions are explored (divergent thinking) to select one potential idea (convergent thinking) (Design Council, 2019).

The four phases are either characterised by convergent thinking or divergent thinking. They are explained as follows :

Discover

In this phase, the researcher's personal motivation guided her interest in the topic. Thus, further research was done into this topic to understand the challenges passengers face at an airport. Surveys, qualitative interviews and market research resulted in understanding the bigger picture and created statistics that helped the researcher in formulating the key research question (Design Council, 2019).

Define

This phase encompasses a convergent thinking approach. The researcher undertakes primary and secondary research to get a preliminary idea of the solution. Understanding and alignment of the needs to research objectives is achieved in the 'Define' phase.

Develop

The researcher's main focus in this stage was to start developing a design-led solution after identifying themes and opportunities. The researcher started developing prototypes, storyboards and mood-boards in this phase.

Deliver

In the last phase, the researcher developed a strategic design-led innovation strategy, which was followed by getting the strategy, prototype and storyboard assessed. This phase marks the completion of the research project. (A study of the design process, 2019)

The following illustration explains the methods and tools used to gather information.

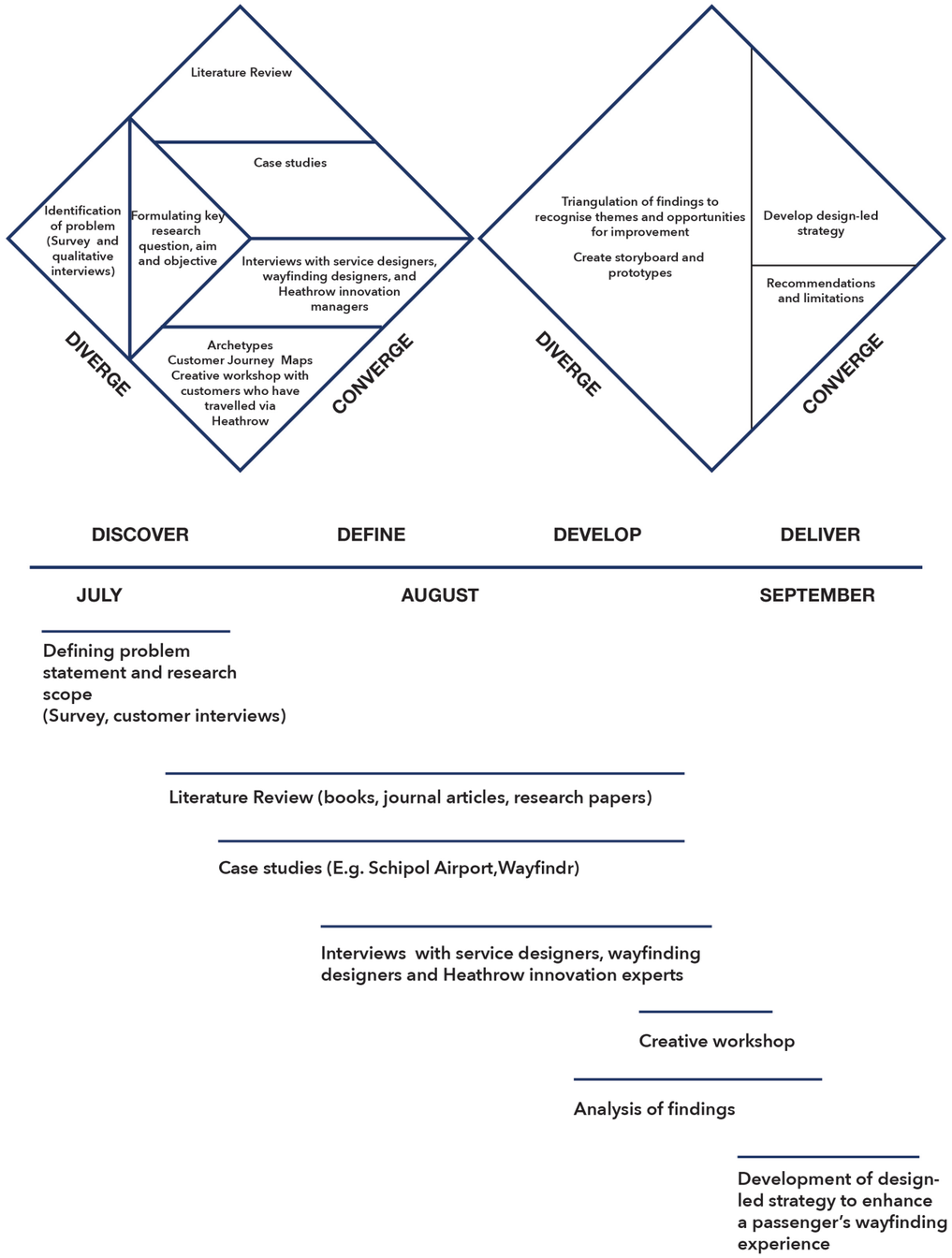


Diagram 2 The Research process (Adapted from Design Council's Double Diamond, 2015)

4.4 RESEARCH METHODS

Research methods explain. "how" one can create and work with tools to develop a solution. A mix of methods should always be considered since each research methods its potential bias (Stickdorn et al., 2018).

SECONDARY RESEARCH

The researcher conducted secondary research through literature review and case studies to gain an in-depth understanding of the existing theories.

Literature Review

A literature review is a critical and in-depth evaluation of existing research (Choi, 2018).
It helps the researcher formulate a comprehensive and unambiguous understanding of the current research, compare it to different research theories and identify gaps in the current research. This will enable the researcher to plan future research and propose new directions to unresolved issues (Imel, 2011 cited in Turner, 2018). It seeks to identify a relationship between ideas and theories and understand its practical implications (Efrat Efron and Ravid, 2018).

Case Studies

A case study can be defined as a detailed investigation of a phenomenon in its real-life context. Case studies help to understand how or why something happened (Thomas, 2011and Yin, 2003 cited in Karlsson, 2016). It gives the researcher an opportunity to gain an in-depth understanding of one aspect of a problem within a limited time frame (Bell, 1999 in Choi, 2018). Case studies are being considered as a secondary source of data collection for this research project. Case studies are based on the best wayfinding at airports, in other environments and the role of technology in wayfinding.

PRIMARY RESEARCH

Primary research is a qualitative source of information that was conducted during almost all phases of the research process. Although it is time-consuming, it provided the researcher with valuable and practical insights into the research problem. It is a vital source of information as it gives first-hand and current information relating to the topic area. The researcher has used qualitative as well as quantitative sources of primary research. To achieve the research objectives within the given time period, the following methods of primary research have been used to gather information :

1. Online Questionnaire
2. Customer Interviews
3. Expert Interviews
4. Customer Journey Maps
5. Archetypes
6. Workshop

Online Questionnaire

A questionnaire survey is an accurate and flexible approach for gathering data in a short period of time from people all across the globe. An online questionnaire survey consisting of 19 questions was carried out during the 'Discover phase'. It was shared via several social media sites such as WhatsApp, Facebook and LinkedIn. The purpose of the survey was to gain an in-depth understanding of a passenger's pain points during their customer journey

while travelling through Heathrow Airport. 135 responses were recorded from people from all around the world who have travelled via Heathrow in the past 2 years. The researcher stated the time period in order to collect current information. The survey helped to understand the aspects at Heathrow Airport where majority of passengers faced the highest problem. Thus, this helped me narrow my research area and formulate the research problem statement.

Customer Interviews

Customer interviews were conducted at the initial phase of the research project. The main purpose was to identify the the behaviour, experience and pain points of a customer when they are travelling through Heathrow Airport. Based on segments created by the researcher, customers from various age groups and disciplines were chosen to participate in the interview. These interviewees were asked to share their departure as well as arrivals experience through Heathrow Airport. These interviews contributed in the making of the overall customer journey map.

Expert Interviews

A qualitative research tool that enabled the researcher to gain professional insights about the current customer experience at airports, customer expectations, trends and services. Semi-structured interviews were a vital part for this research, especially because more than half of the open-ended questions had follow-up queries. Questions and checklists were planned beforehand in order to understand the expert's perception and allow further discussion. At almost every phase of the research process experts were interviewed and their experience and insights were of significant value to the research project. The following is a list of the experts interviewed with their professional title.

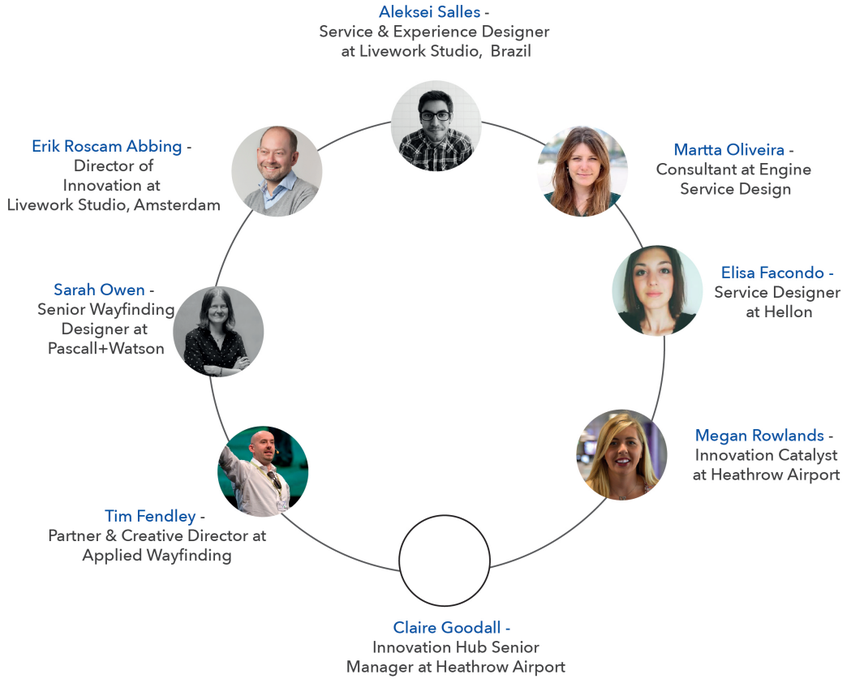


Diagram 3 Experts

Workshop

12 people between the age of 23-31 were chosen to participate in the workshop. The aim was to understand their wayfinding experience at Heathrow Airport. Thus, the workshop was divided into three activities. It was based on extreme archetypes that were designed by the researcher. The first one was about understanding the behaviour and attitudes of the extreme archetypes through empathy maps. The second activity required the participants to use the empathy maps in order to create a customer journey map, where the main focus had to be their wayfinding experience at Heathrow Terminal 3. The idea for the last activity was adapted from Disney's creative thinking technique. This technique involves exploring a situation using three perceptual positions i.e the dreamer, the realist and the critic (Michalko, 2011). This helped to narrow down the most feasible and efficient ideas for the research project.

Customer Journey Mapping

Customer journey mapping is considered the most recognised tool for improving service experience. A journey map is a tool that helps to understand the overall experience of a customer with a product or service. They make intangible experiences visible and facilitate a common understanding between team members (Stickdorn et al., 2018). It helps to focus on one aspect of the service. For this research project, two customer journey maps were prepared. The first one is an overall journey experience map, to identify the pain points of the passenger, and the second one is a customer journey map that focuses on the wayfinding experience of the passenger.

Archetypes

Archetypes are inspired by actual customer segmentation. They are a description of the different kinds of attitude and behaviours that passengers travelling through the airport have. Archetypes were created during the initial phase of the research to gain a better understanding of a passenger's specific behaviour in a given context. It helps to focus on more nuanced scenarios. This tool was a vital starting point and helped in guiding the research. It was used as a base for customer segments in the workshop as well (Behavioural Archetypes, n.d.) (Putnam, 2019).

5

Findings and Analysis

This section objectively presents the critical analysis of the data collected.

5.1 SECONDARY RESEARCH

Literature Review

Psychology of Wayfinding

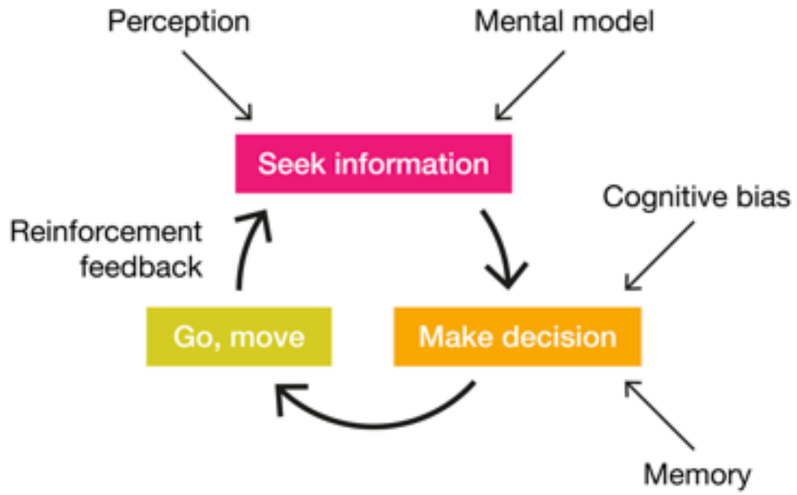


Figure 13 : Psychology of wayfinding

A cyclical model has been illustrated to gain an understanding of the psychology of wayfinding. Based on perception and mental models, a person looks for information. A decision is then made based on memory of the route. Most often, people make biased decisions and as for wayfinding, people perceive that what they see is all there is, which leads to people not recognising information. For wayfinding to work, a person relies on their senses, what they hear, see or smell. Important elements of wayfinding are colour, landmark, nodes, lighting, space, paths and crowds. A person's brain is on a constant run to find information, register the environment that they are in, and plan their journey. It is a highly complex process and puts cognitive load on our brain. A person's existing knowledge helps to recall the landmark and routes. According to Kevin Lynch, people form a picturer in their mind of different spaces. (Girling, 2016)

While wayfinding, a person adapts to various strategies. These include educated navigation, track following, map reading and social navigation. A combination of these strategies is the most common approach to wayfinding. (Girling, 2016)

Customer experience

Customer experience is one of the main drivers of loyalty. Forrester states that 56% consumers are open to new experences whereas that number was at 39% 10 years ago. It costs a brand 500% to attract a new customer. It's more expensive to attract a customer than retain one (Forrester, 2019)

5.2 PRIMARY RESEARCH

5.2.1 Online Questionnaire

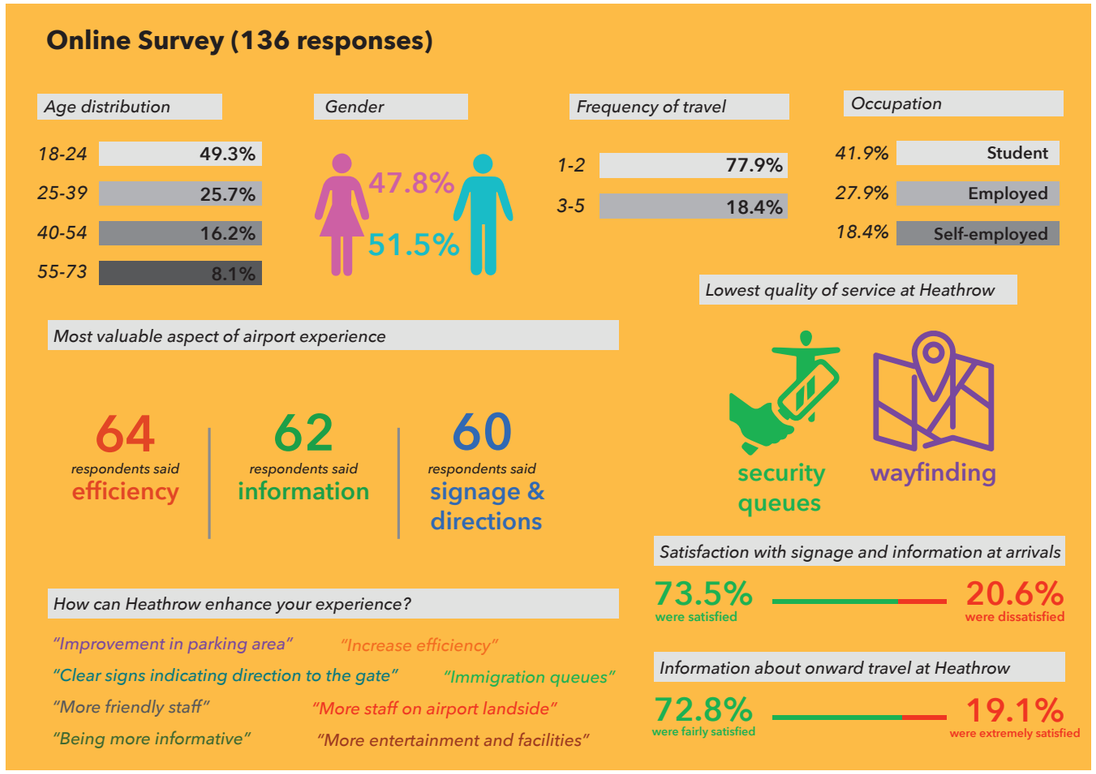


Diagram 2 Online survey results

The purpose of the survey was to understand the passenger's experience while travelling through Heathrow Airport and identifying the main areas of improvement. The survey has mostly been filled by students, employed and self employed individuals. The results demonstrate that participants value efficiency, information and signage and directions the most at Heathrow Airport. Participants said that security queueing and wayfinding were not upto their expectations. Participants were fairly satisfied with the information and signage at arrivals and onward travel at Heathrow Airport. Participants also expressed their need for more friendly and informative staff at the airport,improvement in immigration queues, and clear signage.

Key insights

All passengers require utmost efficiency during their journey at Heathrow. Having the right information and clear signage and directions gives the passengers control over their journey. Security queues are a process at the airport that people despite the most. What they really want is to get through security without having to wait in a long queue, or without having to remove their belongings. Similarly,wayfinding is a critical element at the airport.It is what helps passengers navigate their way through the airport. People want efficiency in wayfinding, so that they can travel independently, without getting lost. They desire wayfinding to be as simple and straightforward as possible. Complicated designs and architecture in a complex environment like Heathrow will just cause more stress to the passenger. Hence, the survey helped the researcher understand narrow down to the areas of improvement in terms of passenger experience i.e security and wayfinding. Passengers at departure want utmost efficiency in their journey at departures and an efficient wayfinding system will help them to gain control over their journey.

5.2.2 Open-ended customer interviews

The open-ended customer interviews were conducted after the survey. The purpose was to have a more detailed understanding of the specific aspects that lead to a bad customer experience. It also helped understand the behaviour of the passengers at each stage. 13 people between the age group of 22 to 55 were chosen to be interviewed. They had different background and cultures.

Key findings :

Having an in-depth interview with participants who have travelled via Heathrow Airport helped the researcher understand identify different customer segments who travel through the airport. Personas were created based on the customer interviews. It helped the researcher understand the touchpoints, emotional journey, and pain points of a passenger travelling through Heathrow. The following diagrams show the different customer segments and their journey at Heathrow Airport.

SOLO BUSINESS TRAVELLERS

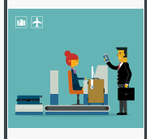
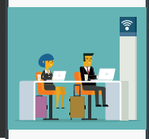
	DEPARTURE								ARRIVAL		
	RESEARCH	BOOKING	GETTING TO THE AIRPORT	CHECK-IN	SECURITY	FINDING THE GATE	WAITING AT GATE	BOARDING	IMMIGRATION/ PASSPORT CONTROL	BAGGAGE CLAIM	LEAVING HEATHROW
STORYBOARD											
CHANNELS											
TOUCH-POINTS	Browse different websites and give your top flight options	Tell the person invit-ing you for business to book the ticket for you	Pre-book the Uber and leave as per schedule and traffic	Use the check-in kiosk to print ticket and show it to airport personnel	Go through the security scan and meanwhile use phone	Use phone to browse activities around and signage to get to the gate	Using phone, eating and then waiting at gate	Showing ticket to air-port personnel and checking screen for group number	Scanning passport and walking through the e-gates	Checking signage to get to baggage collection belt	Checking signage for directions, and phone to check tube time
EMOTIONAL JOURNEY	EXCITED	HAPPY	RELAXED	HAPPY	FRUSTRATED	CONTEMPLATING	FRUSTRATED	RELIEVED	TIRED	TIRED	TIRED
PAIN POINTS					QUEUE IS USUALLY LONG, OPENING NEW LINES IS FRUSTRATING	SIGNAGE IS NOT THAT APPEALING, AND I DON'T REMEMBER WHERE WHICH RESTAURANT IS	THERE IS NO SYMBOL FOR QUIET AREAS WHERE I CAN WORK		ELECTRONIC READER DOES NOT DETECT PASSPORT SOMETIMES	I DON'T KNOW HOW LONG WILL IT TAKE FOR MY BAG TO ARRIVE	NO FACILITIES AT PARK-ING ARE AND CONFU-SION ABOUT LOCATION
KEY FEATURES					SHOULD BE NOTIFIED AS TO HOW LONG THE QUEUE WILL TAKE, MAKE SCANNING MORE EFFICIENT	MAKE SIGNAGE MORE EF-FECTIVE AND EFFICIENT TO USE	IMPROVE SIGNAGE TO SHOW WHAT'S AROUND THE TERMINAL		SHOULD HAVE ADVANCED AND EFFICIENT TECHNOLO-GY	SHOULD BE ABLE TO TRACK YOUR BAG SO YOU HAVE AN IDEA AS TO HOW LONG YOU HAVE TO WAIT FOR	SHOULD HAVE A SEATING AREA AND SOME FACILITIES
IDEAS					SCREENS TO SHOW APPROXIMATE TIME AND NUMBER OF PEOPLE, AND MORE EFFICIENT SCANNING SYSTEM	HAVE SMARTSCREENS AT AIRPORT THAT CAN HELP YOU ASCERTAIN WHAT'S AROUND	CAN HAVE AN APPLICATION ON THE PHONE THAT CAN HELP YOU FIND WHAT YOU WANT		SYSTEM IMPROVEMENT	RFID TAG ON THE BAGS	HAVE A COFFEE SHOP AROUND AS WELL AS WAITING AREA

Diagram 4 **Pain Points : Security queues, inefficient signage and wayfinding, spending time at departure gate, immigration, baggage claim and waiting at the parking area**

FAMILY LEISURE TRAVELLERS

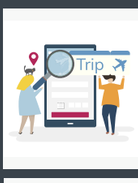
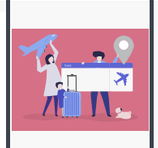
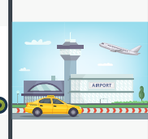
	DEPARTURE								ARRIVAL		
	RESEARCH	BOOKING	GETTING TO THE AIRPORT	CHECK-IN	SECURITY	FINDING THE GATE	WAITING AT GATE	BOARDING	IMMIGRATION/ PASSPORT CONTROL	BAGGAGE CLAIM	LEAVING HEATHROW
STORYBOARD											
CHANNELS											
TOUCH-POINTS	Browse different websites and dis-cuss with family	Check prices on dif-ferent websites, and book flight through laptop	Pre-book an Uber and leave when it arrives	Use the check-in kiosk to print ticket and show it to airport personnel	Go through the security scan and meanwhile use phone and keep kids entertained	Use phone to browse any leisure activties for kids as well as res-taurants to eat.	Playing with kids, using phone and waiting at the gate	Showing ticket to air-port personnel and checking screen for group number	Using phone while waiting in the queue, showing passport at immigration	Checking signage to get to baggage collection belt	Checking signage for directions, and book an Uber
EMOTIONAL JOURNEY	EXCITED	HAPPY	HAPPY	HAPPY	FRUSTRATED	CONTEMPLATING	BORED	RELIEVED	ANGRY	TIRED	RELIEVED
PAIN POINTS					QUEUE, REMOVING BELONG-INGS (BELT, ELECTRON-ICS, LIQUIDS	DON'T KNOW HOW FAR MY GATE IS, WHAT RETAIL STORES, FOOD PLACES ARE AROUND			LONG QUEUES AT THE END OF A TIRING FLIGHT, NOTHING COULD GET WORSE	I DON'T KNOW HOW LONG WILL IT TAKE FOR MY BAG TO ARRIVE	
KEY FEATURES					SHOULD BE NOTIFIED AS TO HOW LONG THE QUEUE WILL TAKE. MAKE SCANNING MORE EFFICIENT	MORE EFFICIENT WAYFIND-ING SYSTEM, TO NOTIFY THE CUSTOMERS OF HOW FAR THEIR GATE IS AND WHAT IS AROUND			SHOULD BE NOTIFIED AS TO HOW LONG THE QUEUE WILL TAKE	SHOULD BE ABLE TO TRACK YOUR BAG SO YOU HAVE AN IDEA AS TO HOW LONG YOU HAVE TO WAIT FOR	
IDEAS					SCREENS TO SHOW APPROXIMATE TIME AND NUMBER OF PEOPLE, AND MORE EFFICIENT SCANNING SYSTEM	HAVE SMARTSCREENS AT AIRPORT THAT CAN HELP YOU ASCERTAIN TIME TO GATE AND THINGS AROUND			SCREENS TO SHOW TIME AND NUMBER OF PEOPLE AHEAD OF YOU	RFID TAG ON THE BAGS	

Diagram 5 **Pain Points : Security queues, inefficient signage and wayfinding, immigration, baggage claim**

FRIENDS' LEISURE TRAVELLERS

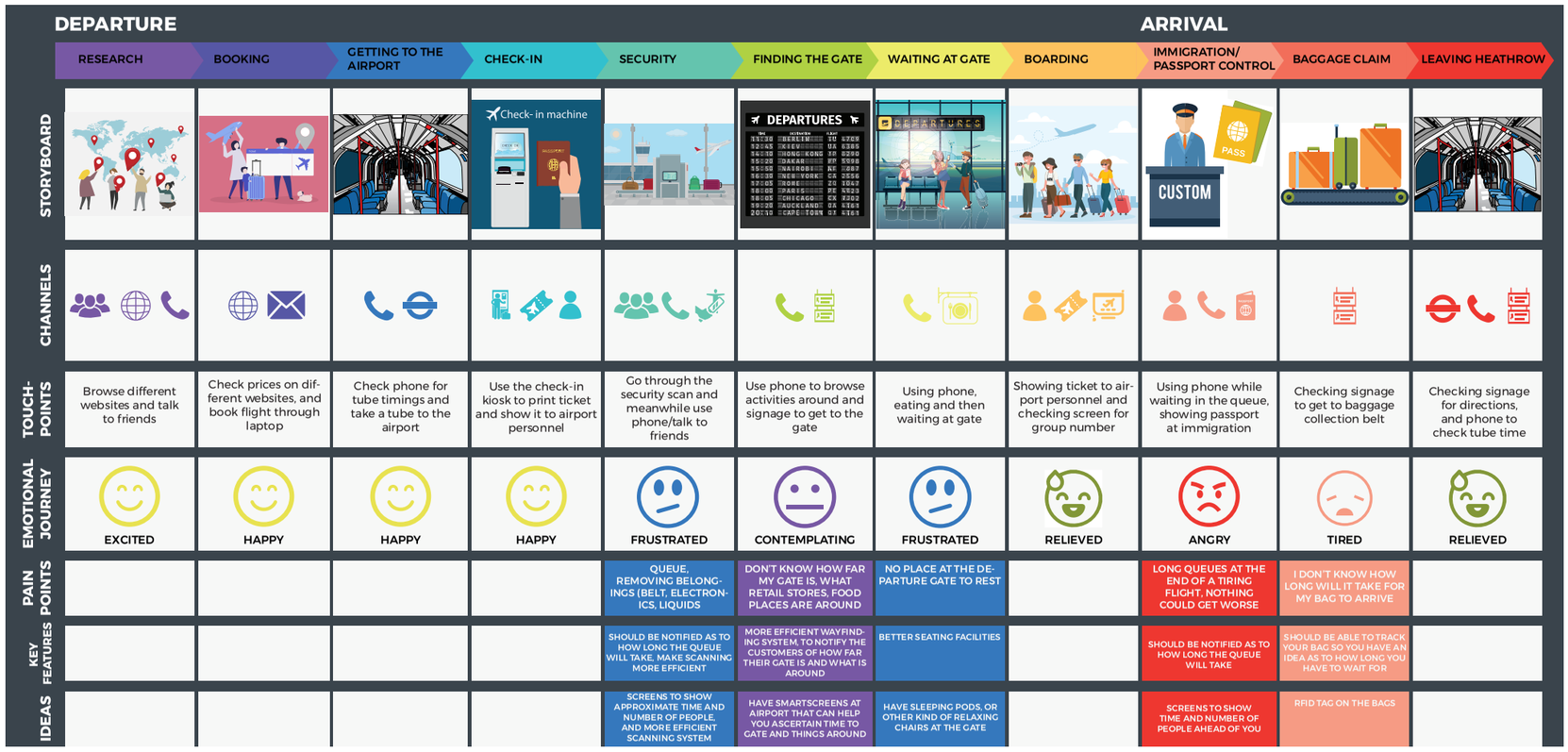
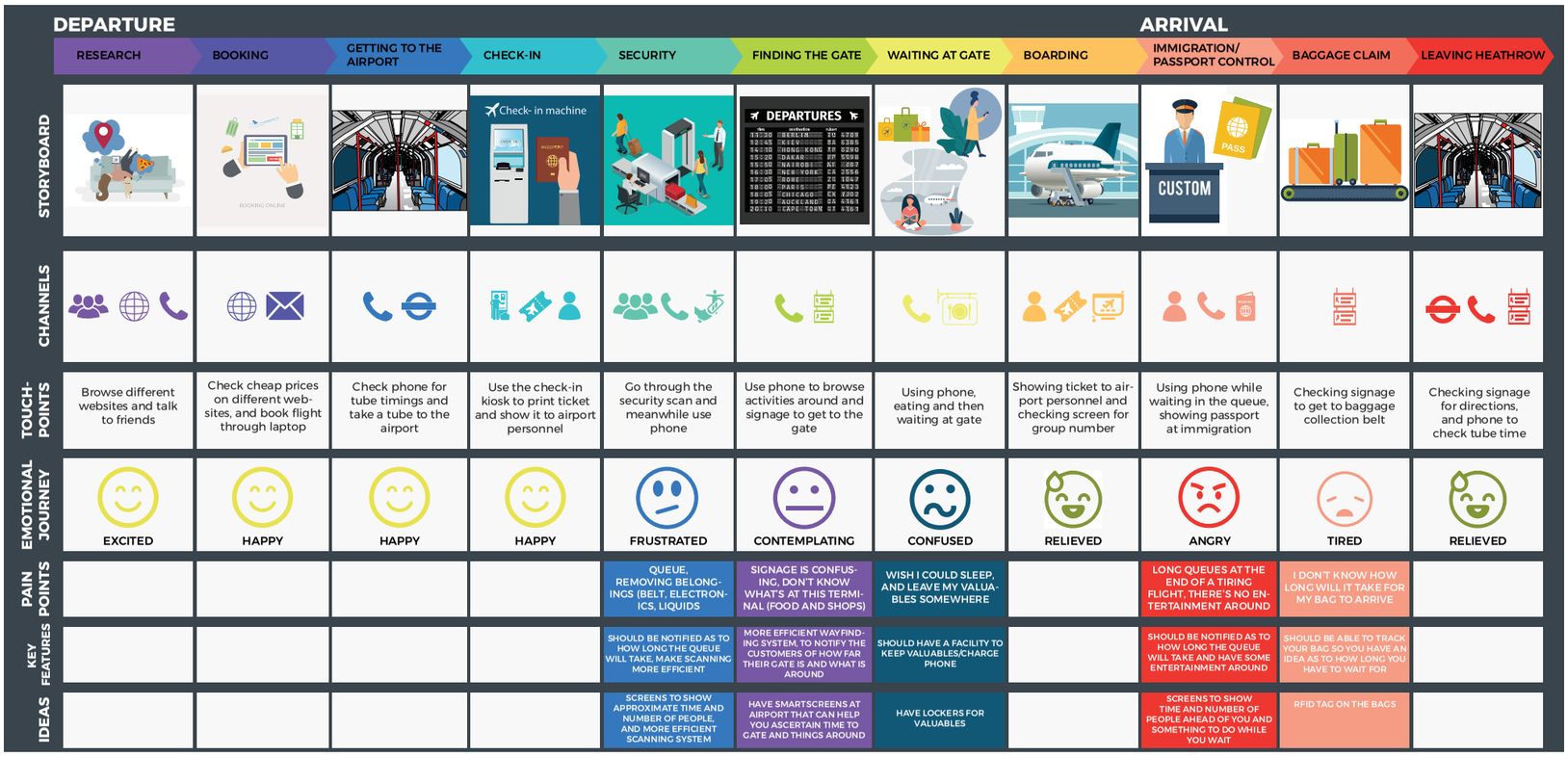


Diagram 6

Pain Points : Security queues, inefficient signage and wayfinding, immigration, baggage claim

SOLO LEISURE TRAVELLERS



Pain Points : Security queues, inefficient signage and wayfinding, spending time at departure gate, immigration, baggage claim

Diagram 7

Key insights:
Personas and the customer journey maps are a great tool to gain an empathetic understanding of the customers as well as identifying areas of improvement. After analysing the customer journey based on each persona, the researcher narrowed down to the areas where the passengers felt most frustrated, confused or angry. The customer segments somewhat had a similar journey. They felt frustrated at the security check-in because of the queues and the amount of belongings they had to remove. This establishes the fact that no passenger is fond of going through security and most of them feel frustrated. Airports are a complex environment and planning their journey at the airport is a top priority for the passengers. Through the interview, the researcher analysed that even though the customers had been to Heathrow a couple of times earlier, they did not feel confident during their journey. Some participants were not very well-versed with the English language and thus the clustering of signs at the airport not only increased their stress level, but also caused confusion in the passenger's mind.Taking into consideration the pain points of the personas, the researcher came to a conclusion to narrow down the research area to wayfinding at the departure area. The survey proved that wayfinding at arrivals and onward travel was not a big hassle, and wayfinding is a significant element at the departure area, which will help the passenger gain control his their journey.

5.2.3 Expert interviews

Eight experts were interviewed during the course of the research project. The purpose of conducting expert interviews is to gain first-hand insights from people who have worked on a similar project, or have expertise in the major aspects of this research project. The experts comprise of service designers, wayfinding designers and innovation experts.

Aleksei Salles
Service and Experience Designer,
Livework Studio, Brazil
Skype call interview

Aleksei Salles was chosen as an expert as he has good experience in innovation projects that use design as the main aspect to deliver better experiences to users. The interview was conducted during the initial stage of the project, when the researcher was gathering information to gain a broad understanding of passenger experience at Heathrow.

Key Findings :
A bad customer experience can impact business results. This has been followed and proven by several industries. Experiences are everything for a brand, and if delivered correctly it will result in an increase in brand loyalty. Passengers seek personalisation of experiences.

Martta Oliveira
Consultant
Engine Service Design, London
Face-to-face interview

Martta Oliveira has several years of experience as a service designer and has been involved in projects about improving customer experience at airports. She is an expert at developing customer experience strategies and thus she was interviewed to gain insights about the same. The interview was conducted when the researcher had narrowed down the scope of study.

Key Findings :
Research design underpins the ability to develop and deliver efficient and effective solutions. While doing research design, it is important to understand the context of the customer as well as the context of the employees delivering it. It is becoming complex to offer an experience to customers that sits exactly at the point you want it to. Therefore, it is important for a brand to be delibrate about creating great customer experiences. A design audit helps to analyse elements that come through a journey. It creates a holistic understanding of everything surrounding the experience. Benchmarking study serves the purpose of an inspiration report when conducting a research project. Archetypes and as-is customer journey maps are important to understand the attitude and behaviour of the customers.

Elisa Facondo
Service Designer
Hellon, London
Phone call interview

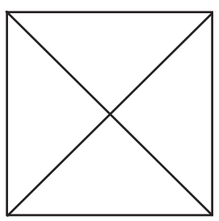
Elisa Facondo ia a service designer, who has worked on projects that involve improving customer experience at airports. Elisa was interviewed when the researcher was making a decision of what area to narrow down the research to.

Key Findings :
It is important to gather first hand information i.e information from customers. It will help to narrow down to a terminal that is facing challenges at the moment. Assumptions from literature should be validated by customers.

Megan Rowlands
Innovation Catalyst
Heathrow Airport, London
Face-to-face interview

Megan Rowlands was interviewed as she is the Innovation catalyst at Heathrow Airport. Her role is to identify innovation opportunites to re-imagine the airport of the future.

Key Findings :
There are several stakeholders involved at an airport, thus they are constantly involved in the decision making process of the airport. Wayfinding at Heathrow Airport has more scope of improvement. Technology enables efficiency of operations reduces wait time.



Claire Goodall
Innovation Hub Senior Manager
Heathrow Airport, London
Face-to-face interview

Claire Goodall is responsible for bringing innovation process and expertise to Heathrow Airport.

Key Findings :
Innovation helps a brand to stay ahead with the moving times and helps brands evolve in the way they operate. Different innovation teams at Heathrow strive to innovate in different aspects of the airport, for example sustanability, business viability, feasibility, amongst others. Design thinking principles are used by Heathrow to understand the problem, challenge and opportunity.

Sarah Owen
Senior Wayfinding Designer
Pascall+Watson, London
Face-to-face interview

Sarah Owen has worked on multiple wayfinding projects, including Heathrow Airport.

Key Findings :
A successful wayfinding design system is one that is simple. Digital technology may be a great solution to wayfinding, but the target group does not involve all the passengers travelling through the airport, which is a big concern.

Tim Fendley
Partner and Creative Director
Applied Wayfinding, London
Face-to-face interview

Tim Fendley is an information designer and entrepreneur who specialises in information, wayfinding and design.

Key Findings :
The challenge of wayfinding is to make all the different systems and processes feel lke one journey. Airports need to incorporate universal design in their wayfinding, which has to be incporated through their signage and language. What might mean arrivals in one country might have a different meaning to someone from another country. Digital technology is used to enhance an experience, not be fully controlled by it. Wayfinding should use a system of coding and progressive disclosure just like the London Underground. Consistency is another important element of a good wayfinding system.

Erik Roscam Abbing
Director of Innovation
Livework Studio, Amsterdam
Skype call interview

Erik Roscam Abbing incorporates service design to build inclusive services that make the world a better place.

Key Findings :
Service design enables the human touch, empathy and understanding of human behaviour, psychology and human emotions. This serves as a powerful basis for innovation. Digital technology is a layer that makes wayfinding simpler, and it helps to customise needs to reality However, most companies are really focused on digital, but the process has to start with gaining empathy of the customers and understanding them instead of creating a full-fledged digital solution. Everybody wants personalisation, but the challenge is about getting it right.

Key Insights from expert interviews:
Customers are willing to pay more for experience. Customers' expect positive and memorable experiences, especially at airports. Knowing that the airport is a stress environment, the customer expects that the airport will undertake all activities to ensure that the customer does not face any challenge or difficulty at the airport. The perception of the problem needs to be sovled. What could seem like a challenge to the passenger might not be perceived in the same manner by the airports.

Customer experience is a company's brand. If you have a terrbile experience, it is the brand you are going to have in mind for the company. Pain points in an experience are driven by the gap in the promise made to the customers of the experience and the actual experience. Expectation management is an important component of cusomer experience at airports. Design helps to evoke emotions and create great experiences for services. Design thinking helps to understand what the situation is, at the moment and helps to identify a gap. Benchmarking studies help to understand what is going on in the world that is influencing the customer expectations. This enables one to push their thinking. While personas demonstrate the demographic information of a person, archetypes help to understand atttitudes and behaviours, which is a more important factor to consider while developing an experience design strategy for customers.
The several stakeholders at an airport influence its operations and working. The airport has to align to demands of big airlines like British Airways and Virgin Atlantic. Even though the airlines have the capability to speed up the departure process, the airport has a different opinon. The main motive of an airport is to make passengers spend money and thus they want people to while their time away.

Heathrow is working towards improving wayfinding and see more potential for the same.
Wayfinding creates reliability and control over the journey. Heathrow puts service design a the heart of its operations and the customers at the centre of everything they do. Innovation is everything to a brand like Heathrow. It's one thing to provide facilities. Its another to make it an experience.

Innovation embraces one to acknowledge different aspects. It has a different meaning to different parts of the airport. Innovation brings together business strategy, consumer need, technical viability and feasibility to deliver an experience that is valuable. It's very much about relationships between organisation and customers, and how those relationships foster a new kind of value.

Wayfinding information should be given as a piecemeal to the passengers, progressively and slowly. Airports nowadays are pushing towards dgital technology. When wayfinding works, nobody notices it, because its seamless.Organisational connectivity is an important element of wayfinding. Passengers from all over the world travel through Heathrow. Pictograms should be universally understood so that there is no confusion amongst the passengers. The London Underground is a complex system as well, but with the help of colour and coding it makes the navigation easy for even a stranger.

A design-led innovation approach is a good way to gain an in-depth understanding of the problems and understand very fundamentally what you're working on. It helps you to strategize much more, to use innovation as a discovery tool and to understand what your business is about, and what you want it to be. It's interesting to start by prototyping a solution from a human, tangible physical experience perspective, and then see what could be done by adding a digital layer to enhance that.

5.2.4 Workshop

The workshop had 12 participants, the age range being 23-31. Through the workshop, the researcher aimed to gain an in-depth understanding of the wayfinding experience of passengers at Heathrow Airport.

The researcher created five archetypes based on primary and secondary information. Archetypes are different from personas.

They demonstrate the attitude and behaviour of the different types of passengers travelling through Heathrow. For wayfinding, it is important to know what the passenger is thinking and feeling rather than ascertaining their demographic information.It helps to focus on more nuanced scenarios. These archetypes were the basis of the activities that took place in the workshop.

Figure : Extreme archetypes

Key Findings:
Empathy maps helped to understand the behaviour and attitudes of the above archetypes. Solution seekers like being in control of their journey and feel anxious due to the uncertainty of the journey. Situational stressers, as the name suggests stress about everything around them. In a complex environment like Heathrow,not having reliability of their journey can increase their stress. Escape artists travel via the airport often and thus know the general layout of the airport. He feels more secured than the rest of the passengers. His only concern is being updated about the changes in the environment and a quiet place to work at. Special travellers are already facing some difficulties due to their disability. Thus, they expect wayfinding to be a simple and smooth journey instead of having to go to the airport personnel at every step of the way.The following diagram shows a summary of what the archetypes feel, think, do and say. It also demonstrates their pain points as well as gains i.e what do they hope their wayfinding experience to look like.

Figure : Empathy maps

Customer journey maps helped to understand the activities, touchpoint channels, emotions and pain points. They are based on the five archetypes and are shown as follows :

The idea for the last activity was adapted from Disney's creative thinking technique. This technique involves exploring a situation using three perceptual positions i.e the dreamer, the realist and the critic. This helped to narrow down the most feasible and efficient ideas for the research project.

ESCAPE ARTIST

STAGES	GETTTING TO THE AIRPORT	CHECK-IN	SECURITY	AT THE AIRPORT	GETTING TO THE GATE
ACTIONS	- Take a cab to the airport	-Passport -E-ticket	-Knows the process, what to dispose and what to put in the tray	Reaching the VIP lounge	- Walking towards the gate by looking at signa
TOUCHPOINT CHANNELS	-Uses the phone to find everything -Boarding pass	Signage	-Security personnel	- Information screens - Announcement	-Staff -Signage
EMOTIONS	Happy	Happy	Frustrated	Relieved	Relieved
PAIN POINTS	-Looking for technology oriented wayfinding solutions	- No pain points	- People are slowing down the queues since they have not understood the instructions	- No pain points	Not getting instant updates

SITUATIONAL STRESSER

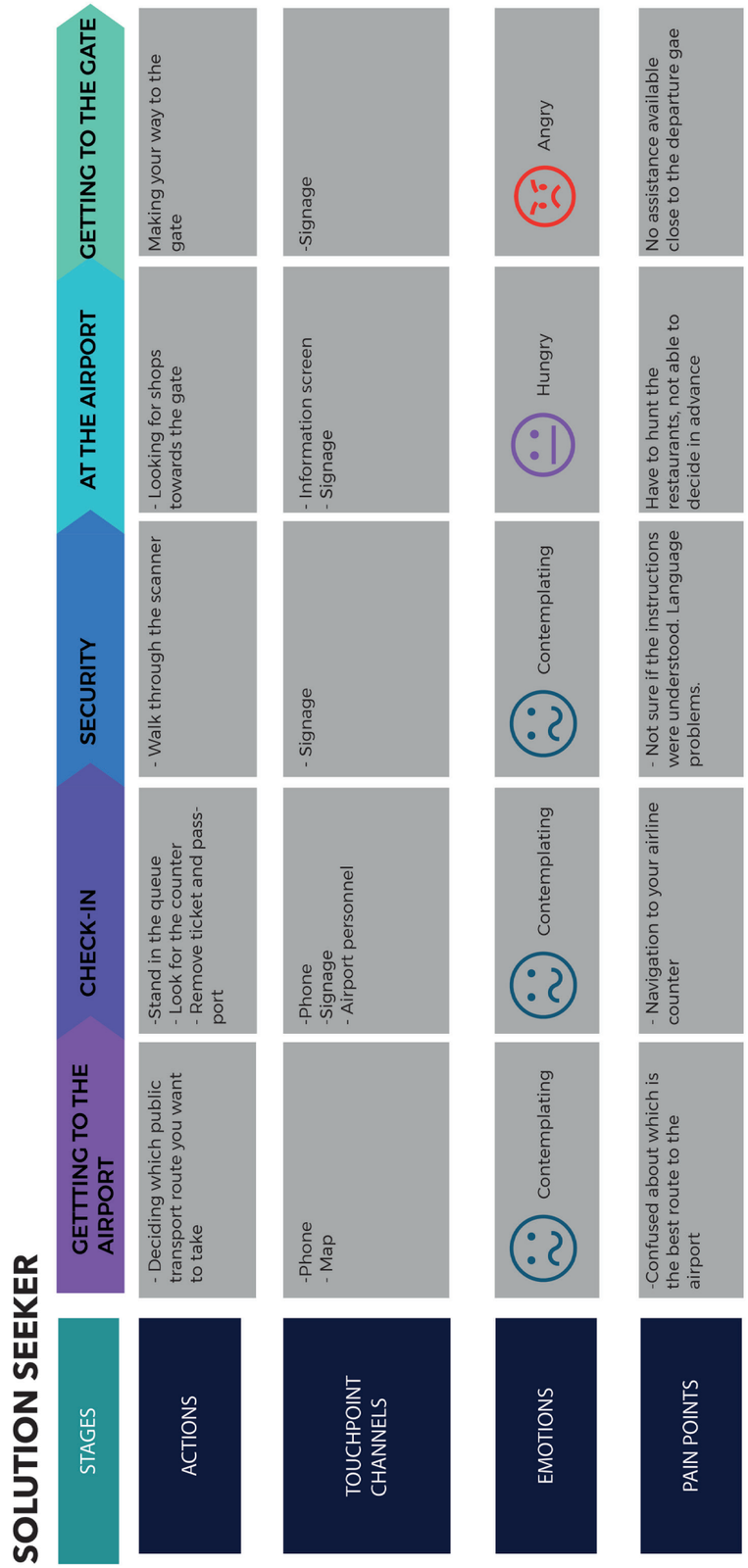
STAGES	GETTTING TO THE AIRPORT	CHECK-IN	SECURITY	AT THE AIRPORT	GETTING TO THE GATE
ACTIONS	-Use google maps to check the time of the bus -Ask airport personnel where you have to check-in	-Find airline desk with help of signage and stand in check-in queue -Ask questions to staff	- Try to understand where to go next -Follow people	-Find a place as close to the information board -Read and follow signs	-Stand in queue -Get your documents ready
TOUCHPOINT CHANNELS	- Signage -Announcements	-Airport personnel -Signs	-Security personnel - Signage	- Information screen - Signage - Announcements	-Staff -Signage
EMOTIONS	Stressed	Stressed	Contemplating	Frustrated	Relieved
PAIN POINTS	-Not getting flight information right away	- Can't read the airline desk number - Queueing	- Removing certain items due to lack of undersanding	Information is all very clustered and chaotic to understand	- Knowing when your supposed to stand in queue for departure

COMFORT JUNKIE

STAGES	GETTTING TO THE AIRPORT	CHECK-IN	SECURITY	AT THE AIRPORT	GETTING TO THE GATE
ACTIONS	-Takes a cab to the airport	-Look for airline counter	- Walk through the scan-ner Put items on tray	-Looking for a coffee shop	-Look for signs that lead you to your gate
TOUCHPOINT CHANNELS	- Phone -Website/application -Signage -Airport personnel	-Airport personnel	-Security personnel - Signage -Passengers	Signage	-Staff -Signage
EMOTIONS	Happy	Happy	Confused	Frustrated	Excited
PAIN POINTS	No pain points	- No pain points	- Removing certain items due to confusion	Cannot seem to find your way to a particular coffee shop of your choice	Could not find the toilet so you will use the one on the fight

SPECIAL TRAVELLER

STAGES	GETTTING TO THE AIRPORT	CHECK-IN	SECURITY	AT THE AIRPORT	GETTING TO THE GATE
ACTIONS	-Take your private car to get to the airport	Looking for the airline counter	-Follow people	- See the signage to decide what to do next	-Get help to reach the gate
TOUCHPOINT CHANNELS	- Signage from parking lot to the termnal	-Personal assistance -Signage	- People - Airport personnel	- Information screen	- Signage - Airport personnel
EMOTIONS	Stressed	Stressed	Contemplating	Frustrated	Contemplating
PAIN POINTS	-Information from the parking lot to the terminal is confusing	- Can't read the airline desk number due to disability	- Feeling los	Information is n small font, cannot understand - Lack of space	- Reachng the wrong gate - Delay in flights were not informed



Key insights :

All the information was gathered by workshop participants. The researcher analysed all archetypes individually and came up with the certain insights. Passengers feel stressed even before they have left for the airport. Their first impression of wayfinding at the airport is probably the parking space. Unclear directions and signage at the parking space already creates stress amongst the passengers. Clarity of the check-in counter number would help passengers notice the counter from a distance. Also, due to the vast number of people at an airport, sometimes the counter number is not so visible. People with disabilties find it particularly challenging to navigate through the airport. By stating people with disabilities, the researcher also refers to a father handling his three children as well as the luggage. It does not include people with physical disabilities. Some disabilities are not visible. At security, some passengers who are uncertain about what to do will follow what the other passengers are doing. Incorporating universal design may help cater to all kinds of passengers. Clustering of information is another reason why passengers might miss some instructions. Wayfinding is supposed to calm a passenger and help him navigate through a space easily. Instead, passengers are stressing more. Some are unable to find the toilets, some cannot find restaurants or cafes. This shows that airport wayfinding should be consistent as the passenger cannot register too much information at once. For passengers who are unfamiliar with the language can be a whole other challenge. Thus, pictograms have to be very clear and concise, since Heathrow does not have their signage written in any other language except for English. Getting to the gate on time is of utmost importance to the passengers as they do not want to miss their flight. With the chaotic airport environment, passengers may tend to not hear the announcements or they might get busy at retail stores or restaurants. By reminding the passengers of their gate and flight time, or informing them of the delay in the flight can help the passenger plan their journey and time at the airport.

The last activity adapted Walt Disney's creative strategy wherein the participants followed three steps

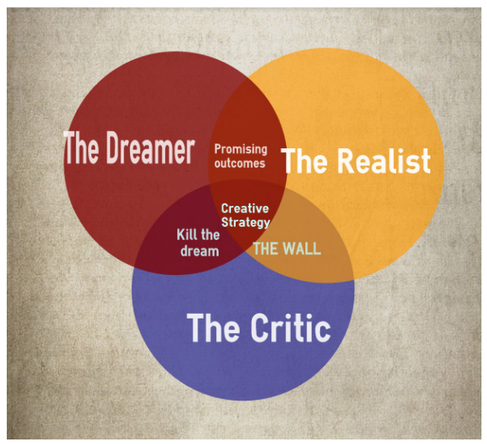


Fig 13(Disney, n.d.)

The creative strategy was implemented by the participants. This strategy is comprised of three steps which require different approaches, each of which helps to switch the thinking.

1. The Dreamer

The first step is to understand the purpose of solving the problem, the possibilities of what the solution might look like. The ideas that come out during this stage can be full of passion and excitement. It helped the participants think from a very broad perspective and enabled them to communicate their dream without any restrictions.

2. The Realist

In this step, the partcipants thought in a more logical manner which helped them narrow down to wayfinding design ideas that may be feasible in the short run or long run, but it's not impossible to achieve. The maginary ideas then turned into a plan.

3. The Critic

In this step, the participants identified the risks of executing a particular idea and constructively criticised it. This step helped to identify the most weak points and thereby shortlisting the most feasible ideas.This helped the researcher reach a conclusion (Elmansy, 2015)

6

Discussion

This section is about making sense of the results. It helps the researcher to explain the insights and understanding of the topic

6.1 How can wayfinding make an airport experience seamless and what are the areas of improvement for Heathrow?

Service design tools such as personas were designed to understand the customer segments travelling through Heathrow. The initial customer journey map led to understanding that wayfinding and security queueing were major pain points of a customer's journey at the airport. In-depth customer interviews were carried out to gain an understanding of the passenger experience as a whole. By talking to customers from different age groups and countries gave the researcher several insights into the problem.As mentioned above, while these interviews were being conducted, the researcher was still in the initial phase of the project, but yet a **pattern** was observed by the researcher from the very start. The customers expressed their opinion that as soon as they entered the airport, it felt like they were thrown into a cluster environment and they got lost there itself. Another interview with an old man gave the researcher an insight into a wayfinding problem. Even though the man had been to Heathrow several times before, he still tend to go the wrong way at the airport. The researcher then looked into this aspect in more detail, which helped her understand that wayfinding is a psychological ability. The cohesion of all elements of wayfinding at the airport is very important. The literature review agreed with this statement as well.

This led to the researcher conducting an in-depth study of what wayfinding is and its importance at an airport like Heathrow. There is not much literature that mentions about wayfinding at Heathrow Airport, or even customer experience at Heathrow. Since Heathrow has 4 terminals at present, and all of them are different from each other, the researcher had to narrow down to one terminal. This decision was made by analysing case studies, talking to customers about which terminal do they face most problem navigating. Some expert interviews also highlighted the fact that Heathrow 2 and 5 has just been done, and therefore the more old terminals should be targeted. More research led to narrowing down to Heathrow Terminal 3 since it mostly has long haul flights and has passengers coming in from all over the world.

Through the literature review and customer interviews, the researcher realised the growing need and expectation of personalisation and customisation within their journey. Literature review too, suggested the implementation of technology to improve services and customer experiences. The researcher analysed the service design expert interviews and wayfinding expert interviews after conducting them and they had a **different opinion as compared to the literature review, case studies and customer interviews.** The analysis of the interviews demonstrate that technology should merely be an enabler of improving customer experience, instead of it being the main element considered to improve the customer experience. This is because when one is designing digital based solutions, they are not catering to the entire population. Airports have all kinds of passengers travelling through. Some may be tech savvy,but there are passengers such as old people,blind or vision impaired people,people with other disabilities, people who are not digital natives and so on. That amounts to a vast number of people being excluded from the problem. This is where **inclusive design** plays a role.

The literature review, interviews and survey emphasized on the efficiency element at the airport. Efficiency can only be obtained when the passenger has control over the journey at the airport, and that can only happen when the wayfinding experience is seamless.

For wayfinding to be a seamless experience, the customers need to first understand that signs are not the only form of wayfinding that exists. Wayfinding is about the spatial layout of the airport, lighting, colours and signs. Space itself alone can help you navigate.

Although the wayfinding at Heathrow does not emphasise elements except for signage for wayfinding.From the primary and secondary research, the researcher has understood that good wayfinding need not be loud, or its designs should not be fancy and complicated. Instead good wayfinding design is simple. Since there are already so many processes, and stakeholders present at Heathrow, the environment automatically becomes so complex. In order to improve the situation, the researcher looked into different elements of wayfinding and how they complement each other. Some key considerations for signage are the placement of the signage, its legibility, its meaning in other countries. If the natural lighting does not fall well on the signage and if the signage is in the corner, one might not even notice it.

6.2 Role of inclusive design (opportunities)

Since there is a clear research gap for inclusive design, this research seeks to take the opportunity to understand what factors of wayfinding at the airport are a challenge to the customer and what can be done to solve the problem. Since inclusive design is based on understanding the real needs of the users, that is precisely what the researcher did. A workshop was conducted in order to make sense of the established information and create new insights.Market segmentation was carried out to establish a clear classification of the type of passengers travelling through Heathrow and understanding the probabe disabilities that some might have.Archetypes were created to establish the five types of behavioural people that exist and travel through the airport. It has been explained in findings. When the researcher was constantly prototyping, she used archetypes to test her solution.If it would work for all archetypes, means the design was successful. Once the researcher understood the requirements and pain points of the passengers at Heathrow, the researcher started developing a strategy. The next part of this section explains how the researcher constantly evaluated her strategy. The above processes and attributes are used when conducting an inclusive design project.

6.3 Design directions

Due to the constraint in time, the researcher has not been able to develop a design solution. Nevertheless, the researcher has created an inclusive design strategy. The process of how and why the researcher chose the particular elements for the strategy is explained as follows. The researcher has adapted Walt Disney's creative thinking strategy. The strategy has three steps :

1. The Dreamer : During the workshop, the partipants created the wayfinding customer journey map and were made to think of the most absurd ideas as the solution for the wayfinding problem. The researcher was actively analysing why the participants are doing what they are doing. This means that trying to understand the needs directly from the passengers and understanding the reason for it was a validation in itself. The ideas that the participants came up with at this stage were : headset wayfinding, virtual planning journey,robot assistants, interactive floor signage system, wayfinding user guidance map, tracking application for watch, press button assistance, sound and audio navigation guide, colour coding, luminent floors, personalisation through technology, colourful paths, relevant information, visual communication screens, fancy lights on screens to grab attention, airport personnel wearing uniforms so its easier to identify in case of a problem, multi-language wayfinding system, more space design than signage design.

Moving on to the next step of the strategy which is :
2. The Realist :
In this stage, the participants were made to understand that if the above ideas were to be implemented, which ones do they think would be feasible and easy to implement in the next few years. This step helped the researcher analyse the essence of each idea. The ideas that made their way to the next step were :sound and audio navigation guide, colour coding, luminent floors, personalisation through technology, colourful paths, relevant information, visual communication screens, fancy lights on screens to grab attention, airport personnel wearing uniforms so its easier to identify in case of a problem, multi-language wayfinding system, more space design than signage design.

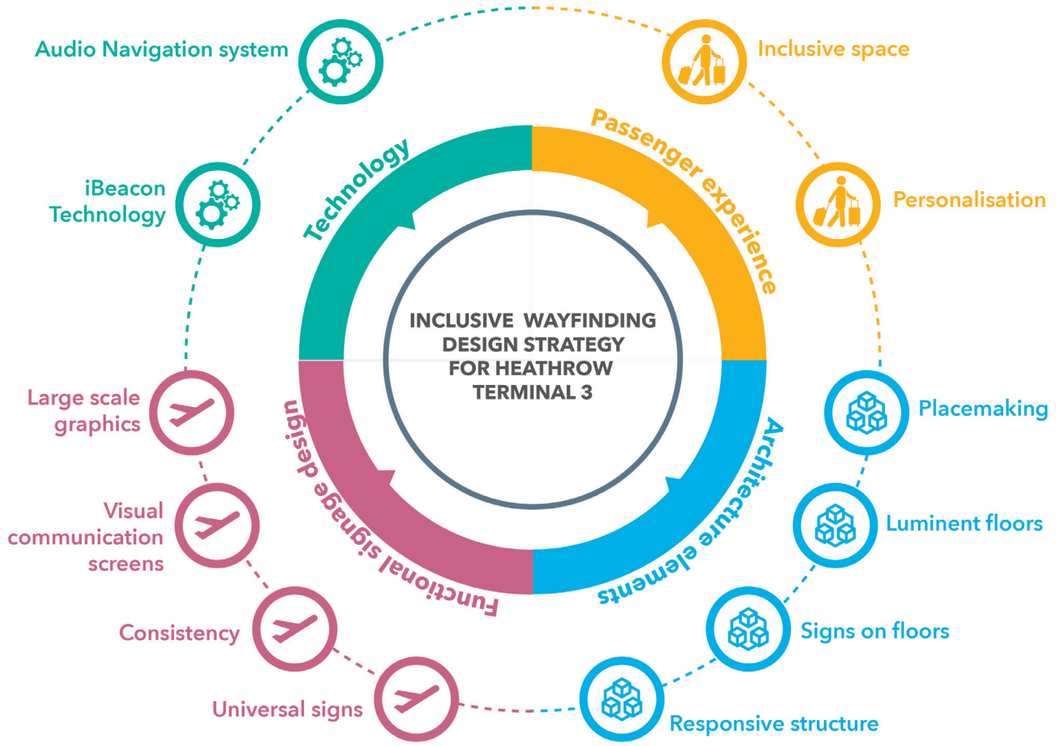
The last step of the strategy is :
3. The Critic:
As the name suggests, the critic looks at every idea with as much as detail as possible. The last stage was completed by the researcher. This is because the researcher had a better understanding of the problem, and could look at the ideas from a more holistic approach. The researcher already had an in-depth understanding of the problem and its feasibility and thus ideas were shortlisted by the researcher and the strategy was developed keeping those ideas in mind.

7

Recommendations

This section explains the strategic solution for the problem

7.1 STRATEGY



Inclusive design wayfinding strategy

This report established that for wayfinding to be successful in an airport context, a human centered and inclusive deisgn approach needs to be undertaken. Designing a wayfinding system at an airport requires resources and time. To make this feasible, a design strategy has been developed. It takes into account all factors that play a crucial role in a successful wayfinding design. These factors help to gain a holistic understanding of the situation.

The purpose of the report at this stage is to raise awareness of the factors that contribute to improving or enhancing a wayfinding system.They are practical approaches that Heathrow can consider during the inital stage of wayfinding design. It has specifically been designed for Heathrow Terminal 3. It is designed in a manner that it fits the goals, customer segments and systems of Heathrow Terminal 3.. Each component of the strategy is explained as follows

1. Passenger experience
Personalisation
Passengers are seeking personalised experiences and customising wayfinding can be a boon for a passenger. This could be done through using technology which would provide the passengers will real time updates. This technology could be in the form of an application that

is customised as per your navigation pattern. The application would comprise of all elements a passenger is in contact with, from the time he has booked the flight until his boards the flight. It is similar to a website, but is customisable as per your needs and requirements. Since the application keeps track of your activities, and has noticed that you take public transport to the airport. Instead of you having to check the route and then decide what time you want to leave for the airport, the application sends you a notifiication. It tells you what is the fastest mode of public transport on that day, and at that time. The application informs the passenger of weather conditions in the destination country so that you have all necessary items. At the airport, the application can notify you about offers at retail stores and restaurants at the terminal. Another key feature of the application would be to send you a message reminding you of the time your departure gate opens, so you can plan your journey accordingly. Hence, this adds a personalised layer to a passenger's experience, and makes it a memorable one.

Inclusive Space -
Creating spaces that are accessible by all passengers travelling through Heathrow will help in creating a positive impact on customer experience. Inclusive design is significant in a space such as an airport because all types of passengers travel through the airport and they should not feel out of place. Therefore, Heathrow needs to look at every aspect that influences accessiibility. Airports are already implementing inclusive design approaches to certain aspects of the wayfinding process so that all passengers can feel welcome in the environment. If all passengers feel that the space and environment is intuitive, means it matches the inclusive design approaches.

2 Architecture elements

Placemaking
Placemaking involves enhancing the features of the airport. Airports don't necessarily have to just be an informative environment. Placemaking is also an important element for wayfinding. There are nodes that lead the way for the passenger. Adding features and landmark creation at airports will not only enhance the look and feel of the airport but it will also prove to be an excellent tool for wayfinding. It will add the seamlessness element in a passenger's wayfinding experience at Heathrow. It will also add a sense of calmness and sense of place. Passengers will automatically walk through that space instead of struggling to find signs or interpret it. Wayfinding is more than signage. Space is an important element of wayfinding and can reduce the anxiety of the passengers.

Luminent floors
Adding lights on the floor of the airport building can also enable wayfinding. Different lights can be used to recognise different spaces at the airport. It does not necessarily have to be monotonous in nature. Subtle lights on the floor can make a difference to a passenger's mood and can also help the passenger navigate through the airport.

Signs on floors
Millenials as well as the rest of the population is glued to their phone most of the time. It does not matter whether they are alone or in a room full of people. Keeping that in mind, placing signs on the floor is a good idea to gain a passenger's attention. In this manner, the passenger

is in his usual zone and the signs also serve the purpose of helping the passengers reach their desired destination at the airport. Also, by placing few signs on the floor will avoid a cluster of signs. The trick is to understand the customer's behaviour and design solutions accordingly.

Responsive structure
Responsive structure is similar to placemaking. Although airport buildings are static structures, they should be responsive and should interconnect with its passengers. The components of an airport building and its wayfinding should seem like one coherent design. For example, at the moment Heathrow Airport Terminal 3 is an old building and separate parts have been worked on at different times. Even though some wayfinding elements might be strategically designed, the non-coordination leads to bad wayfinding. Thus, it is important to consider all elements of wayfinding together while creating a responsive structure.

3 Functional signage design

Universal signs
Passengers from different countries, who speak different languages and have different cultures travel through Heathrow Airport. Ensuring that the wayfinding signage works for all of them is of utmost importance. The airport does not want to only serve a part of the population. Thus, universal signs should be implemented in the wayfinding signage at Heathrow Terminal 3. Language can be another barrier and thus to overcome that problem, pictograms and signs should be universal in nature. In environments like airports, by default universal signs should be adapted.

Consistency
The amount of information, processes and signs at the airport are too much to process for the customer. Consistency of signs is key to a good wayfinding. Passengers cannot register a sign if it is only shown once. Consistency in signs will help the passengers at Heathrow Terminal 3 to get to their desired location at the airport. Passengers at airports comprise of old people, children and less-abled people too. For them specifically, consistency of signs is significant. It will enable dissemination of information and will clearly communicate vital information during a passenger's journey at Heathrow Terminal 3.

Visual communication screens
A picture speaks a thousand words. Visual communication screens already exist at Heathrow Terminal 3 but it is barely legible. Using bigger and clearer fonts will help to communicate information to all passengers. Also, placement of the visual communication screens is important. Often, the screens are placed at such a height that passengers can barely read the information and resort to other means.

Large scale graphics
The goal of graphics at the airport are to be clear, visible from a distance and relevant. The gate numbers at Heathrow Terminal 3 are not so prominent from afar, neither are the signs for toilets, restaurants or retail stores. These are important aspects at an airport. By just designing them well and strategically placing them does not mean the information has been communicated correctly to the customer. By using large scale graphics, even vison impaired people or old

people will be able to spot the signs, let alone the other passengers. In this manner, it will be easy for all passengers to independently navigate their way through the airport and not get lost. These graphics are key contributors of the visual wayfinding at airports. It should be designed in a way that does not overwhelm the passengers. Design and strategy need to go hand in hand. Strategic use of colour will help to reduce visual clutter.

4 Technology

iBeacon technology

iBeacon technology already exists at Heathrow Terminal 3. It is accessible by only the premium passengers of Virgin Atlantic. Since this technology already exists, it is easier to implement it for the less abled passengers. Technology can be of more help to the less abled passengers. It is important to consider using the technology for all the passengers at the terminal. This will improve customer experience and ease the navigation to different aspects of the airport. Using the beacon technology will improve interoperability and facilitate maintenance in the future.

Audio navigation system

The audio navigation system is mainly built for blind or low vison users. It can also be used by old people, or people with visual disabilities. The audio navigation sysem called Wayfindr is built in the form of an application. It will give passengers the direction through instructions on the application. It helps to navigate in an indoor environment and gives the less-abled people the chance to navigate independently. They do not always want to be assisted by an airport personnel.They want to be able to navigate their way through an airport on their own. It boosts the confidence of the passengers and helps them gain control and reliability over their journey.

8

Conclusion

This section gives a summary of the research and shows how design, innovation have contributed to the study

The researcher has attempted to identify the significant factors and elements that a passenger uses while orienting themselves at Heathrow Terminal 3. Service design thinking, inclusive design and experience design approaches and techniques have been implemented to devise and develop a wayfinding design strategy. The research discovered how design thinking can influence a passenger's wayfinding behaviour.The current research suggests that there is a vast scope for improvement.

People spend a considerable amount of time at an airport, and it is an important aspect of a passenger's journey experience. Complex environments like Heathrow can create stress and anxiety amongst passengers. Wayfinding is often taken for granted. It helps the passenger reach from the parking area up until the departure gates. Wayfinding at airports can be a synonym for customer experience. If a passenger's wayfinding experience is not good, their customer experience obviously takes a downfall. For an airport such as Heathrow which caters to such a wide variety of passengers, it is important to create a wayfinding seamless experience for their passengers. Hence, it is important to involve all stakeholders in the design process and create a coherent design system.

When complex routes through a terminal become necessary, an efficient signing system becomes essential.
To conclude,most existing wayfinding stratetgies exclude the less-abled passengers in their target segment. Therefore, the researcher conducted this study toc reate an inclusive wayfinding design strategy.

Research limitations and suggestions for future research :
This research project has been carried out from July to September i.e 3 months.The research started with gaining a broad understanding of the passenger experience at Heathrow Airport. Since this research has a funnel nature, the problem statement was defined by the start of August. A major drawback of this project was time. Due to the insufficiency of time, the researcher had to conduct primary and secondary research at the same time. The primary research went on until mid September. This did not give the researcher the means to execute the research as per plan. Due to the lack of time, the researcher had to develop a strategy towards the end which did not give her time to validate the information. Thus, this research comprises of a design strategy along with a user journey map of one archetype.

The suggestions for future research are to study the topic in more depth, and create a strategy with storyboards and detailed user journey maps.

9

References

This section demonstrates the papers and information used as reference for conducting the research, demonstrating key problems and challenges

A study of the design process. (2019). [ebook] London: Design Council. Available at: https://www.designcouncil.org.uk/sites/default/files/asset/document/ElevenLessons_Design_Council%20(2).pdf [Accessed 10 Sep. 2019].

Airport Business. (2014). Wayfinding innovation. [online] Available at: http://www.airport-business.com/2014/06/wayfinding-innovation/ [Accessed 26 Aug. 2019].

Angrave, J. (n.d.). Passenger experiences of the airport experience. [online] Empathyce. Available at: https://empathyce.com/passenger_experience_research/ [Accessed 25 Aug. 2019].

Applied Wayfinding. (n.d.). Heathrow - Making sense of one of the world's busiest airports. [online] Available at: http://appliedwayfinding.com/projects/heathrow/ [Accessed 26 Aug. 2019].

Behavioural Archetypes. (n.d.). [ebook] Available at: https://smashingideas.com/wp-content/uploads/2017/10/SmashingIdeas_BehavioralArchetypesToolkit.pdf [Accessed 11 Sep. 2019].

Brandculture. (2018). An expert guide to wayfinding design. [online] Available at: https://brandculture.com.au/wayfinding-design-guide/ [Accessed 26 Aug. 2019].

Brown, T. (2008). Harvard Business Review. [ebook] Harvard Business Publishing, pp.84-96. Available at: https://new-ideo-com.s3.amazonaws.com/assets/files/pdfs/IDEO_HBR_DT_08.pdf [Accessed 28 Aug. 2019].

Carleton, F. (2016). Passenger experience at Heathrow: Putting the glamour back into flying. [online] International Airport Review. Available at: https://www.internationalairportreview.com/article/76023/passenger-experience-at-heathrow/ [Accessed 25 Aug. 2019].

Castiglioni, R. (2017). New report says improved wayfinding makes airports more accessible. [online] Reducedmobility.eu. Available at: http://www.reducedmobility.eu/20170309711/TheNews/new-report-says-improved-wayfiding-makes-airports-more-accessible [Accessed 26 Aug. 2019].

Choi, Y. (2018). Research methodology, ethics and data collection.

Customer Driven Transformation. (2018). Total Customer Experience Palette — Customer Driven Transformation. [online] Available at: https://www.customerdrivenbook.com/total-customer-experience-palette [Accessed 26 Aug. 2019].

Design Council. (2019). Design Methods Step 1: Discover. [online] Available at: https://www.designcouncil.org.uk/news-opinion/design-methods-step-1-discover [Accessed 10 Sep. 2019].

Design Council. (2019). What is the framework for innovation? Design Council's evolved Double Diamond. [online] Available at: https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond [Accessed 6 Sep. 2019].

Efrat Efron, S. and Ravid, R. (2018). Writing the Literature Review : A Practical Guide. [ebook] Guilford Publications. Available at: https://ebookcentral.proquest.com/lib/brunelu/reader.action?docID=5522670 [Accessed 10 Sep. 2019].

Elmansy, R. (2015). Disney's Creative Strategy: The Dreamer, The Realist and The Critic. [online] Designorate. Available at: https://www.designorate.com/disneys-creative-strategy/ [Accessed 27 Sep. 2019].

Engine. (2018). Why is customer experience so important?. [online] Available at: https://www.enginegroup.co.uk/news-and-views/exclusive-content-on-customer-driven-transformation-sign-up?utm_content=bufferb278a&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer#doc-form [Accessed 26 Aug. 2019].
Fewings, R. (2001). Wayfinding and Airport Terminal Design. Journal of Navigation, [online] 54(2). Available at: http://www.signdesignsociety.co.uk/images/Knowledgebase/Fewings_WATD.pdf.
Forrester (2019). Light On The Horizon. [online] Available at: http://file:///Users/dhruvijhaveri/Downloads/Forrester-Light-On-The-Horizon%20(1).pdf [Accessed 27 Sep. 2019].
Gad, T. (2016). Customer experience branding.
Heathrow 2.0. (2018). [ebook] Heathrow Airport Limited. Available at: https://your.heathrow.com/wp-content/uploads/2018/07/Heathrow2.0.pdf [Accessed 25 Aug. 2019].
Heathrow's Strategic Brief. (2018). [ebook] Heathrow Airport Limited. Available at: https://www.heathrow.com/file_source/Company/Static/PDF/Companynewsandinformation/Heathrow_Strategic_Brief.pdf [Accessed 25 Aug. 2019].
IDEO | Design Thinking. (n.d.). IDEO Design Thinking. [online] Available at: https://designthinking.ideo.com/ [Accessed 27 Aug. 2019].
Imagine a world class Heathrow. (2008). [ebook] London First. Available at: https://londoneconomics.co.uk/wp-content/uploads/2011/09/54-Analysis-of-the-regulatory-environment-facing-the-owners-of-London-Heathrow.pdf [Accessed 25 Aug. 2019].
Karlsson, M. (2016). What Is a Case Study?. [ebook] Available at: https://pdfs.semanticscholar.org/6fc3/6000962619dedf72af1d97c226fe953d7120.pdf [Accessed 10 Sep. 2019].
Kirk, P. (2013). PASSENGER EXPERIENCE AT AIRPORTS: AN ACTIVITY-CENTRED APPROACH. B.Sc. Queensland University of Technology.
Knect365.com. (2016). Improving Customer Experience at Airports – What Airports Can Learn from Ryanair. [online] Available at: https://knect365.com/gad/article/f4eceaee-ee36-4749-89e6-c815b077de06/improving-customer-experience-at-airports-what-airports-can-learn-from-ryanair [Accessed 26 Aug. 2019].
Light On The Horizon. (2019). [ebook] Forrester. Available at: http://file:///Users/dhruvijhaveri/Downloads/Forrester-Light-On-The-Horizon%20(1).pdf [Accessed 27 Sep. 2019].
Manuell, R. (2017). No longer passenger experience; It's now seamless travel | Reflections from PTE. [online] International Airport Review. Available at: https://www.internationalairportreview.com/article/33223/seamless-travel-pte/ [Accessed 26 Aug. 2019].
McKim, C. (2016). The Value of Mixed Methods Research. Journal of Mixed Methods Research, [online] 11(2), pp.202-222. Available at: http://didier-jourdan.com/wp-content/uploads/2017/04/MM-and-Graduates-students.pdf.
Mengersen, K., Campbell, D., Johnson, D., Wu, D., Farr, C., Pitchforth, J., Grummitt, J. and Chan, Y. (n.d.). Complex Systems – Airports of the Future. [online] Airports of the Future. Available at: https://research.qut.edu.au/aotf/projects/complex-systems/ [Accessed 25 Aug. 2019].
Michalko, M. (2011). Walt Disney's Creative Thinking Technique. [online] Creative Thinking Articles and Techniques by Michael Michalko. Available at: https://creativethinking.net/walt-disney%E2%80%99s-creative-thinking-technique/ [Accessed 11 Sep. 2019].

Peate, S. (2018). Where do we go now? Exploring the wonders of wayfinding design. [online] Fabrikbrands.com. Available at: https://fabrikbrands.com/the-wonders-of-wayfinding-design/ [Accessed 28 Aug. 2019].
Peate, S. (2018). Where do we go now? Exploring the wonders of wayfinding design. [online] Fabrikbrands.com. Available at: https://fabrikbrands.com/the-wonders-of-wayfinding-design/ [Accessed 28 Aug. 2019].
Popovic, V., Kraal, B. and Kirk, P. (2019). Towards Airport Passenger Experience Models. In: Proceedings of 7th International Conference on Design & Emotion,. [online] Available at: https://eprints.qut.edu.au/38095/1/c38095.pdf [Accessed 26 Aug. 2019].
Putnam, K. (2019). Brand Archetypes - The Powerful Brand-Building Tool. [video] Available at: https://www.youtube.com/watch?v=zFMXiiXfVX8 [Accessed 11 Sep. 2019].
Saunders, M., Lewis, P., & Thornhill, A. (2007). Research Methods for Business Students, (6th ed.) London: Pearson.
Stickdorn, M., Lawrence, A., Hormess, M. and Schneider, J. (2018). This is service design methods, a companion to This is service design doing. O'Reilly Media Inc.
Sustainable Transport Plan. (2014). [ebook] Heathrow Airport Limited. Available at: https://www.heathrow.com/file_source/Company/Static/PDF/Heathrow_STP_inter.pdf [Accessed 25 Aug. 2019].
Symonds, P. (2017). Wayfinding Signage Considerations in International Airports. Interdisciplinary Journal of Signage and Wayfinding, [online] 1(2). Available at: https://repository.cardiffmet.ac.uk/bitstream/handle/10369/8801/Journal-wayfinding.pdf?sequence=1.
Tezcan, P. and Hiemstra-van Mastrigt, S. (2019). The Effect of Light Projections for Wayfinding Purposes within an Airport Context. Journal of Navigation, [online] 72(5), pp.1200-1216. Available at: https://www.researchgate.net/publication/332948692_The_Effect_of_Light_Projections_for_Wayfinding_Purposes_within_an_Airport_Context.
The Promise of Heathrow. (2014). [ebook] Heathrow Airport Limited. Available at: https://www.heathrow.com/file_source/Company/Static/PDF/Companynewsandinformation/The_Promise_of_Heathrow.pdf [Accessed 25 Aug. 2019].
Turner, J. (2018). Literature Review. 2nd ed. [ebook] Available at: https://onlinelibrary-wiley-com.ezproxy.brunel.ac.uk/doi/epdf/10.1002/piq.21275 [Accessed 9 Sep. 2019].
Wayfinding & Navigation Expert. (2019). Multi-Lingual Signage, dual and multi-language signs design.. [online] Available at: https://www.travelwayfinding.com/multi-lingual-signage/ [Accessed 25 Aug. 2019].

Images and videeos

Figure 1 Alastair Campbell tweets about Heathrow. (n.d.). [image] Available at: https://empathyce.com/wp-content/uploads/2015/03/LHR-tweet.png [Accessed 27 Sep. 2019].

Figure 2 Acxiom (2017). The complexity of being Heathrow. [image].

Figure 3 Narita International Airport Terminal 3, Tokyo. (2015). [image] Available at: https://images.adsttc.com/media/images/552f/e96c/e58e/cead/0b00/0056/large_jpg/portada_150326_0367.jpg?1429203295 [Accessed 25 Sep. 2019].

Figure 4 Wayfinding at Narita International Airport Terminal 3. (2015). [image] Available at: https://images.adsttc.com/media/images/552f/e60e/e58e/cead/0b00/0049/large_jpg/150326_0000.jpg?1429202431 [Accessed 25 Sep. 2019].

Figure 5 Pictogram. (2015). [image] Available at: https://images.adsttc.com/media/images/552f/e883/e58e/ceea/6500/0055/large_jpg/150401_0640.jpg?1429203063 [Accessed 25 Sep. 2019].

Figure 6 Wayfinding. (2015). [image] Available at: https://images.adsttc.com/media/images/552f/e7c8/e58e/ceea/6500/0053/large_jpg/150401_0513.jpg?1429202875 [Accessed 25 Sep. 2019].

Figure 7 Wayfinding Schiphol. (n.d.). [image] Available at: http://thoas.nl/wp-content/uploads/THO_1330.jpg [Accessed 26 Sep. 2019].

Figure 8 Wayfinding at Schipol Airport. (n.d.). [image] Available at: http://thoas.nl/wp-content/uploads/THO_1502.jpg [Accessed 26 Sep. 2019].

Figure 9 Wayfinding at Schiphol. (n.d.). [image] Available at: https://miro.medium.com/max/808/1*JGeFhbZmcL9zFalpjA5dJQ.jpeg [Accessed 26 Sep. 2019].

Figure 10 Signage at Schipol airport. (n.d.). [image] Available at: http://thoas.nl/wp-content/uploads/THO_1484.jpg [Accessed 26 Sep. 2019].

Figure 11 Wayfindr (2015). Navigating through the LU. [image] Available at: https://i.ytimg.com/vi/mc3KmbfxuUQ/maxresdefault.jpg [Accessed 26 Sep. 2019].

Figure 12 Wayfindr (2016). Creating a sonic identity for Wayfindr. [image] Available at: https://www.wayfindr.net/wp-content/uploads/2016/05/Participant-reduced-size.jpg [Accessed 26 Sep. 2019].

Figure 13 Disney (n.d.). Disney | Mason's Morning Minute. [image] Available at: http://3.bp.blogspot.com/-fuvPtiuqvnk/U_shA2iMErI/AAAAAAAACI0/XnIucVfYzJ8/s1600/Disneycreative_strategy_venn.png [Accessed 27 Sep. 2019].

Figure 14 Mijksenaar (n.d.). Paul Mijksenaar's expert walkthrough of Schiphol Airport. [video].

Fastsigns. (n.d.). 3 Brilliant Innovations in Wayfinding. [online] Available at: https://www.fastsigns.com/blog/detail/2015/05/14/3-brilliant-innovations-in-wayfinding [Accessed 27 Sep. 2019].

10

Appendix

This section includes the letter of ethical approval, consent form, participation information sheet, and questionnaire

College of Engineering, Design and Physical Sciences Research Ethics Committee
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH
United Kingdom

www.brunel.ac.uk

8 July 2019

LETTER OF APPROVAL (CONDITIONAL)

Applicant: Ms Dhruvi Jhaveri

Project Title: Dissertation

Reference: 17421-LR-Jul/2019- 19766-2

Dear Ms Dhruvi Jhaveri

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.
- Please consider you own personal safety when recruiting unknown participants in public. Please consider taking a friend or fellow student along in these situations.

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

Professor Hua Zhao

Chair of the College of Engineering, Design and Physical Sciences Research Ethics Committee

Brunel University London

CONSENT FORM

Title: Dissertation

Name of Researcher: Dhruvi Jhaveri

Outline of Study: My project is about understanding how human-centered and inclusive design can be used to enhance customer wayfinding experience at Heathrow Airport. This research aims to develop a strategy for the same. The main area that would be the topic of study would be understanding the factors that hinder a seamless passenger experience. The researcher would be speaking to people who have travelled via Heathrow airport, authorities at the airport and service design and user experience professionals. The research is carried out by a student of MA Design Strategy and Innovation as part of her studies at the Design Department, Brunel University. This information will only be used for academic purposes and would be highly confidential. All the answers will be anonymized.

	Please tick the appropriate box	
	YES	**NO**
Have you read the Research Participant Information Sheet?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Have you received satisfactory answers to all your questions?	☐	☐
Who have you spoken to?		
Do you understand that you will not be referred to by name in any report concerning the study?	☐	☐
Do you understand that you are free to withdraw from the study?		
• **at any time?**	☐	☐
• **without having to give a reason for withdrawing?**	☐	☐
• **without affecting your future care? (where relevant,** • **if necessary)**	☐	☐
I agree to my interview being recorded. (where necessary)	☐	☐
I agree to the use of non-attributable direct quotes when the study is written up or published. (where relevant)	☐	☐
I agree to my photograph being taken	☐	☐
Do you agree to take part in this study?	☐	☐

Name of Participant (CAPITALS):
Signature of Research Participant: **Date:**
Witness statement:
I am satisfied that the above-named has given informed consent.
Witnessed by:
Date:
Name of witness:

Researcher name:	**Signature:**
Supervisor name:	**Signature:**

PARTICIPANT INFORMATION SHEET

Study title
Service design and innovation to enhance passenger experience at Heathrow Airport

Invitation Paragraph
You are cordially invited to take part in the research carried out by Dhruvi Jhaveri of MA Design Strategy and Innovation, Brunel University.

What is the purpose of the study? Why have I been invited to participate?
This study aims to investigate the pain points a passenger experiences at Heathrow Airport as well as their expectations thereby exploring both the opportunities and challenges. You are invited to participate because you are current and/or potential part of the chosen organisation/company. Therefore, the researcher would like to hear your opinions regarding the topic.

Do I have to take part?
Your participation is completely voluntary.

What will happen to me if I take part? What do I have to do?
You will be asked to answer a number of open questions, which will help the researcher understand your perception toward the chosen topic, such your perception towards its brand and existing services. If you have any questions, please feel free to clarify them with the researcher.

What are the possible disadvantages and risks of taking part? What are the indemnity arrangements?
The study is considered low risk. It is very unlikely to cause any financial loss/burden to participants. No sensitive and personal question is included. It should take no more than 5 minutes to complete.

Will my taking part in this study be kept confidential?
The information will be used of academic purposes only and treated as highly confidential. All answers will be anonymised. The results will not be publicly published nor made available outside of the university.

What will happen to the results of the research study?
The findings will be presented to the academic staff and the master students of MA Design Strategy and Innovation and MA Design and Branding Strategy only.

Who is organising and funding the research? Who has reviewed the study?
The researcher itself is organising and funding the research. The questions have been developed in consultation with academic staff of MA Design Strategy and Innovation and MA Design and Branding Strategy programmes.

Can the participant withdraw from the study anytime?
The participant is allowed to withdraw from the study at any point if the participant is uncomfortable. Their reason of withdrawal from the study will not be questioned.

Contact for further information and complaints
For further information, please contact Dr Busayawan Lam, the programme director of MA Design Strategy and Innovation and MA Design and Branding Strategy courses. The contact details are:
Dr Busayawan Lam
College of Engineering Design and Physical Sciences Brunel University, Uxbridge, UB8 3PH
Tel: 01895 266592
Email: Busayawan.lam@brunel.ac.uk

To make a complaint, please contact professor Hua Zhao, the chair of the college's research ethics committee.

The contact details are:

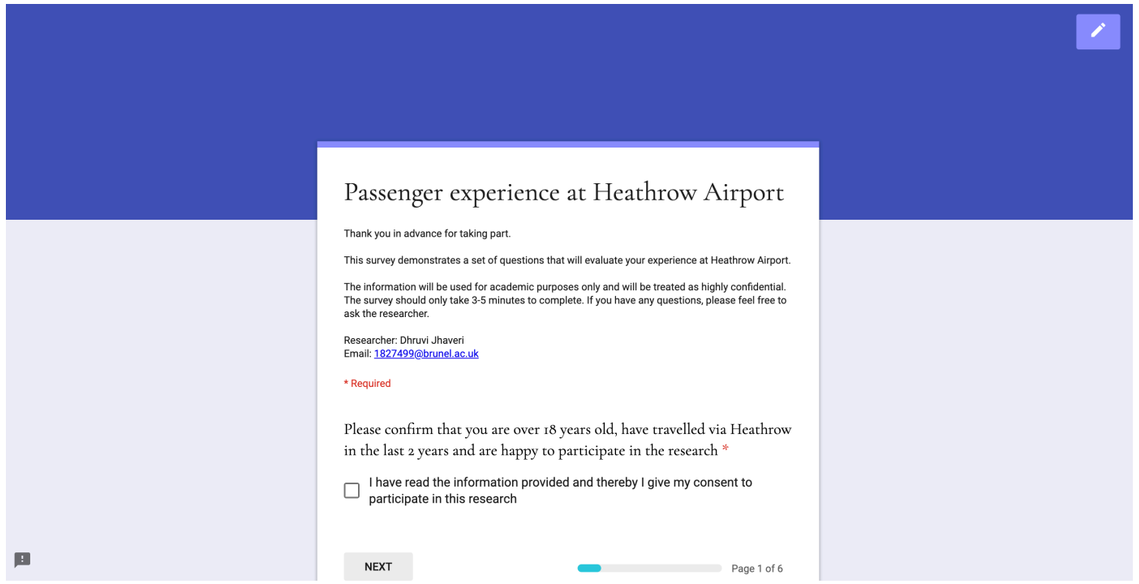
Professor Hua Zhao
College of Engineering Design and Physical Sciences
Brunel University, Uxbridge, UB8 3PH
Tel: 01895 266698
Email: hua.zhao@brunel.ac.uk

Thank you very much for your time and valuable information.

Researcher's contact details :

Dhruvi Jhaveri
1827499@brunel.ac.uk
MA Design Strategy and Innovation
Brunel University London

QUESTIONNAIRE



Passenger experience at Heathrow Airport

Thank you in advance for taking part.

This survey demonstrates a set of questions that will evaluate your experience at Heathrow Airport.

The information will be used for academic purposes only and will be treated as highly confidential. The survey should only take 3-5 minutes to complete. If you have any questions, please feel free to ask the researcher.

Researcher: Dhruvi Jhaveri
Email: 1827499@brunel.ac.uk

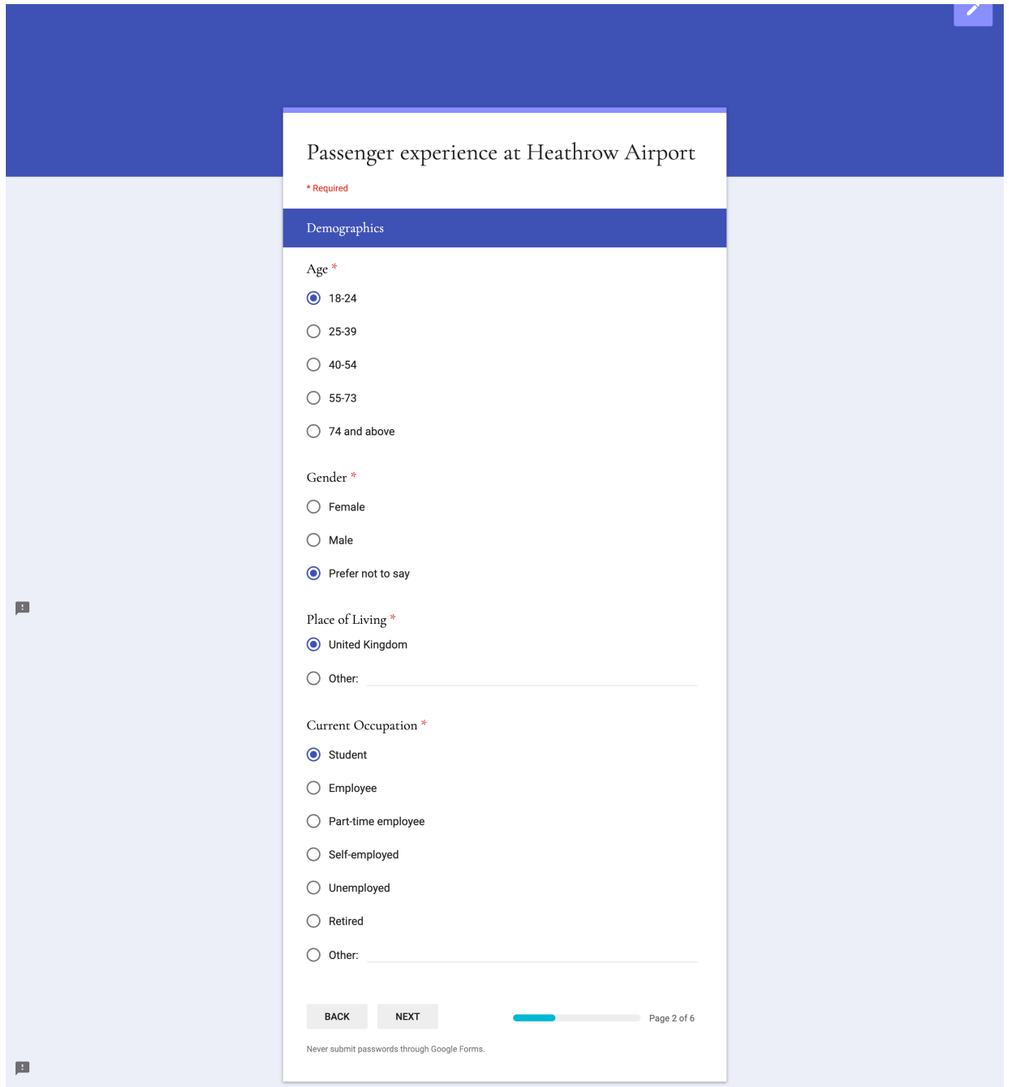
* Required

Please confirm that you are over 18 years old, have travelled via Heathrow in the last 2 years and are happy to participate in the research *

- [ ] I have read the information provided and thereby I give my consent to participate in this research

NEXT

Page 1 of 6



Passenger experience at Heathrow Airport

* Required

Demographics

Age *

- 18-24
- 25-39
- 40-54
- 55-73
- 74 and above

Gender *

- Female
- Male
- Prefer not to say

Place of Living *

- United Kingdom
- Other:

Current Occupation *

- Student
- Employee
- Part-time employee
- Self-employed
- Unemployed
- Retired
- Other:

BACK NEXT

Page 2 of 6

Never submit passwords through Google Forms.

Passenger experience at Heathrow Airport

* Required

General questions

In a year, how frequently do you travel via Heathrow Airport? *

- (•) 1-2
- ( ) 3-5
- ( ) 6-10
- ( ) 11-20
- ( ) 21 or more

By which cabin class do you usually fly? *

- ( ) First Class
- (•) Business Class
- ( ) Premium economy Class
- ( ) Economy Class
- ( ) Prefer not to say

BACK NEXT Page 3 of 6

Never submit passwords through Google Forms.

Passenger experience at Heathrow Airport

* Required

Departure

For what purpose do you usually travel through Heathrow Airport? *

- ( ) Business
- ( ) Leisure
- (•) Study
- ( ) Other: _____

How satisfied are you with the automatic check-in facilities? *

- ( ) Extremely satisfied
- (•) Fairly satisfied
- ( ) Neither satisfied nor dissatisfied
- ( ) Fairly dissatisfied
- ( ) Extremely dissatisfied
- ( ) I don't use it

Is the reminder of security requirements well communicated to you? *

- ( ) Yes
- ( ) No
- (•) Maybe

What guided you at Heathrow Airport? *

- (•) Airport personnel
- ( ) Signage
- ( ) Digital device (phone/tablet)

How do you prefer to spend your time at Heathrow Airport? (1=least preferred, 5= most preferred) *

	1	2	3	4	5
Shop	( )	(•)	( )	( )	( )
Eat	( )	(•)	( )	( )	( )
Study/business work	( )	(•)	( )	( )	( )
Reading a book	(•)	( )	( )	( )	( )
Explore	( )	(•)	( )	( )	( )
Use your phone	( )	(•)	( )	( )	( )
Sleep	( )	(•)	( )	( )	( )

What do you value the most during an airport experience ? (1=least valuable, 5= most valuable) *

	1	2	3	4	5
Efficiency	○	◉	○	○	○
Information (Flight, flight delays, baggage reclaim	○	◉	○	○	○
Signage and directions	○	◉	○	○	○
Friendliness/ helpfulness of staff	○	◉	○	○	○
Facilities and entertainment	○	◉	○	○	○
Airport design	○	◉	○	○	○

Please evaluate the quality of service of the following at Heathrow Airport? (1=lowest quality , 5= highest quality) *

	1	2	3	4	5
Flight check-in	○	◉	○	○	○
Security queues	○	◉	○	○	○
Wayfinding (Signage)	○	◉	○	○	○
Sufficient seating	○	◉	○	○	○

Rate the following aspects of Heathrow Airport.

Flight check-in	○	◉	○	○	○
Security queues	○	◉	○	○	○
Wayfinding (Signage)	○	◉	○	○	○
Sufficient seating	○	◉	○	○	○

Rate the following aspects of Heathrow Airport.

	Extremely satisfied	Fairly satisfied	Fairly dissatisfied	Extremely dissatisfied
Catering (restaurants, cafés, bars)	○	◉	○	○
Access to Wi-Fi	○	◉	○	○
Waiting area for transportation	○	◉	○	○
Overall airport appearance	○	◉	○	○

BACK NEXT Page 4 of 6

Never submit passwords through Google Forms.

Passenger experience at Heathrow Airport

* Required

Transfer passengers

Were there any aspects of your experience you were dissatisfied with? *

- ◉ Transferring between or within terminals
- ○ Wayfinding
- ○ Flight information
- ○ Seating facilities at the gate
- ○ I have not taken a transfer flight via Heathrow Airport
- ○ Other: _____

BACK NEXT Page 5 of 6

Never submit passwords through Google Forms.

Passenger experience at Heathrow Airport

* Required

Arrival

Are you satisfied with the signage and information to get to baggage claim? *

- Yes
- No
- Maybe

How satisfied are you with the immigration queues? *

- Extremely satisfied
- Fairly satisfied
- Fairly dissatisfied
- Extremely dissatisfied

What do you think about the information about onward travel (e.g. provision of information points, signs to trains/taxis/buses) at Heathrow Airport? *

- Extremely satisfied
- Fairly satisfied
- Fairly dissatisfied
- Extremely dissatisfied

How do you think Heathrow Airport can enhance your experience? *

Your answer

Is there any other feedback you would like to give?

Your answer

BACK SUBMIT Page 6 of 6

Never submit passwords through Google Forms.