Assisted by Tech, Uplifted by People:
A Human-Centered Strategic Approach to Redesigning Departure Hall 2

Master Thesis by Ivy Steijn
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Colophon

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Preface

With this thesis, I will have completed my masters Design for Interaction and Strategic Product Design at the faculty of Industrial Design Engineering of the TU Delft. These past 7 years at university have shaped me both personally and professionally and I have learned incredibly much from different mentors, professors and other students.

Through the projects that I have been a part of during my studies, I developed an interest in combining Human-Centered Design with Strategic Design approaches, which I was able to further explore and develop in this graduation project. In my opinion, focusing on real user needs but also making sure a solution fits within a company's long term goals and branding are two elements that fit well together in creating a meaningful designs. This is something I hope to pursue after graduating.

While not consciously having planned it, during my studies, I developed a big interest in designing for the mobility sector, especially aviation. A place where people from so many different backgrounds and cultures come together, while operationally everything needs to be handled well, fascinates me. Designing for an airport departure hall process and being able to choose this as a topic for my thesis has been a rewarding conclusion to my time at TU Delft.

This project would not have been possible without the support of my team. I am especially grateful to my chair, Sicco Santema, and mentor, Lara van der Veen, for their inspiring conversations, for challenging me with the tough questions that pushed my work further and for encouraging me to look critically at my own work.

I also want to thank my KLM supervisor, Robbert Hazenberg, for inspiring me as a designer in a professional setting, sharing your expertise, including me in the team and introducing me to interesting stakeholders. Additionally, I'm grateful to the other designers on the team for the engaging conversations, the inspiration you brought to my work and for helping me see things from new perspectives whenever I felt stuck.

Finally, I want to thank everyone who participated in my research through interviews and user tests, as well as all my friends, family and roommates who supported me throughout this project.

Enjoy reading!

Ivy

Executive summary

This graduation thesis explores the future of airport departure experiences through a strategic and human-centered design approach, with the goal of enhancing KLM's operations in Departure Hall 2 at Amsterdam Airport Schiphol. In an industry facing rising passenger expectations, rapid technological advancements and increasing economic and regulatory pressures, KLM must adapt its service delivery to meet the demands of more complex and high-traffic terminal environments. This study responds to that need by developing a future-oriented vision and strategy that aims to boost both passenger confidence and the meaningful role of Passenger Service Agents (PSAs) by the year 2040.

As a legacy airline, KLM faces with the dual challenge of maintaining a premium service experience while improving cost-efficiency. The brand is defined by three core pillars: Meaningful Interactions, Convenient Connections and Peace of Mind. However, the current passenger experience in Schiphol's departure hall is hindered by confusion, repetitive procedures and limited staff engagement. This presents an opportunity to transform the departure hall into one that answers the need, while maintaining a "human touch" in an increasingly automated environment, as KLM positioned themselves as service oriented.

The project adopts the Double Diamond model and incorporates methodologies from both the Strategic Product Design and Design for Interaction masters. The research follows four main phases: Discover, Define, Develop and Deliver.

Key activities include:

- Exploratory literature review on airline competition, service strategies and automation.
- Qualitative field research, including passenger diary studies and observational studies of PSA roles.
- Customer journey mapping to identify major pain points in the departure process.
- Creative trend research, informing long-term change drivers.
- Concept development through prototyping and user testing with both passengers and PSAs.
- A strategic roadmap divided into three phases to guide implementation of the proposed vision concept.

The five drivers of change that emerged from the research are Technology, the Customer journey, Spatial constraints, Finances & competitive position and Policy & regulations. The three key challenges for passengers and agents include:

- The degree of active attitude from agents
- The lack of information for both sides
- Insecurity of passengers by unclear wayfinding

After thorough creative trend research, a 15-year future vision statement was developed: "Passengers travel confidently and effortlessly through the departure hall, assisted by technology and uplifted by people." Supporting tools are such as interactive projection-based touchscreens ("Care Tables") and earbuds, facilitate efficient, personalized assistance. A reimagined layout for the departure hall promotes intuitive navigation, smooth passenger flow, and better spatial utilization when less passengers unnecessarily pass through.

The main aspect of the proposed solution is the KLM Care Center, which is a dedicated space where Care Agents provide support to passengers requiring help for their special case. This space is supported by personalized communication, passenger self-registration and a two-tier agent system that differentiates responsibilities based on the necessary experience. The concept reduces unnecessary process steps while increasing passenger confidence.

A phased strategic roadmap outlines the implementation across three time horizons, balancing innovation, organizational readiness and stakeholder alignment. Final validation was conducted through virtual prototyping and VR user testing (both with passengers and Passenger Service Agents), which demonstrated measurable improvements in clarity, confidence and emotional engagement.

By integrating strategic futures planning and human-centered design, this thesis delivers a concrete, actionable vision for KLM's future departure hall experience. It bridges passenger needs with with operational complexity, taking into account KLM's values of care, efficiency and brand identity in the evolving aviation landscape.

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List of abbreviations

AAS	Amsterdam Airport Schiphol
FSC	Full-service carrier
KLM CX	KLM Customer Experience department
KLM D&T	KLM Data & Technology department
KLM PS	KLM Passenger Services department
LCC	Low-cost carrier
PSA	Passenger Service Agent
SSDOP	Self-Service Drop-Off Point

1 Introduction

Image source: Schiphol (2023).

1.1 Project Scope

KLM Royal Dutch Airlines, founded in 1919, is the national airline of The Netherlands and is the oldest airline still operating on its original name in the world. Based in Amstelveen and Schiphol, KLM is a founding member of the SkyTeam airline alliance and operates a hub-and-spoke network of domestic and international flights. Since 2004, the airline is part of the Air France-KLM Group, which has a combined global reach of 318 destinations in 118 countries. Together, the 2 airlines carry 77 million passengers per year and have become the largest European airline group (KLM, 2024a). KLM strives to stay a leading airline in Europe, while prioritizing both passenger satisfaction and environmental responsibility.

Departure Hall 2 at Schiphol Airport is solely operated by KLM. The current process setup causes multiple different problems for both passengers and Passenger Service Agents that pass through and work inside the departure hall, which will be discussed in chapter 2. The project challenge is to create a vision concept for the departure hall in 15 years, solving these problems for both these stakeholders. This will be achieved by gaining understanding of the processes that now happen within the departure hall, as well as how passengers and agents operate through it. Additionally, trend analysis and future visioning will lead to an extensive understanding of how the world will change in 15 years, in order for the vision concept to be grounded in reality.

This thesis seeks to explore how different factors influence innovations within the departure hall and how they will change in the future. Three key research questions will be answered, and a design roadmap will be created to act as a guide on how to achieve the future vision for the departure hall in 15 years. These were formulated in collaboration with KLM in order to analyze the current departure hall process and tackle the project challenge.

Key research questions

- What are the current main challenges for passengers and Passenger Service Agents?

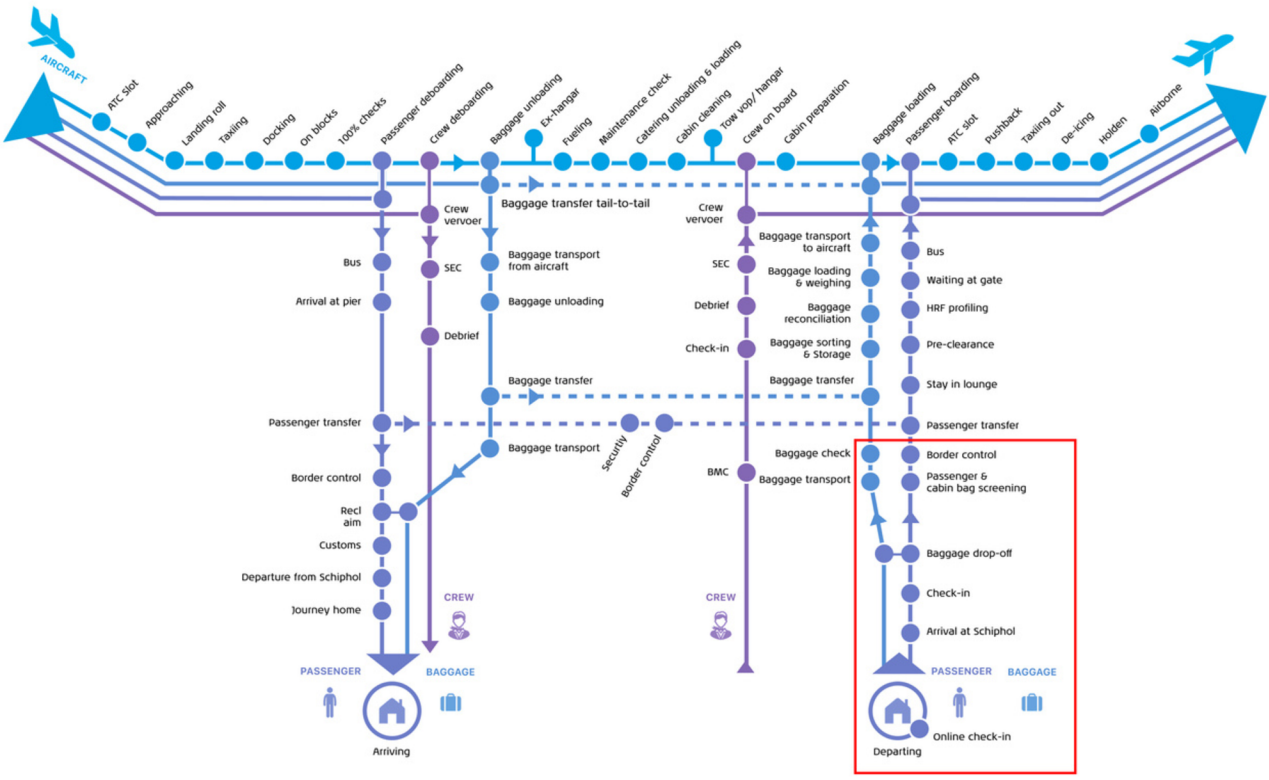

Figure 1: The airport air travel infographic, with the scope in red (KLM Data & Technology business platform IP&C, 2024).

- How will the role of the Passenger Service Agent(s) change in the future?
- What tool will the Passenger Service Agent(s) use in the future?

The airport process can be divided into four streams: aircraft, baggage, passenger and cockpit & cabin crew. Figure 1 shows the steps that all these four streams go through from landing to departure. The part that this thesis focuses on is on the bottom right of this infographic: the landside, on-airport part (indicated in red). It includes the five steps of online Check-in, Arrival at Schiphol, Check-in, Baggage drop-off and Security, which will be further elaborated on in chapter 2.2. These are the steps in which a passenger gets ready for their flight, making sure that they have all necessary documents and belongings sorted out until they move on to the air-side part of the airport. From there, they should be able to relax, potentially shop and/or eat before departing from their gate.

1.2 Methodology

For this thesis, a combination of methods is used within the overarching Double Diamond model. This is a structured approach to the design process, which encourages divergent and convergent thinking to refine and select the best solution to a problem challenge (Design Council, 2004), and is shown in Figure 2. The Double Diamond model consists of four phases:

Discover, which focuses on doing extensive research to gather insights and understand the problem space.
Define, in which the insights from the Discover phase are synthesized and analyzed to clearly define the core problem.
Develop, where ideation and prototyping take center stage. Multiple solutions are being brainstormed, prototypes are created and different approaches are experimented with.
Deliver, which focuses on finalizing and implementing the chosen solution. This involves rigorous testing, validation and refinement to ensure the solution meets user needs and project goals.

Complementing this framework, the method of **Design Roadmapping** is used, which includes broad trend analysis into how the world will change in the future, scouting for new technologies and based on this, creating a future vision. It is used to strategically explore future design innovations (Simonse, 2018) during the Develop phase, which will be followed by the creation of a strategic roadmap.

As the broad creative trend analysis consists of four different approaches, a strong understanding of the future society is gained, which creates a strong foundation for a vision concept to be created. This vision concept will be created based on all previous research to solve the key challenges, and a prototype will be tested with relevant users and stakeholders.

Integrating Design Roadmapping into the Double Diamond process allows for both creative exploration and strategic forecasting. While the Double Diamond helps define and refine a human-centred solution, Design Roadmapping will lead to a concept that fits within larger technological, organisational and societal developments. This combination is especially useful in long-term innovation projects such as this, where both user experience and future implementation must be considered.

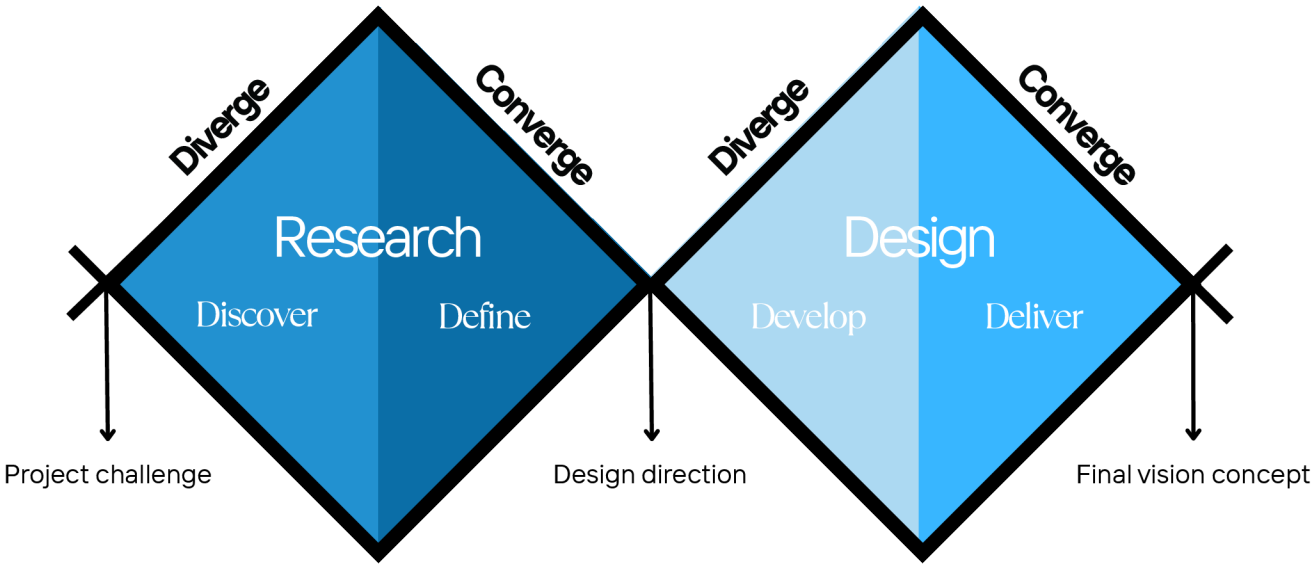

Figure 2: The Double Diamond Model.

1.3 Human-centered and strategic design

This thesis brings together theories and practices from both the Design for Interaction (DfI) and Strategic Product Design (SPD) master's programs, creating a multidisciplinary approach that strengthens the overall design process. From the DfI perspective, the project focuses on user needs, behavior and experiences, using methods such as user testing, contextual research and journey mapping to understand how passengers and service agents interact with complex environments. This human-centered foundation ensures that the final vision concept is not only on process improvement and efficiency but also responds to actual current challenges for agents and passengers.

At the same time, the SPD perspective provides a long-term strategic view. It focuses on the broader business context, helping to align the vision with organisational goals, future trends and increase the feasibility of implementation. Methods like stakeholder and company analyses, future visioning and strategic roadmapping make sure the concept will fit with the company and the society that it finds itself in, and give a solid direction for development over the next 15 years.

By combining these two approaches, this thesis creates a strong balance between human-centred design and strategic decision-making. This allows for a concept that is not only user-friendly but also future-proof and relevant for both KLM and the wider airport environment. Rather than seeing interaction and strategy as separate areas, this integrated approach shows the value of designing with both the user and the system in mind. Figure 3 shows an overview of methods used during the 4 phases of the project, and to which of the master programmes they mostly fit with.

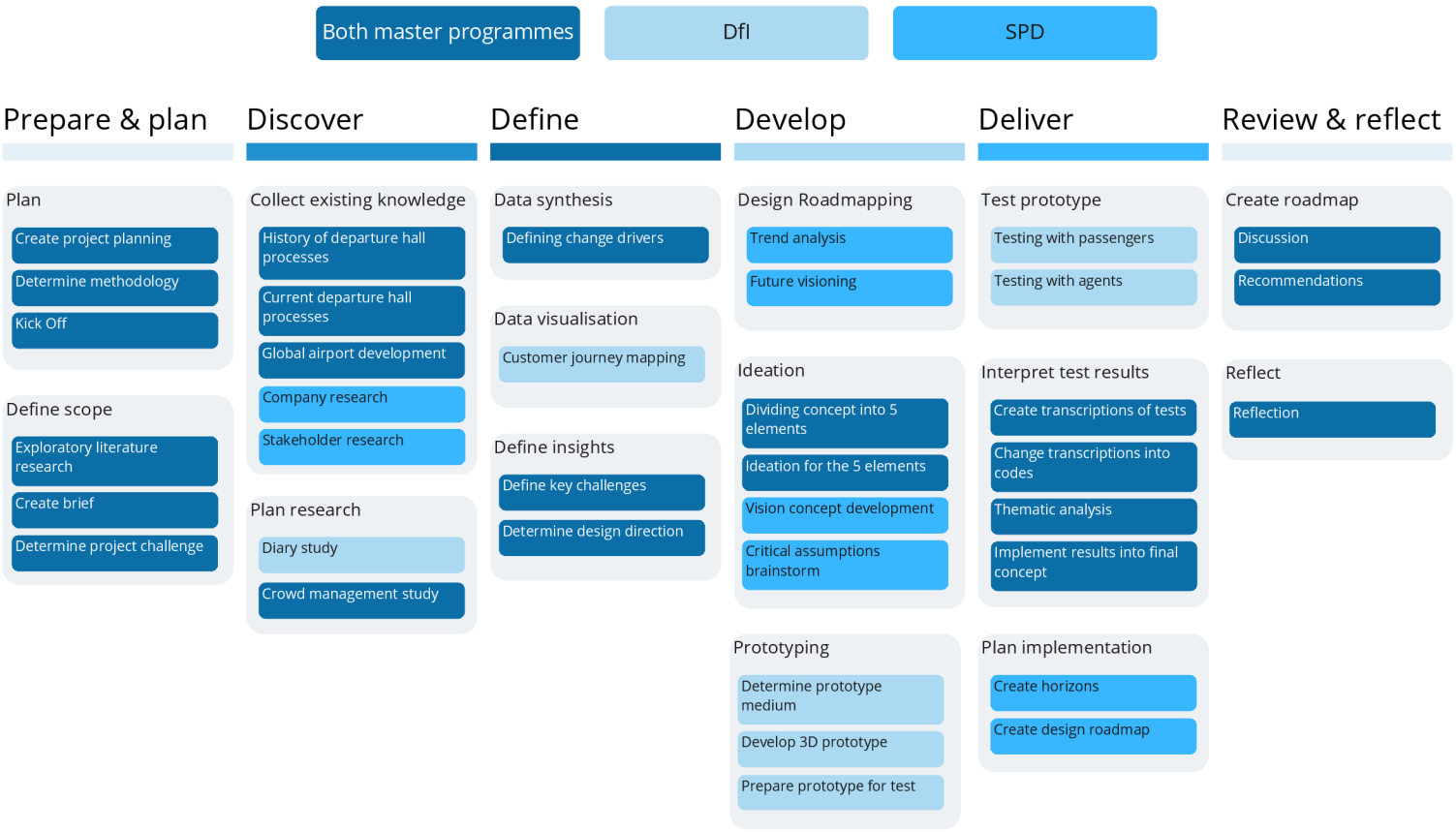

Figure 3: Method overview.

1.4 Exploratory literature research

Airline competition

The aviation industry is one that is highly competitive. Especially since low-cost carriers (LCCs) have introduced themselves in the market, the competition for fare prices has become increasingly bigger. LCCs have had great successes so far. In 2005, 70% of all passengers flying in Europe were carried by the three biggest LCCs (Bouwens & Ogier, 2020). The success of low-cost carriers in increasing their market share has forced full-service carriers (FSCs) or 'legacy' carriers to rethink their traditional strategies and, in some cases, reevaluate their entire business models.

Low-cost and full-service carriers operate fundamentally differently, not just in their network structures but also in their commercial strategies and pricing approaches (Alderighi et al., 2011). KLM, even as legacy carrier, has since had to shift its pricing and branding strategy. KLM invested in optimizing its service by increasing the aircraft baggage bins, renovating the aircraft interiors, expanding the loyalty program, and introducing self-service check-in (Bouwens & Ogier, 2020). Currently, next to its network, KLM's reputation is the second most important factor in why passengers choose to fly with the airline (Figure 4).

Service oriented airline

To stay competitive, KLM needs to keep differentiating themselves from other airlines. KLM's current brand and customer strategy is focused on three key differentiators: convenient connections, meaningful interactions and peace of mind (KLM CX, 2023). 'Convenient connections' are reflected by the airline's wide network and convenient hubs, having direct flights to over 170 destinations (KLM, 2024a). 'Peace of mind' is shown in its operations by being reliable, on-time and efficient (Colos, 2024). The 'Meaningful interactions' are demonstrated through its customer-centric approach and personalized services. These three will be further explained in chapter 2.4.2. Having a pro-active, high-quality service and bringing the human touch in a digital world are two design principles that KLM uses for this brand value.

In the evolving landscape of the aviation industry and with the company's current brand values, the role of KLM Passenger Service Agents (PSAs) is becoming increasingly important (Diani, 2021). PSAs are at the forefront of passenger interactions and are the face of KLM, making sure that travelers experience seamless service during the check-in, boarding, and transfer processes. As technology continues to advance and passenger expectations evolve with it, the role of PSAs is also expected to change. While maintaining the 'human touch' in the digital world, it is important for KLM to remain competitive with other airlines.

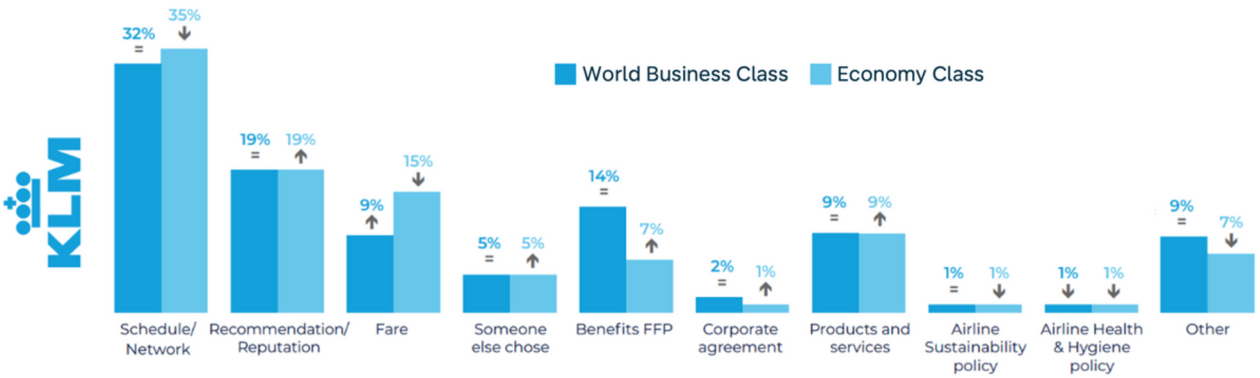

Figure 4: Reasons for passengers to choose KLM (KLM CX, 2023).

Automation

As in many industries, automation has become important in aviation (Haleem et al., 2021). More so, it is becoming critically important for the diffusion of new technology (Haleem et al., 2021). Currently, both airports and airlines rely on automated systems to streamline operations, reduce human error and improve passenger convenience (Cugurullo et al., 2024). With the introduction of automated systems like Self-Service Drop-Off Points (SSDOPs), airports and airlines have focused on creating a faster passenger flow (Medvedev et al., 2017). These systems are placed to lessen the physical tasks required from PSAs to check in passengers and decrease the waiting time before the security check (Rajapaksha & Jayasuriya, 2020).

Schiphol has the goal of becoming Europe's most high-quality and sustainable airport and sees innovation as the way to achieve this ambition (Schiphol, 2023). This is visible in various initiatives; Schiphol & KLM have been the first in the use of systems like the self-service transfer desks and SSDOPs by implementing them as the first airport in the world in 2008 (International Airport Review, 2008). As labor costs are high and three-quarters of Dutch businesses currently experience staff shortages (Centraal Bureau voor de Statistiek, 2023), companies are looking to increase automation, thus decreasing the pressure on the workforce. This can influence what processes will look like in the future, like the one in KLM's departure hall at Schiphol.

2 Discover

Image source: Het Parool (2023)

The Discover Phase involves gathering insights, mapping out the context, and understanding the problem from different stakeholder perspectives. It emphasizes research, observations and user feedback to uncover key challenges, needs, and opportunities. This phase helps set the groundwork for defining the problem which in the end will lead to innovative solutions.

2.1 History & evolution of the airport process

Departure Hall

KLM has been operating from Amsterdam Schiphol Airport since the beginning of its founding in 1919. Back then, the ticketing registration and other ways for passengers to prepare before flights looked different from the way that it is done today. In the departure hall there were ticket desks, where passengers could buy a ticket that was not restricted to a certain flight. In the case that a flight was missed, it meant that people had no financial losses and were able to just take the next flight. All processes and documentation were done manually and hand-written, and luggage was weighed with analogue scales, as is shown in Figure 5 (Bouwens & Ogier, 2020). In 1921, KLM was the first airline worldwide to open a passage office, a first 'lounge', for the convenience of passengers (KLM et al., 2024). It was connected to the city of Amsterdam with a small passage office building on the Leidseplein, from where a bus took passengers to the airport.

Figure 5: An old KLM check-in desk at Schiphol Airport (n.d.).

Boarding passes & tickets

From the end of the Second World War to the early 1970s for example, tickets would double as boarding passes (Pettersson & Chacón, 2023). They would be placed in a paper folder, after which the airline agent would write the name, flight number and a three-letter airport code for the passenger on the outside of that folder (Figure 6). Seats were free to choose as the passenger would enter the aircraft. In 1930, the IATA Traffic Committee introduced the first standardized handwritten ticket for multiple trips, a system that remained in use across the industry until the early 1970s (IATA, 2008).

Figure 6: A KLM boarding pass, 1954 (Athanasios, 2025).

In the 1960s, this changed. Airlines would get a chart with stickers representing each seat, and as a passenger had chosen their desired seat, the sticker was put on the passenger's ticket folder. Another change in that time is the fact that boarding passes got tear-off tabs, which

were collected by the flight steward(ess) during boarding. The next development in the mid-1970s was the introduction of computer-printed boarding passes. This meant boarding passes changed their design a bit, as they had to run through a computer. They were printed at the ticket desks in the departure hall, or by travel agencies.

In 1983, a new type of ticket was introduced; tickets with a magnetic stripe on the back. On the magnetic stripe, passenger and flight information was stored. These specific boarding passes required a special printer. These were placed at the check-in desks and inside kiosks. In the 1990s, instead of magnetic strips the boarding passes got barcodes consisting of vertical lines. In 2005, these barcodes were extended into two-dimensional versions (Figure 7), which could hold more information (IATA, 2010). The next step was electronic tickets, which first were issued in 1994. This meant that passengers could check-in online for the first time, and print out the boarding passes at home. In 2008, IATA announced that 100% of ticketing was electronic (IATA, 2008). Now, with the development of smartphones, tickets can be shown on mobile devices, making full paper-less boarding possible.

Figure 7: Boarding pass with a two-dimensional barcode (Alderighi et al., 2011).

Customer service

Where in the past, it was important for a company to get competitive advantage by having manufacturing strength (big fleet), distribution power (strong network) and information mastery (data management), currently the strongest sustainable competitive advantage is to have knowledge about and engagement with customers (Cooperstein et al., 2013). This change in importance of customer service is very visible when looking at the history of it in aviation, and the way that it has progressed.

When commercial flights first started, flying was only possible for the rich and wealthy. The most important role was to make the passengers feel comfortable and pampered (Careerroo, 2024). In the 1950s and 1960s, the increasing number of regulations in the aviation industry required service personnel to not only ensure comfort, but also the safety of the passengers. This new responsibility also influenced the type of training that the personnel had to get. Another change that effected the customer service of airlines was the volume increase of passengers in the 1970s. Flying became more affordable, and the personnel now also had to be able to handle this large volume of people, as well as handling customer issues and complaints (Figure 8).

Figure 8: The KLM ticketing office in the departure hall at Schiphol 16 December 1986 (Carreeroo, 2024).

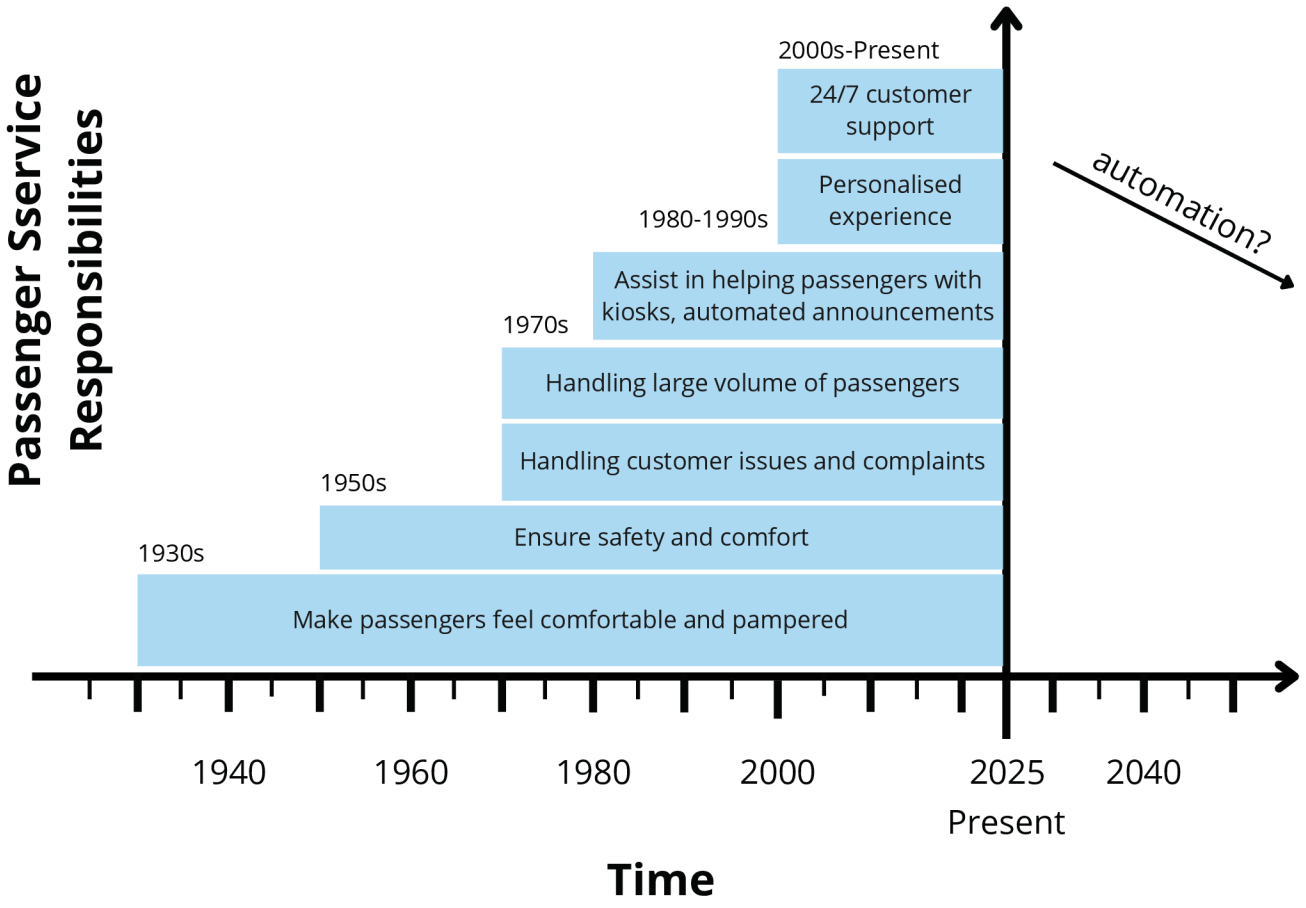

Figure 9: The responsibilities of customer service in aviation over time.

As technology like personal computers was implemented in the 1980s and 1990s, passengers started to be able to book and manage their flights online. This meant that the customer service also required IT knowledge, to help their customers navigate their online purchasing systems. Self check-in kiosks were introduced, and automated announcements needed to be made in the departure hall.

Now, in the 'digital age' that we find ourselves in, customer service is expected to have social media presence, 24/7 customer support online as well as on the airport, and a personalized service for specific customer segments and their different needs (Careerroo, 2024). These changes are shown in Figure 9. With automation, part of the responsibilities might partly to the passenger themselves. Also, the way that the tasks and responsibilities are carried out will change.

Key insights

KLM's departure hall operations have evolved from manual ticketing and baggage handling to fully digitalized processes. Early tickets were flexible, while boarding passes progressed from handwritten notes to barcode and mobile-based systems. Customer service shifted from luxury-focused to safety, crowd management, and digital engagement, now offering 24/7 online support and personalized experiences for passengers.

2.2 The current departure hall process

Air travel processes are extremely complicated. Airlines strive to have as many daily flights per aircraft as possible to keep air fares low, which results in the fact that turnaround times minimized. With many people involved in the processes, strict schedules are needed, and when a small disruption happens during the day, all the process steps that happen behind it are affected. This adds to the pressure that staff experience in doing their work. Delays can have a domino effect, disrupting schedules for multiple flights and increasing operational costs. Additionally, this results in an increase in passengers waiting in the departure hall to be rebooked, checked-in or assisted in another way.

The flow that a passenger goes through currently has many steps. The steps that are part of the scope can be divided into 5 stages. These include the stage before entering the departure hall, the stages inside the departure hall and the stage where passengers move from landside to airside;

- **Online check-in:** The passenger confirms flight details and obtains a boarding pass remotely before arriving at the airport.
- **Arrival at Schiphol:** The passenger travels to and arrives at Schiphol, and proceeds to the check-in and baggage drop area, or goes immediately through to the security screening area.
- **Check-in (on-airport):** The passenger completes the check-in process at the check-in desk if it's not done online yet. This includes a baggage drop-off by a PSA, as well as an extra check for specific documents (for example when flying with a pet).
- **Baggage Drop-Off:** The passenger scans their boarding pass, prints a bag tag and drops off their checked luggage at an SSDOP.
- **Security:** The passenger scans their boarding pass and passes through the security screening before heading to their gate. Here, they pass from landside to airside.

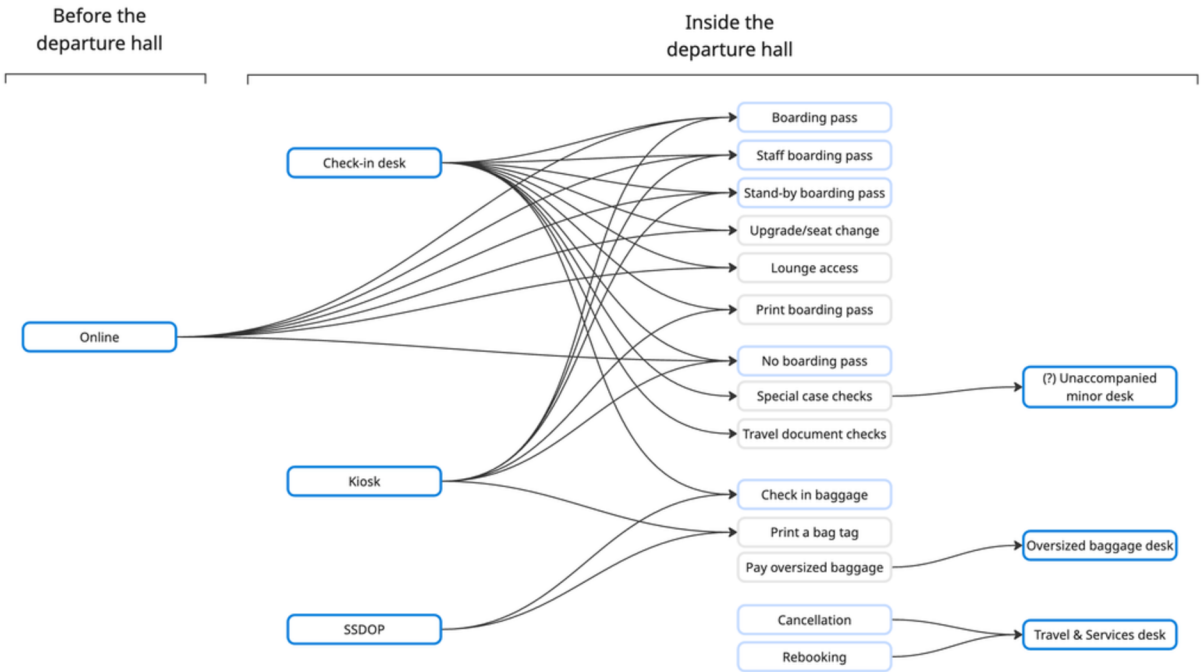

Figure 10: Simplified visual of the current departure hall process.

Although KLM as an airline has no direct effect on the security process itself, it is still included into the research as this is where passengers go after having their experience in the departure hall.

Passenger Service Agents

Currently, there are 8 roles that PSAs can fulfill in departure hall 2 (Table 1). New personnel gets trained to be able to fulfill all of these positions except for the ticketing agent. Ticket agents require an extra training and is only done by more experienced agents, who can handle the difficult situations that are taken care of at the Ticket & Services desk. All the agents have their own iPad with the application Appy2Help, which is created by KLM to give agents the opportunity to provide flight information, personal passenger information and sell upgrades.

With the information that was acquired through interviewing agents in all 8 roles, as well as observing in the departure hall, a table listing the most important differences between the agents was created. It is important to know that these roles were created to assist passengers throughout the current departure hall process, and will change most likely in the future.

Table 1: The 8 current Passenger Service Agent roles.

Role of agent	Main responsibility	Location	Sitting/Standing	Device used
Kiosk agent	Assist passengers in using the kiosk, either pro-active or passively (only when people ask for it).	In front off -or next to- the kiosks	Standing	iPad
Check-in agent	Check passengers in while sitting behind check-in desk.	Behind a check-in desk	Sitting (standing also possible)	Desktop computer
SSDOP agent	Assist passengers in using the SSDOP (no technical knowledge).	In front of the SSDOPs	Standing	-
Host/hostess	Check if people have boarding passes or not and based on that, let them through to the check-in desks or not.	In front of the KLM gate	Standing	iPad
FlowCo	Send people to one of two lines so that the length of the lines stays equal in size ('human barrier').	Behind the KLM gate	Standing	-
Floorwalker	Walk freely around and answer questions from passengers ('human direction giver')	Anywhere	Standing	Desktop computer
Passport check (cute car)	Stand behind cute car and scan passengers based on their passport	Behind the cute car (in front of the SSDOPs)	Standing	iPad
Ticketing agent	Sit at the Travel & Service desk. Help passengers rebook their flights, help with delays and cancellations.	At the Travel & Services desk	Sitting	Desktop computer

2.3 Airport development on a global scale

The International Air Transport Association (IATA) is a global airline organization and publishes yearly reports with predictions, trends and industry standards. Among these is the Airport Development Reference Manual (ADRM), which is focused on the development of airport terminal buildings, providing valuable information for how to develop an efficient, passenger-friendly, and future-ready airport infrastructure (IATA, 2019).

In the ADRM, IATA predicts the departure hall of the future to be a seamless, technology-driven experience focused on efficiency and passenger convenience. **Biometric authentication** will replace traditional check-in and security processes, allowing travelers to move with ease through the airport. Currently, this is set in motion with the OneID initiative, in which IATA wants to establish a document-free process. For passengers. **Personalization** is a topic that is mentioned as well. It is important to capture and understand passenger preferences; "understanding patterns and behaviors can create a more personalized experience". For this, involved stakeholders like airports and airlines need to share information, eliminating repetitiveness in the process for the passenger.

According to the report, baggage will be tracked in real time using **RFID and AI-powered systems**, reducing lost luggage. Automated self-service kiosks and mobile apps will handle everything from check-in to boarding. Airlines aiming to provide consistent quality service worldwide should adopt a “build once, deploy everywhere” strategy. This means that international stations are very important to keep the experience consistent. Overall, IATA predicts future departure halls to be faster, safer, and more passenger friendly.

2.4 KLM: The Dutch airline

To understand KLM as a brand, and what makes passengers choose the airline in a great field of competition, a brand analysis is performed. The analysis consists of different parts, looking at both how customers perceive the brand from the outside, as well as how the company positions itself from the inside.

Brand Equity Model

The Keller Brand Equity Model (Keller & Brexendorf, 2019) is filled in. This brand pyramid focuses on customer perceptions. It provides a structured approach to understanding how customers form their views of a brand, starting from basic awareness and progressing to deeper emotional connections.

Essentially, it helps to understand what factors drive the brand's success and how to develop those factors systematically. It is crucial to understand the entire pyramid, especially how the brand connects with its customers.

Figure 11 shows Keller's filled in brand pyramid. With desk research on the evolution of the brand and by filling in the pyramid, a deeper understanding of customers' relationship with KLM as a brand is gained.

- **Strong brand identity:** The airline establishes a clear and recognizable identity with elements such as a blue color scheme and the royal crown in the logo. Dutch people are proud of KLM, and view the airline as a premium and reliable airline. This leads to a high brand recall, especially among frequent travelers.

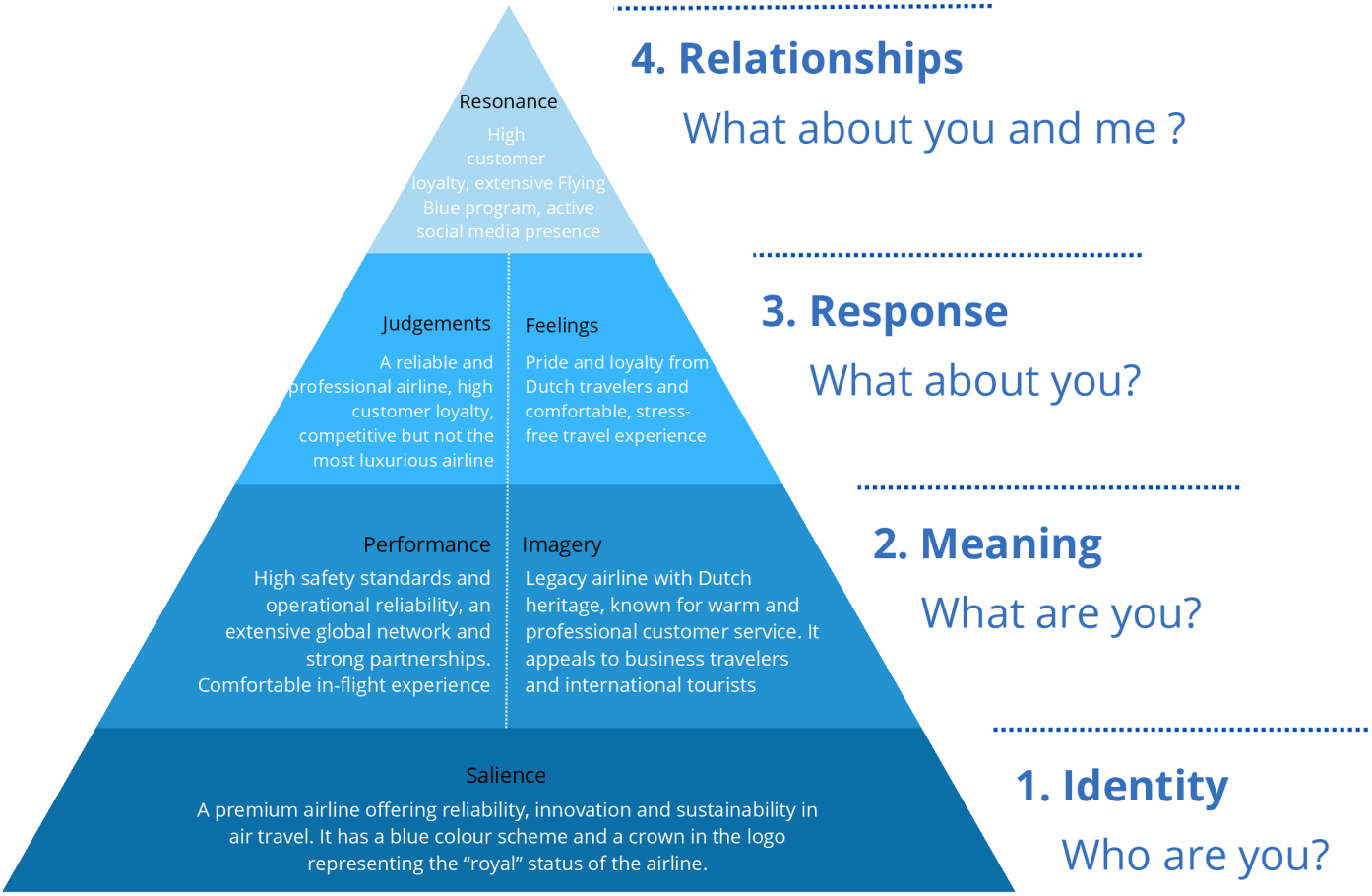

Figure 11: Keller's Brand Equity Model for KLM, created by author.

- **Functional and emotional brand meaning:** KLM differentiates itself through safety, reliability, operational excellence, and its extensive global network, ensuring a comfortable travel experience. It positions itself as a legacy airline with strong Dutch heritage, known for professional service and appealing to business travelers and international tourists (transferring at Schiphol) while keeping a personal, friendly tone of voice. An example of this is the typical Dutch Delft Blue Safety instruction video, that is shown in all flights with an in-flight video system (KLM, 2015).
- **Brand resonance and relationship with customers:** The airline has achieved high customer loyalty through programs like Flying Blue and an active social media presence. This strong brand-consumer relationship helps drive repeat-customers, advocacy and long-term engagement.

KLM's key differentiators

KLM currently differentiates itself from competitors through three key pillars: Meaningful Interactions, Convenient Connections, and Peace of Mind, which are shown in Figure 12 (KLM CX, 2023). By focusing on these three, KLM sets itself apart as a brand, as well as connect with its customers by aligning with their values and needs.

- **Meaningful Interactions:** KLM prioritizes personalized service and genuine customer engagement, making every interaction with passengers feel special. KLM does this by focusing on having a (digitally) empowered staff, connecting with the customer on a personal level and by caring for the customer; making them feel welcome and cared for throughout their entire journey.
- **Convenient Connections**: KLM ensures seamless travel through its global hub at Amsterdam Schiphol Airport and strategic partnerships. This is achieved by being on time and with baggage, providing a good transfer on Schiphol Airport, and using partners to offer a seamless journey including alternative modes of travel.
- **Peace of Mind:** KLM provides reliability, transparency and sustainability. KLM focuses on keeping the customer pro-actively and transparently informed, by having a clear offer, and being convenient by supporting customers to manage their journey easily.

Key insights

It is important to keep in mind the three brand differentiators (Meaningful Interactions, Convenient Connections & Peace of Mind), as these are inherent to the KLM brand and are a reason for passengers to choose for this airline over others. They are a strength of the company and need to be considered when making decisions in the future of the passenger interactions.

Figure 12: The three key brand differentiators of KLM (KLM CX, 2023).

2.5 From full service to hybrid carrier; KLM's service model

There are various service models that an airline can operate under. Generally, they are divided into two; the Full Service Carriers (FSCs) and the Low Cost Carriers (LCCs).

According to the ITU Aviation Institute (2024), FSCs are known for offering a global network with high connectivity (meaning many direct flights), premium services (such as in-flight meals, lounges, and high-frequency flights), and high service levels. This model is costly due to legacy expenses, high labor costs, and the investment needed for global coordination and service reliability.

On the other hand, LCCs focus on minimizing costs by reducing services such as in-flight meals, offering simpler ticketing, and having less frequent flights. They often fly from smaller airports and do not offer transfer service. This approach allows them to provide cheaper fares while maximizing operational efficiency (ITU Aviation Institute, 2014).

As mentioned in chapter 1.1, KLM has originally followed the service strategy of an FSC. Certain aspects of the FSCs are very true for KLM. However, with the changes in baggage policies and offering an increasing amount of amenities at an extra cost (Van Woerkom, 2025), this seems to be changing.

To determine what category KLM falls under currently, I've created a comparison table using the definitions from the ITU Aviation Institute (n.d.) and Refundor (2020). Additionally, an analysis of which service strategy KLM exercises was performed. The results are shown in Appendix A.

The results show that KLM has a combination of features from both FSCs and LCCs, which fits with the fact that a new classification of airlines has emerged: the hybrid airline (Klisauskaite, 2024). This is a strategy in which there is a balance between low costs and high-quality service. Hybrid airlines typically offer a variety of fare classes, maintaining a balance between relatively low fares and a higher level of service.

Transavia

The airline Transavia functions as an LCC that focuses on a low-budget customer segment. Since 2003, KLM has acquired 100% of the shares of the airline Transavia (Transavia, n.d.) and now operates under the same umbrella as KLM. It offers lower fares by reducing amenities such as free meals and simplifying operations, allowing KLM to cater to cost-conscious travelers. Transavia's model complements KLM's full-service offerings by targeting different market segments. However, the changing strategy of KLM now partly covers the same customers as KLM. Transavia and KLM might end up competing over the same potential customers.

Key insights

KLM is a full-service carrier moving towards a service strategy of a hybrid airline and offers many benefits for the customer in exchange for a higher fare. This is important to the branding and identity of the airline and will remain important in future positioning and planning. However, because KLM is currently trying to reduce costs to remain financially healthy (NOS, 2025), the airline is moving more toward an LCC pricing strategy in the future. It will become a challenge to maintain the unique selling point of having an excellent service while keeping costs as low as possible. It is expected that this plays a role too in the design of the departure hall in the future.

2.6 Stakeholder research

The departure hall of an airport is a dynamic environment where multiple stakeholders interact to ensure a seamless passenger travel experience. From airport authorities, international organizations and ground handling services to passengers, each group has distinct roles, responsibilities and interests. Understanding how they are related to the departure hall processes differently is crucial when creating for the departure hall context. For this, two stakeholder maps were created through the method of Simon (2023) and analyzed the differences in interest and power for this context. The first shows the stakeholders that regulate and design the departure hall processes (Figure 13, left side), and the second shows which stakeholders simply use the departure hall (Figure 13, right side). The stakeholders and their roles and responsibilities are further explained in the next subchapters.

External: Passengers

The biggest group of stakeholders are the passengers. They are the ones paying for the airport and airline services, and all processes going through the departure hall are focused on accompanying this group. They have a high interest and a low power in making decisions for the departure hall process. As this group is immensely diverse, the needs can vary greatly. The needs that a passenger has can be influenced by, among other factors, cultural background, age, frequency of past air travel, group composition and their reason of travel. Also, as KLM flies with a hub-and-spoke structured network, many of the passengers are there on transfer, thus never leave the airside area. These passengers are not in the scope of this thesis.

External: Amsterdam Airport Schiphol

Amsterdam Airport Schiphol (AAS) is the main international airport of The Netherlands, and one of the busiest airports in Europe. It is located about 9 kilometers (5.6 miles) southwest of Amsterdam, in the municipality of Haarlemmermeer. Schiphol Airport is globally a

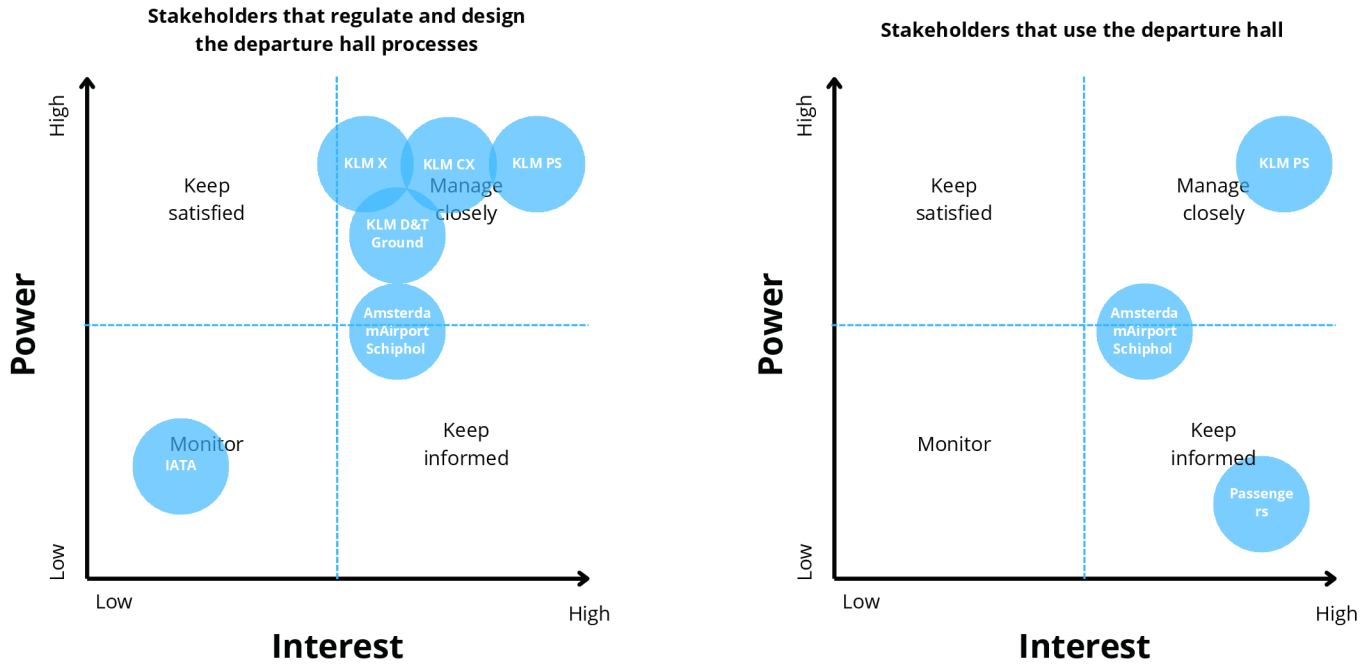

Figure 13: The two stakeholder maps, created by author.

major air transportation hub, with a significant number of international flights and connections. Yearly, over 60 million passengers fly through the airport (Schiphol, 2024), of which more than 30 million are flying with KLM (KLM, 2024c). With their founding dates only 3 years apart, Schiphol and KLM have collaborated for 102 years now, and their history is closely intertwined. As KLM is following a hub-and-spoke network model, Schiphol Airport is an important hub and the main base for KLM's operations. The destinations that KLM flies to strengthens the position of the hub and thus increases the attractiveness of Amsterdam Airport Schiphol for passengers and freight carriers (KLM, 2024b).

Since 2016, Departure Hall 2 is operated by KLM only (Van Woerkom, 2016). This fact is very visible as two big KLM-logos and many are clearly visible above the check-in rows, together with the fact that the departure hall is colored mostly blue and white. Even though KLM is the only operator in this departure hall, Schiphol owns the check-in desks and self-service drop-off point (SSDOP) machines. It could be seen as a landlord (Schiphol, 2022), owning the space and therefore an important stakeholder in departure hall changes. It has a high interest as the process affects the way passengers value the airport, and a medium amount of power compared to the other stakeholders.

External: IATA

The International Air Transport Association (IATA) is the trade association for the world's airlines. It represents 340 airlines, and is an organization that sets industry standards, organizes tariff conferences that facilitate price fixing. The association also assigns unique three-letter codes to airports (AMS for Amsterdam Airport Schiphol) and two-letter codes to airlines (KL for KLM), which are widely used in the aviation industry for identification and logistical purposes. This means that all flights that are operated by KLM have a flight number starting with KL.

IATA publishes yearly reports and manuals with standards and guidance for aviation professionals, for example the Airport Development Reference Manual (ADRM). In this manual, IATA reports on industry trends, addresses design considerations for passenger and cargo terminal planning and advises about digital transformation for airports (IATA, 2019). Another example of an IATA standard is the Level of Service (LoS). This is a framework that uses different factors to calculate an airport capacity (IATA, 2021). It is a way of assessing and determining overall airport performance, and gives handles for airport planners on what to consider when (re)designing a terminal building. Examples of this are: "Public departures/arrivals halls, check-in area including self-service kiosks, bag drop desks/units and traditional check-in desks" (IATA, 2021). IATA has quite low power and low interest in the processes done by KLM specifically, as long as everything adheres to their standards.

Internal: KLM Customer Experience (CX)

KLM CX is the Customer Experience department of the company. Their primary focus is to create a brand and customer strategy, and make sure that KLM maintains a strong customer satisfaction, with a brand image that is consistent throughout all experiences between the passengers and KLM. For innovations on the airport, this means that both passengers and KLM as a company need to be ready to implement changes, and they need to fit to the brand image and values that the Customer Experience department wants the company to convey. KLM CX has a high interest in the processes on the airport as these have a huge

impact on the passenger experience, and can make decisions based on what the desired passenger experience from KLM out as well. Therefore, they have high power and need to be managed closely.

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Internal: KLM X

KLM X is a department within KLM that is focused on designing and developing innovative solutions in the departure hall, by testing often and iterating quickly on the designs. This strategy is called the 'X way of working'. It is a method that has been developed in collaboration with the Faculty of Industrial Design Engineering of the TU Delft. With the position that KLM X has in the company, the department has a high power in changing the departure hall processes as they are quick to test and implement small changes. They have a high interest into the improvement of the processes and so, they need to be managed closely.

Internal: KLM Passenger Services (PS)

The Passenger Services (PS) department is a dedicated division within KLM that focuses on providing assistance and support to passengers throughout their travel journey. It is responsible for ensuring that all aspects of a passenger's experience, from booking and check-in to in-flight services and post-flight support, are handled efficiently and to the highest standards. Passenger Service Agents, the human staff of PS, work both on the airport in the terminal building, as well as in the office through phone contact and online channels. As KLM PS is the operational body in the departure hall, it has high power and interest. They need to be managed closely, to have the most successful and smooth adoption of changes and improvements by this part of KLM.

Internal: KLM Data & Technology Platform Ground (D&T Ground)

The Data & Technology department of KLM is responsible for the design, development and maintenance for all digital tools that are used by KLM staff. Data & Technology is divided into five business platforms, all working for their own operational user groups:

- Flight
- Ground
- Integral Planning & Control (PT&I)
- Safety, Security & Crisis Management (SSC)
- People, Technology & Intelligence (IPC)

Business Platform Ground supports the systems used by all KLM Ground Operations staff. This includes all systems used by Passenger Services (both inside and outside the departure hall), Baggage Services, and Apron Services. For the departure hall, this primarily involves digital systems such as

check-in systems for boarding passes, passenger seating, baggage labels, and transfer services, among others. It is, therefore, one of the most important departments for the development and design of departure hall processes. As the users of D&T Ground are the PSA's that work in the departure hall and form the basis of the operational processes, this department also has a high interest and power, thus needs to be managed closely.

Key takeaways

There are many stakeholders in and around the departure hall that play a crucial role in maintaining operational efficiency and creating innovative solutions to keep customer satisfaction high. Even within KLM as a company, there are multiple departments with similar interests but different expertise and ways of working. These all need to work together for the departure hall process to be as safe, seamless and enjoyable for the passenger and ground staff as possible. The stakeholders that need to be managed most closely are KLM PS, X, CX, and D&T Ground. These departments are mostly in charge of the changes in the departure hall.

2.7 Customer Experience Journey

Introduction

Understanding the passenger experiences in the departure hall is essential for designing a new process. To uncover everyday pain points and emotional moments, this study takes a qualitative, participant-led approach to explore the departure process through the eyes of real travelers.

This research focuses on the land-side phase of the passenger journey; the part of the airport process before passengers pass through security. By gaining insight into how people experience this phase in real-time, we can better understand which touchpoints feel intuitive or stressful and what aspects of the journey leave positive or negative impressions. Participants self-reported their thoughts, experiences, and activities, as well as their likes and dislikes. The study lets passengers self-report their observations and take photographs to capture these moments as they happen, helping them to illustrate the journey through their eyes and offering a deeper, more empathetic look into the challenges and highlights of traveling through Schiphol Airport.

Method

To explore current issues within the departure hall process at Schiphol, a qualitative diary study was conducted (User Interviews, 2025). This method was chosen to gather first-person, real-time reflections from participants as they navigated their journey from arrival at the airport through to the point of entering the air-side area (i.e., post-security).

Participant selection

Participants were recruited before their travel through Schiphol and were briefed on the study's goals and method. The sampling method probability sampling was used, where each sample has an equal chance of being selected, to represent the entire population.

Data collection

Participants were instructed to self-document their journey through the departure process using a combination of short diary entries and optional photographs. Specifically, they were asked to note:

- What passenger flow they follow
- What they were thinking and experiencing at each moment
- What activities they did during the 5 phases
- What they particularly liked and disliked
- Any moments of confusion, stress, or delight

A structured template was created to act as guidance for the self-reporting, as shown in Figure 14, next page. Participants submitted their completed forms via email or text message right after finishing their journey.

Results

In total, 9 participants flew from Schiphol and self-reported on their journey through the departure hall. As some of the passengers were flying together, there were a total of 6 different trips. However, they all filled in the diary study individually. The results of the study were analyzed per question first, to get a complete overview that covers the entire journey. Within those questions, the different answers per stage of the journey were compared.

What are your thoughts?

Generally, passengers are satisfied with their journey. 4 participants had little to no thoughts that can be perceived as a stressful or negative. They thought that the journey is "**efficient, simple and relatively fast**"

(Participant 3, at online check-in, arrival at Schiphol and security). Additionally, 3 participants mentioned that they like how easily **accessible** the airport is. This applies to people arriving by train, as well as by car. "It's so nice how the train arrives in the middle of the airport" (Passenger 8, arrival at Schiphol).

The thing that passengers are mostly thinking about is things that affect them, but are **out of their control**. "Hope this is going to be fast" (Participant 7, at check-in). 4 participants thought of things that are not in their power. This also includes having to wait in line. "Pff very long line. Hopefully check-in goes well" ... "Too bad I missed my security time slot because of the long line. I quickly requested a new time slot before the line. Hopefully that works." (Participant 8, at check-in and security).

Also, they are sometimes **not sure if they are doing things right**, or if they are forgetting something. They mention to be "never completely sure if there's still something I need to do" (Participant 6, at check-in). 2 participants mentioned this directly.

What do you experience?
Multiple participants experienced a feeling linked to the amount of people that flow through the airport. 4 participants mentioned experiencing **crowdedness**; "As I came up the escalator I was momentarily overwhelmed by the sudden hustle and bustle" (Participant 8, upon arrival at Schiphol and during check-in).

Out of 9 participants, 5 experienced confusion when finding out **where to go**; "Looking where you need to go is confusing" (Passenger 4, arrival at Schiphol), "I double-check whether I'm in the right place (using the app and signs)" (Participant 6, arrival at Schiphol)," I was overwhelmed, but luckily I quickly found the right direction." (Participant 8, arrival at Schiphol). It is clear that the most confusion happens during the arrival at Schiphol.

What activities do you do?
The passengers' activities mostly consist out of activities that are expected at these steps; providing their passport information, retrieving a boarding pass, leaving the car or train to get to the departure hall, handing in their checked luggage and walking to security. However, some did experience issues and stress during these steps.

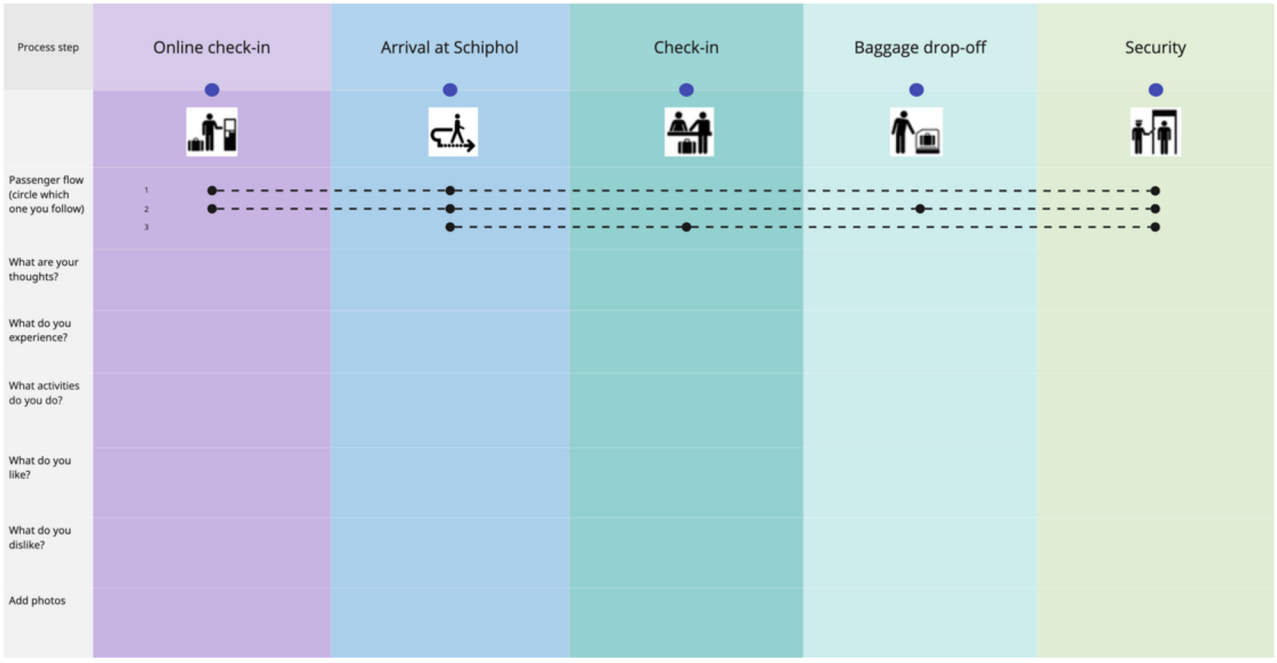

Figure 14: Template for the diary study, created by author.

During the online check-in participants experienced problems with **providing their passport information** and **receiving a boarding pass**. It is not clear to them why it did not go well; "Checked in, filled in passport. I had to scan my passport but that did not work very well. Because of this I also could not check in for my parents." (Participant 1, online check-in), "I have to do it multiple times, it doesn't work well. Documents cannot be loaded properly" (Participant 4, online check-in). "I double-check whether it worked, making sure I have all my check-in essentials in one clear place, such as my iPhone Wallet." (Passenger 6, at online check-in). However, there are also positive experiences with the online check-in "I like that you don't have to queue at Schiphol to check in." (Passenger 4, at online check-in).

What do you like?
Passengers were satisfied with multiple things. They liked the ability to **check-in online** before coming to the airport. 4 passengers mentioned this specifically; "Happy to have this done before coming to the airport" (Passenger 7, at online check-in).

They also liked how **well organized** everything is, as well as the **accessibility** to the airport. This was especially the case as they arrived at Schiphol. 4 participants mentioned the clarity and organizational success of the airport. 2 of them specified this further to touch upon the accessibility of entering through train or car; "Efficient long-term parking, good transport to main building" (Passenger 3, arrival at Schiphol), "I like the train arriving at Schiphol" (Passenger 8, during the arrival at Schiphol).

Something that was also positively referred to was satisfaction towards **short lines**. 2 participants mentioned this specifically; "The queue was fairly short" (Participant 7, at baggage drop-off). This is something very case-specific, as there also were some participants who experienced long lines; "A bit irritated by the very long line" (Participant 8, at check-in).

What do you dislike?
As was found before, passengers experienced problems with finding **where to go**. They found the signs too small or confusing, or they disliked the path that they should take to security if they already had checked in. They felt like they "shouldn't be walking there" (Participant 1, upon arrival at Schiphol). Also, they had to ask for directions in order to get to the right place. "Signage for our scenario (drop off hand-luggage for a European flight with KLM) was poor, meaning we had to ask for directions" (Participant 7, arrival at Schiphol).

Also, 3 passengers felt that they had to repeat actions throughout the journey. They mention that especially during the online check-in and baggage drop-off steps. "Ease of use is not ideal. It only works after multiple attempts and not in every browser." (Passenger 4, during online check-in), "Doing the same things multiple times" (Passenger 5, at baggage drop-off).

Participants also mention their interactions with the personnel (excluding security officers). 3 participants are dissatisfied with this. This is especially during the moments where passengers interact with the personnel, like at check-in and baggage drop-off. "Staff stands around doing nothing" (Participant 4, baggage drop-off), "There is a same amount of staff as at the counters present who do nothing by the way. The personnel is unhelpful" (Participant 5, baggage drop-off), "You don't always know what the desk employee is doing in the system. Sometimes, they walk away or consult with other staff members." (Participant 6, check-in). 2 participants mention a positive experience with the personnel. "Had a chat with the ground staff, who were friendly" (Participant 7,

at baggage drop-off), “Very sweet KLM lady at check-in” (Participant 8).

The completed diary study results, as well as the participant table are shown in Appendix B.

Key insights

From this study, I discovered different issues that can be seen as key challenges for passengers in the departure hall.

Navigation: People had difficulty finding how to get to the right location. Not all passengers need to go to the check-in desk before going to security, and to their gate. However, it is not clear to them when and if that applies to them.

- “It is hard to find where to go”
- “Information is small and confusing”
- “I feel like I shouldn’t be walking here”

Repeating steps: People had to repeat different steps, which caused friction. Even though there are different stakeholders in their journey like KLM itself and Schiphol, passengers expect the digital systems to work together, thus do not want to provide the same information multiple times.

- “At online check-in I need to give the same information multiple times”
- “At baggage drop-off I need to do the same thing multiple times”
- Disengaged Personnel: People thought that the personnel standing around at the baggage-drop and kiosk areas is not helping passengers.
- “Staff stands around doing nothing”
- “Personnel is unhelpful”
- “The idea is nice but the SSOP is not much better than a counter. Also the same amount of staff is present”

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- “Personnel is unhelpful”
- “The idea is nice but the SSOP is not much better than a counter. Also the same amount of staff is present”.

2.8 Crowd management study

Introduction

Efficient crowd management in airport departure halls is essential for ensuring passenger satisfaction, operational effectiveness, and overall safety. As Schiphol plans to continue rising passenger volumes, understanding where and why people accumulate within terminal spaces is central for a departure hall process redesign.

Passengers, Passenger Service Agents and other visitors and personnel form a complicated web of walking paths. To get a thorough understanding of how people move through the departure hall and what activities are done here, a crowd management study was conducted.

Accumulation could be positive or negative; people can come together in meeting points, relax there or visit shops and gastronomy. However, accumulation in the wrong areas can cause congestion. Crowded environments directly influence the emotions, stress levels, and behaviors of passengers. High-density zones can cause anxiety, confusion, and impatience, particularly when wayfinding is unclear or space feels limited. These emotional states can affect decision-making, reduce satisfaction, and lead to delays or conflicts. Similarly, airport agents working in densely crowded conditions may experience elevated stress, reduced job satisfaction, and difficulty offering personalized support. In this way, the spatial distribution of people is not only a logistical issue but a human-centered concern that impacts the perceived quality of service on both ends of the interaction.

This study aims to explore and address these issues through a multi-phase approach: analyzing international crowd patterns, formulating a hypothesis about accumulation zones, and testing this hypothesis in a real-world departure hall.

Method

Phase 1: Timelapse analysis

Publicly available timelapses of departure halls in 7 airports in Europe, Asia and North America were investigated, during which locations

Figure 15: The timelapse analysis for 7 airports.

where passengers accumulate in the departure hall could be identified (Figure 15). For the airports where these were accessible, multiple camera angles were used in the analysis. Special attention was paid to the density of presence and temporary build-up patterns.

Phase 2: Hypothesis

From the global timelapse analysis, the following five locations were identified as areas where people accumulate in a departure hall:

- At the entrance of a bankline.
- In an area where fewer people walk.
- Near the entrance of the departure hall.
- Before a narrow passage-way.
- Close to an information screen.

With these locations, a hypothesis was created on which locations in departure hall 2 at Schiphol are most likely to have passengers accumulate, causing a congestion of people (Figure 17, left side).

Phase 3: Hypothesis testing in Departure Hall 2 at Schiphol

Subsequently, the area between the departure hall entrance and check-in desks was chosen as observation zone, mirroring the ones used in the global timelapse study. Data collection was performed over 1,5 hours (Figure 16), using:

- Time-stamped photography every 5 minutes to capture accumulation hotspots.
- Personal observations noting behavior and actions done by passengers.

In addition to the spatial data, emotional cues in agents and passengers we observed, such as signs of confusion, agent-passenger tension, and performed actions. The predicted areas for the accumulation of people could be validated, and a new area could be discovered specific to departure hall 2.

Results

The following areas were confirmed, refuted, and newly found. Also, there is an area that does not apply to departure hall 2 at Schiphol, as there is no narrow passageway where people accumulate. These results are visualized in Figure 18, right side.

- At the entrance of a bankline: Confirmed
- In an area where fewer people walk: Confirmed
- Close to an information screen: Confirmed
- Near the entrance of the departure hall: Refuted

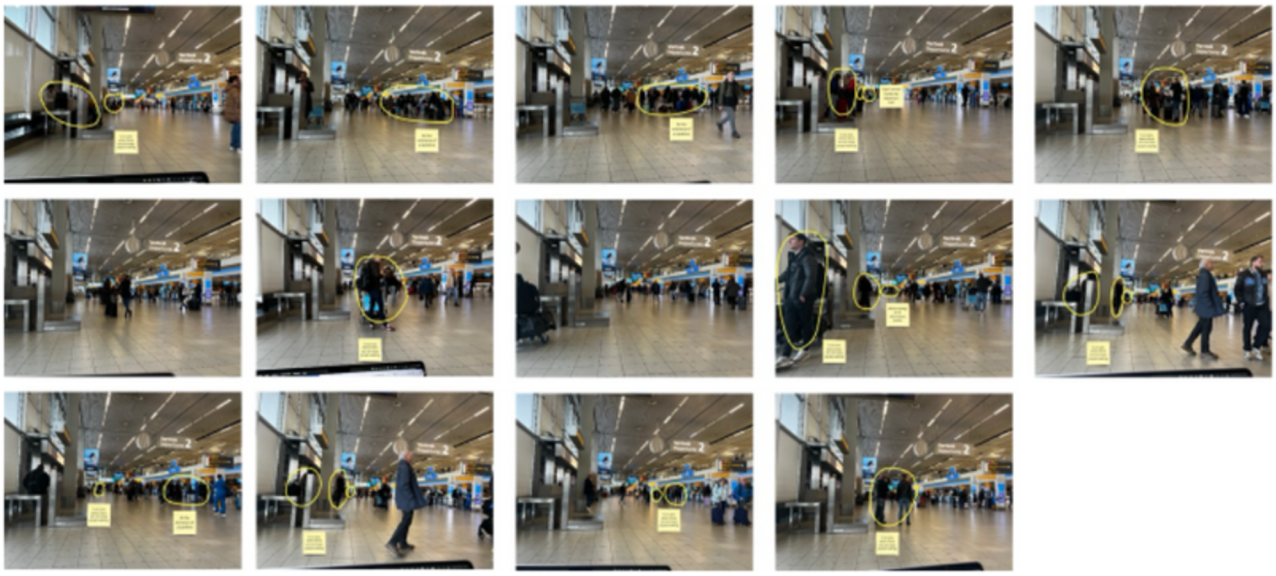


Figure 16: The analysis of departure hall 2 at Amsterdam Airport Schiphol.

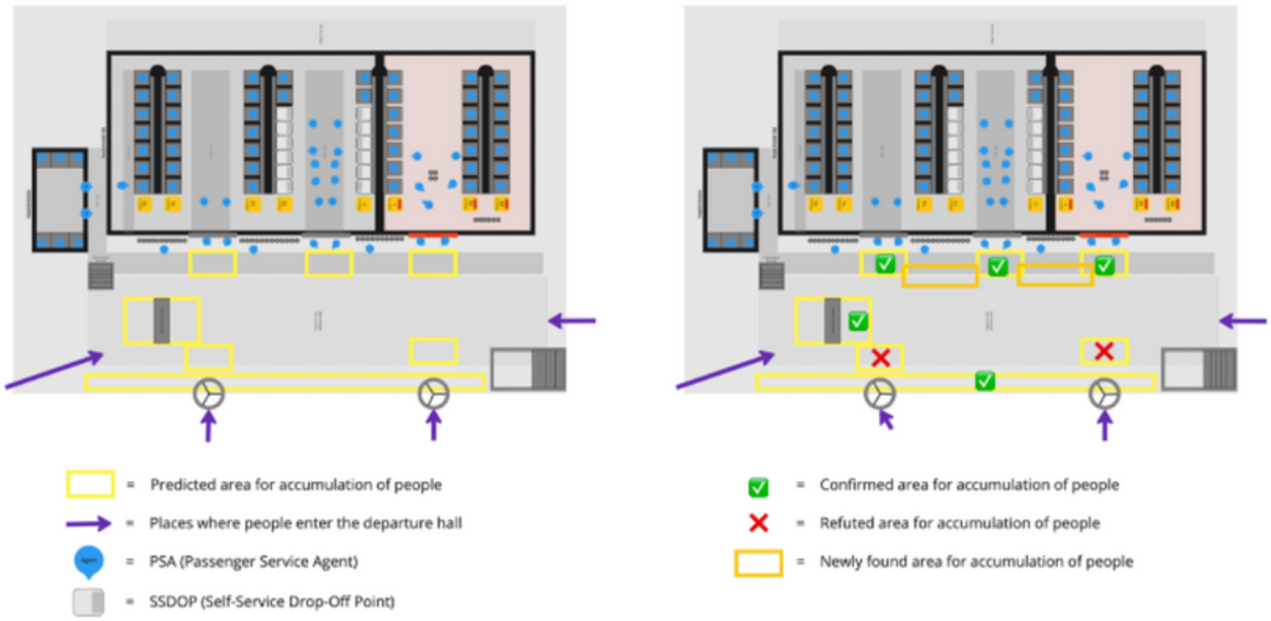


Figure 17: Ground plan for departure hall 2 (ratio to scale). Left: predicted accumulation areas. Right: Validated accumulation areas.

- In front of the kiosks: New finding
- Before a narrow passage-way: Not applicable to departure hall 2

By observing people's behavior in these areas and directly asking them, it became clear what activities they were engaged in while standing still in these locations. They are listed below:

- Re-organizing their luggage before dropping it off.

- Waiting for travel group members to meet before check-in.
- Looking for travel information (boarding passes, gate information) on their phone.
- Looking at an information screen.

Key insights

The combination of timelapse analysis and on-site observation proved effective in identifying congestion points, confirming most predicted areas while also uncovering new insights specific to Schiphol. The confirmed areas are:

- At the entrance of a bankline (if they are still there in the future scenario)
- In areas where fewer people walk
- Close to information screens
- In front of kiosks (if they are still there in the future scenario)

When making changes in the departure hall for the future, it is important to keep in mind that there needs to be space for these specific activities. What those areas will look like, will be treated during ideation in the Develop phase.

3

Define

Image source: Eccles (2022)

The Define Phase focuses on clearly understanding and articulating the problem. It involves synthesizing insights gathered during the Discover phase, visualizing data, identifying key challenges, and defining specific goals. This phase sets the foundation for ideation and solution development.

3.1 Mapping the customer journey

Importance of the journey map

To gain a comprehensive understanding of the departure hall and integrate all the previously mentioned information, a customer journey map was created (Figure 18). This helps make sense of the information and identify gaps, inefficiencies, and areas for improvement. The journey from both a passenger's and a KLM perspective were analyzed, taking into account actions from multiple PSA roles. The visual includes the following information:

Possible passenger flow

There are multiple ways passengers can go through the airport. Some of them check in online, and some check-in in at a desk at the airport. This decision is not always their choice either. Some must drop off their checked luggage, and some only fly with hand luggage. Three passenger flows were created based on the physical steps they go through to compare the journeys.

- Flow 1. From online check-in, arriving at Schiphol to security.

Passengers that follow this flow check-in online before going to the airport, and then when arriving at Schiphol, they go directly to security. They have their boarding pass before entering the airport and carry only hand luggage.

- Flow 2. From online check-in, arriving at Schiphol, to baggage drop-off, to security

Here, passengers check-in online and receive their boarding pass before going to the airport. After arriving there, they go to an SSDOP and drop off their checked luggage. From there, they go to security.

- Flow 3. From arriving at Schiphol, to the check-in, to security

During this journey, passengers do not check-in online but do so physically at a desk at the airport. If they have checked luggage, they also drop this off at the same counter, with help from a check-in agent. Document checks are also done here. Then, passengers go to security.

What passengers see

During their journey, passengers see many different signs, objects and people as they go through the steps. Mapping these out is essential for understanding their experience. It helps reveal areas of confusion, congestion, or inefficiencies. By analyzing their visual journey, insights can be gained into how passengers navigate the space and where improvements may be needed.

Who passengers interact with

From the moment they check-in online, all the way to the point that they go through security, passengers come across many other people. Identifying these people and how they relate to each other helps understand how they interact with others.

What passengers are carrying

People only have two hands but must carry many different things on their airport journey. This can impact their mental state and feelings of well-being during the process. Understanding what they bring provides opportunities for better services and can create a more comfortable travel experience.

Pain points from passengers

Eliminating negative experiences during a passenger's journey through the departure hall is critical to increasing their feeling of

comfort. Identifying pain points helps recognize areas where passengers experience problems or frustration. Addressing these issues can create opportunities to make the journey more enjoyable and efficient.

Actions from KLM staff and passengers
These are the specific actions the two groups carry out to achieve a successful travel journey without delays. Visualizing them this way shows the complexity of the context and displays what exceptions there are for some of the passengers.

Creation of the visual

To create this visual, all previous research was used, including observations in the departure hall and interviews with PSAs and passengers. The visual is structured through the 5 phases of the passenger journey, from online check-in (before entering the departure hall) to security (the step after the departure hall), and can be seen in Figure 18, next page. Even though KLM is not in charge of the process and steps during security, it is the step that passengers go through after being in the 'KLM environment', thus having an effect on the state that passengers are in when passing through this step.

Key insights

When looking at the challenges that passengers and agents face as mapped in the customer journey map, multiple contradictions are found;

The degree of active attitude from personnel
Passengers mention that they find the staff 'unhelpful' and that they look 'bored', especially at the SSDOPs and kiosks. However, staff standing at the same locations mention that when they look to active, passengers quit thinking for themselves and ask for help too soon; before trying it independently. It seems like they both are unhappy with the behavior of the other.

The lack of information for both sides
When passengers cannot check-in properly, they are sent to check-in desk row 16. This serves as a row for the 'special cases'. Passengers don't know always why they can't check in online, however sometimes staff also don't know this either. This results in many people having to wait in line at check-in desk row 16, which for some cases might be unnecessary. PSAs mention that "some passengers get sent there without actually needing anything exceptionally". They might have been concerned without a reason. Additionally, passengers need to provide the same information multiple times, which causes additional annoyance.

Insecurity of passengers
Some passengers don't seem to know for sure if they still need to go past a desk or not, even when they have checked in online already. Also, they are unsure where to go exactly to security, and have difficulty finding how to walk there. This leads to a feeling of insecurity and may lead many passengers through the departure hall without needing to go there at all.

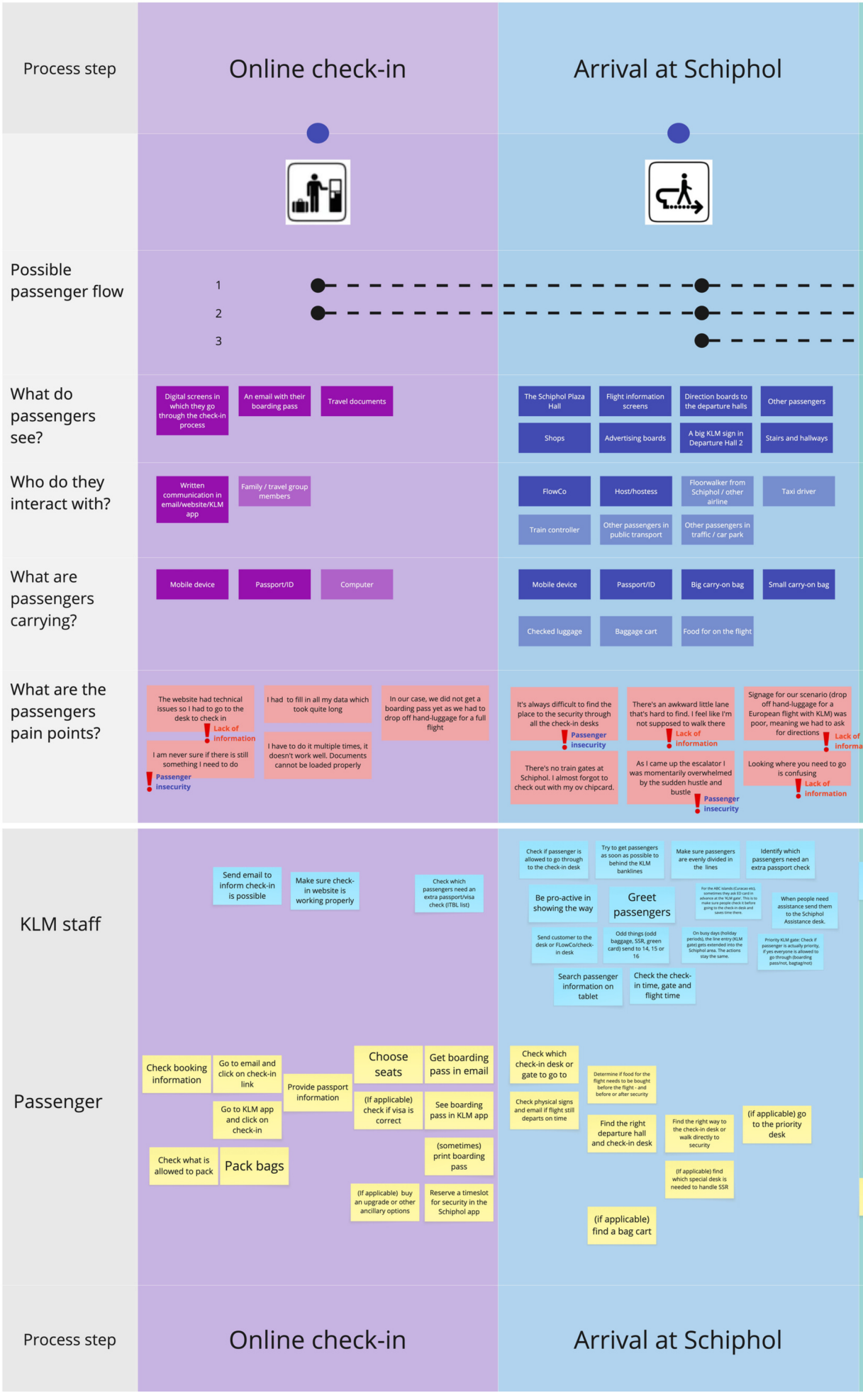
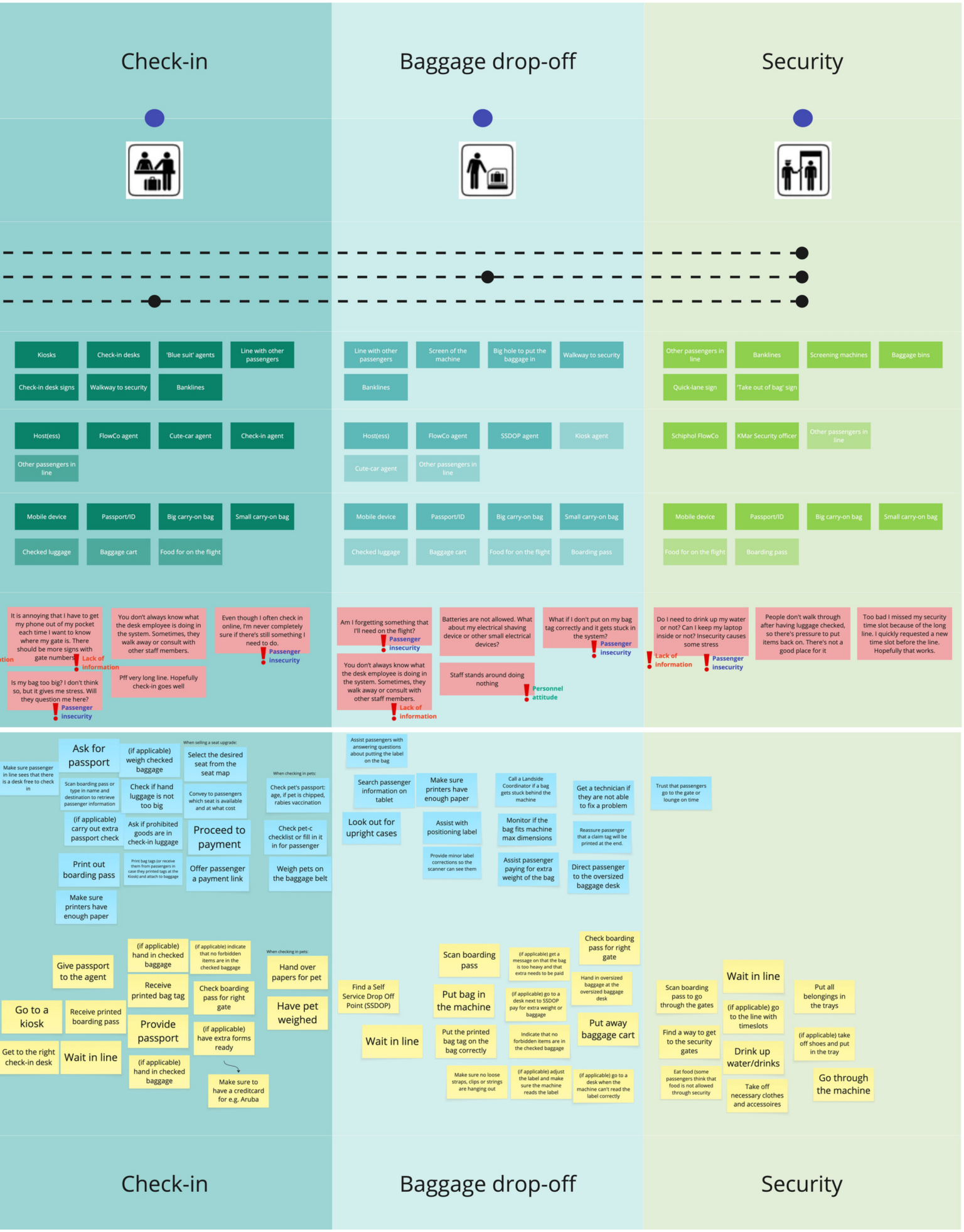


Figure 18: The customer journey map, created by author.


Check-in
Baggage drop-off
Security
Kiosks
Check-in desks
'Blue suit' agents
Line with other passengers
Check-in desk signs
Walkway to security
Banklines
Line with other passengers
Screen of the machine
Big hole to put the baggage in
Walkway to security
Banklines
Other passengers in line
Banklines
Screening machines
Baggage bins
Quick-lane sign
'Take out of bag' sign
Host(ess)
FlowCo agent
Cute-car agent
Check-in agent
Other passengers in line
Host(ess)
FlowCo agent
SSDOP agent
Kiosk agent
Cute-car agent
Other passengers in line
Schiphol FlowCo
KMar Security officer
Other passengers in line
Mobile device
Passport/ID
Big carry-on bag
Small carry-on bag
Checked luggage
Baggage cart
Food for on the flight
Mobile device
Passport/ID
Big carry-on bag
Small carry-on bag
Checked luggage
Baggage cart
Food for on the flight
Boarding pass
Mobile device
Passport/ID
Big carry-on bag
Small carry-on bag
Food for on the flight
Boarding pass
It is annoying that I have to get my phone out of my pocket each time I want to know where my gate is. There should be more signs with gate numbers
Lack of information
You don't always know what the desk employee is doing in the system. Sometimes, they walk away or consult with other staff members.
Even though I often check in online, I'm never completely sure if there's still something I need to do.
Passenger insecurity
Is my bag too big? I don't think so, but it gives me stress. Will they question me here?
Passenger insecurity
Pff very long line. Hopefully check-in goes well
Am I forgetting something that I'll need on the flight?
Passenger insecurity
You don't always know what the desk employee is doing in the system. Sometimes, they walk away or consult with other staff members.
Lack of information
Batteries are not allowed. What about my electrical shaving device or other small electrical devices?
Staff stands around doing nothing
Personnel attitude
What if I don't put on my bag tag correctly and it gets stuck in the system?
Passenger insecurity
Do I need to drink up my water or not? Can I keep my laptop inside or not? Insecurity causes some stress
Lack of information
Passenger insecurity
People don't walk through after having luggage checked, so there's pressure to put items back on. There's not a good place for it
Too bad I missed my security time slot because of the long line. I quickly requested a new time slot before the line. Hopefully that works.
Make sure passenger in line sees that there is a desk free to check in
Ask for passport
Scan boarding pass or type in name and destination to retrieve passenger information
(if applicable) carry out extra passport check
Print out boarding pass
Make sure printers have enough paper
(if applicable) weigh checked baggage
Check if hand luggage is not too big
Ask if prohibited goods are in check-in luggage
Print bag tags (or receive them from passengers in case they printed tags at the Kiosk) and attach to baggage
When selling a seat upgrade:
Select the desired seat from the seat map
Convey to passengers which seat is available and at what cost
Proceed to payment
Offer passenger a payment link
When checking in pets:
Check pet's passport: age, if pet is chipped, rabies vaccination
Check pet-c checklist or fill in it in for passenger
Weigh pets on the baggage belt
Give passport to the agent
Go to a kiosk
Get to the right check-in desk
Receive printed boarding pass
Wait in line
(if applicable) hand in checked baggage
Receive printed bag tag
Provide passport
(if applicable) hand in checked baggage
(if applicable) indicate that no forbidden items are in the checked baggage
Check boarding pass for right gate
(if applicable) have extra forms ready
Make sure to have a creditcard for e.g. Aruba
When checking in pets:
Hand over papers for pet
Have pet weighed
Assist passengers with answering questions about putting the label on the bag
Search passenger information on tablet
Look out for upright cases
Make sure printers have enough paper
Assist with positioning label
Provide minor label corrections so the scanner can see them
Call a Landside Coordinator if a bag gets stuck behind the machine
Monitor if the bag fits machine max dimensions
Assist passenger paying for extra weight of the bag
Get a technician if they are not able to fix a problem
Reassure passenger that a claim tag will be printed at the end.
Direct passenger to the oversized baggage desk
Trust that passengers go to the gate or lounge on time
Find a Self Service Drop Off Point (SSDOP)
Wait in line
Scan boarding pass
Put bag in the machine
Put the printed bag tag on the bag correctly
Make sure no loose straps, clips or strings are hanging out
(if applicable) get a message on that the bag is too heavy and that extra needs to be paid
(if applicable) go to a desk next to SSDOP pay for extra weight or baggage
Indicate that no forbidden items are in the checked baggage
(if applicable) adjust the label and make sure the machine reads the label
Check boarding pass for right gate
Hand in oversized baggage at the oversized baggage desk
Put away baggage cart
(if applicable) go to a desk when the machine can't read the label correctly
Scan boarding pass to go through the gates
Find a way to get to the security gates
Eat food (some passengers think that food is not allowed through security
Wait in line
(if applicable) go to the line with timeslots
Drink up water/drinks
Take off necessary clothes and accessoires
Put all belongings in the trays
(if applicable) take off shoes and put in the tray
Go through the machine
Check-in
Baggage drop-off
Security

3.2 Defining change drivers

Following the design research, design synthesis was performed, according to the method of García (2020). It is a way to transform research data into actionable knowledge. The goal of this process is to identify connections between the different data, uncovering meaningful insights from observed behaviors during the research phase. This understanding helps identify opportunities and constraints, shaping the framework within which more accurate and effective solutions can be developed. The method consists of three steps, in this specific order;

1. **Organizing:** Organizing the data involves grouping related items together to identify patterns or outliers, creating clusters known as affinity diagrams, and using visual tools like physical walls or digital platforms to facilitate this process and prevent preconceived notions.
2. **Pruning**: Pruning involves selectively removing or ignoring data to prioritize the most important items based on their popularity and rarity, requiring designers to continually reference their design problem to identify and focus on relevant information, thus avoiding distractions and inefficiencies.
3. **Interpreting**: Interpreting involves assigning meaning to data by creating hypotheses to explain behaviors, influenced by both designers' and users' perspectives, and forming insights through abductive inferences to generate new knowledge and ideas.

This design synthesis method helped me to uncover connections between the different data, which has led me to identify five change drivers for the changes in the departure hall. Developments over time in these 5 topics are what lead to changes in the future departure hall.

Technology

This change driver is fueled by the developments of technological and digital system innovations; automation in the departure hall through kiosks, the use of digital boarding passes and SSDOP machines are examples of how technology is changing the departure hall processes.

Customer journey

As time goes by and passengers adjust to the societal changes, their expectations on a service level change as well. Furthermore, the digital literacy of the KLM customer base evolves with the world, changing how they perceive the automated processes on and off the airport.

Spatial constraints

The number of passengers on Schiphol airport increase over the years due to the use of bigger aircraft, however the terminal building that houses the departure hall is planned to roughly keep the same size. This means more people, but not more space so the amount of space per passenger in the departure hall will come more under pressure.

Finances & competitive position

The financial position is an important factor which influences the changes in departure hall. It can both be a push for innovation, forcing the company to implement modern techniques fitted to customer expectations

(partly influenced offerings from competitor airlines), as well as a pull, where in times of ‘heavy weather’ cutbacks can be made in innovation budget.

Policy & regulations

In an international environment like an airport, many policymakers set rules in place. These include Amsterdam Airport Schiphol, the Dutch government, European policymakers, and IATA. For example, over time, rules and regulations regarding privacy and safety change, as well as laws for the use of biometrics are created and amended.

The 5 drivers will be used in the next phase, in performing a trend analysis according to the design method Design Roadmapping (Simonse, 2018). Following the design synthesis, the key insights per change driver are plotted in a table that can be seen in Figure 19.

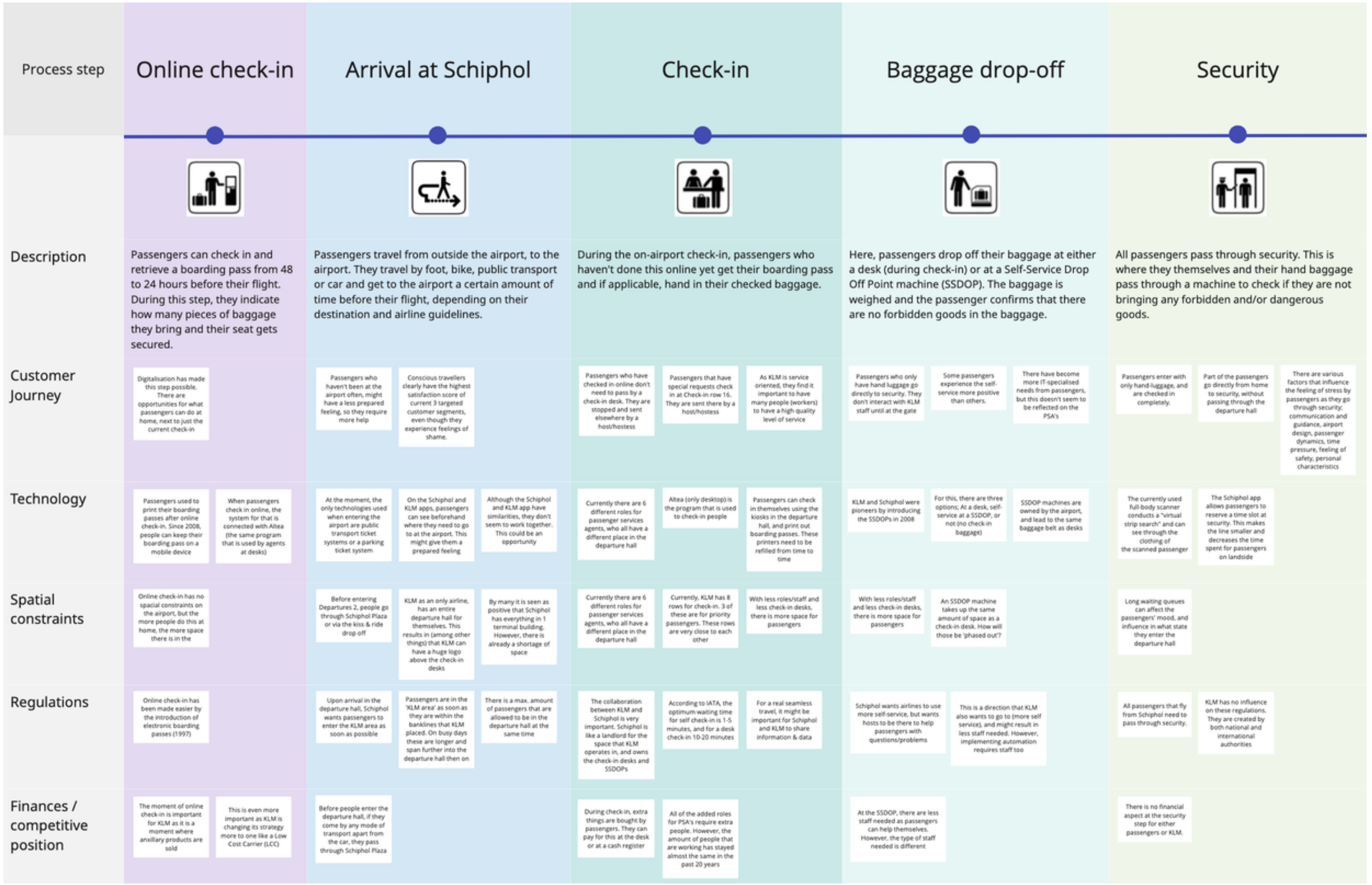


Figure 19: The key insight table following the design synthesis.

3.3 Key challenges for KLM and passengers

From the previous research the key challenges for KLM and its staff, as well as those of passengers are summarized.

Challenges for passengers passing through Departure Hall 2

Navigation: Passengers struggle to figure out how to reach the correct location. Not all of them need to visit the check-in desk before heading to security and their gate. However, it's unclear when or if this step applies to them.

Repeating steps: Passengers have to repeat various steps, creating frustration. Although there are multiple stakeholders involved, such as KLM and Schiphol, passengers expect the digital systems to integrate seamlessly and prefer not to provide the same information repeatedly.

Disengaged Personnel: Passengers feel that the agents at the kiosks and baggage drop area are not being helpful. Additionally, during check-in they sometimes don't understand what the agents are doing, for example when they walk away to consult with other staff members.

Challenges for KLM in improving the process in Departure Hall 2

Human touch in a digital world

While digitalization can improve the passenger experience immensely, according to KLM CX is important to keep a human touch as this service is one of the reasons why passengers choose to fly with KLM.

Complex stakeholder environment

Next to the authorities, there are many stakeholders that are involved with changes in the departure hall. This includes different departments within KLM, as well as passengers themselves. Innovations need to be tested while the operation of incoming and outgoing passengers continues every day.

Regulations from Schiphol, IATA and government

While KLM and other airlines strive to innovate, they are slowed down by rules and regulations from authorities (Airports Council International Europe, 2024). There is freedom to move, however getting approvals in a safety regulated zone takes time.

Back on Track

Due to higher costs in the operation and staffing salaries, KLM currently faces financial challenges. This limits the ability to invest in innovations and process improvements. However, this financial state is expected to improve in the future, so for the long-term vision this is not expected to decrease as a threat.

3.4 Design direction

Passengers navigating through the departure hall rely on a combination of surrounding cues, travel information and agent interactions to feel confident in their journey. However, insights gathered during the Discover phase indicate that gaps in spatial awareness and inconsistent agent involvement can lead to uncertainty and stress. The research showed passengers feel confused and unsure if they follow the right path for their case specifically.

Time scoping

The time scope that was chosen for the future design is 15 years. Interviews with various stakeholders, including passengers and expert staff from inside and outside the departure hall, revealed a need for long-term solutions that can adapt to evolving technologies and passenger expectations.

Aligning with the future vision of KLM Passenger Services, this timeframe allows me to integrate new technologies, while creating a realistic time pacing strategy for an industry as complex as the aviation industry. A 15-year horizon provides enough room to innovate and develop changes progressively, ensuring that there is enough time for the next steps to be implemented without having a large impact on the daily operations.

Defining the design direction

Based on the aforementioned challenges, the design focus in the next part of this thesis will be on two key aspects, while shaping the departure hall process of the future: improving passengers' ability to intuitively navigate the airport and redefining the role of agents in supporting spatial awareness. Instead of just providing more information, the focus is on creating an environment where travelers can move confidently without confusion.

To formulate a well-defined design direction, an exploratory activity was conducted to map out different possible scopes within the broader departure hall processes. The links between them became clearer by zooming in and out on various elements. The activity consisted of structuring the possible scopes into layered categories, ranging from general topics like departure hall interior design and passenger-agent interactions, to more specific areas such as wayfinding or passenger confidence. Through this process, a combination that best captured the core issue could be selected. An image of this activity can be found in Appendix C. Subsequently, the design direction will be as follows:

"In this thesis, I focus on re-shaping the departure hall process and the role of the Passenger Service Agents, in order to increase passengers' confidence in the departure hall in 15 years."

Why this matters

A seamless airport experience depends on both intuitive design and human interaction. When passengers struggle to navigate the space, their confidence decreases, leading to stress and inefficiencies. Therefore, the following phases will aim to make airport navigation more intuitive.

While staying ahead of competition and keeping customers loyal by staying true to the brand identity, this thesis aims to give shape to Departure Hall 2 in the future, introducing practical solutions that improve the confidence of passengers. The insights gained will form the foundation for the Develop phase, where targeted interventions will be designed and tested to create a more intuitive and supportive airport experience.

3.5 Key requirements from the first diamond

Based on the activities done in the Discover and Define phases, a list of requirements was set up to guide my future design practices. These requirements will be used in the validation of the vision concept, which will be created in the next chapter during the process of Design Roadmapping.

Communication to passengers
Ensure passengers know what to expect and what is expected of them and how to navigate to their personal next steps. Communicate this in a clear, accessible way. This proves to be a current big issue.

Engagement for agents
Agents should be able to balance being available and helpful without causing passengers to become overly reliant on them.

Fit with KLM brand
Make sure the brand values of KLM are kept, which are the reason why people choose for this airline specifically. This is important to keep in mind when making changes to the communication with the passenger.

Improved information systems
Clear, accessible information for passengers as well as agents for when they need to deviate from their normal travel routine. An example is when they cannot check-in online due to a special case. Make sure agents are supported in a way that they can understand and communicate passenger issues with for example online check-in, so they do not unnecessary refer passengers to check-in desk row 16 (special cases desk).

Technological Integration
Continued development and integration of automated systems (online check-in, SSDOPs and kiosks), ensuring a seamless interaction between digital systems to avoid that passengers need to repeat steps and provide their information multiple times.

Stakeholder collaboration for minimal disruptions
Improve collaboration between various internal and external stakeholders, for example with Schiphol. Make sure innovations are tested and implemented with minimal disruptions to daily operations.

Long term adaptability
Establish a framework for continuous feedback and improvement based on both passenger and agent experiences.

Fit with the rest of the travel process

These requirements are not meant to make the departure hall process as futuristic as possible, but are based on current issues of both passengers and agents, and are not achieved right now.

4

Develop

Image source: Het Parool (2023)

The Develop Phase focuses on creating ideas and turning them into practical solutions. During this phase, the Design Roadmapping method is carried out to create a roadmap based on the design direction that was created during the Define Phase. During the Roadmapping activities, a Vision Concept is created for the desired future. The Develop phase also involves prototyping, testing, and refining concepts based on user feedback, ensuring the designs are viable and effective before final implementation.

4.1 Trends

The first element of the Design Roadmapping Method (Simonse, 2017) is to do creative trend research. Trend research is essential to get a good understanding of what's happening in the world, and what the possibilities are for the desired end state. Creative trend research is done through four techniques;

- **Trend views.** With this technique, trends are established by the authoritative voice of a single expert. In this case, the company VML (previously Wunderman Thompson), a global company (28.000 employees, 150+ offices) which is part creative agency, part consultancy and part technology company. They have created reports stating global insights on certain trends. Also, they create a yearly trend report, the Future 100 (VML, 2025).
- **Trend topics**. For this, a broad DESTEP trend analysis (Lucidity Strategy, 2025) into the broader context was performed, including topics like travel, customer service staff, airports and digitalization in a service environment.
- **Trend scenarios.** These trends are established by conducting interviews with experts inside and outside the company. For this, a Future Technologies & Apple Specialist and a Program Director Biometrics & Clearance for the airport have been interviewed.
- **Trend patterns.** This technique has led me to immerse myself into the context and contexts that are similar, in order to identify longer lasting trends. Additionally, 2 hospital staff members have been interviewed at the Reinier de Graaf Hospital, both of whom have experienced digitalization in their workplace and a subsequent change in their role.

Combined, they have led to a rich understanding of how the world changes in the future in multiple aspects of society. Together with the previous research from the Discover and Define phases, this provides handles as to what the future departure hall must look like. The full research can be seen in Appendix D. To give structure to the found trends, they are divided into the 5 drivers that change the departure hall. Some trends overlap in their effects, and cover two drivers. In this case, they are placed in the driver category that fits with it the most.

Technology

Omnilingual and symbiotic tech

Omnilingual and symbiotic tech aim to eliminate language barriers by enabling real-time translation and interpretation across multiple languages (VML, 2024). Using advanced AI and machine learning, these systems understand context and cultural nuances, making interpersonal communication more natural. Agents could speak to passengers freely without an awkward translation process. Beyond translation, symbiotic tech learns from user interactions to help with personalized assistance (Yonashiro, 2024).

Omnichannel

An omnichannel strategy offers a seamless experience across multiple online and in-person platforms like phones, personal computers and other devices (Pouw, 2024). It integrates data analytics with customer

management systems to maintain a consistent brand- and user experience, regardless of how customers engage. This is especially relevant in the airport context as passengers indicate that they need to provide their information multiple times, as well as repeat steps. Additionally, according to Pouw (2024), people expect staff to have a 360-degree view of them. As consumer expectations grow (Lemos, 2024), omnichannel strategies are becoming essential for businesses like airlines seeking to remain competitive in the digital age.

Big AI models vs small AI models

The debate between big and small AI models focuses on balancing power, efficiency, and accessibility. Big AI models, with extensive data and neural networks, are great for complex tasks but require significant resources. In contrast, small AI language models are resource-efficient and suitable for limited-capacity scenarios (Kannenberg, 2025). Scenarios like these could involve passenger questions about specific baggage or cancellation policies, where the relevant answers are currently scattered across multiple documents, making them time-consuming for agents to find (Van Wel, 2025).

Individual messages and a 'patient pass'

The 'patient pass' system in hospitals enhances healthcare management by storing patient information on a barcode, which is printed on a personal pass. Using individual SMS messages, patients receive personalized communication with appointment reminders directly on their mobile devices. By letting them 'check in' with their patient pass at the right hospital ward, administrative tasks are reduced and staff expected tasks change.

Projector touchscreens

Projector touchscreens turn any flat surface into an interactive display (Pell, 2020). Using projection technology and motion sensors, the virtual screens allow users to engage with digital content without physical devices. They offer flexibility and portability where traditional screens are impractical, which makes them ideal for collaborative environments like an airport departure hall. As technology advances over the years, improvements in resolution, responsiveness, and cost (Samsung, 2025) will make projector touchscreens a good alternative for physical carry-on devices, integrating digital interaction between PSAs and passengers seamlessly into the physical environment.

Customer journey

Haute-airport experiences (private and seamless)

Passengers' expectations are changing. Haute-airport experiences (coming from haute-couture) redefine luxury, with emphasizing private and seamless services (VML, 2024). From personalized check-ins to exclusive lounges, wealthy travelers increasingly seek to avoid the typical airport crowds. They view discretion as luxury (VIP Air Assist, 2024) and want airports to be a place of relaxation and exclusivity. It becomes a part of their journey, and not just a stop on their way to a destination (Booking.com, 2025).

Digital simplicity

As the world becomes overwhelmed by digital clutter, digital simplicity emerges as a refreshing trend (VML, 2025). Prioritizing intuitive interfaces and streamlined functionalities, people increasingly prefer quality over quantity. This minimalist approach allows users to focus on essential tasks, reducing cognitive overload. As technology grows more complex, digital simplicity serves as a reminder that less can indeed be more, offering people clarity in an increasingly chaotic and distracting digital landscape (Lee, 2021). It is therefore important that in a future airport experience, both digital and physical information overload is kept in mind and prevented.

Generational gap between tech-literates and non tech-literates

The widening generational gap between tech-literates and non tech-literates presents unique challenges and opportunities. Tech-savvy generations fluently navigate digital landscapes, while others struggle with basic tech functionalities. This divide affects communication, job opportunities, and access to information. Bridging this gap through education and empathy is crucial. By fostering intergenerational learning and understanding, we can ensure that technological progress benefits everyone, creating a more inclusive digital future for all.

Gen Z and Gen alpha growing up

As Generation Z and Generation Alpha mature, they are reshaping norms through their digital proficiency. Having been born into a technology-centric environment, they skillfully utilize digital platforms for self-expression and advocacy (Khan, 2024). Additionally, they are accustomed to using interactive technologies from a young age, and are likely to be highly adaptive and innovative. As they enter adulthood, they will enter the age where they will be the majority of KLM's customer base (Weltje, 2024).

Eco-conscious travel advice

Passengers increasingly demand from airlines to offer eco-conscious travel advice (Bennett, 2023). Airlines will have to guide passengers toward making responsible choices and travel more sustainably. From carbon offset programs to greener packing tips and destination awareness, personalized suggestions will empower travelers to reduce their environmental impact. This year, 93% of global travelers already say they want to make more sustainable travel choices (Booking.com, 2025). This shift reflects that a broader industry commitment is to responsible travel and passenger education in the face of climate change.

People demand human-to-human interaction

The demand for genuine human-to-human interaction is rising in an era dominated by digital communication. People crave authentic connections that transcend screens, seeking meaningful conversations and personal engagement (Euroanswer, 2025). This need reshapes customer service and social spaces as individuals prioritize empathy and understanding over automation (UserView, n.d.). Nothing replaces the warmth of personal interaction, which will be relevant when creating a departure hall, especially for a service-oriented airline such as KLM. It will be a challenge to keep the human touch in a process that is, for a significant part, automated.

Spatial constraints

Spatial tech

Spatial technology is changing how we interact with our environment (VML, 2024). Advanced sensors and augmented reality seamlessly integrate with everyday life, offering real-time data overlays on physical spaces. This immersive tech will bring the digital and physical worlds closer together and might change how people navigate through a space. Spatial tech can be especially interesting in a space like a departure hall, where many people, baggage and information streams come together.

Video-calling with personnel

In a context like a bank, video-calling with personnel has become integral to customer service and professional interactions (CustomerFirst, 2021). With advancements in communication through technology, these calls offer businesses the ability to provide personalized, immediate assistance, elevating customer satisfaction and operational efficiency. Singapore Changi Airport is already using video-calling between remote agents and passengers standing in the terminal

building (Wong, 2022).

Physical space as welcoming area instead of process area

Digitalization has transformed the physical spaces of businesses and institutions like banks, libraries, and hotels into welcoming areas rather than mere process hubs (Nederlandse Vereniging van Banken, n.d.). By prioritizing comfort and aesthetics, these have become spaces encouraging interaction and relaxation. This shift not only enhances user experience but also changes the role of the staff, as the reason for people to enter these spaces becomes different.

Spatial directing

The strategic use of space to guide individuals to their destinations will become more advanced, thanks to intelligent design and technology. Interactive signage and smart flooring systems recognize visitors (Scanalytics Inc., 2025) and provide personalized directions. This innovation minimizes confusion and congestion, enhancing the efficiency of public buildings and ensuring an intuitive journey for everyone, whether in malls, airports, or hospitals (Becerik-Gerber et al., 2022).

Finances & competitive position

High salaries for experienced agents, change in low-skilled jobs by introduction AI

In the future, AI will empower customer service agents by helping them answer complex questions quickly and accurately (ITIC, 2024). However, in some situations, the social skills and emotional intelligence of experienced agents will still be needed. Even though personal AI's understanding of people's emotions will improve (VML, 2024), human insight will remain essential for genuinely effective and compassionate customer service for tasks involving empathy, negotiation, or sensitive issues. Examples are passenger cancellations and re-bookings, where understanding passengers' emotions is immensely important.

Policy & regulations

EU is creating a wallet app for digital passports

The European Union is introducing the EU Digital Identity Wallet, a secure mobile app enabling citizens, residents, and businesses to prove their identity and manage digital documents across the EU (European Commission, 2025). According to the European Commission, by 2026, each member country will provide at least one wallet version, allowing users to store IDs, diplomas, and travel documents, and to access services while maintaining full control over their personal data. This will ease the passport- and visa check processes, as passengers will be able to have these done at home before entering the departure hall.

Conclusion

The creative trend analysis serves as a foundation for envisioning what the future will look like. By examining emerging trends and underlying patterns, it becomes possible to construct a substantiated and imaginative picture. This future image serves as a crucial step towards formulating a clear and insightful vision statement, one that is both forward-looking and grounded in evidence.

4.2 Future Vision

Next is establishing the destination for the roadmap; the future vision. This is a strategic reference point for a desired future, which imagines possible future experiences concretely. The future vision will function as the 'north star', and will provide inspiration for the design of the vision concept of the departure hall. The time scope for this is chosen to be 15 years, which aligns with the time in which KLM currently is planning for.

Figure 20 shows the Futures Cone, which is a visual framework that categorizes different types of futures: possible, plausible, probable, and preferable. It helps structure thinking about how the future may unfold and highlights that multiple futures can exist simultaneously. When creating a future vision statement, as described in Simonse's Design Roadmapping theory (2017), the preferable future is highlighted. This represents the desired direction an organization aims to work towards and shows that it is possible for KLM not just to be a player in the future, but also to shape the future by what it decides to do today.

The future vision that has been created for this project is as follows:

"We imagine a future where passengers travel confidently and effortlessly through the departure hall; assisted by tech, uplifted by people. Agents guide passengers when needed with a friendly but knowledgeable approach, like a general practitioner. This will enable us to create a departure hall where both agents and passengers seamlessly interact in an efficient yet personal way."

This statement embodies the four elements that were created by Simonse (2017) to define a good future vision; clarity, value drivers, an artifact and magnetism.

Clarity

To begin with, a future vision should be clear. This part clearly sets the scene and intention of the vision. It paints a specific and understandable picture of the desired future experience. The use of "**seamlessly**", "**efficient**" and "**personal**" makes the outcome tangible and relatable, enhancing clarity.

'Seamlessly', 'efficient' and 'personal' come from the found trend of haute-airport experiences. Passengers, especially the rich, will grow further in their expectations for having a seamless and personal airport experience. 'Efficient' also comes from the fact that more people are expected to fly from Schiphol in the future as the used aircraft will be bigger. This evokes the need for efficiency, as passengers already mention feeling overwhelmed in the departure hall by, among other things, the number of other passengers

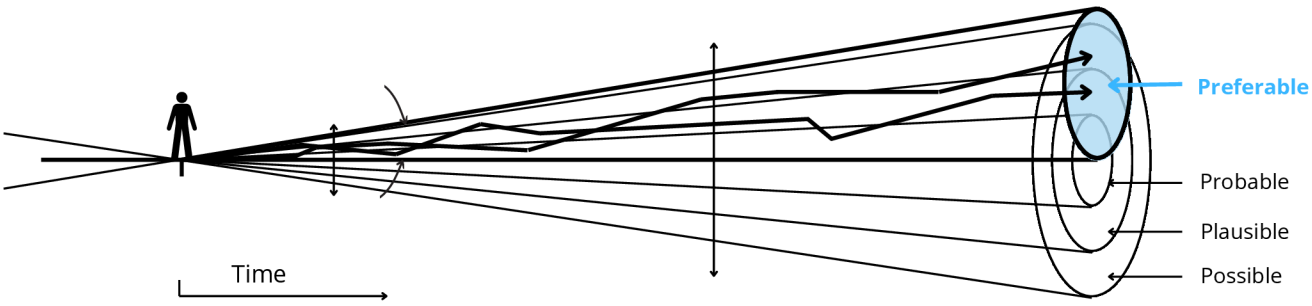


Figure 20: The Futures Cone (Voros, 2023).

there, as found in the research done in the Define Phase.

Value drivers

Value drivers communicate what makes the vision valuable. Words like "**friendly but knowledgeable**" show how agents should position themselves in relation to the passengers. "**Confidently and effortlessly**" are the words that reflect the strategic benefits driving the value for passengers. These are derived from the research in the Define Phase, where the challenges of passenger confidence and lack of information were identified.

Other versions of the future vision statement consisted of 'giving a gentle nudge' in describing the role of the agents. However, while it's emotionally appealing, "a gentle nudge" not a clear descriptor of the practical value an agent brings. Value drivers should be actionable and specific. A 'nudge' suggests a subtle prompt or hint, which downplays the knowledgeable, proactive role that agents actually need to play in the future, as it found not to be the case currently. Also, it might imply the agent is only there to encourage movement, not to provide real help or answers.

Artifact

The artifact of a future vision can be a metaphor or a visualization. For car manufacturers, often something tangible as a concept car is used. For now, the desired interaction is displayed as a metaphor. However later during this project a visualization of the vision concept will be created, which will also function as artifact for this future vision.

The metaphor of the "**general practitioner**" creates a compelling and inviting picture of the future that can inspire both internal and external stakeholders. Patients visit the GP when they can't take care of something themselves, and have trust that they will be helped specifically for their individual case, with their best interest in mind. This metaphor describes the desired interaction between passengers and agents that can be shaped in the design process.

Other metaphors considered were a 'guide dog leading its owner' and a 'coach guiding a team of athletes'. However, the complicated relationship between the power and responsibilities make these less suitable metaphors for a number of reasons, and need to be chosen carefully.

For the guide dog metaphor, there is an imbalance in power: This metaphor suggests complete dependency from the agent; the guide dog is entirely in charge of leading, while the owner follows with little active input. Also, passengers are portrayed as passive/ vulnerable: It implies that passengers are incapable of navigating alone, which undercuts the confidence and agency we're aiming to support. For the coach and team metaphor, there is a team vs individual context mismatch: A coach guides a team with structured roles and shared goals, but in an airport, each passenger has individual goals and timelines.

Magnetism

This is reflected by the use of the words "**assisted by tech, uplifted by people**". This part evokes emotion, aspiration, and desirability: a blend of technology and human interaction, personalized guidance, and a balance between efficiency and warmth. This sentence is suitable for a number of reasons. Firstly, it is emotionally balanced: "Assisted" is calm and non-threatening; "uplifted" adds a warm, empowering tone, which fits with the KLM brand values. Next, it conveys a clear partnership between technology and people; both contributing to a better journey. Also, it's rhythmically clean, easy to remember, and feels like a mantra or tagline. Lastly, it's tied to

reality: It’s inspiring but still credible in a practical airport context.

Other alternatives considered were “navigating with confidence, connecting with care”, “where personalized guidance meets human warmth” or “a seamless symphony of travel”. Why these are less suitable will be explained next, therefore not chosen as part of this future vision.

“Navigating with confidence, connecting with care” was not chosen as it focuses too much on the navigation. Also, it is too abstract: It doesn’t clearly indicate who provides the care, or what role technology plays. Next to that, it uses a weaker imagery: It is less tangible than "assisted by tech" or "uplifted by people", so it risks being less evocative, which is important for the future vision element of magnetism.

“Where personalized guidance meets human warmth” focuses well on the personalization, and adds the warmth, however it uses a repetitive type of sentiment: “Personalized guidance” and “human warmth” overlap in meaning; there's less contrast or tension than in "tech and people", which gives the chosen sentence more energy. Additionally, it is longer and not as memorable or slogan-like.

“A seamless symphony of travel” is very magnetizing and uses an alliteration, however it is less suitable as it’s too poetic and vague: While ‘symphony’ is beautiful, it’s also abstract and not directly suitable or visual in a travel context. It lacks human focus: It sounds more like a system design or brand ad than something grounded in people’s experiences. It also doesn’t clearly define roles (tech, people, passengers, agents).

4.3 Vision concept

A vison concept is created to demonstrate the future vision. Creating these are a way to explore new strategic ideas for innovation. As the departure hall is a complex environment where changes in one aspect effect the others, it is important to keep a clear overview of the elements that the concept will consist of, and how they will work together to solve the challenges that the current process causes. Therefore, the vison concept is divided into 5 elements; The passengers, the space, the tooling of the agents, the roles of the agents and the communication to the passengers.

Passengers

We start with the passengers. They are the main users, the biggest group of people that move through the departure hall and therefore are at the center of this concept. It will need to be determined which passengers should and should not pass through the departure hall, what their paths of movement will be and therefore influence what the floor map will look like. Increasing the confidence of the passenger is the most important design criterium, therefore it should be intuitive and easy for them to move through the departure hall.

Tooling

Agents will use tools in order to help passengers, where they access passenger booking information, answer questions regarding their specific case and makes changes to bookings. Currently, this is done with desktop computers at the check-in and Travel&Service desks (using programs like Altea CM and PSHelp), as well as tablets (using the Appy2Help app), as explained in chapter 2.2.1. The current set-up of tools proves to contribute to the current challenge of lack of information, as was found in the Discover Phase.

Space

Next comes the division of the space in the departure hall. Based on the history of the building, and after seeing the timeline of future terminal plans, it is assumed that the departure hall building will stay roughly the same in 15 years. Additionally, it is expected for this departure hall to remain a KLM-exclusive hall, as the airline has been and will most likely remain the airline with the most ground and air operations at Schiphol Airport.

Agents

Currently, there are 8 roles that PSAs can cover. Some of these are perceived as 'boring', which leads to dissatisfaction by agents, which subsequently leads to annoyance by passengers. Changes in the departure hall processes will influence the tasks and responsibilities of agents. Some will become redundant, and executing some tasks will take a different form. The roles of agents will need to be re-evaluated, and change accordingly.

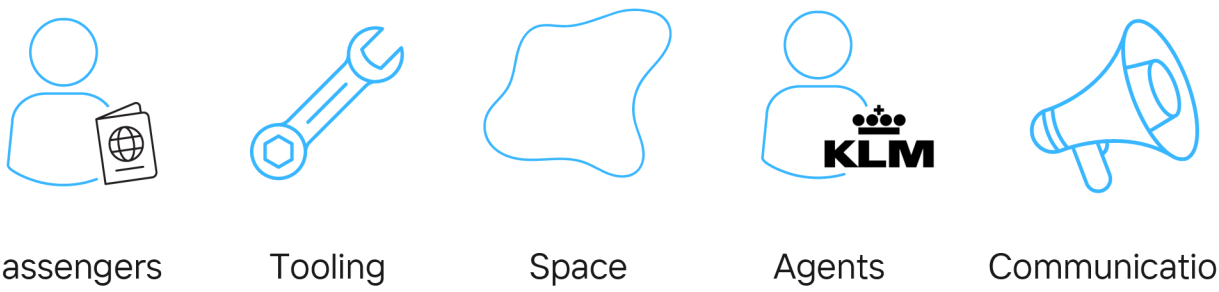


Figure 21: The 5 elements of the vision concept.

Communication

Before and during their stay in the departure hall, communication is key, especially for passengers. Lack of information and not knowing what to expect are proven to be challenges causing discomfort, therefore an important aspect of the concept. In 15 years, the devices on which passengers receive the information regarding their trip can be very different from the current. But is crucial that their expectations are pro-actively managed, whatever device they might use.

4.4 Concept development and ideation

Passengers

To begin, the essential steps passengers will need to take 15 years from now were examined. Based on current trends, it is anticipated that check-in and passport or visa verification by airlines will still be required. This expectation is driven by the increasing strictness of security measures in aviation. However, these steps will be completed digitally before arriving at the airport, and potentially even automatically. As a result, passengers will only need to interact with an agent if they are unable to obtain a boarding pass and require in-person approval. Note that the at-home part of the check-in process will not be part of the concept, as this falls out of scope.

In 15 years, the passengers will have four possible passenger flows, as shown in Figure 22. It will be important for passengers to be informed about the path they personally need to follow, as this is one of the challenges that passengers currently face, as was found in the Define Phase. This will be further elaborated on in the Communications section of this subchapter. The four paths are listed below, with the start of the passenger journey being upon their entrance into the departure hall, and the end at security:

- Go directly to security
- Go past an agent to check in
- Go past an agent to check in, then baggage drop-off point
- Go to the baggage drop-off point

The following list is provided by KLM (Kumar, 2025), and outlines the special cases shaped by rules and regulations beyond KLM's control.

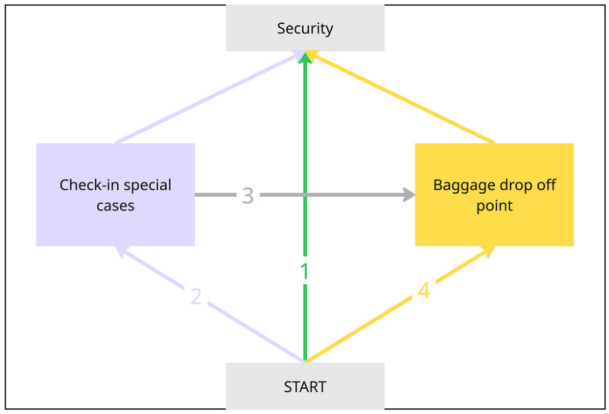


Figure 22. Future passenger flow chart.

These external constraints set by governments, airport authorities, or international organisations must be accounted for in the design, as they limit the flexibility to make changes or improvements within certain parts of the passenger journey. They are the special cases for which a passenger still absolutely needs to go past an agent:

- Wheelchair / visually impaired / disabled
- Pet / service animal in cabin
- "Inadmissible passenger information"
- Unaccompanied minor
- Weapons, firearms or ammunition
- Bulky cabin baggage
- Seaman (military / staff / standby)
- Hand luggage can be taken as hold
- AV (extra security check is needed)

A dedicated space is needed to handle these special cases, where agents can be supported by technology to carry out additional checks and tasks. The design of this space will be shaped by the tools and systems agents use to manage these situations effectively. To inspire for the layout of the space, the passenger flow chart was put over a floor map of the departure hall building. The result is shown in Figure 23.

Design considerations

Currently the largest group of passengers already goes to security directly. According to KLM data analyst Kumar (2025), roughly around 30.000 passengers enter Departure

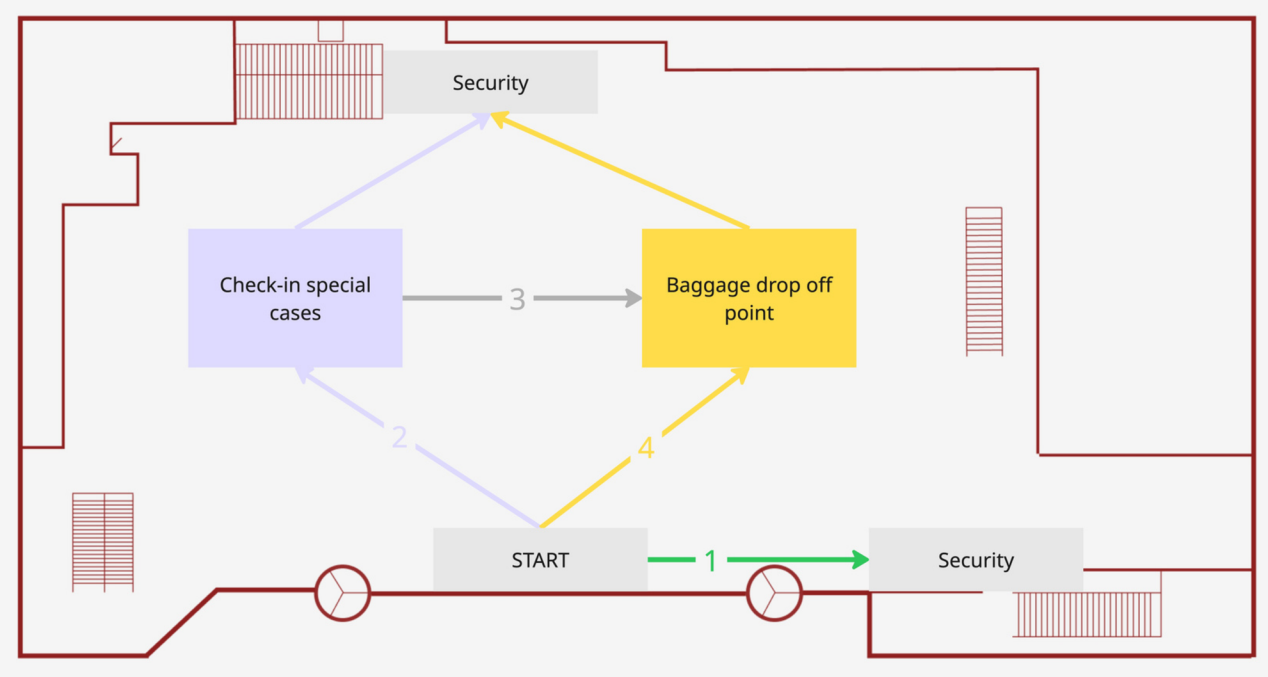


Figure 23: Floor map with passenger flow chart.

Hall 2 per day. Out of those, 20.000 straight away go to security, and in the remaining 10.000, around 6.000 goes to a check-in desk and 4.000 goes to an SSDOP to check in their baggage (Kumar, 2025). These figures highlight a clear shift toward streamlined, self-guided travel. As most passengers no longer require face-to-face interaction for check-in, the layout of the departure hall should reflect this behavioral trend. More space can be allocated to efficient flow toward security, while check-in areas can be more compact and service-oriented; the departure hall will be focused primarily on assisting the minority with special cases.

Tooling

Multiple tools are considered, to be used by agents to assist passengers with special cases in receiving their boarding passes. These tool concepts can be standalone or combined to achieve interactions that solve the passenger and agent challenges as well as possible.

Design considerations

When choosing one or multiple tools, there are a few things to consider. The tools can be either embedded in the environment (such as smart floors, walls and projector touchscreens), worn on the body (smart watches, smart glasses and AI pins) or held in hand (tablets). Each comes with its own advantages and limitations related to visibility, privacy, mobility, and ease of interaction. Also, KLM department D&T Ground is currently creating a new digital tool for the agents to use in the future, where they will be empowered with having the information regarding the check in displayed in a different way. Part of that is giving a clearer checklist for each passenger when they have not been able to at home yet. This program will be run on the tool that the agents will use in the future.

The 8 tools that are considered are:

- Concept T1: AI Pin
- Concept T2: Smart wall
- Concept T3: Projected touchscreen on the table
- Concept T4: Smart floor
- Concept T5: Earbuds
- Concept T6: Smart glasses
- Concept T7: Smart watch
- Concept T8, keep the current tool: Tablets

They each are displayed in Appendix E, along with their advantages and disadvantages and example images.

Name

The name of a brand shapes people's perception and compliance towards it (Keller et al., 2008), and carries personality traits that impact user engagement and trust (Aaker, 1997). Names shape expectations and influence both passenger and agent behavior, therefore the name of the concept should be chosen carefully. At the core of the concept lies the dedicated space where passengers with special cases receive assistance. These are the passengers that face have unique booking situations, or experience travel disruptions. The key words here are help and support, but mostly people need to feel cared for.

The name that was chosen for this project is "**KLM Care Center**", with the tools called "Care Tables" and the agents working there called "Care Agents". The fact that this name spans over all parts of the concept is important, as it shows brand consistency and makes it easy for passengers to understand that they are part of the same concept. Other alternatives considered were 'Sky Desk', 'Blue Help' and 'Passenger Support Lounge'.

'Sky Desk' lacks clarity about its purpose. It could refer to anything, making it less intuitive for passengers seeking personal help or support. Also, it has the name "desk" in it, which could make people think of the old check-in desks. 'Blue Help' references KLM's brand color, however the term feels a bit cold and generic. It doesn't convey emotional warmth or the level of care that are intended for the experience. 'Passenger Support Lounge' sounds very formal and passive. The word "lounge" also could imply waiting rather than active assistance, which could mislead expectations.

"KLM Care Center" was chosen because it has a good balance between brand recognition, warmth, and clarity of the purpose: "Care" embodies a human, empathetic tone suggesting support, attention, and kindness beyond basic assistance. "Center" implies a central and organized place of service.

Space

When looking at the space, there are multiple components to take into account; the building, the needed components, layout and the aesthetic of the hall. The building is assumed to stay relatively the same in 15 years, and is mostly out of control for KLM, as Schiphol Airport is the owner here. Therefore the location of the entrances, stairs to security, oversized baggage drop-off point and toilets will remain the same. However, note that KLM is an important stakeholder for Schiphol too; it is in Schiphol's interest that operations by airlines are run as smoothly as possible, in order to remain happy passengers and efficient, delay-free processes. Therefore, KLM and other airlines will have a voice when it comes to big changes; there is a dependency from both sides. This is especially the case as KLM is the only operating airline in Departures 2.

Design considerations

When designing the departure hall, there are choices to be made in terms of the areas in it. The areas/components needed in the space are as follows, where the inclusion/exclusion for the two components labeled "potentially" will be evaluated and decided upon later in the concept development phase:

- *Tools and/or desks.*

The special cases for the passengers still need to be handled by the agents. Digital tools will be essential, and there needs to be room for passengers and agents to sit together, talk and/or exchange information regarding the passenger's individual booking.

- *Somewhere for physical tools to be stored*

Agents will still need things like measurement

tools and personal items like jackets, therefore need an 'agent help' place. Potential portable tools may require charging, which can also be done at this location.

- *Self-Service Bag Drop-Off*

However far into the future, passengers are expected to still take baggage with them on their trip. The assumption is made that in 15 years, passengers will be able to hand in their baggage not only in a departure hall, but also at other locations such as airport hotels and in city centers, like at train stations. This will lessen the amount of bag drop capacity needed in the departure hall. A reason why the implementation is currently still hindered, is that these drop-off locations will become vulnerable for misuse.

- *Baggage system entrances*

There are currently four locations where checked baggage enters the floor below, where the baggage system is located. People are not able to enter here. Relocating the point(s) where baggage is transferred underground would require modifications to the floor below, where the baggage handling system is located. This would introduce additional challenges and involve stakeholders not currently considered within the project's scope. An alternative approach is raising the floor to create space for a layer of conveyor belts between the baggage machines and the system below. However, this would reduce the ceiling height and make the area feel less open. As a result, the existing 'entry points' will remain unchanged in these concepts, but some of them might be closed off due to them becoming redundant.

- *Potentially: A location for the 'free activities' found during the crowd management study in the Discover Phase*

An important consideration for the decision if there should be a specific location for these 'free activities', is questioning what the relevance is of such an area. Currently, people use the area between the entrance of the departure hall and the check-in desks for this, even though they are blocking other passengers from passing through it there. Passengers did not mention specifically having issues with this currently, but at busy moments like holidays this fact can cause delays and annoyance. This component can therefore be treated as potential.

- *Potentially: Shielding gates where only KLM passengers can pass through*

Important considerations for the decision if there should be shielding gates in the departure hall, are the amount of people wanted in these areas and the safety requirements for these areas. The shielding gates can either;

  - Not exist
  - Seal off part of the departure hall
  - Seal off the entire departure hall

These shields will ensure that only the necessary passengers will be able to enter that area, and prevent unnecessary congestion. The baggage drop area currently is only accessible to people that have a boarding pass. In the case that shielding gates are completely removed from the departure hall, this means that anyone can enter and put objects in the machines, which could potentially cause a security threat. However, the severance and likelihood that something could happen here should be further researched, which falls out of scope for this project. It's also important to notice that shielding gates can block people's view and give a narrow appearance. A possible solution for this could be for the shielding gates to look transparent and not span the full height of the departure hall.

The layout will be created by ideating on the arrangement of areas and components. A broad overview of the layout ideas is given in Appendix F. Three different concepts were chosen from these ideas to be evaluated further. In each concept three main areas are indicated, each with its own color, to help understand the layouts. The yellow area is for baggage drop-off, where the SSDOP machines are placed. The green area is allocated for the

'free activities.' The pink area is the KLM Care Center, where passengers with 'special cases' will be assisted in all checks and tasks required before receiving their boarding passes, as well as rebookings and cancellations.

Three concepts were created for the layout of the space. They each are displayed in Appendix G, along with their advantages and disadvantages and example images.

Agents

As was found in the Discover Phase, there are currently eight distinct passenger service agent roles operating within the departure hall (see Table 2). Each role addresses specific tasks within the check-in, guidance, and support processes. However, in the envisioned future scenario, the need for several of these roles will diminish.

Four of the current roles are likely to become redundant, as their primary tasks are either automated or integrated into broader support systems. These include tasks that are repetitive, low in complexity, or heavily reliant on manual input such as document scanning, basic wayfinding, or manual queue management. The remaining tasks are the following:

- Help passengers retrieve boarding pass & special cases.
- Assist passengers in using the baggage drop-off machines.
- Answer any questions form passengers.
- More experienced: Help passengers rebook their flights, help with cancellations and delays.

These tasks will be redistributed over the new agent roles.

Design considerations

An important difference between the roles is not only just the tasks that they carry out, but also the amount of experience that the agents have. More experienced agents have more experience with the social aspect of handling passengers. Passengers with cancellation or delay have a higher chance of being in an emotional state, and need an appropriate way of handling by the agent. Therefore, currently only a specific group of agents is selected to become 'Ticket agent', which occupies the Travel & Service desk where these cases are handled. It is also important to keep in mind that tasks like handling the 'special cases' will

Table 2: Current PSA roles and their tasks.

Role of agent	Main responsibility
Kiosk agent	Assist passengers in using the kiosk.
Check-in agent	Help passengers retrieve boarding pass & special cases.
SSDOP agent	Assist passengers in using the baggage drop-off machines.
Host/hostess	Filter passengers and determine which check-in desk to go to
FlowCo	Send passengers to one of two lines so that the length of the lines stays equal in size ('human barrier').
Floorwalker	Answer any questions from passengers ('human direction giver')
Passport check (cute car)	Perform an extra passport check.
More experienced: Ticketing agent	Help passengers rebook their flights, help with delays and cancellations.

not only be transferred to the new agent role, but will also look different. This is based on the tooling that the agent will use and the layout of the departure hall. Also, there might be new roles that come up with this new setting, although the overarching task of 'helping passengers becoming flight-ready' will stay the same.

In the vision concept, the four remaining tasks can be distributed over two or three new 'tiers' of agents, where one of them will be responsible for the 'special cases', and one (more experienced) will be responsible for cancellations and delays. One other tier might be needed to oversee the baggage drop area, and make sure that everything goes smoothly here. However, the necessity of this will be influenced by how user-friendly, intuitive and therefore mistake-free the SSDOP machines at that moment will be. In this case, it is assumed that new baggage drop machines will be installed in 15 years. Although this forms a basis for the envisioned future, a detailed investigation falls beyond the scope of this thesis.

Communication

To make sure passengers become more confident, it is essential that it is communicated well what they can expect and what their journey on the airport will look like. Therefore, an overview was created of the possible paths that the passenger could walk, and what information the KLM application would need to provide. This was based on the passenger flow chart shown in Figure 23. The three routes reflect the level of assistance required: from a straightforward self-service path (green) to more complex flows involving special support or additional steps (purple). More high-fidelity user interfaces were later created, but a simplified version of the possible routes and what the application could look like is visualized in Figure 24.

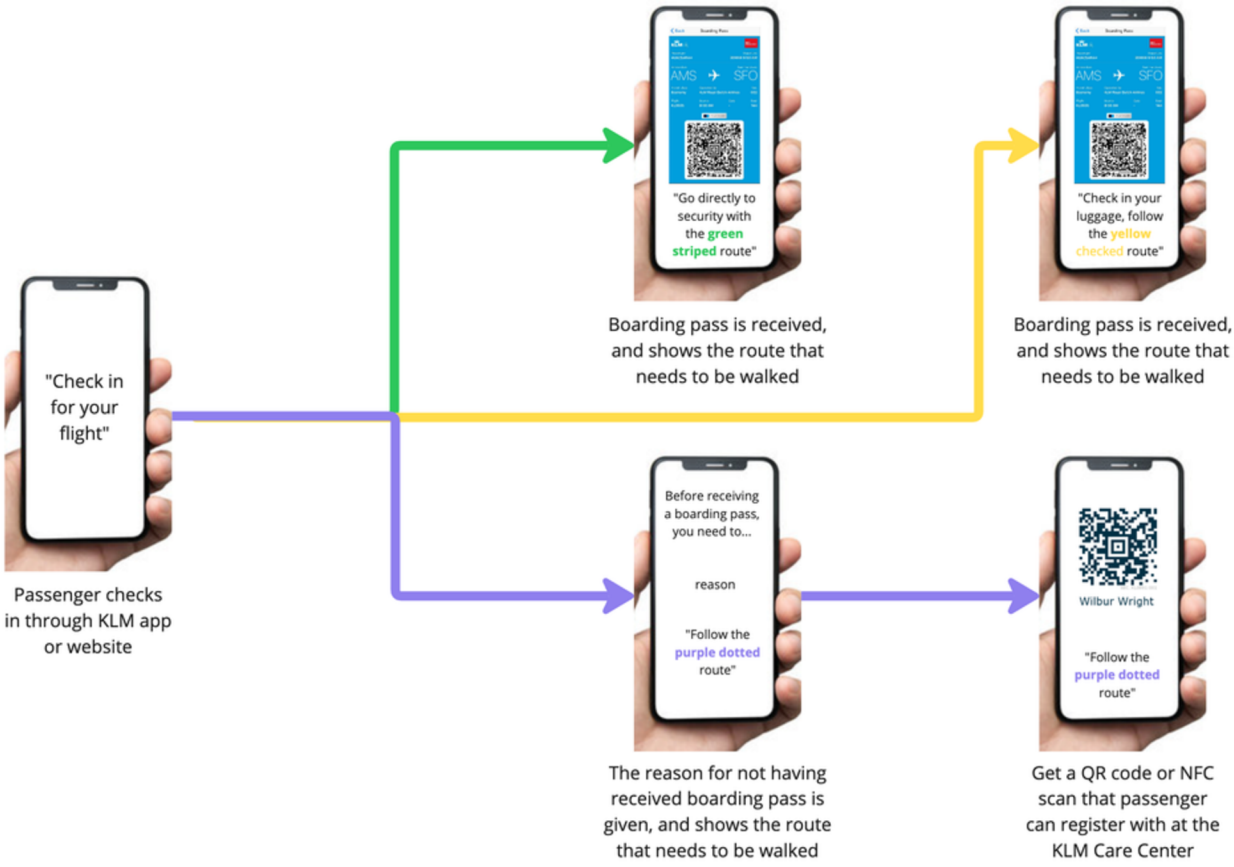


Figure 24: Simplified version of passenger paths and digital communication.

Design considerations

The example in Figure 26 is shown on an iPhone device, but this will most likely look different in 15 years. It is important that the intended information is communicated on whatever personal device the passenger uses at that moment. Based on the devices identified through trend research, it is recommended that KLM considers developing a comparable application or communication method for smartphones, smartwatches, smart glasses, and AI Pins.

Additionally, the assumption is made that passengers still will need to check-in and receive a boarding pass online before entering the airport. Some things that currently hinder the implementation of automated check-in are that this will eliminate a step in which passengers can buy ancillary products and the possibility of an increase in unexpected no-show passengers. Whether this will still be developed and changed in the future will need to be further investigated, but is out of scope for this thesis.

In the current overview, the choice is made to have three colors indicate the individual path that passengers need to make (see Figure 25). In order to make this concept also suitable for passengers with color vision deficiency (CVD), the colors will also need to have a pattern or object that resembles the path. Therefore, options like a “green striped”, “purple dotted” or “yellow checked” route are explored, as well as a “windmill”, “wooden shoe” or “tulip” route.

Conclusion

After exploring and developing the concepts outlined in the previous subchapter, it became evident that the various elements are closely connected and influence each other. Instead of selecting a single concept in isolation, the that the strength of the solution lies in the combination of multiple elements; The strength is in the sum of its parts. The interdependence between the physical setting, the role of the agent, and the tools used meant that each design decision directly impacted the others.

This led to the development of one cohesive vision concept, which will be introduced in the following subchapter. This concept forms the foundation for a prototype that will be tested with real passengers. Insights from this test will inform the next phase, in which the concept will be further refined and iterated based on observed interactions and feedback.

Figure 25: Examples of a striped path on the ground (Saunders, 2020).

4.5 Initial vision concept

Passengers

The four identified paths that passengers will follow have been chosen to be leading in the vision concept. For each path, a most likely scenario will be:

1. **Go directly to security.** A passenger has received a boarding pass, and has no checked luggage. This passenger can enter the departure hall, follows the 'green path' and proceeds to security directly without interacting with a Care Agent. With their boarding pass, they have access to the security entrance.
2. **Go past an agent to check in.** A passenger has one of the special cases. For example, a passenger flies with a pet, needs an extra check at the airport and therefore has not been able to receive a boarding pass at home. At online check-in, the reason the boarding pass has not been given yet is communicated, and a checklist is provided with what documentation is needed and what the criteria for the kennel/bag are. When they get to the airport, they follow the 'purple path,' enter the KLM Care Center with the KLM app, and get help from a Care Agent. After this is done, they proceed to security.
3. **Go past an agent to check in, then baggage drop-off point.** A passenger has not received a boarding pass and has checked luggage. This passenger follows all the steps of scenario 2, and goes to the baggage drop-off area afterwards. After dropping off the checked luggage, the passenger proceeds to security.
4. **Go to the baggage drop-off point.** A passenger has received a boarding pass, and has checked luggage. This passenger can enter the departure hall and follows the 'yellow path' to the baggage drop-off area. With their boarding pass, they have access to that area. After dropping off their baggage, they proceed to security without interacting with a Care Agent.

The flow chart in Figure 26 shows the path that will be followed from a passenger perspective.

Tooling

Agents will make use of a combination of projector touchscreens on tables (concept T3), called "Care Tables" and earbuds (concept T5). A possible scenario for how these tools will be used will be given in the Agent section of this subchapter. The Care Tables will have the following functionalities:

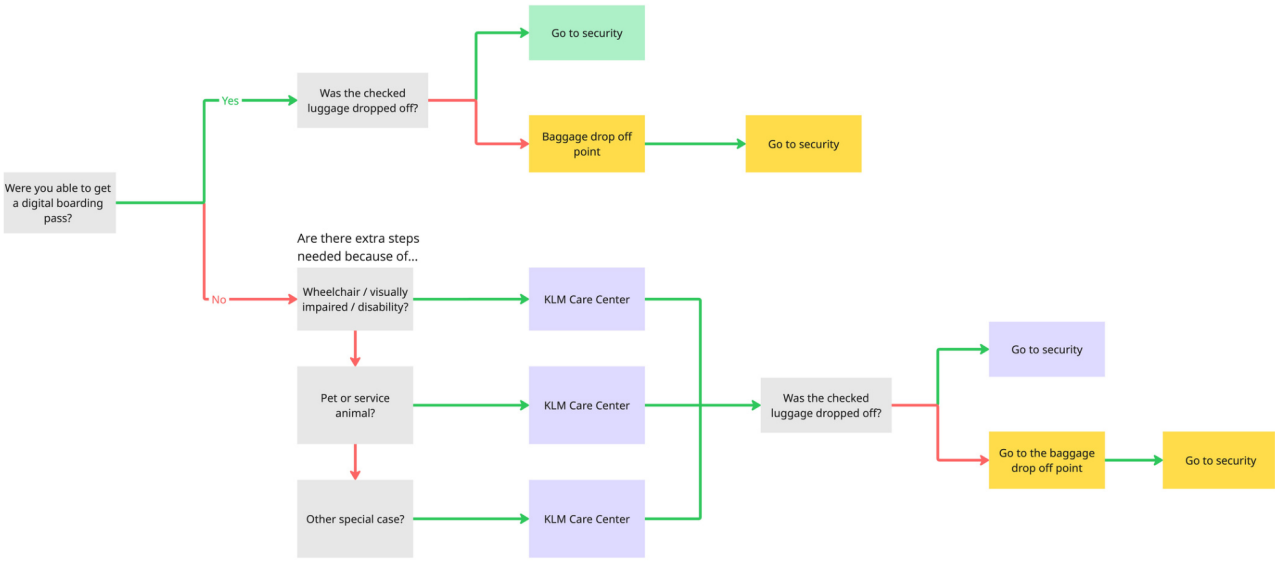


Figure 26: Passenger flow chart.

- NFC scanners where passengers can 'register' their presence at that spot, on which their personal booking information, special case and preferred language are provided. Agents can scan their KLM pass here, to prove their identity and gain the right access to the application.
- Projector touchscreens on which passengers and agents can do the tasks needed to finish the check-in process.
- Spots on the tables where passenger devices can be charged.

The tables will be large, to fit about 8 seats and have a simple, clear design. A visual moodboard can be seen in Figure 27.

Figure 27: Visual moodboard of the Care Tables.

The earbuds will have the following functionalities:

- Providing agents with the location of the next passenger on the digital waiting list.
- Providing agents with the special case for the next passenger in advance.
- An option to ask the AI tool PSHelp for information regarding specific booking requirements.
- A live language translator for passengers who do not speak Dutch or English.

The fact that passengers can register themselves at these Care Tables fit with the changing role of the passenger; they check in and get ready themselves at home, and will only be dependent of agents at tasks where they are obliged to be checked. Passengers and agents can both watch the screen together, showing transparency. This corresponds with the key differentiators of **Meaningful Interactions** and **Peace of Mind**.

Space

The chosen layout for the departure hall is mostly based on concept S2, and is shown in Figure 28. This choice has been made by comparing the advantages and disadvantages of all three concepts, and solving the disadvantages by improving the concept.

In the concept, the baggage drop area and KLM Care Center are on the left, which are easy to seal off. In the top right of the departure hall, people will have to be able to walk to the Schiphol Assistance and Schiphol Oversized Baggage desks. This is not the case on the left side of the hall, which makes it suitable for a sealed off area. Only KLM passengers will be able to enter, which will prevent unnecessary congestion. There is also a dedicated area for people to do 'free activities'.

The disadvantages that concept S2 had, are solved with the following added properties:

- There are specific Care Tables for **SkyPriority** passengers – they get assisted first. This is important as KLM's loyalty program Flying Blue is an important aspect of the "brand resonance", which is a brand strength as was found in the brand analysis in the Discover Phase.
- People that **assist** passengers get their own digital registration beforehand, and can access the KLM Care Center area. Currently, these assistants are also allowed in the check-in and baggage drop-off areas, and are important to be there as they provide emotional support to vulnerable passengers before going through security. Examples of this are passengers in wheelchairs, unaccompanied minors, and visually impaired and disabled passengers.

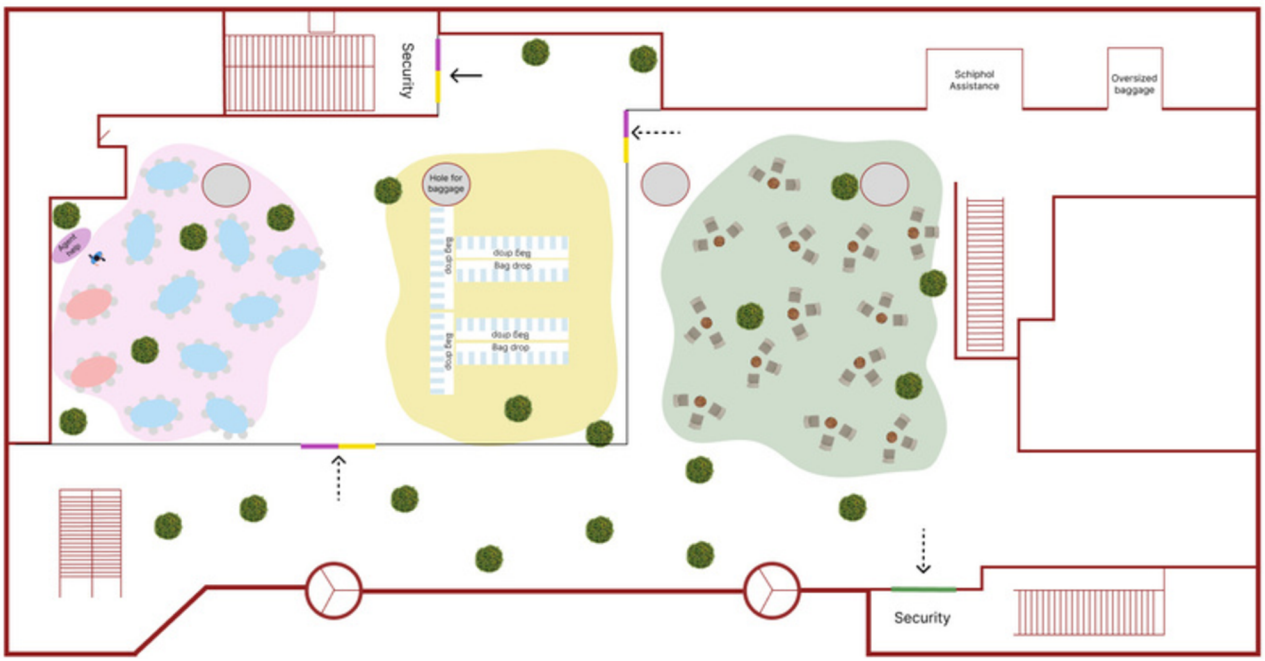


Figure 28: Layout of the vision concept..

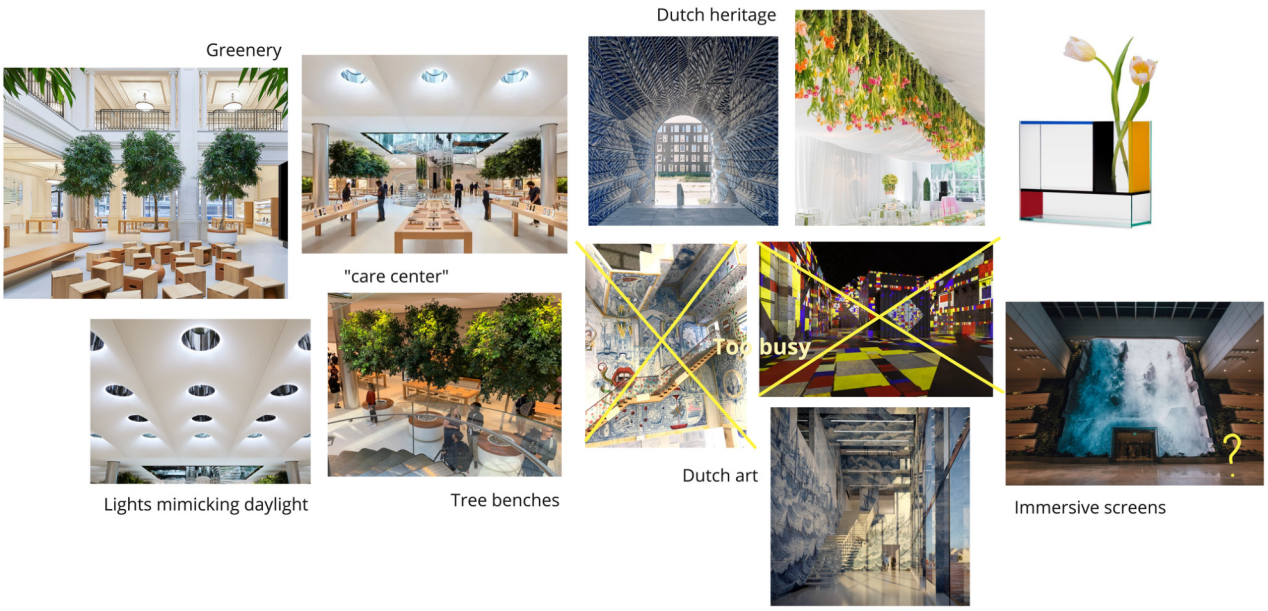


Figure 29: Visual moodboard of the future departure hall.

A visual moodboard of the departure hall is shown in Figure 29. The departure hall should use natural materials and as much natural-looking lighting as possible. This could be done by having sensors outside of the departure hall to track the lighting. Additionally, the departure hall should show subtle elements of Dutch heritage. The use of Delft Blue, tulips, and design elements by artists like Mondriaan are examples of this. These elements should not be too present and busy so as not to distract people or make it overwhelming.

Immersive screens could be placed but will not be used as a tool for the agents. It could merely function as an art installation or place for passenger engagement.

To compare the check-in and bag drop capacities of the current and future systems, Table 3 has been created. As the desks are replaced with tables and the bag-drop activities shift to one specific area instead of being at every desk, the space is much better used. The 'check-in' capacity has more than

doubled, which fits with the expected growth in number of passengers and the expected decrease of passengers that will unnecessarily enter the departure hall. The total bag drop capacity decreases by about 10%. However, it is assumed that part of the passengers' baggage will be able to enter the baggage system in other areas than the departure hall, like airport hotels and city centers. Moreover, currently about 75% of baggage drop locations are part of a check-in desk and are not in use during the time that any other activity is being performed at the desk (e.g., getting a boarding pass, performing a document check, handling a 'special case').

Table 3: Capacity comparison table (where currently every check-in desk has a bag drop belt).

	Current system	KLM Care Center
Check-in units	39	88
SSDOPs	12	46
Total bag drop points	51	46

Agents

All agents currently receive the same training and are assigned to different positions for each working shift, so this will need to change. As passengers will only need to be assisted with 'special cases' and rebookings/ cancellations, agents will require flexibility, empathy, and problem-solving skills. To reflect this shift, the current four remaining tasks will be distributed across two distinct roles, each tailored to different types of passenger needs.
Tier 1 Care Agents will focus on managing the check-in process for passengers with 'special cases'. Their primary role is to ensure that these passengers complete their pre-boarding checks efficiently while still receiving personal attention and not feeling 'rushed'.

Scenario Tier 1 Care Agent
A passenger takes a seat at the Care Table, and scans their device. They enter a digital waiting line. The Care Agents wear earbuds, in which they hear which passenger is next and what the special case is. They hear; "Go to passenger 'B3' with a Pet in cabin". Each table has a letter and each seat has a number. When agents need another physical tool (like measurement tools), they can get it in the 'agent help' closet. Agents scan their KLM staff card when they get to the table, in order to get access to the check-in program. In the program, the needed 'checklist' opens based on the special case. When an agent gets a specific question they do not know the answer to, they can press their earbuds and ask the PSHelp AI. After the checklist is completed, the passenger receives their digital boarding pass and proceeds to the security or baggage drop-off area.

Tier 2 Care Agents will handle the more emotionally complex and socially sensitive situations, such as rebookings, delays, missed connections, and cancellations. These agents are trained not only in practical problem-solving but also have experience in handling emotional situations, as their role has a high chance of having to manage passenger stress, disappointment, or confusion. They act as calm, empathetic points of contact, capable of providing both information and reassurance during flight disruptions.

Scenario Tier 2 Care Agent
A passenger takes a seat at the Care Table, and scans their device. They enter a digital waiting line. The Care Agents wear earbuds, in which they hear which passenger is next and what their booking situation is. They hear, "Go to passenger 'D2' with a canceled flight". Agents scan their KLM staff card when they get to the table, in order to get access to the booking program. When the passenger is not able to rebook themselves, the agent will look at other options and handle the situation to the best of their ability. The passenger receives their digital boarding pass and

proceeds to the security or baggage drop-off area.

Together, these two tiers form a flexible support system that responds to different layers of passenger needs. While a Tier 1 Care Agent makes sure the necessary steps in the check-in process are completed, a Tier 2 Care Agent focuses on maintaining emotional well-being and trust during more challenging experiences.

Communication

In the future vision of the departure hall, communication begins well before the passenger arrives at the airport. By making use of personal devices such as smartphones, smartwatches, or AI Pins, passengers will receive tailored information that supports a seamless and confident travel experience. Three high-fidelity model screens have been created, based on the files of the current KLM mobile application. In 15 years, the user interface will certainly look different, but the same information needs to be provided to the passenger. Three example screens have been developed to illustrate how this information may be communicated, based on the layout of the current KLM app (see Figure 30).

When passenger has a booking with one of the special cases, a check-list will be provided for the passenger to prepare themselves. This can for example be a list of requirements for animal kennel dimensions, or the right papers to be signed by the guardian of an unaccompanied minor. Note that for the 'security' and 'baggage drop-off' paths, a button to the boarding pass is provided. In the 'KLM Care Center' path, a registration code (QR or NFC) will be provided so the passenger can access the area and register at a Care Table. Next to that, an airport map will be provided showing the passenger how to reach Departure Hall 2, as well as a floor map of the hall itself.

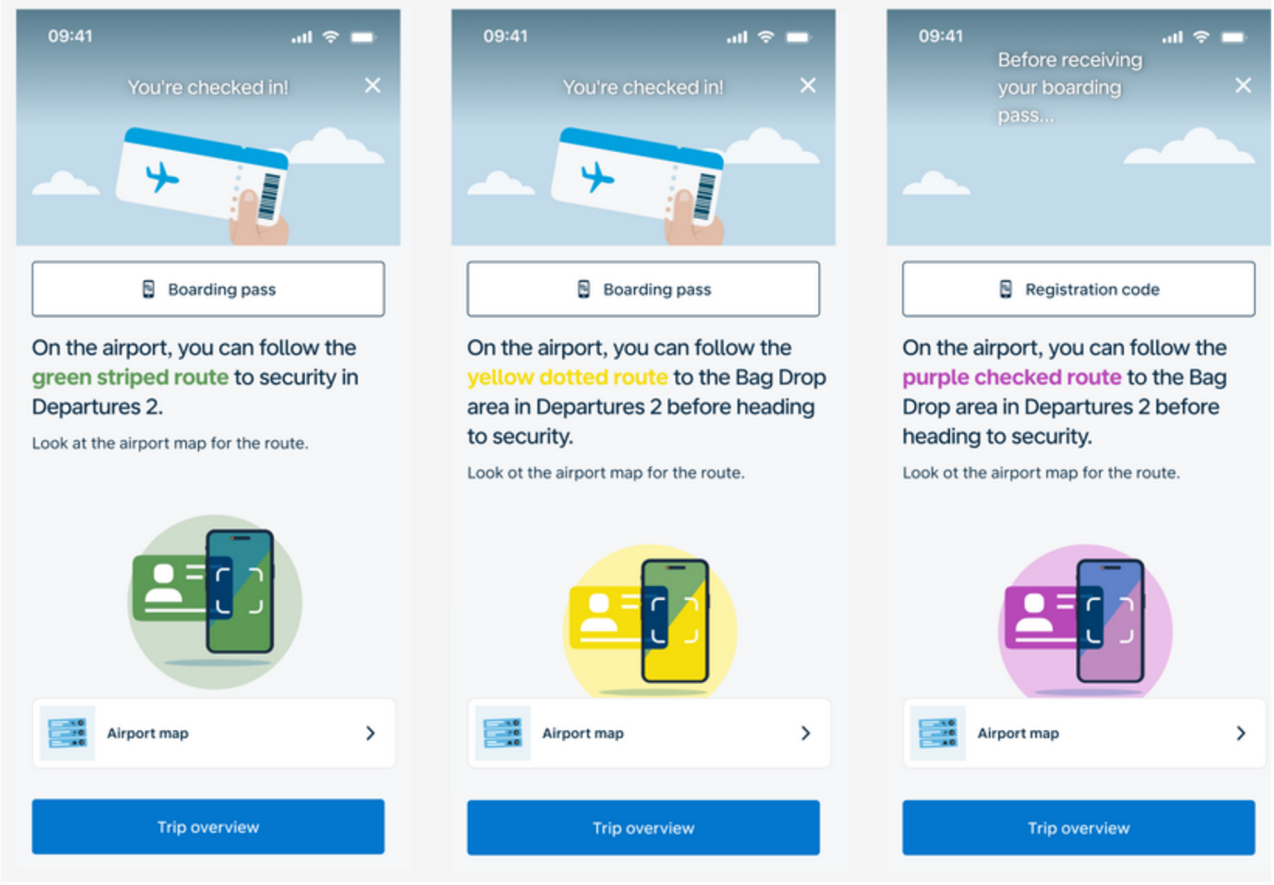


Figure 30: Three high-fidelity screens for the KLM application.

4.6 Assumptions

To develop a concept for 15 years into the future, it is essential to make underlying assumptions explicit. Assumptions clarify the reasoning behind decisions, strengthen the credibility of the concept, and provide a foundation for discussion and further development. In order for the concept to work, KLM will have to focus on making these assumptions reality, or find another way to work around these.The following list is partly based on the creative trend analysis and outlines the assumptions guiding this work. All of these assumptions are mentioned earlier in this chapter in their relevant sections, however are listed here for clarity:

- **Dropping off checked baggage happens both in the hall and in city centers (train stations) and airport hotels.**
- **In 15 years, there will be new self-service baggage drop-off (SSDOP) machines that are narrower than the current. Therefore, less space is needed.**

These two are important because in the vision concept, the maximum baggage drop-off capacity will decrease with about 10% (5 spots). A way to work around this is to make the 'free area' smaller, so there is more space for baggage drop-off machines.

- **Boarding pass retrieval/check-in still happens at home (but can also be fixed by agents on-airport).**
- **Travel document/passport checks for visas still happen at home (but can also be fixed by agents on-airport).**

These two are currently already true, but are important because the vision concept is based on the fact that only special cases will be handled on-airport. About 80% of passengers already checks in at home, and at-home passport checks are recently new, however it is assumed that this will only grow.

- **The building will stay roughly the same.**
- **Schiphol accepts significant layout changes in the departure hall.**

These two are important because if one of these will not be true, the entire vision concept will be impossible or blocked from becoming a reality. Schiphol is an important external stakeholder, and as 'owner' of the departure hall the principal decision-maker for the area. KLM will need to work closely with Schiphol and get approval in order to make this concept a reality.

4.7 An immersive prototype

To explore the feasibility and user experience of the future departure hall vision concept, a prototype was developed using 3D modeling technology (see Figure 31). This prototype aimed to visualize the spatial layout, test key design features, and enable early-stage user interaction in an immersive digital environment. By creating a virtual representation of the concept, it became possible to evaluate how passengers might navigate and perceive the space and therewith iterate on the vision concept.

The prototype was created using the professional real-time visualization tool Twinmotion from Unreal Engine, chosen for its ability to produce detailed architectural models and the possibility of connecting with a virtual reality (VR) headset. The model included all major components of the future departure hall, such as the KLM Care Center area, baggage drop-off machines, wayfinding lines and architectural elements. Once the 3D environment was completed, a Meta Quest 2 VR Headset was connected to allow full-scale, immersive walkthroughs. Images of the finished prototype can be found in Appendix H.

Design considerations

Unfortunately, a few things are impossible to implement in this prototype. Firstly, it is not possible for a user to hold a device with information on a screen while being immersed in the prototype, so this will have to be provided in another way. Examples are a paper version of the screen or a digital version on a separate device from the VR set, such as a smartphone. Additionally, it is not possible to project a screen on the Care Tables in the simulation. Lastly, although there are people in the simulation, it is not possible to interact or have conversations with them. Therefore there will not be an active role for agents in the prototype. And lastly, it is not possible to pattern the lines on the floor; they only can have one solid color. This aspect must be considered in the evaluation, but it does not reduce the relevance of the findings.

The digital prototype successfully translated the conceptual design into an interactive, navigable virtual space. This approach simulated the real-world passenger movement and interaction within the concept space. The VR experience allows participants to experience the environment from a first-person perspective as if they were walking through it in real life.

Conclusion

By choosing one combined concept and prototyping it, the concept can be validated. The prototype will be tested with the two most important users, passengers and Passenger Service Agents.

Figure 31: The 3D prototype of the vision concept.

5

Deliver

Image source: Created by author.

The Deliver Phase is centered on finalizing and implementing the solution developed in the previous phase. It covers the evaluation of the impact of the concept and ensuring it aligns with user needs and strategic goals. This phase also includes the creation of a Design Roadmap and implementation strategy.

5.1 Passenger validation

Introduction

After finishing the development of the VR prototype, a user test was created to evaluate the concept of the future departure hall from a passenger perspective. The aim was to assess the usability, clarity, and emotional responses on the new departure hall process, as well as to identify potential improvements. Testing the concept at this stage allowed for user-centered insights to be incorporated into the design before further refining it.

Method

Participants were invited to interact with the 3D prototype using a VR headset. The test environment provided was a full-scale walkthrough of the departure hall, which gave users the opportunity to experience the space as they would in real life. The testing sessions were guided by a test plan, which included semi-structured pre- and post-test interview questions, and specific tasks and scenarios were given to observe behavior, decision-making, and navigation.

Participants were asked to perform tasks such as navigating to security zones, identifying and following their individual paths, and experiencing passenger service protocol. Next to using a combination of concurrent and retrospective “think aloud” protocols (Alhadreti & Mayhew, 2018), observations were supported by the interview responses to gather broad and in-depth feedback. The test plan and interview guide, outlining the methodology, participant selection, scenarios and interview questions, are provided in Appendix I and J, respectively.

Several potential biases were considered and minimized during the user test. To reduce the Novelty Effect, participants were given time to acclimate to the VR environment before testing. The Observer Effect was addressed by fostering a relaxed setting and emphasizing that honest feedback was valued. Limited Sensory Feedback was acknowledged, with testing instructions focusing on evaluating spatial layout rather than overall atmosphere, and additional surrounding cues being given by the researcher during the test.

Results

Initial testing resulted in valuable feedback regarding the intuitiveness and effectiveness of the design (see Figure 32). A thematic analysis was performed, which involves transcribing the interviews, reading through the data to become familiar with it, coding relevant segments, identifying patterns or recurring topics and grouping these codes into overarching themes. Four themes were identified: Technology integration, User confidence and emotional response, Navigational clarity and Inclusivity and accessibility. These themes represent the different ways in which participants interpreted, navigated, and experienced the VR prototype. Additionally, several areas for improvement were suggested. The full transcriptions cannot be shared because of privacy reasons, however the results of the thematic coding can be found in Appendix K.

Technology integration

Participants widely acknowledged the potential of technology to enhance airport experiences. Several comments underscored the role of mobile integration and real-time updates. "I do think that this might become more of a future with your phone" (Participant 1), suggesting that they expect to have more

Figure 32: User testing with the VR headset.

smartphone-based navigation.

User confidence and emotional response

Feelings of confidence in navigating the VR environment varied, and was often influenced by how intuitive users found the VR experience. When tasks felt straightforward, participants expressed a middle to high confidence. One participant (Participant 1) rated their confidence at "a 7,5", explaining that while they managed the navigation well, the VR experience required some acclimatization.

The lack of visual feedback during the wait period at a Care Table led to feelings of uncertainty. Participant 2 explained, "If I knew how long I had to wait, I'd feel more self-assured... otherwise I'm sitting there wondering if I'll miss my flight." This response highlights the critical role that clear communication and transparency play in the user confidence.

Navigational clarity

Across participants, clarity of navigation emerged as a central concern. While many appreciated the presence of the colored lines, the absence of directional arrows or clarifying signage sometimes led to confusion. "The purple line goes in lots of different directions... it's not super interactive for me to know" (Participant 3) and "I know you said follow the yellow line and that was intuitive, but in most airports that I've been to, it's not like this" (Participant 3).

In contrast, when visual instructions were clear, they contributed positively to the user experience. "If you are told in advance that you have to follow the yellow line, then that is very clear" (Participant 1), demonstrating how pre-arrival instructions can streamline navigation.

Inclusivity and accessibility

Participants also highlighted the need for support to diverse users, including those with visual impairments, children, and non-native speakers. "Color might help people who don't necessarily read a particular language or are children" (Participant 4) illustrating the role of color in the navigation.

Moreover, cultural and linguistic accessibility were identified as priorities. One participant (Participant 3) proposed, "a checklist in your own language," and appreciated the idea of having the interface automatically adapt based on user preferences. Another (Participant 6) discussed the benefit of live translation through the earbuds to assist international travelers.

The pet check-in experience also led to feedback. Users appreciated the checklist feature, but wanted more clarity on the process and expectations. "With pets, it's good to have the checklist on the screen in your own language, but also maybe indicate how long until someone helps you" (Participant 2).

Suggestions for realism and immersion

Finally, many participants offered suggestions for enhancing realism of the test within the VR prototype. Participant 5 suggested the inclusion of environmental sounds to create a more realistic setting: "Add airport sounds throughout the experience." Others questioned how the system would function at busy moments, with Participant 6 asking, "What happens if you enter with twenty people and they all have to follow the yellow line?"

Conclusion

These findings confirmed the strengths of the concept while also highlighting specific aspects for improvement. The feedback collected during this test will impact the design, ensuring that it becomes more closely aligned with the needs and expectations of its future users.

The main improvements after testing are:

- Passengers get notified of how long they need to wait at the Care Tables.
- Especially on busy days, it needs to be clear to passengers that they are in a digital line.
- The Care Center gets a logo, which is displayed on the airport and functions as a secondary indicator that passengers are at the right location.
- The wayfinding lines get arrows in it, so passengers can understand the direction of the line.

Figure 33 shows the KLM Care Center with the suggested improvements.

Figure 33: The prototype with implemented directional arrows and Care Center logo.

5.2 Passenger Service Agent validation

Introduction

Next to testing with passengers, the other main users of the concept are tested with; Passenger Service Agents. They will have to work with the new concept, and have the current experience needed to critically assess the benefits and limitations of the concept. Therefore, a qualitative user test with 8 PSAs was set up. Similarly like with the passenger user test, the aim was to assess the usability, clarity, and emotional responses on the new departure hall process, as well as to identify potential improvements.

Method

Passenger Service Agents with different levels of experience received a guided walkthrough of the digital prototype. The test setting featured a slide deck with still and moving images played on a computer screen, simulating the redesigned departure hall (Figure 34). The prototype illustrated the new spatial layout, Care Tables, passenger communication and the changed roles of agents within the 15-year future context. The test plan included a semi-structured interview before and after the concept explanation and -scenarios.

Participants observed the vision concept images and videos to understand the concept, and got explained two scenarios in which an agent interacted with passengers in different contexts, including special case check-in and getting difficult questions. They were encouraged to comment on the tools and environment, and asked to be critical. They were asked to ask questions themselves if clarification was needed, and to provide feedback throughout when they felt like it. The test plan and interview guide, outlining the methodology, participant selection, scenarios and interview questions, are provided in Appendix L and M, respectively.

Efforts were made to reduce participant bias and ensure the reliability of feedback. The speculative nature of the design was explained clearly to avoid overly optimistic or idealized responses. A relaxed, judgment-free atmosphere was maintained to encourage honest and critical input. Moreover, participants were specifically asked to be critical. Any potential distraction due to video pacing or technical issues was minimized through pre-testing and technical preparedness.

Results

Thematic analysis of the qualitative interviews revealed five core themes: Passenger Disorientation, The Value of Human Contact,

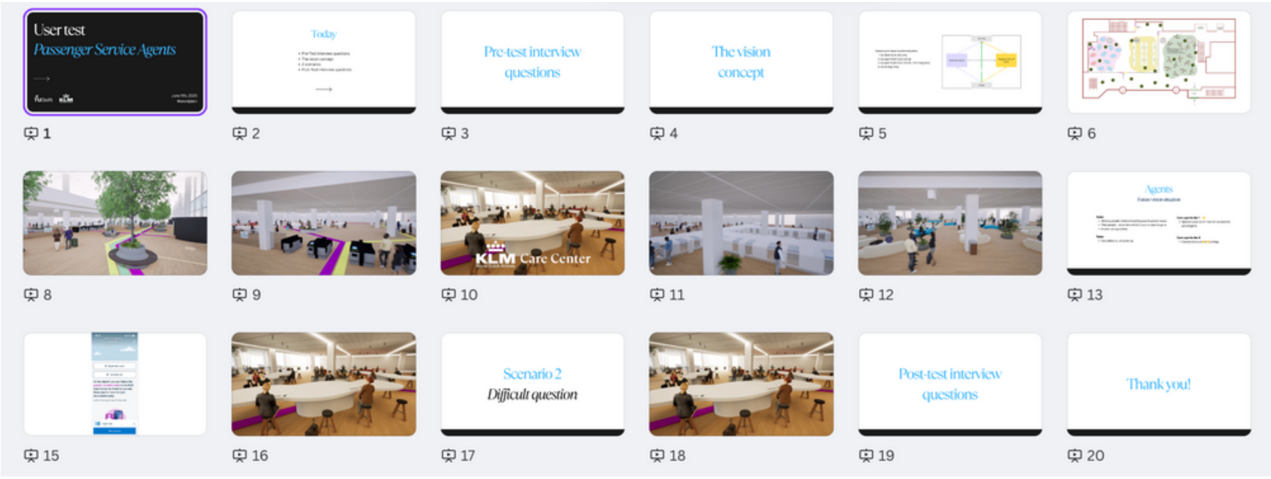


Figure 34: The slide deck for the user test.

Design for Diverse Needs, Stress Under Time Pressure, and Communication Clarity. These themes reflect the professional observations of agents who work in Departure Hall 2 and provide insight into the implications of the vision concept. The full transcriptions cannot be shared because of privacy reasons, however the results of the thematic coding can be found in Appendix N.

Passenger Disorientation

Passenger Service Agents frequently confirmed that many travelers are unsure of where to go within the airport, especially when first arriving. Participant 1 noted that "many passengers don't know where to go", pointing to the fundamental gap in wayfinding. Even experienced travelers, according to the same agent, can become confused without clear instructions: "zelfs de ervaren reizigers zijn soms in de war" (Participant 1).

Digital signage, while common in modern terminals, was perceived as insufficient by several agents. "Digital signs are sometimes confusing", Participant 2 mentioned, suggesting that visual clutter hinders comprehension.

The Value of Human Contact

Despite advancements in automation, agents strongly emphasized the continued importance of human presence. Participant 7 explained, "sometimes passengers just want to speak to someone", expressing the comfort that face-to-face interaction provides. Technology, while useful, should remain a complement rather than a substitute. As Participant 7 mentioned, "technology should be supportive, not a replacement".

This was particularly relevant for travelers uncomfortable using digital tools or who feel intimidated asking questions. Participant 3 observed, "some people are afraid to ask", identifying a barrier to digital travel systems like the one presented. However, the participant afterwards mentioned having forgotten that passengers in 15 years will have a different digital literacy from today.

Design for Diverse Needs

Agents observed that the concept might not accommodate the widest range of user needs. Families, for example, present specific challenges. Participant 4 explained, "parents with children quickly become stressed", while group travelers can behave inconsistently: "one leader, the rest don't always follow" .

Accessibility also emerged as a critical topic. Participant 7 shared, "wheelchair users have different needs", and Participant 5 mentioned, "hearing-impaired travelers might miss announcements". They explained that pictograms and signage are not always universally understood. As Participant 6 stated, "not everyone understands the pictograms".

Color-coded routes and other visual strategies were generally viewed positively, as they were designed with inclusivity in mind. "Kleur en vorm werken samen" (color and shape work together), suggested Participant 6, indicating that multimodal cues can help reduce confusion.

Stress Under Time Pressure

Another dominant theme was the emotional strain passengers experience due to time constraints. Agents repeatedly mentioned that "veel mensen raken in paniek bij tijdsdruk" (many people panic under time pressure) (Participant 8). The lack of clear and sequential information about the travel process intensifies this stress. "Last minute boarding veroorzaakt paniek" (last-minute boarding causes panic), observed Participant 8.

Providing a predictable and transparent journey, in contrast, was seen as calming. "Duidelijke stappen zouden rust geven" (clear steps would bring calm), said Participant 8.

Uncertainty about what to expect or where to go next was identified as a trigger for anxiety, particularly when travelers must navigate unfamiliar procedures such as self-check-in or oversized baggage drop-offs.

Communication Clarity
Effective communication emerged as an important influencer of positive passenger experience. Agents highlighted that "information provision is often unclear" (Passenger 1), and that English alone is insufficient. "English is not enough", stated Participant 3. They liked how passengers got to know beforehand what they could expect in real life.

The lack of translated instructions was a complaint that was mentioned multiple times. Participant 9 remarked, "translations are missing on signs". Multiple agents approved integrating multilingual explanations and real-time translations to reduce dependency on staff while still supporting comprehension. As Participant 9 concluded, "clear instruction prevents misunderstandings".

Conclusion

While four agents specifically mentioned seeing this concept in real life, they gave various exceptions that require extra attention in further development. The feedback collected during this test confirmed the strengths of the concept while also highlighting specific aspects for improvement. This ensures that it becomes more closely aligned with the needs and expectations of its future users.

Exceptions that will need to be further investigated are:

- Aggressive passengers
- Handling large touring groups
- Last-minute changes in visa requirements (country exceptions)
- SSDOP malfunctions
- KLM Care Table malfunctions

5.3 Strategic Design Roadmap

To support a realistic and practical implementation of the vision concept, three strategic horizons were created (see Figure 34). Each horizon is five years apart and represents a clear step towards the future departure hall, allowing a gradual introduction of changes. This avoids a large disruption to the daily operations and gives time for both staff and passengers to adapt to new technologies and processes. The changes per horizon are divided into the 5 concept elements, and are shown in Figure 35.

The horizons were designed based on several factors: the complexity of the changes, the expected pace of societal and technological development (based on the creative trend research, as explained in chapter 4.1) and the organization's ability to implement new systems over time. Especially the last-mentioned factor plays a big role in this context due to, among other things, the complex stakeholder environment. Renovations are costly and need to be carefully planned to prevent operational delays, while daily flights continuously bring passengers to the departure hall. Therefore, the removal of desks happens for example in 2 stages. Technology develops fast, and the tools used in the vision concept are based on emerging tech that is technically already possible. However, changes in the departure hall at Schiphol proved to be much slower in implementation.

The current bulky SSDOPs have been unchanged since 2008, 17 years ago. This demonstrates a clear gap between what is technologically feasible and what is practically implemented within the airport environment. A KLM PSA with 35 years of experience also confirmed this fact. Therefore, the horizons account for this slower pace by allowing enough time for infrastructural adjustments, budget planning, and organizational alignment. They offer a structured timeline that respects real-world constraints while gradually integrating future-proof solutions, ensuring that the vision remains both ambitious and achievable.

Rather than introducing all changes at once,

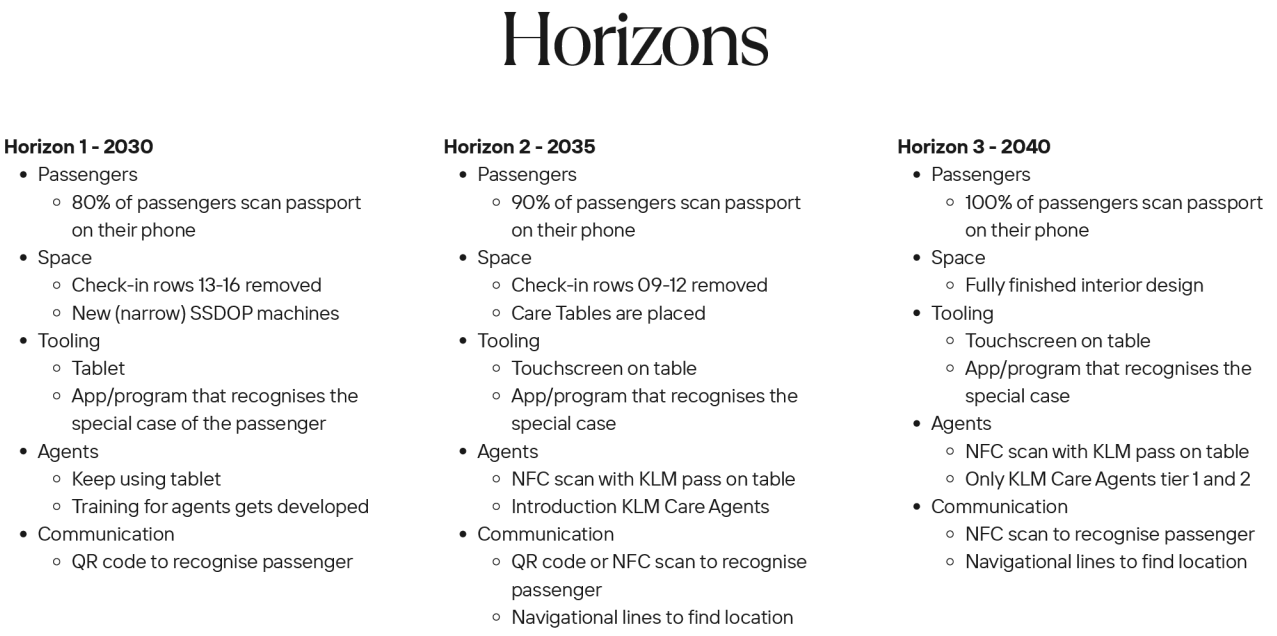


Figure 35. The horizons for the future departure hall implementation.

the steps have been carefully structured to prepare for the full future vision implementation. For example, early actions in Horizon 1 prepare the foundation for new tools and passenger behavior while making space for the improved layout of the departure hall. Horizon 2 introduces updated spaces and agent roles. Horizon 3 completes the vision by combining all elements into one integrated system. This step-by-step method also allows for testing, learning, and improving between stages. As a result, the vision can be refined throughout its development, ensuring a smoother and more successful transition to the future departure hall process.

Horizon 1: Establishing a foundation

This horizon is meant to develop a strong foundation for the future transformation of the departure hall, and will be in 5 years (2030). This includes introducing initial digital tools for agents, developing a training for their new roles, and creating a physical environment that can accommodate future technologies. Minor but impactful improvements are made to signage, routing, and communication channels with passengers. The goal is to build the confidence and infrastructure needed to support long-term innovation.

Trends that are relevant here are:

- **Omnichannel**

By creating a QR code so passengers can identify themselves and a system that keeps track of their personal status, passengers will no longer have to keep repeatedly give the same information.

- **Human-to-human interaction**

In a world where automation is growing and with KLM being a service-oriented airline, this is an important trend. By keeping the agents available to help passengers with special cases, passengers who cannot check-in online will continue having human interaction.

- **Small AI models**

As explained in Appendix E, the small AI language model Chatty2Help will be developed and be in use, helping agents find answers to difficult questions easier without having to scan through multiple online regulation documents. In the Care Center, this AI will be available for the agents in the earbuds.

- **EU Digital passport wallet**

As the EU will create digital passport systems, the travel document/passport checks will increasingly be easy for passengers to do at home.

Horizon 2: Introducing the Care system

The second horizon focuses on expanding and integrating the recognition of passengers with the digital tools more deeply into everyday operations. 10 years from now (2035), agents will receive the first trainings in using the new program, which becomes a standard in handling special cases. Passenger communication is increasingly personalized where they receive clear information as to where they personally need to go to. The layout of the departure hall is further adapted to facilitate clearer navigation and streamlined services, by placing the wayfinding lines. The first Care Tables are placed, replacing the old check-in desks and desktop computers.

Trends that are relevant here are:

- **Projected touchscreens**

This technology trend will be visible in the Care Tables that are now being placed. Here, the projected characteristic of the screen will keep the table clear and clean, but available whenever needed by the agent.

- **Gen Z and Gen Alpha growing up**

In 10 years this trend will be clearly visible. At that moment, about 60% of the KLM customer base will be millenial or younger (Weltje, 2024). As these generations will be grown up

with digital tools around them, they will have no issue doing check-in and passport checks at home, online.

- **Individual messages**

The message on passengers' KLM app or email will reveal their personal path, and prepare them for where they will have to go when arriving on airport. This corresponds with the wayfinding lines on the ground, and make sure passengers feel confident.

Horizon 3: Realising the future vision

In the final phase, the departure hall process fully runs with the Care Center. It will be the year 2040. The passenger experience is seamless and nearly effortless, turning the departure hall into a stress-free extension of the journey. Agents focus solely on special cases, while the projected screens on the Care Tables show exactly what they need in order to help a passenger.

Trends that are relevant here are:

- **Omnilingual and symbiotic tech**

The system on the Care Tables recognises the passenger and their special case. Passengers have many different origins and languages, and can have the screen live translated so they can understand the process. This is transparent, and will make passengers feel more confident in completing their pre-travel checks.

- **Welcoming area instead of process area**

The departure hall interior will be finished. Just like in banks and hospitals, the space will no longer feel like a process area, but like a welcoming area where passengers are helped with things that they cannot do online at home.

- **Spatial directing**

The whole layout of the space with the directional lines will show passengers where to go. They are directed to the right place, assisted by the KLM app.

In Figure 36, a strategic roadmap illustrates the implementation of the new system. The roadmap timeline aligns with KLM's plan for the Departure Hall of the Future, of 15 years. It outlines the necessary steps to realize the future vision for the service. The roadmap also highlights relevant trends for each step horizon and the value this service brings to passengers and Passenger Service Agents.

Figure 36. The Strategic Design Roadmap.

KLM Departure Hall of the future

Strategic Roadmap

Horizon 3

Realising the Future Vision

All passengers use mobile passport scanning, and the departure hall achieves a fully finished interior design. Agents use the Care Tables, and are supported by NFC-based recognition.

2040

Horizon 2

Introducing the Care system

90% of passengers do passport check online, and Care Tables are placed to achieve smoother, more personalized assistance for agents. The transition towards Care Agents starts.

2035

Horizon 1

Establishing a Foundation

With smooth self-service, most passengers scan their passports and check in at home. Space and tooling begin adapting, with agents supporting special cases via QR code recognition on tablets. Agent training is developed.

2030

Present
2025

Benefits

for the passenger
- Mobile passport scanning becoming more standard
- Less time in queues with more self-service options
- Clear identification through QR codes for smoother help

for the Passenger Service Agent
- Easier support with tablet-based tools
- Quicker identification of passengers in need
- More time to focus on exceptions, not routine tasks

Trends: Omnichannel | Human-to-human interaction | Small AI models | EU digital passport wallet

Benefits

for the passenger
- Proactive help based on QR code recognition
- Full personalized service via Care Agents
- Faster assistance at smart service tables

for the Passenger Service Agent
- Hands-free workflows via embedded table screens
- Better focus on care and human interaction
- Smart environments reduce repetitive tasks

Trends: Projected touchscreens | Gen Z and Gen Alpha growing up | Individual messages

Benefits

for the passenger
- Fully personalized, low-effort journey
- Instant support based on needs
- No need to explain or request, as the systems anticipate

for the Passenger Service Agent
- Proactive alerts and smart prioritization
- Seamless workflows via fully embedded tech in the work environment
- Focus shifts entirely to empathy and exception handling

Trends: Omnilingual and symbiotic tech | Welcoming area instead of process area | Spatial directing

Future Vision

We imagine a future where passengers travel confidently and effortlessly through the departure hall; **assisted by tech, uplifted by people**. Agents guide passengers where needed wtih a friendly but knowledgeable approach, like a general practicioner. This will enable us to create a departure hall where both agents and passengers seamlessly interact in an efficient yet personal way.

Graduation Thesis
Ivy Steijn
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MSc Design for Interaction
MSc Strategic Product Design

Visually based on the IDE Design Roadmapping course

6

Discussion

Image source: Enago (2022)

This thesis explored how KLM can maintain a competitive and human-centered departure experience in an increasingly competitive aviation sector, by re-shaping the Passenger Service Agent's role to increase passenger's confidence. With diary studies and agent interviews, three main challenges were identified. By integrating strategic future visioning with human-centered design, the project proposes a vision for KLM's departure hall 15 years from now, balancing digital efficiency with personal, human interaction. This discussion reflects on the key contributions, the scope and assumptions, the vision concept, and the strategic roadmap. It also acknowledges limitations and offers recommendations for future development.

6.1 The Scope

Defining this project's scope proved to be one of the most difficult aspects of the thesis. The challenge was choosing a precise and specific scope, narrowing it down enough to allow for a thorough research and design process while still accounting for the many interdependent elements that shape the departure hall experience. Schiphol's Departure Hall 2 is a dynamic, multi-stakeholder environment where spatial layout, passenger experience, stakeholder operations and technology come together. Isolating only part of this process or target group risked neglecting critical dependencies between those elements.

Although the current scope remains broad (including the physical space, digital tooling & communication, agent roles & responsibilities and passenger flow) it was necessary to provide a realistic and coherent vision of the future. At the same time, the size and complexity of the chosen scope meant that certain elements of the vision concept could not be explored as deeply as initially preferred. More time and iteration would have been valuable in refining the wayfinding lines and the agent earbuds (which influence the agent-passenger interactions) components of the vision concept. While these elements are also important for building passenger confidence, the project's scope required prioritizing other components of the vision concept to ensure a comprehensive outcome within the graduation timeline.

Nonetheless, the scope chosen allowed for a meaningful exploration of the systemic and personal challenges of passengers and agents in the departure hall. It enabled for realistic vision concept to be proposed, that considers not just individual elements of the process, but the connections and dependencies that define the experience as a whole.

6.2 The vision concept: KLM Care Center

The vision concept, the KLM Care Center, responds to the project's core challenge: how to improve passenger confidence while redefining the role of Passenger Service Agents in the complex departure hall environment. By showing passengers exactly why they cannot receive a boarding pass, as well as repositioning agents as proactive 'Care Agents', the concept bridges operational efficiency with personal support.

The passenger paths were restructured into four distinct flows, each communicated to them pre-arrival via digital application or email. This anticipatory approach to wayfinding is one of the concept's strengths, as it addresses one of the three user challenges: not knowing exactly where to go or what steps to follow. Furthermore, the redesign of the physical layout improves the spatial planning, reduces line formation, and supports clearer segmentation based on personal passenger needs.

Integrating new tools such as the projected touchscreens, earbuds and new baggage drop-off machines with the current KLM infrastructure and procedures, will be a challenge that needs to be further investigated as well. While KLM is actively creating digital solutions, these need to be ready before the physical tools can be used. Additionally, bigger physical objects like the Care Tables and new SSDOP machines will require intensive planning and collaboration with Schiphol. Currently, the assumption is that Schiphol is open and willing to make big changes as to improve the passenger experience.

Limitations

Although extensive efforts were made to ensure a thorough and credible research process, several limitations should be acknowledged. Something that is important to reflect on is the role evolution of the agents. Shifting the 8 roles to 2 is a significant change, which will not only change the process for the passenger but also the way KLM operates and divides its staff. Important questions to answer regarding the Care Agent Tier 1 and Tier 2 roles are: What does this change mean for the staff training, how they are recruited, but also the emotional effects for agents that have worked the same way for a long time and will need to change tools? Using technology to decrease the number of unnecessary passengers in the departure hall will decrease the total workload, but the expected handling times for a certain role will change completely, therefore will need to be newly calculated. In turn, passengers will be receiving more situation-tailored care, without having to repeatedly provide the same information.

User testing using the VR prototype confirmed the concept's potential to improve navigation, both digital and physical support, and emotional comfort. Participants particularly appreciated the personalization of the process and the integration of technology with clear instructions and human contact. However, they also raised concerns about the need for visual feedback while waiting, the direction of the color-based wayfinding system (which was a limitation of the prototype program), and the realism of the environment during busy moments. These insights informed further refinements and highlight the importance of detailed planning and communication strategies (having a clear alignment between the digital instructions and the physical environment, making sure passengers find what they expect).

The immersive prototype used for passenger testing was constrained by the limitations of current VR technology. While it allowed for spatial exploration, it did not fully capture environmental variables such as noise, stress

from time pressure, or social interaction, which are factors that greatly influence real-world experience. Due to practical limitations, Passenger Service Agents were shown video walkthroughs rather than interacting with the prototype in VR directly. This reduced the depth of feedback on the agent tooling and task complexity, particularly for emotionally demanding situations like when helping passengers with cancellations.

Additionally, The user testing involved six passengers and eight Passenger Service Agents. This is a relatively small sample, which may not represent the full range of perspectives and behaviours found in a larger population. Therefore, the insights gained should be seen as indicative rather than definitive.

The vision concept assumes the adoption of certain emerging technologies, such as projector touchscreens and digital checklists. While these are grounded in current trends and prototypes, their adoption at scale depends on organizational, financial, and egulatory readiness. The implementation of the proposed vision concept relies heavily on collaboration between KLM and Schiphol Airport, as well as external bodies like IATA and the Dutch government. These stakeholders have dependencies that may delay or alter the envisioned changes. This is why the horizons were chosen this conservatively.

Recommendations

To build upon the research and to achieve a successful implementation, future steps should include live pilots with agents and passengers in an operational airport setting, providing insights into the usability, staff workload and the effects on congestion during peak hours. The KLM X department already uses a method for concept testing, 'the X way of working', which was developed by the Industrial Design Engineering faculty. With that, concepts are tested in a real-life environment early in the process. This department should be consulted and can carry out these live pilots. Continued early collaboration with Schiphol, regulators, and partner airlines is also essential, supported by the dedicated inter-organizational innovation team to align efforts and manage priorities. Supporting agent role transitions will require attention to organizational and emotional factors, including training, role clarification and space for feedback and reflection.

Future work could also better consider exceptional cases such as passengers with low literacy levels, or without digital devices. These groups were currently chosen not to be part of the focus. As part of the trend analysis, it was found that digital literacy will decrease dramatically, with a large part of the KLM customer base having grown up in a digital age. Although inclusivity for people with colorblindness and language barriers were considered, there are many more ‘edge cases’ that can be further researched.

The feeling of need for privacy can also be further investigated. This has not been found as a current pain point for passengers, however this might be a new challenge with the introduction of the Care Tables. Although the open floor and table design aligns with KLM’s brand differentiator of “Peace of Mind” by enhancing transparency and passenger confidence, it may raise privacy concerns for travelers with sensitive cases, such as those carrying a weapon.

6.3 The Strategic Roadmap

The strategic roadmap developed in this thesis plays an important role in achieving a realistic implementation for the future vision concept. By dividing the changes of the departure hall into three clear time horizons, the roadmap makes it possible to introduce changes gradually, keeping the disruption to daily operations low while still working towards long-term strategic goals. It offers a practical framework to time-pace innovation in the highly complex environment, where infrastructure, technology, and human factors must be carefully balanced. The roadmap also ensures that changes to the space, digital tools, and staff roles are introduced in a coordinated and well-timed manner.

The roadmap reflects the interdependence between the five core elements of the vision concept; passengers, space, tooling, agent roles and communication, by showing how each should evolve over time. Rather than proposing all changes at once, the roadmap uses a step-by-step structure that gives space for testing, adaptation, and alignment across stakeholders. In doing so, it supports not only the design of the future departure hall, but also the organizational processes required to realize it.

Limitations

While the roadmap provides a strong guideline for strategic implementation, it also has limitations. Most importantly, it remains conceptual and has not yet been fully tested against budgetary constraints, operational planning, or policy approval processes at Schiphol and within KLM. The timeline assumes a consistent pace of innovation and cooperation that may not reflect the practical reality of the organizational changes, especially in environments where delays are common.

Recommendations

To make sure the strategic roadmap achieves actual implementation, future work should focus on the financial and labour costs that it will take to implement. It is recommended to expand the roadmap with more detailed planning for each horizon, including resource requirements, internal responsibilities, and potential risks. In addition, it would be valuable to incorporate a change management and staff adoption strategy that supports staff during transitions, especially as all of their roles will change. This should include training programs, internal communication plans, and feedback loops to keep track of progress and adjust plans where needed. Finally, the roadmap should remain a living document, regularly updated to reflect new developments. With this approach, it can become a key tool in achieving KLM's long-term vision for the departure hall.

6.4 Critical reflection on framing, assumptions and systemic risks

While this project has generated valuable insights, a vision concept for the future departure hall and an implementation strategy to realising it, it is also important to reflect critically on the underlying premises that shaped the outcome. Firstly, the framing of the design challenge by KLM inevitably directed the project's scope and focus. By re-creating the departure experience within a virtual model and assuming current passenger flows and airline roles will stay the same, the project may have upheld current assumptions instead of critically re-evaluating them. Assuming the fact that passengers will still have to do checks in order to receive a boarding pass, and even the use of a boarding pass are examples of this. A more open-ended exploration might have uncovered alternative departure models or even challenged the necessity of the departure hall as we know it. This could have been achieved by having a more speculative design approach and/or a time scope that is further in the future than 15 years.

Furthermore, my own design choices, research methods, and disciplinary background inevitably influenced the project trajectory. The decision to use the diary study for the passenger experience and the journey maps for agent experiences reflects a human-centred lens, but also risks marginalising infrastructural, operational, or ecological perspectives. My selection of methods (3D digital prototyping, user testing, and interviews) privileged observable and reportable user behaviour, potentially overlooking systemic or historical frictions between stakeholders that also shape airport experiences.

A number of assumptions supported this project, particularly the idea that air travel will remain a large mode of transport. However, this may not hold true in the long term. If Schiphol's operations shrink due to (climate-, noise- and air pollution related) regulations, or if alternatives like the Hyperloop or Lelystad Airport become viable, the relevance of the current vision concept proposal could be fundamentally changed. What is optimised for today's hub-and-spoke model may become obsolete in the face of decentralisation or transportation modal shifts. Even the opposite could happen; the development of an entire new terminal building has been a plan for Schiphol, even though there has not been made a decision on this yet. This could influence the position of Departure Hall 2 and whether KLM will still operate from it as a sole airline.

In terms of impact, the primary beneficiaries of this proposal are likely to be KLM, Schiphol and passengers using email or the KLM application, who can navigate the hybrid digital-physical environment. However, passengers who are tech minimalist or who have alternative mobility needs, may benefit less or even experience more barriers than before. Additionally, when actively redirecting passengers to not go through the departure hall unnecessarily, while efficient, will have consequences for job roles. The future of work within airport terminals could be changed significantly, leading to job loss.

Unintended consequences must also be considered. For example, the open table layout still has unclear boundaries on passenger privacy. Similarly for the agents, there are also still elements of the concept that are still unclear. An example is a situation where passengers are angry and become violent towards agents. These both are serious concerns and need to be evaluated thoroughly.

Finally, there are risks that could render the vision concept less usable or even irrelevant. Regulatory changes in aviation policy or geopolitical shifts affecting mobility could reposition the departure hall within a different socio-economic and ecological landscape. Especially in the current unstable global political situation, the realism of big changes in a departure hall such as this is put under pressure.

In short, while this project delivers a meaningful concept within its defined frame, its long-term applicability depends on a complex set of evolving factors. It is essential for design research not only to fulfil the requirements of a brief but also to critically reflect on the larger systems it is part of and might reshape.

6.5 Personal reflection

Looking back on this project, I can confidently say that it has been one of the most challenging and rewarding experiences of my academic journey. Working on a futuristic yet realistic vision concept for the future airport departure hall has allowed me to apply a wide range of skills developed during my bachelor and master's programmes, including design research, digital prototyping, user testing and systemic thinking.

What has been most challenging is carrying out the project of almost 9 months individually. Being used to creating a planning for a group project, it was an adjustment to suddenly carry out all activities alone. Luckily I had many people around me with whom I could bounce ideas off. Another challenge was instead of following one straightforward design process, combining multiple together. This corresponds with combining the two masters.

In the end, the combination of the Double Diamond method and Design Roadmapping proved very effective. While the Double Diamond allowed for thorough exploration and user insights, the roadmapping approach helped structure these findings into actionable steps across the future horizons. This dual approach made the design both grounded in user feedback, and realistic.

What made this project particularly meaningful was its relevance and complexity. The airport departure hall context is dynamic with many different aspects; technological, social, operational, and even emotional. Designing for this environment required me not only to understand the needs of passengers but also to consider the perspectives and limitations of Passenger Service Agents, other stakeholders, and the broader organisational structure. I found it especially valuable to be able to speak directly with agents who have decades of experience and could reflect on how the airport has evolved. Their stories and insights added a strong layer of realism to the project and helped keep the vision grounded.

Overall, this project taught me to work confidently with uncertainty and to communicate complex ideas clearly. It reinforced my passion for designing experiences that are both human-focused and future-fitting.

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Appendices

Image source: Enago (2022)

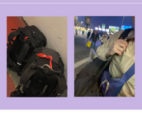
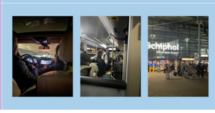
Appendix A. Service Model Analysis

	Full Service Carrier	Low Cost Carrier	KLM
Price	Higher fares	Super cheap	KLM offers continuous pricing with different fare classes, providing customers options for budget-conscious or premium services (KLM Tech & Data, 2025). Generally, they are higher than the price of competitors, showing a strategy tending towards that of a FSC.
Luggage	Cabin: At least 1 full-sized bag Checked: Yes, except for the basic fare	Cabin: Free, but often small piece Checked: Extra cost	KLM provides a range of baggage allowances based on ticket type, with options to purchase additional baggage for extra fees. The base fares do not include checked baggage (KLM, 2025a).
Food	Get food for free	Pay for all food and drinks, pre-order meals	In-flight meals are included for long-haul flights, with special meal options available upon request. Drinks are (currently) free in all flights (KLM, 2025b).
Amenities and extras	Airport check-in, blankets & pillows, airport lounges	At an extra cost or not possible at all	KLM provides amenities like blankets, pillows, and entertainment for free, with additional extras available for a fee (KLMc).
In-flight Wi-Fi	Free	At an extra cost or not possible at all	Wi-Fi is available on many KLM flights, with a 'Messaging' plan being free, and 'Surf' and 'Streaming' plans available for purchase (KLM, 2025d).
Seating options	Free 1 or 2 days in advance	At an extra cost or not possible at all	KLM offers standard and premium seating options, including extra legroom and business class for more comfort (KLM, 2025d).
Airport network	Close to city airports	Secondary airports, further away from the city	KLM operates a global network of airports, offering multiple international destinations (KLM, 2025e).
Frequent flyer program	Loyalty program, collect points by flying	Not existing	KLM has Flying Blue, the frequent flyer program with four membership levels; Explorer, Silver, Gold and Platinum (KLM, 2025f).
Connecting flights	Takes care of missed connections	Not offering connecting flights, self-transfer	KLM facilitates smooth connections through its extensive hub system, primarily via Amsterdam Schiphol Airport (KLM, 2025g).

Appendix B. Diary Study Results

	Age	Gender	Nationality
Participant 1	20s	Male	German
Participant 2	50s	Female	German
Participant 3	50s	Male	Dutch
Participant 4	20s	Female	Dutch
Participant 5	50s	Female	Dutch
Participant 6	20s	Male	Dutch
Participant 7	20s	Female	Dutch
Participant 8	20s	Female	Dutch
Participant 9	20s	Male	Dutch

Passenger 1 (German, male, 20s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
Passenger flow (circle which one you follow)	1 2 3				
What are your thoughts?	Online checkin went well, however I had to fill in all my data which took quite long	I love arriving at Schiphol.	We did this online	Hand-luggage	Schiphol security is great.
What do you experience?	It went well.	It was cold, I had summer cloths with me, luckily there was a place to wait for the shuttle			I really like that I can leave my laptop in the bag
What activities do you do?	Checked in, willed in passport. I had to scan my passport but that did not work very well, because of this I also could not check in for my parents	We parked at p3 and then took the shuttle to the terminal. I could not make a timeslot for security as usual but that was oke. I planned it so I did not have to wait long. I fly a lot so I was only a few minites before I was at security. Its always difficult to find the place to the security through all the checkin desks			I had let my hand-luggage be checked extra at security. Because I have diving equipment. Also at the gate I had to be checked again, because we where flying to the US. It was a "random check" but I had to take everything out of my bag. I was stressed because I had way too much hand luggage.
What do you like?	That it was online	The entire experience at Schiphol is nice. Everything is clear			I like that I can leave laptops in the bag, and don't have to put the fluids into a small bag
What do you dislike?	The passport scan. It was also not clear if I could take full hand luggage. It said only if I fly over the pacific, but my second flight did not fly over the pacific, after consulting the customer care, I found out I was allowed to bring full hand luggage	Going through the checkin desks to security. There's an awkward little lane that's hard to find. I feel like I'm not supposed to walk there			Every time I fly with scuba gear I get checked again
Add photos					

Passenger 2 (German, female, 50s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
Passenger flow (circle which one you follow)	1 2 3				
What are your thoughts?	It went fine	The door of the front was a little bit weird because we had to wait to get inside the building. The parking was easy but crowded.	x	x	It feels safe at Schiphol
What do you experience?	Easy, but it was not nice that we could not change the seats for free	Stressless			I like that we had not to show the fluids and electronic devices
What activities do you do?	Checked in and uploaded passport	Parking, taking the bus, looking for the gate			Passing the security – our 2 pieces of hand luggage got checked – passport control
What do you like?	It went easy and quick, it is nice that you get your boarding pass	Its well organized			It felt safe, well organized and the communication was friendly and clear
What do you dislike?	Not clear about how much baggage I can bring	It's always difficult to find the place to the security through all the check-in desks			
Add photos					

Passenger 3 (Dutch, male, 50s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
Passenger flow (circle which one you follow)	1 2 3				
What are your thoughts?	Efficient, simple, time saving and effective	Efficient long-term parking, good transport to main building			Relatively fast and efficient
What do you experience?	Done by someone else, but from past experience: simple and effective procedure	Efficient reservation procedure, gate opens upon arrival, carpark relatively full with no indication of empty spaces. In main building: well described route to security / gates.			Fast, effective procedure. Hardly any waiting time (due to time of departure?). Friendly officers.
What activities do you do?	Visit website, check-in following simple sequence.	Enter P3, walk to bus, enter main building, walk to security and customs, walk to gate, wait at the gate for boarding.			Wait for check, empty pockets, remove belt, go through scanner, body search, and reverse procedure.
What do you like?	Efficiency and simplicity, time-saving	Efficiency, simplicity			Efficiency, simplicity
What do you dislike?	Nothing	Nothing			Nothing
Add photos					

Passenger 4 (Dutch, female, 20s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
Passenger flow (circle which one you follow)	1 (2) 3				
What are your thoughts?	Handy that this is possible beforehand	Busy			Going well, fairly quiet
What do you experience?	I have to do it multiple times, it doesn't work well. Documents cannot be loaded properly	Confusing			Short line, quick access
What activities do you do?	Enter and check details on telephone	Look where you need to go		Printing labels Standing in line Showing passport again Labels again Suitcase in overhead bin	having items checked
What do you like?	That you don't have to queue at Schiphol to check in	Multiple screens		Nothing	good flow, also at the military police
What do you dislike?	Ease of use is not ideal. It only works after multiple attempts and not in every browser	Information is small and confusing for some		Long queue while gates are not being used Backpacks are not read properly on luggage KLM staff does not know which queue you should be in Computer crashes Staff stands around doing nothing Not enough people in the required places	people who don't walk through 😅 after having luggage checked, pressure to put items back on etc. not a good place for it
Add photos					

Passenger 5 (Dutch, female, 50s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
Passenger flow (circle which one you follow)	1 (2) 3				
What are your thoughts?	Saves time	There we are again		If it works it is handy	15-20 minutes waiting is ok
What do you experience?		Quite busy		Frustration	Goes really quick!
What activities do you do?	A website, enter data and check in	Walk to the incheck / baggage		Printing labels Back in a line Drop-off baggage	Stuff off and through the machine, then through customs
What do you like?	Clear overview			The idea is nice but at the moment it is not much better than a counter (also the same amount of staff present who do nothing by the way)	Goes fast, even if the bag has to be checked. You don't have to take everything out of your bag etc.
What do you dislike?	Repeatedly having to fill in the same things	Too small information on the signs and confusing		Doing the same things multiple times Personnel is unhelpful Bag does not fit properly in the luggage-compartment	Not a good place to put things back on or put them in the bag afterwards
Add photos					

Passenger 6 (Dutch, female, 20s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
					
Passenger flow (circle which one you follow)					
What are your thoughts?	Always pay close attention to when online check-in starts. I often travel with someone, and you want to sit next to each other. It's always a question of whether that will work.	I've already checked in the Schiphol app to see which departure hall I need to be at. There's a direct train connection from my home, which makes it a convenient option, but the possibility of delays can be stressful. Being dropped off by car feels like a better option—it's more flexible. My dad knows exactly where to park briefly at Schiphol, whereas I wouldn't have a clue. The roads stress me out, and I wouldn't know what's most practical. I used to always follow my parents' lead, arriving at Schiphol well in advance. Now that I've been there many times, the process usually runs smoothly, so I now aim to arrive a maximum of two hours beforehand.	Even though I often check in online, I'm never completely sure if there's still something I need to do.	In general, I prefer to travel with hand luggage. I can keep it with me and don't have to worry about it getting lost. I bring as few liquids as possible. If I do have a suitcase, I find it annoying because I have to drop it off at the right place first. Usually, you can see which desk to go to, but there are also those big white self-service machines where you can place your luggage. I always wonder, can I use those for my suitcase?	I always find this very interesting and pay close attention to how everything works. My thoughts are always, "What if I were to smuggle something—would they actually catch me?
What do you experience?	Some websites are clearer than others (I don't have an example at the moment). Sometimes I can add the boarding pass to my iPhone Wallet, and sometimes I can't. It's nice when it works so that I don't have to search through my emails.	I double-check whether I'm in the right place (using the app and signs). I get annoyed by slow, lost people, but that quickly turns into positive thoughts—"Yes, I'm going on a trip!"	I trust that my ticket in my wallet is correct.	If I have luggage for the baggage drop-off and need to go to the desk, I feel more stressed. You never know exactly how long it will take, and sometimes people start reorganizing their suitcases there. Sometimes, you can use those big white machines. I'm not sure if that's always an option, so I ask and then decide where to drop off my luggage based on the answer.	I find security fascinating and love watching everything that happens. I could observe this for hours.
What activities do you do?	Double-check whether it worked, making sure I have all my check-in essentials in one clear place, such as my iPhone Wallet.	drop off my luggage and go through security as quickly as possible—just to get it over with and avoid carrying heavy bags any longer. I prefer to travel with only hand luggage. That way, I can skip the baggage drop-off and don't have to wait for my suitcase at my destination.	Not much—just focusing on getting to the right place for security.	No specific activities—just making sure it's done as quickly as possible. The stress only goes away after passing through security.	Mostly just observing and quickly finishing my bottle of water. A sink would be useful since many people have liquids with them—it's a shame to fill up the trash bins with them.
What do you like?	If it works	I love the feeling of going on a trip. Always happy and excited when I am at Schiphol.	If online check-in was successful, there's always a brief moment of surprise, and then I'm happy.	When there's no long line.	The entire security process. If it goes smoothly. Sometimes, to make it even more convenient for myself I have booked a timeslot for security. Then it goes really fast.
What do you dislike?	If I have to search through my emails entirely.	The pre-trip stress—though I realize it's actually unnecessary because things at Schiphol always go faster than expected. Nowadays, the app even shows how busy it is, which helps with planning.	In general, I don't like standing in line to check in. There are often groups of people awkwardly handling their suitcases, etc.	When things move very slowly at the desk. You don't always know what the desk employee is doing in the system. Sometimes, they walk away or consult with other staff members.	My biggest annoyance is when people walk through the security gates wearing belts or other clothing/jewellery, even though it's clearly stated multiple times what needs to go in the trays. Then, they have to go back, remove their items, and go through security again. That irritates me, and I think, "Just go to the back of the line and read the signs again." And If the security staff seem irritated. I know exactly what to do, so they don't need to explain everything to me. But I understand that others might need instructions. Of course, the staff can't tell who already knows the rules, so they always repeat what shouldn't go in the trays. That makes sense, as they need to keep things moving for those unfamiliar with the process.
Add photos					

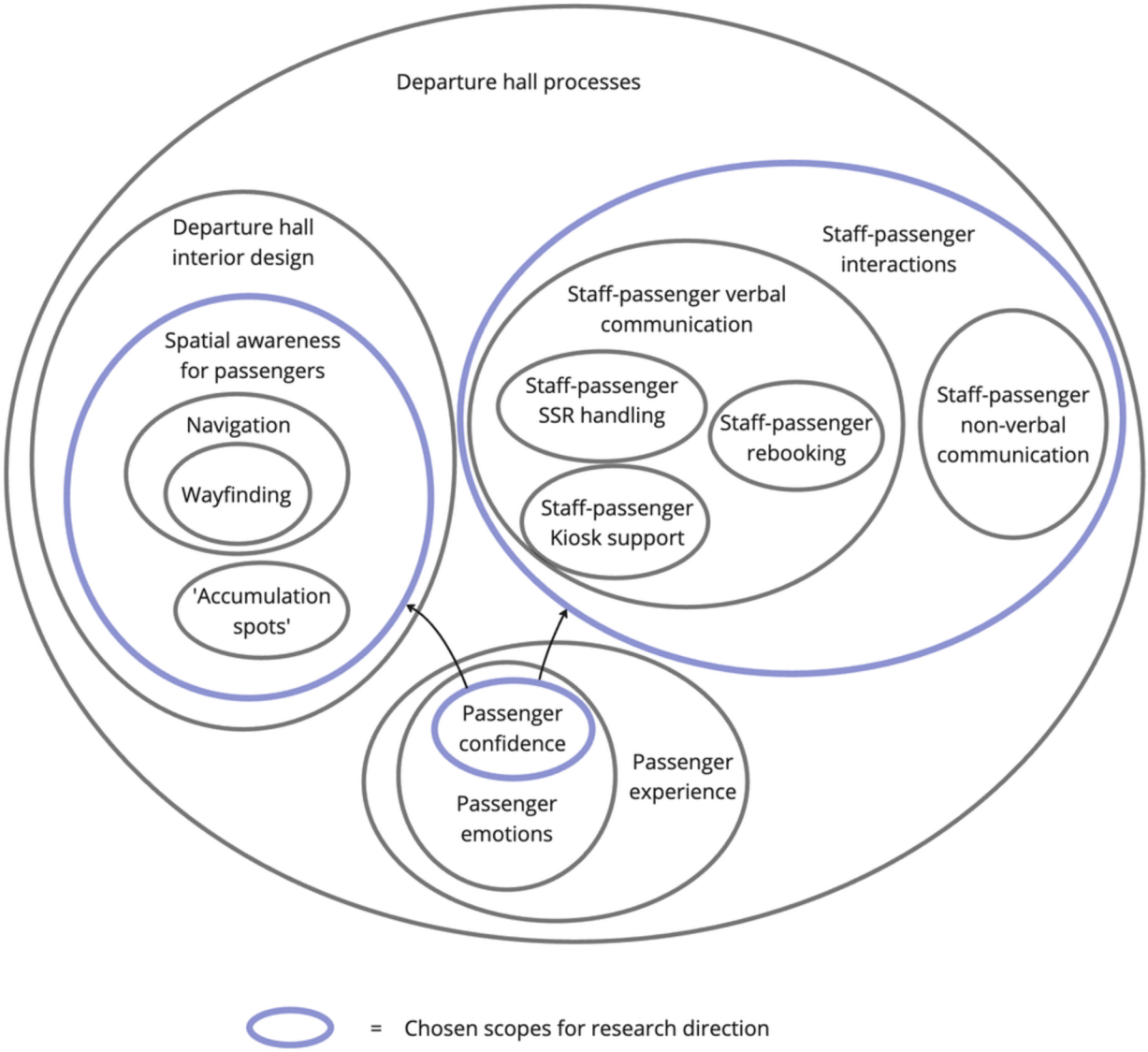
Passenger 7 (Dutch, male, 20s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
					
Passenger flow (circle which one you follow)	1 (2) 3				
What are your thoughts?	Neat that this is available!	Happy to be dropped off so close to the departure hall (by car)		Hoping this is going to be fast	Hoping to be through quick to grab a drink somewhere after
What do you experience?	Ease of use, accessibility	Accessibility, traffic, orientation		Had a chat with the ground staff, who were friendly	Handling of luggage, scanned items, security
What activities do you do?	Confirm attendance for the flight, book a seat	Meet up with friends, print a label for our luggage		Wait in line, drop off our luggage	Drop things to be passed through the scanner, receive a body scan
What do you like?	Happy to have this done before coming to the airport	The accessibility of Schiphol		The queue was fairly short, staff was friendly	The queue was fairly short (only 10 minutes or so), and Schiphol security is generally very little hassle compared to elsewhere
What do you dislike?	In our case, we did not get a boarding pass yet as we had to drop off hand-luggage for a full flight	Signage for our scenario (drop off hand-luggage for a European flight with KLM) was poor, meaning we had to ask for directions		-	Not allowed to take large bottled fluids through security anymore
Add photos					

Passenger 8 (Dutch, male, 20s)

Process step	Online check-in	Arrival at Schiphol	Check-in	Baggage drop-off	Security
					
Passenger flow (circle which one you follow)	1 2 (3)				
What are your thoughts?	Normally I like online check-in and always do this. On this flight (with China Southern) I could not check in online	It's so nice how the train arrives in the middle of the airport	Pff very long line. Hopefully check-in goes well	At the same time as check-in, so a lot of overlap	Too bad I missed my security time slot because of the long line. I quickly requested a new time slot before the line. Hopefully that works
What do you experience?	A feeling of stress. Better check in online	As I came up the escalator I was a bit overwhelmed by the sudden rush, but luckily I quickly found the right direction.	A bit irritated by the very long line and the crying child in front of me. But luckily I left on time		Very short line at the time slots. Felt really good to be able to walk past the long line
What activities do you do?	Looked up experiences of other travelers with this airline. Apparently not being able to check in is a common problem	On the Schiphol app, look at which terminal and counter I need to go to. Find the right signs for that	Playing games on my phone. People watching a bit. Getting my visa, passport already	Put a rain cover on my backpack. Feel my bag a few times. How many kilos would it be?	Read the signs. What should I take out of my bag?
What do you like?	That other travelers were also unable to check in.	Clear instructions on Schiphol app about arrival. And train arriving at Schiphol	Very sweet KLM lady at check-in		That I could walk past the line and not have to take anything out of my bag
What do you dislike?	That I couldn't check in online	That there are no gates at Schiphol station. Almost forgot to check out	People in line who go to watch a movie without earphones		Actually quite little
Add photos					

Appendix C. Scoping activity



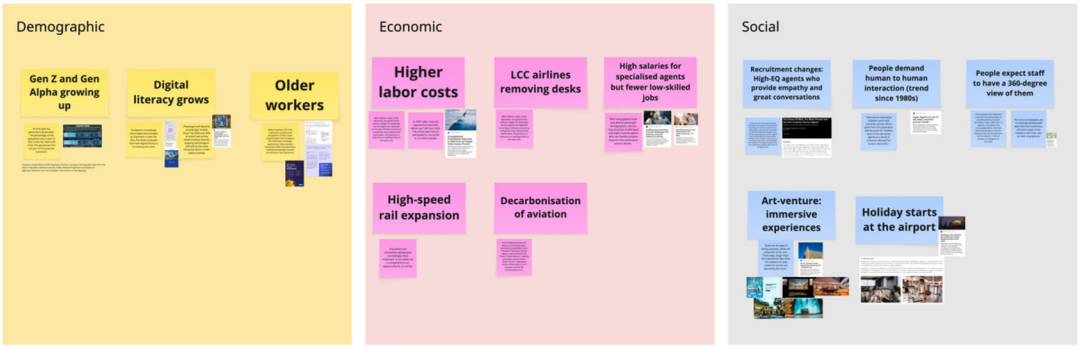
Appendix D. Creative trend research

Trend topics

"The role of the Passenger Service Agents in the departure hall of the future"

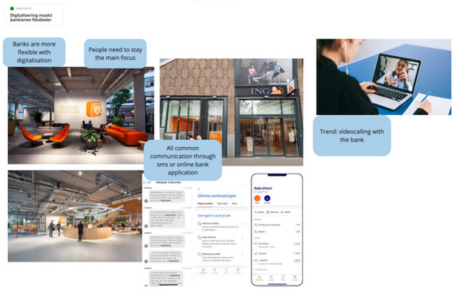
Scope of this DESTEP:

- Travel
- Digitalisation
- Aviation
- Staff role changes



Trend patterns

Banks



Hospitals

Libraries

"24/7 de bibliotheek in je broekzak en zo toegang hebben tot alles wat de bibliotheek te bieden heeft, van boeken tot activiteiten en cursussen."

Hotels

Interview hospital visit

Receptionist 1

- *Heeft 20 jaar bij patiëntregistratie gewerkt*
- *Werkt nu 3 jaar bij de receptie*

Receptionist 2

- *Werkt al 25 jaar bij de receptie*

Hoe is het werk anders dan vroeger?

- Eigenlijk is ons werk veel minder omdat er meer zelfstandig wordt gedaan door de afdelingen
- Vroeger waren er echt rijen bij de balie, daarna deden we het met kaartje trekken en nu lopen mensen direct door
- Eerst werden mensen geïdentificeerd met een polsbandje, daarna werd het een sticker op de kleding en nu is het met een patiënten-pas. Mensen moeten één keer aanmelden met hun patientenpas en die kunnen ze daarna elke keer gebruiken. Ze kunnen direct doorlopen naar de afdeling en daar bij een paal zichzelf inchecken.

Hoe was het om te switchen naar digitale programma's?

- Het was eerst even wennen maar het is wel makkelijker

Hoe werkt het met mensen die speciale behoeftes hebben?

- Dat lost zichzelf vaak op; mensen die minder goed zien hebben vaak iemand die ze helpen dus dat is niet anders dan anders

Waar bestond jullie taak uit voordat het proces digitaal werd?

- Bsn check
- Verzekering doorgeven

De nieuwe programma's die wij gebruiken zijn:

- Chipsoft
- Hix
-
- Planon

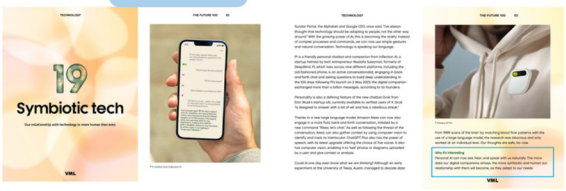
Activity
For this research, I have looked at the authoritative voice of a single expert - in this case, the company VML (previously Wunderman Thompson). This is a global company (28.000 employees, 150+ offices) which is part creative agency, part consultancy and part technology company. They have created reports stating global insights on certain trends. Also, they create a yearly trend report, the Future 100.

Results
(!) Interesting finding: People on the one hand value human, face to face contact. However, they want a seamless travel experience. How can we try to achieve both?

The most important trends that I have found are:

'Bring the physical and digital worlds closer together'

AI can speak with us more naturally. It adapts to our needs.

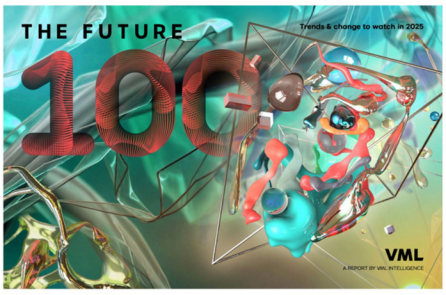


Omnilingual tech - instructions in passengers native language

Haute-airport experiences (seamless and private)

This trend seems to be fitting with the needs of the customer segment 'premium leisure traveler' from my earlier research.

Premium passengers don't want to be in busy crowds. They want a private, calm experience

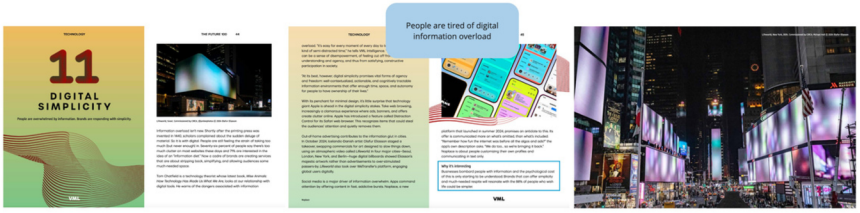


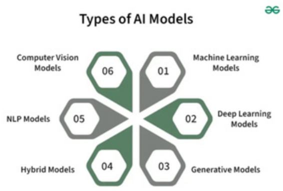
Generational gap between tech-literates and non tech-literates

Aviation is being decarbonised & airlines are upgrading their economy offerings

"Thrift traveling" - people have less budget for leisure travel, but still want authentic experiences

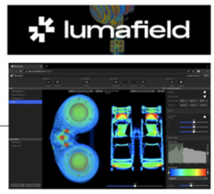
People are tired of digital information overload





Daylon, Future Technologies & Apple Specialist

- Baggage recognition with cameras
- Following the agent's hand movements in order to train a machine learning model to assist new personnel, and later maybe robots
- People recognition with cameras, agents know what steps passengers did and didn't do
- Grote AI modellen (heel breed, voor alle vragen) vs kleine AI modellen (op een device, voor iets specifieks)
    - Gepersonaliseerde AI per agent en/of passagier
- In verschillende systemen gebeurt hetzelfde, dezelfde informatie wordt opgezocht (door passagier thuis en daarna door de agent)
- Lumafield, bedrijf wat bepaalde X-Ray technologie maakt
- De EU is een wallet-app aan het maken, voor een digitaal paspoort
- Humanoid robots could handle things, or robots drive around
- AirPods or RayBan glasses with cameras, scanning everything.
- The passenger only gets notified when an action is needed, but only the bare minimum to decrease the overload



Big vs small AI models

Nick, Program Director Biometrics & Clearance for the airport

- There are two types of ID biometrics;
    - Identification - Scanning someone and recognising who it is
    - Validation - Scanning someone and validating that this is the person who it's supposed to be
- There is a project between Schiphol and KLM regarding biometrics
- Amount of passengers will increase by having more wide body aircraft. So the same amount of aircraft, but bigger aircraft -> more passengers

Appendix E: Tooling concepts

Concept T1: AI Pin

An AI Pin is a small, wearable device that uses AI to assist users through voice, gesture, and visual input. It translates live to 48 languages, and a PSA could use it for hands-free access by touching the button and asking questions to real-time flight info, translation, or making booking changes. They can ask the pin questions (KLM is already developing an AI called Chatty2Help, which scans through KLM documents and answers questions that passengers might ask) which can be answered immediately. They can scan a boarding pass with the camera and know about the passengers booking status immediately. Currently they are not being sold, but the AI Pin startup, including the team that developed it, was sold to HP (Job, 20215). In 15 years, this technology will most likely be further developed.

The Humane (HP IQ, 2025) and Rabbit R1 (Rabbit Tech, 2025) AI Pins.

Advantages:

- Is portable
- Can offer private assistance

Disadvantages:

- Small screen limits information detail
- Not ideal for complex tasks that require high quality screen
- May come off as impersonal

Concept T2: Smart wall

A large, wall-mounted interactive display that visually communicates information and responds to touch or gestures. It can display a great amount of information, and be an eye-catcher in the departure hall. It can be used by multiple people at the same time.

Examples of a smart wall (TEC Displays, 2025).

Advantages:

- Highly visible, draws attention
- Enables shared, hands-on use
- Good for step-by-step guidance (can display complete process steps)
- Supports group interactions

Disadvantages:

- Is not portable
- Could overwhelm passengers, due to busy appearance (information overload)
- Limited in offering private assistance
- Blocks people's view, which creates a narrow appearance in the departure hall
- Extremely expensive

Concept T3: Projected touchscreen on the table

A flat, touch-responsive interface projected onto a table surface, enabling agents and passengers to interact with digital content in a collaborative and physical setting without traditional screens or devices. The agent tool can be projected upon request, only being projected when a passenger or agent uses it. The fact that this projector can be turned on and off results in a 'clean counter' aesthetic.

The Hachi Puppy Cube Projector Touchscreen (Hachi Puppy Cube DLP Projector, 2025).

Advantages:

- Enables shared, hands-on use
- Clean design without much visible tech
- Good for step-by-step guidance (can display complete process steps)
- Supports group interactions

Disadvantages:

- Requires controlled lighting
- Is not portable

Concept T4: Smart floor

An interactive floor system using lights, sensors, or pressure technology to guide movement and indicate waiting zones or wayfinding paths. It can support smoother and more intuitive navigation through the space, changing color based on the individual passenger walking there.


Examples of a smart floor (left: Luo, 2025; right: Lukas, 2025).

Advantages:

- Offers silent, visual guidance
- Tracks movement patterns
- Aids accessibility for hearing-impaired passengers

Disadvantages:

- High setup and upkeep costs
- Limited direct interaction with passengers
- Limited use for color-blind passengers

Concept T5: Earbuds

Wireless in-ear devices that allow passengers to hear instructions or translations directly from the agent, ideal for real-time, personalized support, especially in loud or crowded environments.


Examples of earbuds (left: Happy Plugs, 2025; right: image was created with AI).

Advantages:

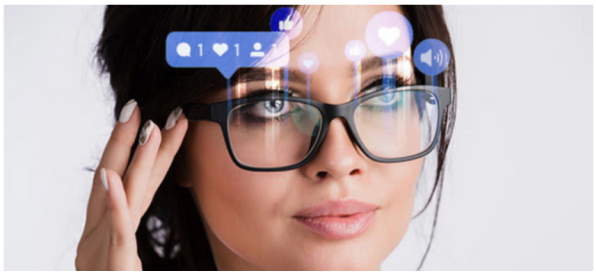
- Information only reachable for agent
- Enables real-time translation
- Works well on the move

Disadvantages:

- Management and distribution can be complex
- Not ideal as standalone device due to not having a screen

Concept T6: Smart glasses

Wearable augmented reality glasses for agents, providing them with real-time information, facial recognition, and document scanning to discreetly support and assist passengers without breaking flow or eye contact.



Examples of smart glasses (left: Ambiq, 2023; right: Jirehl, 2021).

Advantages:

- Hands-free data access
- Information only reachable for agent (even though agents needs to provide input)
- Improves agent responsiveness

Disadvantages:

- Costly and complex to maintain
- Requires extensive training
- May come off as impersonal
- Not ideal as standalone device due to small screen

Concept T7: Smart watch

A wrist-worn device providing agents with quick access to alerts, passenger updates, or workflow cues, allowing them to stay informed while remaining mobile and hands-free during assistance tasks.


Examples of smart watches (Experience, 2014).

Advantages:

- Subtle, quick information access
- Keeps agents mobile and responsive
- Discreet in use

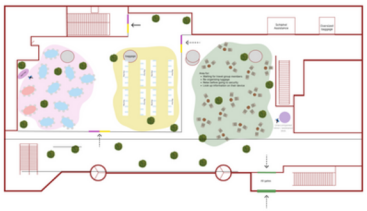
Disadvantages:

- Small screen limits information detail
- Not ideal as standalone device due to small screen
- May come off as impersonal

Concept T8, keep the current tool: Tablet

Tablets are what agents currently use in the departure hall. Each KLM PSA has their own iPad mini, on which they use an in-house developed staff application. Agents use them to look up simple information and make small changes, but most helping tasks regarding bookings are still performed on a desktop computer, as is shown in Chapter 2.2.

Appendix F. Layout ideas



To-security entrance
"green path"

access when:

- Boarding pass is received
- No checked luggage

Bag drop entrance
"yellow path"

access when:

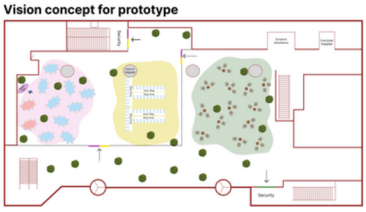
- Boarding pass is received
- Checked luggage needs to be dropped off

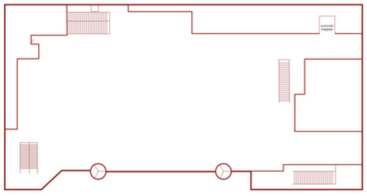
Agent help entrance
"purple path"

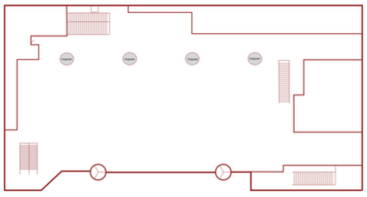
access when:

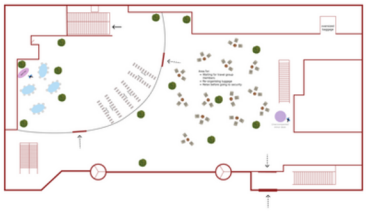
- No boarding pass (special case)
- QR-code (oid) from KLM app

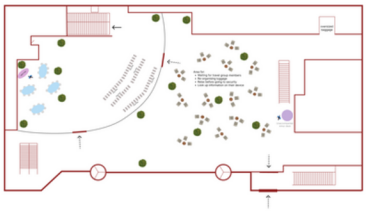
Vision concept for prototype

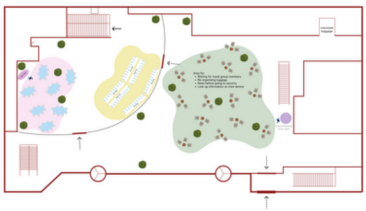


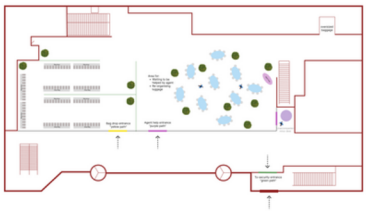


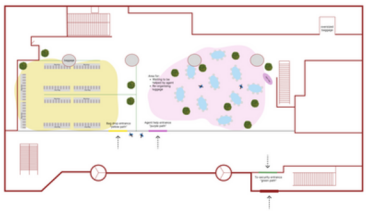


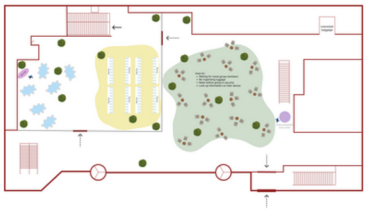


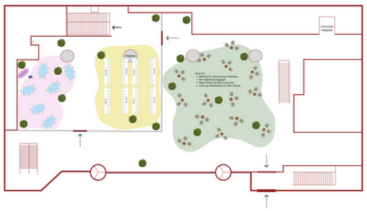


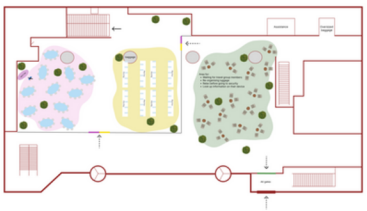


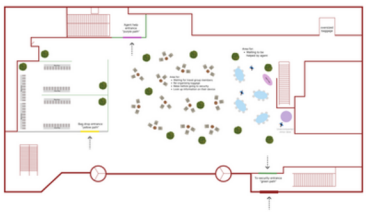


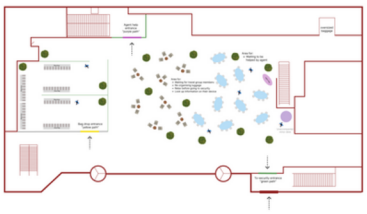


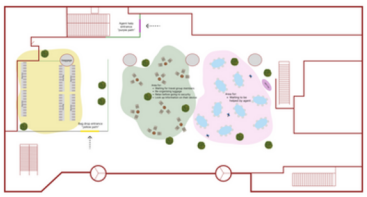


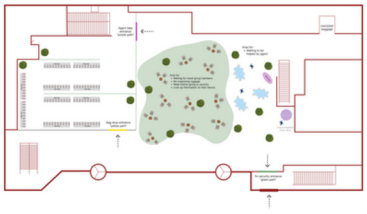


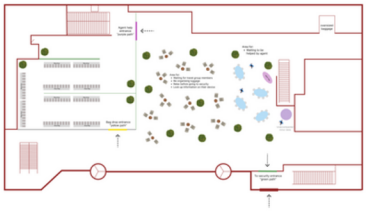






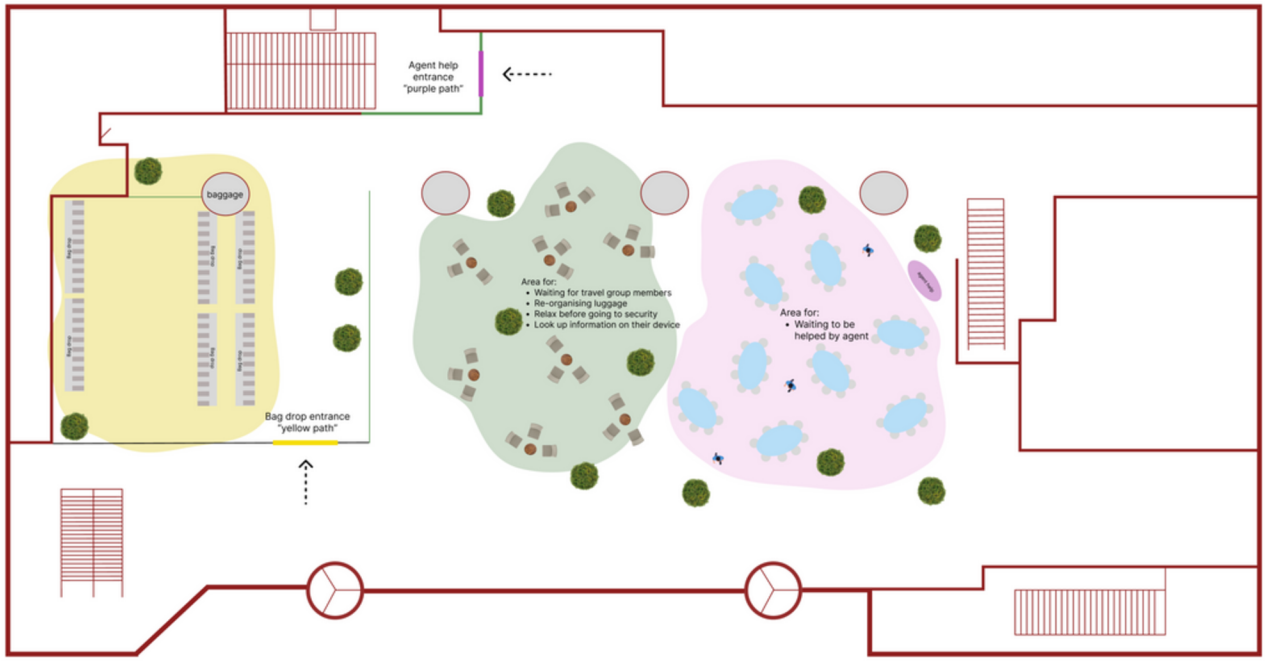






Appendix G: Layout concepts

Concept S1



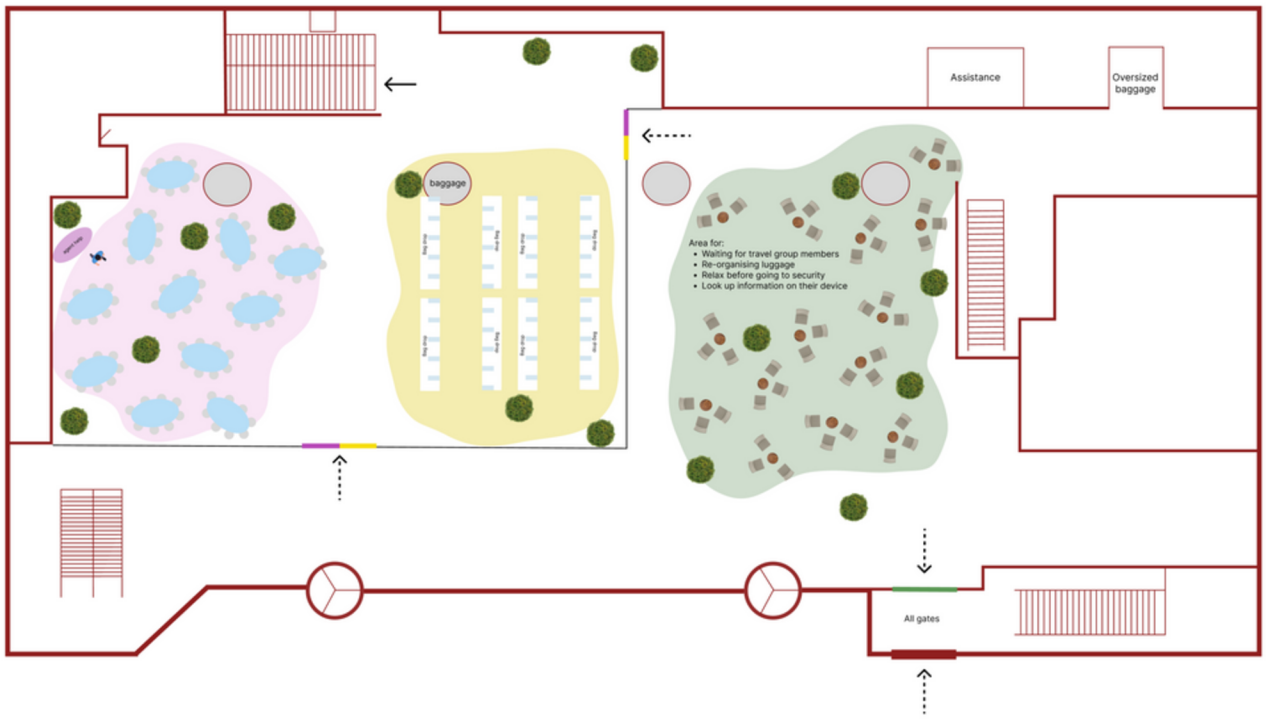
Advantages:

- The baggage drop area is on the left, which is easy to seal off.
- People that assist passengers have easy access to walk along to the KLM Care Center and assist during the boarding pass retrieval.
- Anyone can enter the KLM Care Center, which creates an open feeling.
- There is a dedicated area for people to do 'free activities'.

Disadvantages:

- After being helped in the KLM Care Center, passengers that still need to drop off their baggage will have to move through the green area, which could lead to congestion in this middle area of the hall.
- Anyone will be able to enter the KLM Care Center, included non-KLM passengers and non-flyers which will cause unnecessary congestion.

Concept S2



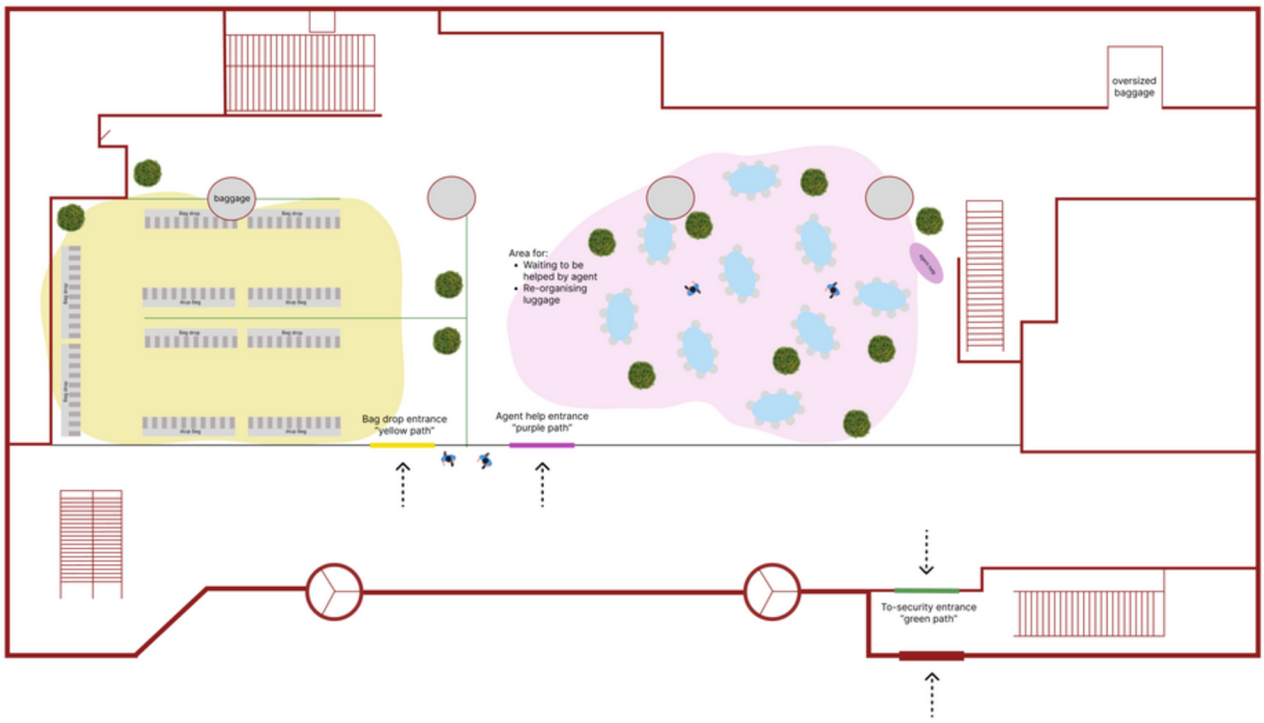
Advantages:

- The baggage drop area and KLM Care Center are on the left, which are easy to seal off.
- There is a dedicated area for people to do ‘free activities’.
- Only KLM passengers will be able to enter the KLM Care Center, which will prevent unnecessary congestion.

Disadvantages:

- People that assist passengers don’t have access to walk along to the KLM Care Center and assist during the boarding pass retrieval.

Concept S3



Advantages:

- The baggage drop area is on the left, which is easy to seal off.
- There is much space for busy days, for when many people need to visit the KLM Care Center.
- Only KLM passengers will be able to enter the KLM Care Center, which will prevent unnecessary congestion.

Disadvantages:

- After being helped at the KLM Care Center, passengers will need to exit and re-enter the baggage drop area in order to drop off their baggage.
- People that assist passengers don't have access to walk along to the KLM Care Center and assist during the boarding pass retrieval.
- There is no area dedicated area for people to do 'free activities', which causes extra business in the other areas of the departure hall.

Appendix H: 3D Prototype images


KLM
KLM
KLM


KLM
KLM

Appendix I. Test plan for passenger testing

Introduction

Objective: Assess the impact of the vision concept on passenger confidence, specifically regarding wayfinding and the changed role of Passenger Service Agents in the departure hall.

Scope

The test will evaluate user interactions with the digital environment, focusing on navigation and information accessibility through a changed passenger application on their device, as well as smart tables and wayfinding lines in the departure hall. Additionally, the role of the agents will be changed.

Objectives

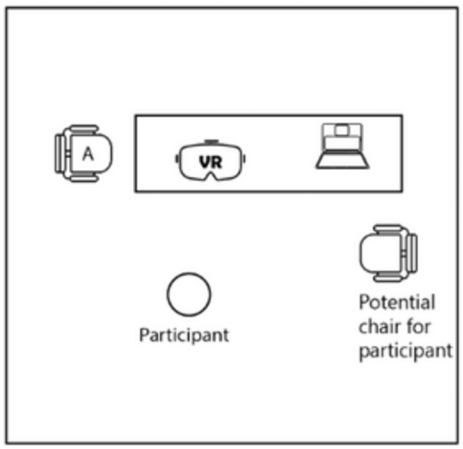
Primary goal: Evaluate if the redesigned system and the changed role of agents increase passenger confidence while navigating the departure hall.

During this test, it will be determined if the following criteria are met with the vision concept:

- Intuitive navigation through the departure hall
- Technological Integration of Care Tables
- Communication to passengers
- Passenger confidence

Test environment

Prototype setup:
The prototype is running in a 3D software, which is put on a desktop PC. A Meta quest 2 VR headset is connected to it, which will be put on by the participant. A screen will be connected to the computer on which the researcher can watch the participant's view live.



Tools:

- Twinmotion real-time 3D visualization software
- Meta Quest 2 VR Headset (suitable for wearing glasses below)
- PC computer + screen
- Phone for recording
- Informed consent form
- Interview guide for the interviewer

Participants

Participants will be selected to be as diverse as possible in terms of demographics, travel experience and language proficiency. The sample size is six, and is shown in the table below.

	Age	Gender	Nationality	Flight experience (per year)
Participant 1	50s	Male	Dutch	3-5 trips
Participant 2	50s	Female	Dutch	3-5 trips
Participant 3	20s	Female	Indian	5-10 trips
Participant 4	20s	Male	Dutch	<1 trip
Participant 5	20s	Female	Dutch	0-1 trips
Participant 6	20s	Male	Dutch	5-7 trips

Methodology

The test consists of 4 sections:

Semi-structured pre-test interview:
First questions will be asked for the participant to become comfortable, collect demographic data as well as assess initial participant confidence and gather baseline data. Additionally, participants are asked if they have experience in using a VR headset, as people can be nervous in using it for the first time.

Getting used to VR environment:
Let participant get acquainted with the navigating through the prototype. First, the researcher will demonstrate the controls of the VR headset and controller, making sure the participant understands how to move through the model. Afterwards, the tasks start.

Tasks in VR environment:
Let participants complete specific tasks with 2 scenarios that are based on real-life examples.

Semi-structured post-test interview:
Measure changes in the confidence levels and collect qualitative feedback on the concept.

Each test will take between 20 and 30 minutes, depending on the length of answers that are given by the participant.

Data collection

Participants will answer questions before and after their experience. This will be collected in the form of an audio recording. The audio recording will be transcribed and deleted after the project ends. All data will be anonymized to maintain confidentiality.

Risks and Mitigations

Participants might be not used to a VR environment and become disorientated. To prevent this, they will first receive a demonstration on how to use the VR system and how to navigate through it.

It is also possible that participants get stuck, while navigating through the VR environment. For example, they could (virtually) teleport themselves to be standing on top of a tree or other unplanned object. In this case, the researcher will intervene and solve the problem for the participant by letting the participant take off the VR headset, and routing back to the point before the issue happened.

Analysis and reporting

The pre-test and post-test results will be compared to evaluate the changes in things like passenger confidence. The qualitative data will be analyzed to understand the specific aspects that influenced the confidence of the user.

Appendix J. Interview guide for participant testing

Interview preface

Welcome and thank you for participating in this research. The total interview will take around 20 minutes. This study is about the design of a new departure hall at Schiphol. First, you will be asked some general questions regarding your previous departure hall experience. Then, we ask you to wear VR glasses and experience the process inside of an airport departure hall. You will hear instructions which you are expected to follow. Please talk out loud and voice all your thoughts, feelings and experiences during the process. After the VR experience, we will evaluate the process and ask you a series of questions. Try to embrace the experience as if it were real life for the sake of the interview.

Informed Consent Form

The participant reads and signs the consent form. This can be done either digitally or on paper.

Pre-Test Interview Questions

Demographic Information:

- Can you please tell me your age?
- What is your occupation?
- How often do you travel by airplane each year?

Travel Experience:

- How confident do you usually feel when navigating an airport? Why?
- What challenges have you encountered in airports regarding finding your way?
- What do you expect from a futuristic departure hall in terms of navigation and assistance?
- How do you think technology could improve your airport experience?

Scenarios

Scenario 1: Yellow route

- Participants receive a phone screen with the yellow route information. They should move through the airport to drop off their baggage and proceed to security.

Scenario 2: Purple route

- Participants receive a phone screen with the purple route information. They are flying with a pet and need to get checked to receive a boarding pass. They go to the KLM Care Center, get helped there and proceed to security.

Post-Test Interview Questions

Overall Experience (retrospective think aloud):

- What did you think of the overall experience?

- How would you rate your overall confidence in navigating this prototype compared to a typical airport?
- What specific elements of the wayfinding system contributed to your confidence?
- Can you describe any difficulties you are experiencing with the signage or digital guides?

Suggestions and Improvements:
- What improvements would you suggest for the wayfinding system?
- Are there any additional features or technologies you think should be included to enhance the experience?

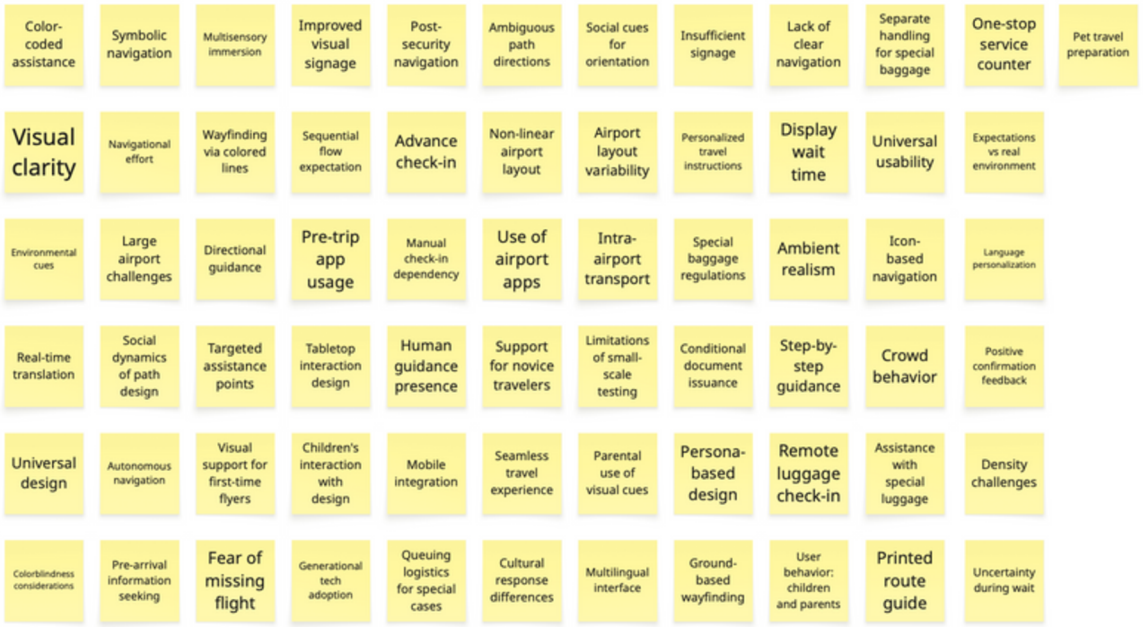
Comparison and Future Outlook:
- How does this experience compare to your previous airport experiences?
- What aspects of this prototype would you like to see implemented in real airports in the future?

Closing Thoughts:
- Is there anything else you would like to add about your experience today?

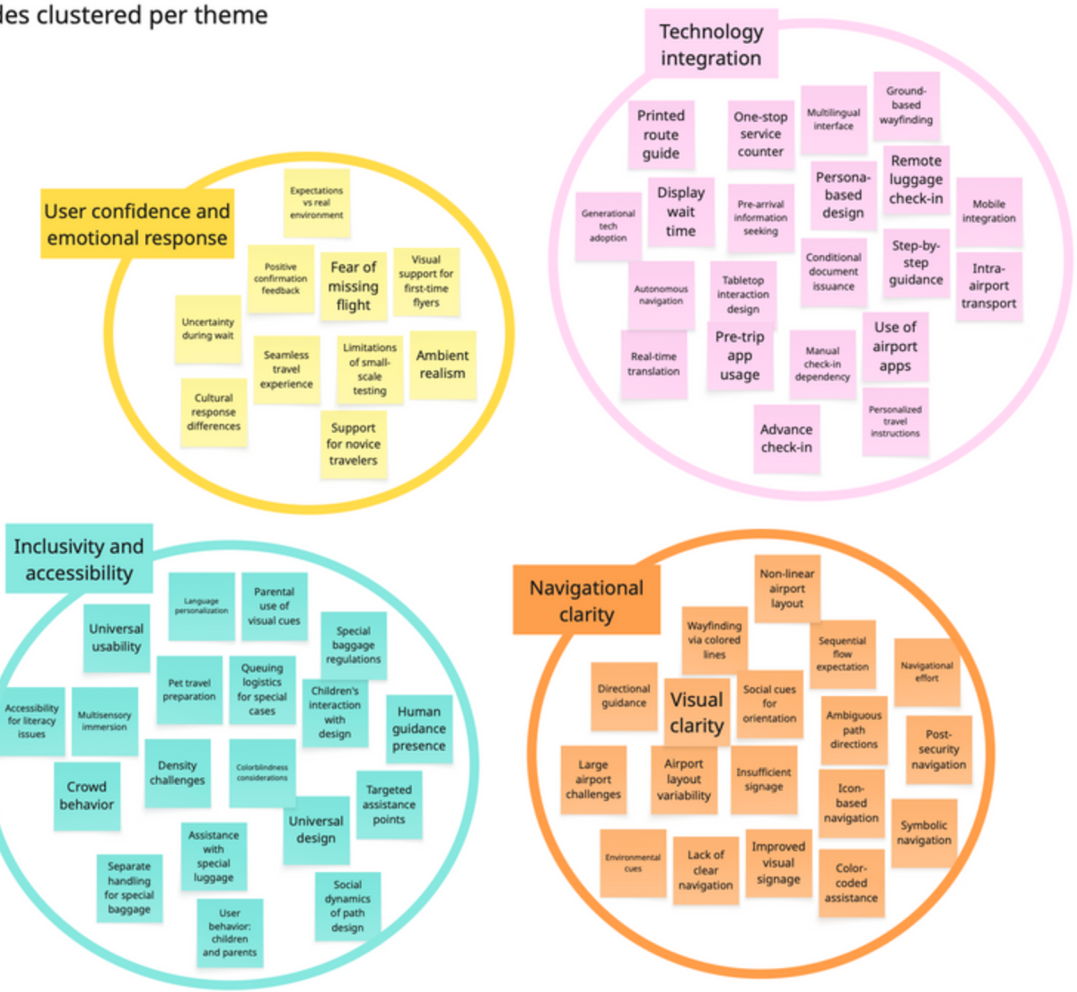
If you have any thoughts afterwards, feel free to contact me.

Appendix K: Passenger testing codes and clusters

All codes



Codes clustered per theme



Appendix L. Test plan for Passenger Service Agent testing

Introduction

This test aims to evaluate the vision concept in the form of a digital prototype from the perspective of Passenger Service Agents. The prototype reflects a future scenario for in 15 years' time, and is intended to explore how agents interact with new spatial layouts, tools, and service flows. By involving real agents in the testing process, valuable feedback can be gathered, to improve the concept into its final form.

Objective

- To assess the usability and effectiveness of the new environment and tools for agents.
- To identify potential challenges in performing agent tasks in the redesigned hall.
- To gather qualitative feedback on role division, task flow, and emotional engagement.
- To understand how the proposed changes support or hinder daily operations.

Test environment

The test will take place in a controlled setting where participants will interact with a 3D digital prototype through viewing moving footage. The setup will simulate full-scale movement through the hall and allow participants to imagine performing typical tasks within the future scenario.

Prototype setup:
The prototype is running in the form of videos, which are shown on a computer screen.

Tools

- Videos of the 3D model
- PC computer + screen
- Phone for recording
- Informed consent form
- Interview guide for the interviewer

Participants

The test involves current KLM Passenger Service Agents from Departure Hall 2, including agents with a variety of experiences (the length of their employment, as well as experience in different operational roles). All of the participants have experienced working as a PSA, however some of them currently have a more superior role, overseeing multiple Passenger Service Agents

	Current job title	Work experience	Gender
Participant 1	Unit Manager	10 years	Male
Participant 2	Project Manager	2 years	Female
Participant 3	Landside Coordinator	23 years	Female
Participant 4	Landside Coordinator	25 years	Female
Participant 5	Ticketing agent	21 years	Male
Participant 6	Regular PSA	5 years	Male
Participant 7	Regular PSA	2 years	Female
Participant 8	Regular PSA	1 year	Male

Methodology

The test consists of 4 sections:

Semi-structured pre-test interview:
First questions will be asked for the participant to become comfortable, collect demographic data as well as assess initial participant confidence and gather baseline data.

Explanation of the concept:
Show the participant the different elements of the concept; from a passenger perspective as well as what it will look like for the agent. Focus lies on the 2 Care Agent tiers, as well as the interactions on the Care Tables.

Scenarios:
Let participants complete specific tasks with 2 scenarios that are based on real-life examples.

Semi-structured post-test interview:
Collect qualitative feedback on the usability, emotional and cognitive workload of the concept. Also, ask for suggestions of improvement.

Each test will take between 20 and 30 minutes, depending on the length of answers that are given by the participant.

Data Collection

Participants will answer questions before and after their experience. This will be collected in the form of an audio recording. The audio recording will be transcribed and deleted after the project ends. All data will be anonymized to maintain confidentiality.

Risks and mitigations

Several risks were identified regarding the testing process, along with ways to mitigate them. The novelty of the prototype may influence participant responses, potentially leading to overly positive or speculative feedback. This will be mitigated by clearly explaining the speculative nature of the design and encouraging participants to focus on realistic, day-to-day usability.

There is also a risk of influencing the participants' experience with technical aspects during the session, such as the speed of the video or program malfunctions. To minimize disruption, all equipment and the test environment will be thoroughly prepared and tested in advance, with backup solutions on hand. Finally, participants might hesitate to share critical feedback, especially if they perceive the concept as being officially endorsed. To counter this, the sessions will be conducted in a non-judgmental atmosphere, and participants will be reminded that their feedback is anonymous and highly valuable to the development process.

Analysis and Reporting

The data will be analyzed using thematic analysis, turning the transcripts into codes and subsequently identifying recurring themes and patterns in agent feedback and observed behavior. Codes will be grouped under categories such as usability, clarity of tasks, role satisfaction, and tool interaction. The findings will be summarized in a dedicated chapter of the thesis, with key insights used to inform the next design iteration. Illustrative quotes and visuals from the test will support the analysis.

Appendix M. Interview guide for Passenger Service Agent testing

Interview Preface

Welcome and thank you for participating in this user test. The total interview will take around 20 minutes. This study is about the design of a new departure hall process at Schiphol and the tools that will be used by passenger service agents like yourself to assist passengers. You will be shown a series of videos that represent different scenarios in a concept for the future departure process. The goal is to gather your thoughts on usability and clarity, as well as to understand how these changes might impact your work. Your insights will help us refine the design in a way that better supports your role. The session will take approximately 45 minutes.

Informed Consent Form

The participant reads and signs the consent form. This can be done either digitally or on paper.

Pre-Test Interview Questions

These questions are designed to understand the agent's current role and experiences.

- How long have you worked as a passenger service agent?
- What are your current responsibilities during your shifts?
- Which digital tools do you currently use the most, and how helpful are they?
- How often do you encounter special cases that require case-specific steps or checks?
- How confident do you feel using new technology introduced into your workflow?

Scenarios

Participants will be shown 2/3 short video scenarios, each illustrating a different moment in the future passenger journey. After each video, questions will be asked to gather feedback.

Scenario 1: Assisting a passenger with special case check-in (as Care Agent Tier 1).

- The agent uses a Care Table to complete documentation checks for checking in a pet and guide the passenger through the process.

Scenario 2: Handling a passenger with a difficult question (as Care Agent Tier 1).

- The agent asks PSHelp through the earbuds and offers quick support using the small-AI program.

Post-Test Interview Questions

After viewing and discussing all scenarios, the following questions will be asked:

General impressions

- What was your overall impression of the proposed tools and environment?

Did any part of the process feel unrealistic or impractical (if it would be real life)?

Impact on work

- How do you feel this concept would change your workload or interactions with passengers?
- Would these changes positively or negatively affect your job satisfaction? Why?

Future role and adoption

- How confident would you feel using the tools shown in the video in your daily work?
- Do you see yourself in the Tier 1 or Tier 2 role, and why?
- What improvements or additions would you suggest for this concept?

Closing thoughts

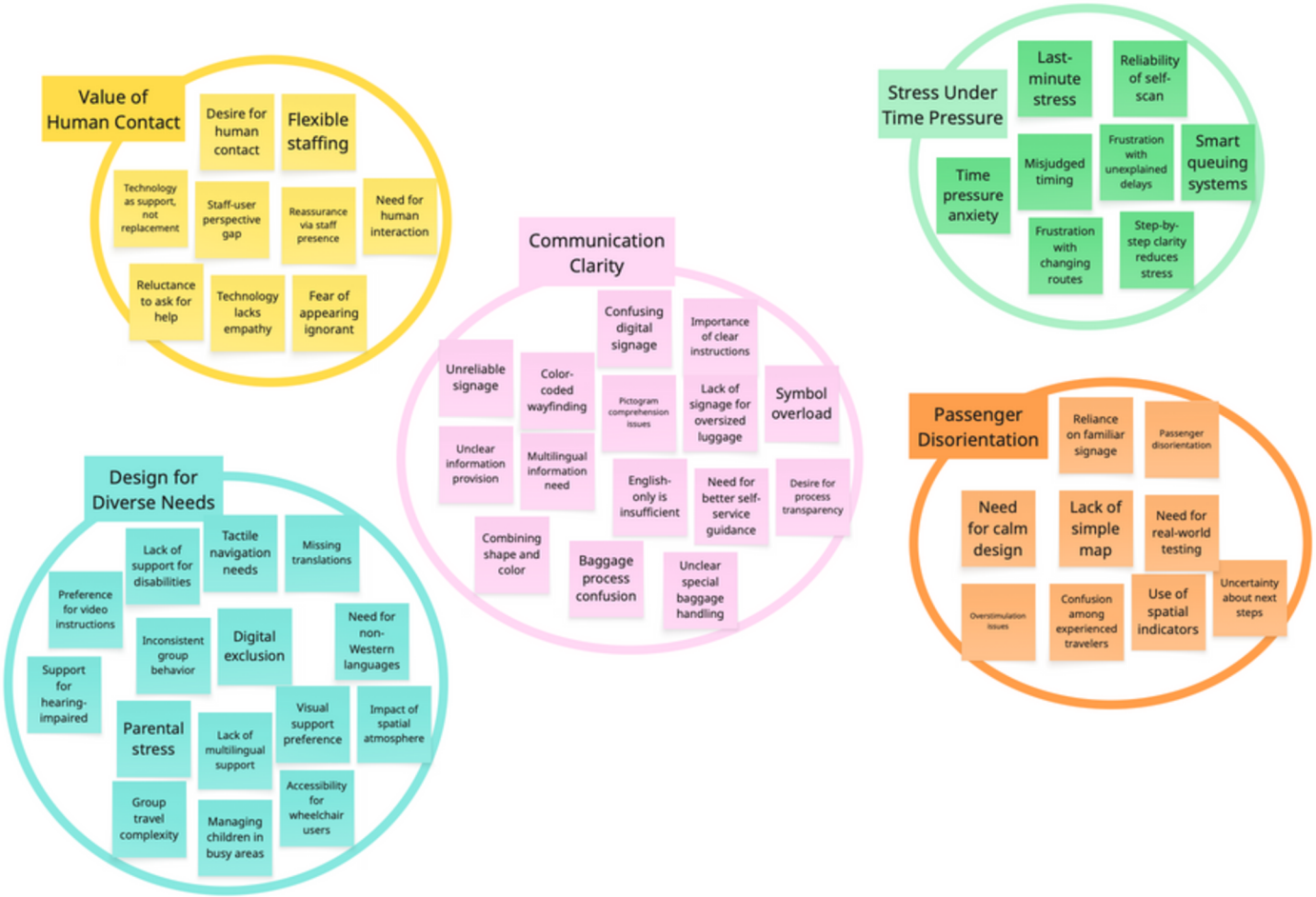
- Is there anything else you would like to add about your experience today?

If you have any thoughts afterwards, feel free to contact me.

Appendix N. Passenger Service Agent testing codes and clusters

All codes

Codes clustered per theme



DESIGN FOR our future

TUDelft

Personal Project Brief – IDE Master Graduation Project

Name student Ivy Steijn **Student number** 4732804

PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title

Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

Introduction

Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

The project takes place in the context of the "Airport/Departure Hall of the Future" project, which reimagines and innovates on the passenger experience of the departure hall in 15 years time. The project's primary focus is to design an innovative and future proof departure hall for KLM, while making use of new and upcoming technologies to increase efficiency, service quality and passenger satisfaction.

The KLM Passenger Services has currently created a future vision. This vision is mainly focused on how the passenger journey should change, as they are expected to organise as much as possible from home digitally. Also, KLM predicts is that in the future, more passengers are expected to pass through the airport (due to more big aircraft being used), but there will not be more space for them than there currently is. As a result, the amount of check-in desks is planned to be decreased.

A lot of inspiration for how this context will take shape in the future can be taken from other initiatives in which digitalisation takes place. Examples are other airports, banks, hospitals and libraries. In here, both the physical layout of the space as well as the role of the staff have changed already due to digitalisation.

Key stakeholders are KLM itself (and the departments designing for it like D&T platform Ground and Customer Experience), passengers, Schiphol airport authorities, and KLM Passenger Service (PS) agents inside & outside of the departure hall themselves. Each stakeholder has interests that consist of efficiency, spacial reorganisation, improved service and new technologies.

→ *space available for images / figures on next page*

introduction (continued): space for images

image / figure 1

image / figure 2

Personal Project Brief – IDE Master Graduation Project

Problem Definition

What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice.
(max 200 words)

The current role of Passenger Service (PS) agents is currently primarily task-driven, where they work behind desks, focused on handling passengers. However, with new technologies and policies being in development, and the changes in the passenger journey, new opportunities are created to change their role. In the current KLM PS future vision, the role of the agent's will change to one more focused on hospitality instead of task-driven. However what this means, and what this could look like remains undefined. Also, KLM needs to stay ahead of the competition and keep finding innovative solutions that increase efficiency, service quality and passenger satisfaction. Therefore, it is important to create a strategy on what KLM can do now in order to stay competitive in the future, as well as a product/service intervention that its staff can use in order to facilitate their work.

I will start this 150 day project with scoping down which part of 'the process' I will focus on. I will look at things like parts of the check-in process, baggage, document check, special needs passengers etc. After making a decision on this, this project will consist of 3 phases:
1. Research and understand how the process will change in 15 years.
2. Create a product/service intervention to facilitate the PS agent in that future process.
3. Develop an implementation strategy for that intervention.

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence) As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:

Design a product/service intervention to improve the work for KLM Passenger Service agents in the departure hall in 15 years, as well as create an implementation strategy taking into account the needs of KLM, passengers and the Passenger Service agents themselves.

Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)

With the triple diamond method:

Discover phase:
Understanding the current role of PS agents, as well as what it has been like in the past. Perform observational studies in departure hall, interviewing stakeholders (PS agents, passengers, airport authoroties, CX for the future departure hall on the passenger side), literature research on digitalising service workers, trend analysis (airport context & identification-technologies).

Define phase:
Determining future vision, ideating & exploring solutions in other contexts (banks, hospitals, libraries), generating prototypes.

Develop phase:
Concept validation, user testing, co-creation session(s), design roadmapping (value mapping, idea mapping,

Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a ***kick-off meeting***, ***mid-term evaluation meeting***, ***green light meeting*** *and* ***graduation ceremony****. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).*

Make sure to attach the full plan to this project brief.
The four key moment dates must be filled in below

Kick off meeting	20 November 2024
Mid-term evaluation	5 February 2025
Green light meeting	4 June 2025
Graduation ceremony	2 July 2025

In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project

Part of project scheduled part-time	
For how many project weeks	
Number of project days per week	

Comments:

Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five.
(200 words max)

This project specifically excites me as a designer as it allows for a combination of human centered design and strategic thinking (roadmapping), two aspects of design that I'm passionate about the most.

I want to create meaningful service experiences that have a 'real' impact. In a major airline like KLM, I feel like I can improve the experience of passengers, but really look at the role of the agent and the company perspective as well. I think that there are few companies to have such a big department focusing on enterprise design, as opposed to only focusing on the customers/passengers.

During the project I want to improve my competencies in: understanding user needs, designing interactions and develop strategic concepts for a big company. I have a big passion for the aviation industry, and having quite some experience now already in this context, it excites me even more that I get to spend my graduation project in it.

Some of my learning goals are to improve skills in service design and systems thinking, and understanding the role of technology in future services as well as the influence of (international) policy on it.