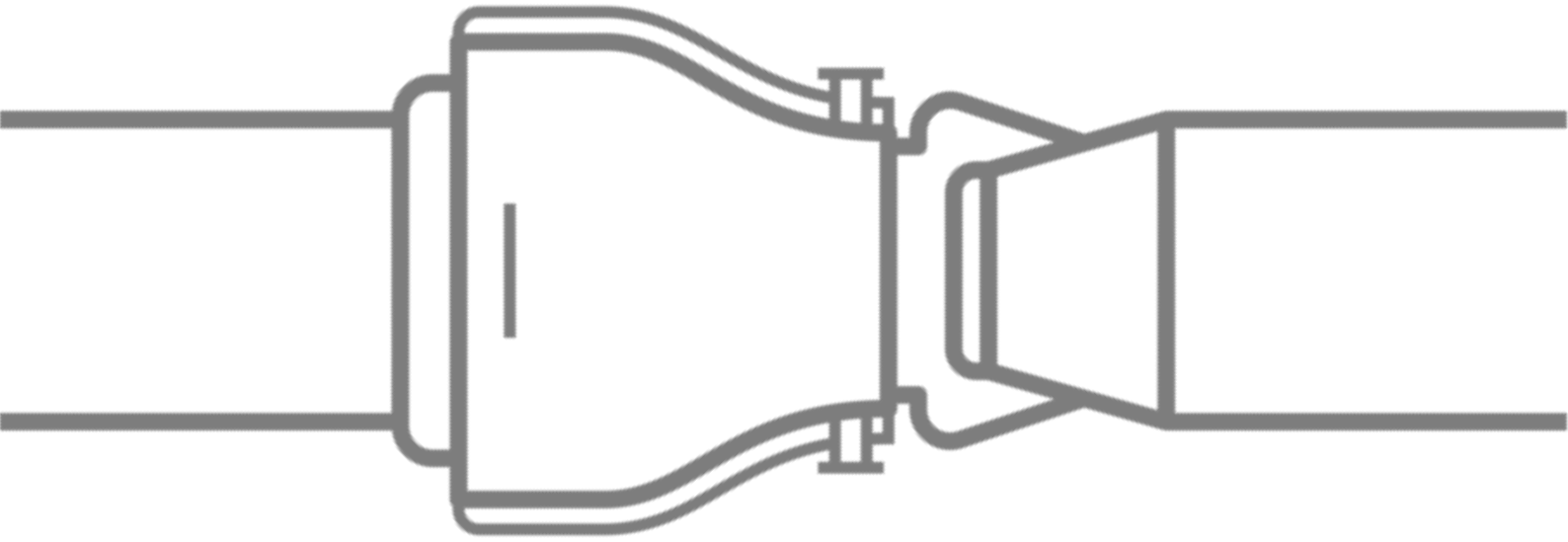
ENHANCING INFLIGHT DINING EXPERIENCES

A design for providing control to economy class passengers over their meals



Graduation Report by
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Master Graduation Thesis

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GLOSSARY

Words and abbreviations to know and understand before the report begins

IFE - Inflight entertainment (The screen in front of your seat)

PSU - Personal service unit (The service unit above you with the air conditioner vent and a provision to call for the crew)

PED - Personal electronic device (Mobile phone, Ipad or more)

FA - Flight attendant

BOB - Buy on board (service)

PUSH MODEL service - This is the regular service of serving food onboard, where you don't pay for food separately and the crew just brings the food for all in the trolley.

PAX - Passengers

Galley - A galley is the kitchen on the aircraft.

Service in the context of onboard experience - Apart from flying from one place to another destination, all services provided by the airlines, onboard are considered as a service.

ABOUT AVIATION INDUSTRY

*"**Over the past decade, as the global economy has improved, airlines have grown in profitability, matured in terms of employing better capacity management and cost controls, and have benefitted from the explosion in demand for passenger air travel.**"* (O'Mara, n.d.)

Over the past 30 years the airline industry has seen a number of changes, such as the increased market share of low-cost carriers (LCCs). The commercial Aviation industry was born in 1914 and there has been a revolution in air travel since then. Today, air travel is cheaper, safer and open to more people than ever before. Moreover, travellers can have full confidence that they will be looked after on their journey due to the rapidly developing on board services.

EXECUTIVE SUMMARY

The project brief was to redesign and improve economy class passengers' dining experiences onboard.
"Air travel has been growing as a commodity much more rapidly than it is visible. "Over the last 40 years global air travel has almost increased eightfold: In 1974 air planes carried 421 million people globally. In 2014 this number has increased to 3,21 billion passengers – that's a billion more in just five years time." (Schuttenhelm, 2016)

Air travel is rapidly becoming easily accessible to almost everyone and everywhere in the world. Low budget carriers are also making it possible for low budget travellers to afford short / long haul trip(s) in a year. With the growing number of flights and connections, the demand and offering for onboard services is also increasing. The levels of these onboard services are different based on the seating arrangements in the air carrier. As of now there is less allowance of personalisation for economy class passengers, but it is expected for the onboard experience by 2025 to be different from what we know it today. To keep up with these growing trends, Safran, the project collaborator, as a world leader for Aviation equipment supply wants to work towards bringing continuous changes to enhance passengers' journey experiences.

To be able to understand what needs to be improved, passengers' current problems had to be identified. The focus of this research was the younger generation (students in this case) of passengers as they are usually highly opinionated and tech savvy with a preference for personalised services. A participant research had been conducted with 15 participants from different nationalities. **The research conveyed that currently passengers experience uncertainty in their onboard meal experience. They often have no information or choice on what they ate or when they ate. Moreover, they feel time pressured in their decision making between often only two options given by the crew in a short span of time.**

This project aims to reverse the uncertainty, the passengers feel, by providing them with information and allowing them to make choices about what they can eat and when they want to eat. The medium designed to enable passengers in making these choices can be accessed through the IFE screen. This medium / tool is a service application known as À la craft, which lets passengers to order their preferred meals (main course, salads, desserts, beverages) and choose when they wish to eat from the given time slots. In addition to this the service also offers passengers, a surprise cultural meal which is determined based on their destination.

This new service may attempt to solve most of the passengers' concerns but increases crew workload if the required technology does not support their tasks. When the passenger places an order from their seat, these orders are then sent to the galley. A screen in the galley will let the crew access the orders and it also instructs them to heat (prepare) the required number of meal items in each category of the meal course and place them in the trolley. Another screen on the trolley will help the crew in locating pax in the aisle and their order details. This service can be eventually implemented, part by part in the way of working for the cabin crew as it is a major step into improving pax's dining experiences. This service has been tested for the target group alone, but it can be assumed that testing for all the other pax groups may bring in more changes in the pax's requirements. The final test found that this service gives autonomy and control to those pax that need it but may give a decision paralysis to those pax that do not prefer making so many choices.

Most importantly, if the service could have been tested in the real context, potential for improvement would have emerged for iterations in terms of the application operated in the aisle and supporting technology for the crew in the galley. In a brief research conducted over the crew's concerns, it has been understood that they believe in letting economy class passengers choose their meal through the IFE as serving and repeating same information on meals to more than 15 rows of passengers is heavily exhausting. It is my assumption that this may increase the workload for the crew by a few more minutes spent in preparing the orders and also would require more coordination with each other to serve pax as per their choices but would ease their workload in the aisle. Based on the findings of this study it is recommended for Safran Group to conduct further research, test the design in the real context by involving the crew and caterers as well and further develop the design it as it has a high potential for improvement and implementation in the future.

READER'S GUIDE

For those readers that cannot spend time to read the entire report but want to understand the project, this reader's guide can help you in finding your way in the report. This report represents a 20 week Masters thesis in Design for Interaction program at the faculty of Industrial Design Engineering in TU Delft. The report has been divided into 8 parts. Each of these parts have chapters in them. Each part has an appendix. All the appendices will be found at the end of the main report.

Part 1 - Project take off

The first part of the project explains the project brief (Chapter 1.1), goals (Chapter 1.2), scope (Chapter 1.3), research methods (Chapter 1.6) and about the company (Chapter 1.7).

Part 2 - Discovering the context

This part starts by understanding what the **onboard dining services** are, how they are delivered to the pax and also what are the **current processes** that are followed by airlines in the dining services (Chapter 2.3). Research about **various other dining services** in the avaition industry can be found here (Chapter 2.4). Finally this part explains about what was found through the **two expert interviews** about the domain, Onboard services (Chapter 2.5)

Part 3 - Discovering Passengers' experiences

It was crucial for the project to understand passengers usual experiences as they are the main stakeholders. Firstly, **types of passengers** had been identified and a **target group** had been picked (Chapter 3.2). Then, a **research** to discover passengers' experiences had been conducted and its **set up** can be found in Chapter 3.3.

Part 4 - Understanding passengers' experiences

The research analysis recognised a few **uncomfortable situations** that pax regularly found themselves in (Chapter 4.3). The interviews from the research explored **pax's definition of 'control'** on their experiences (Chapter 4.4). This chapter will give a deeper insight and understanding into **pax's current concerns** (Chapter 4.5), the **current context** and **how the pax feel in it** (Chapter 4.6).

Part 5 - Building the desired context

This part of the report / project lays a foundation to create the final design. The **desired context** is built (Chapter 5.2) and helped in formulating a **design goal** (Chapter 5.3) and a **vision statement** (Chapter 5.4) for the next phases.

Part 6 - Ideating

The goal of this part is to build concepts to be able to test them in the next phase. **First basic ideas** (chapter 6.5) were made which helped in building **four complete concepts** (Chapters 6.6, 6.7, 6.8 & 6.9)

Part 7 - Testing the designs

The fours concepts had been tested with a few participants that suit the target group and the test results have been analysed in Chapter 7.3. Concept 2 + Concept 3 gave rise to Concept 5 in this phase of the project (Chapter 7.4). This concept also had then been tested and analysed (Chapter 7.5).

Part 8 - Project landing

The last part of the report will show the **final design** (Chapter 8.2), its **test and evaluation** (Chapter 8.3). With the help of the test evaluation the concept has been **validated with the passengers' current concerns** (Chapter 8.4). The report ends with **recommendations** (Chapter 8.5) on what could be done further more, **discussion** (Chapter 8.6) on limitations and changes in the project, a **final critical reflection as a designer** (Chapter 8.7) on what could have been improved and a project **conclusion** (Chapter 8.8).

If you want to just understand the gist of the project

- To understand passengers' current pain points, read "Passengers concerns", chapter 4.5
- To know about about the future for economy class pax's dining experiences, read "Desired context", chapter 5.2
- To know about the design goal of the project, read "Design goal", chapter 5.3
- To know about the final output of the project, read "Final design", chapter 8.2
- To know about the concerns being solved by the final design, read "Validation of Passengers' concerns", chapter 8.4
- To understand the Conclusion of the report, read "Conclusion", ,chapter 8.8

CONTENTS

1. Project Take off

2. Discovering the context

3. Discovering passengers' experiences

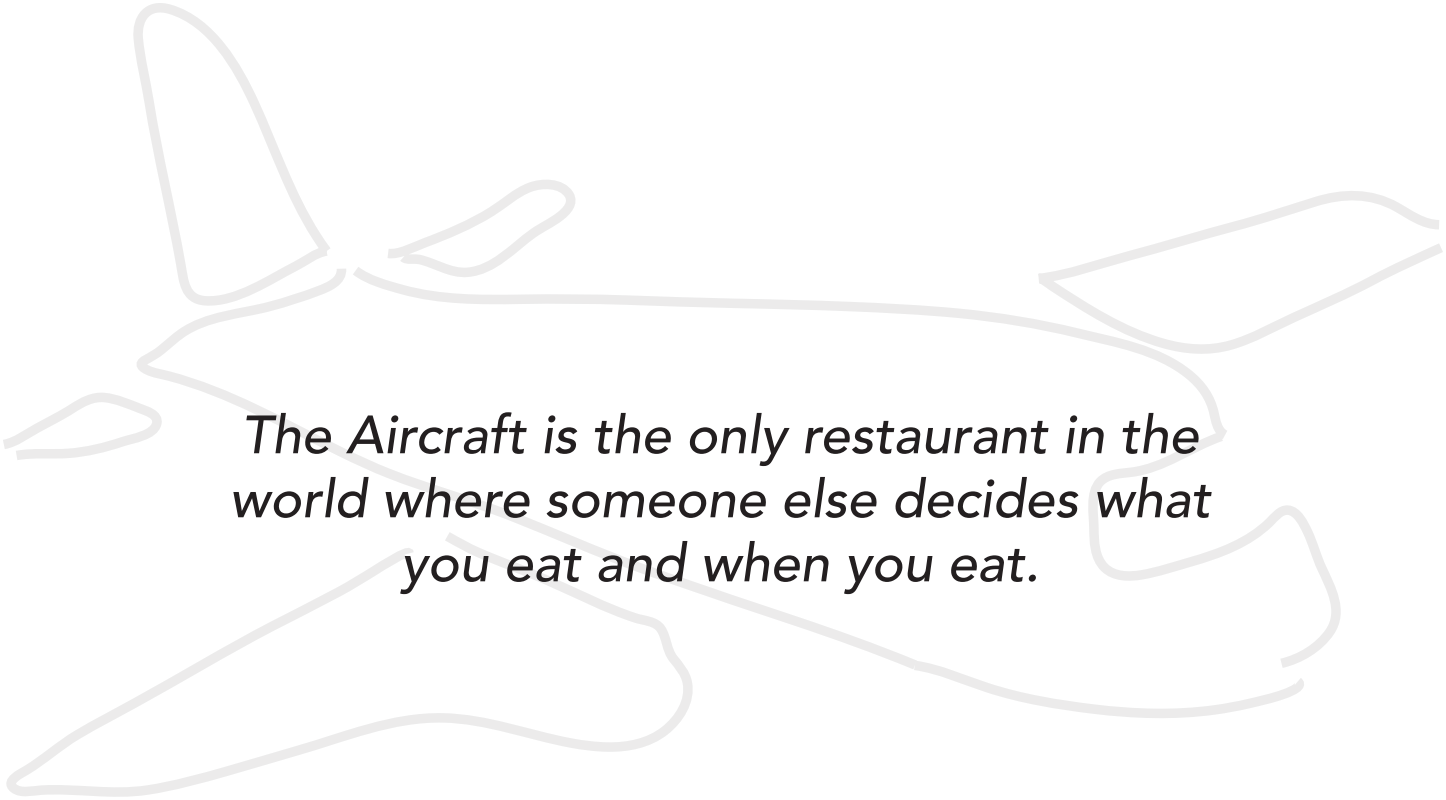
4. Understanding passengers' experiences

5. Building the desired context

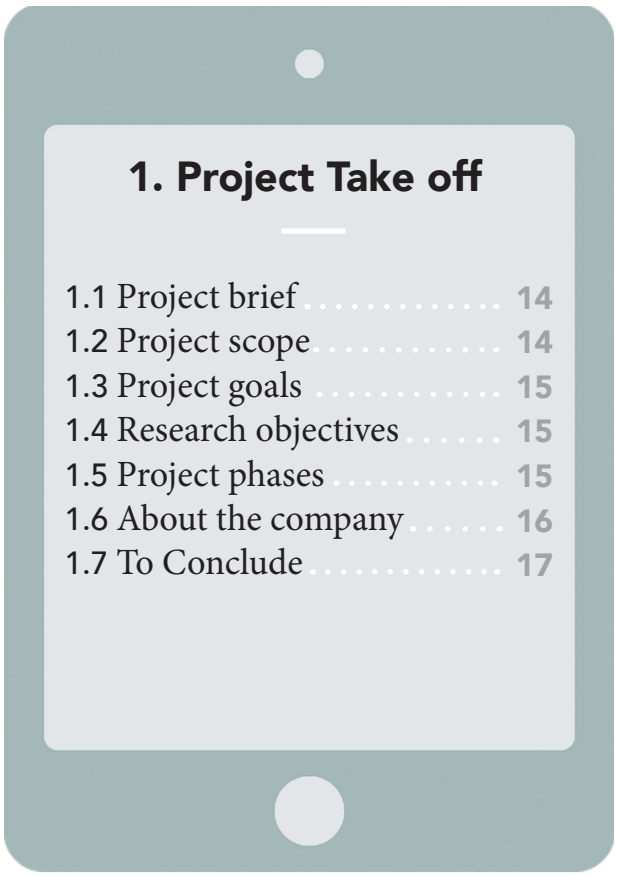
6. Ideating

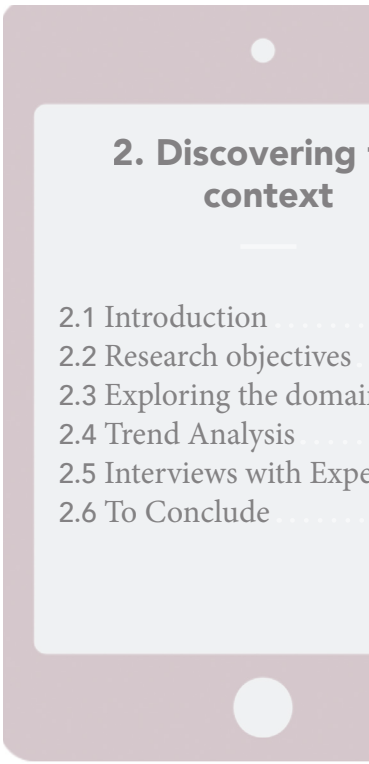
7. Testing the designs

8. Project landing



The Aircraft is the only restaurant in the world where someone else decides what you eat and when you eat.





This chapter presents the brief of the project, which was to give the passengers the best possible control of their dining experience. The aim of this chapter was to study indepth about the project scope and about the company, Safran Group. In the chapter, explored are the need for user focused journeys and long haul low cost carriers as well as are given the project phases.

1.1 PROJECT BRIEF

In this interaction design assignment, the existing paradigm of the push model service is challenged. The brief of the project is to focus on passenger and crew research to design the future interactions with the system to support the ondemand "eat what you want, when you want" experience and give the passenger a control over her or his own onboard experience.

The assignment is to design the future interactions between the intelligent food trolley, Sophy (currently being developed by Safran Group), passengers and the air cabin crew.
The main focus is to give passengers the best possible control of their dining experience in the aircraft, following 'eat what you want, when you want'. The term 'control' brought in many new perceptions that are outlined further. (page 39)

To conduct this project, following research questions needed to be answered.
1) How could these services be different for economy and business class?
2) What are the **time constraints, safety concerns** that are looked at?
3) Whether or not it is reasonable to fulfill all expectations of the passengers.
4) What are the different **mindsets** of passengers, their **perceptions of control**, **levels of cooperation** from passenger and crew side, involvement of different **stakeholders** and a few more.

1.2 PROJECT SCOPE

The project scope revolved around user focused journeys and long haul, low cost carriers. These user focused journeys consisted of stakeholders that were identified and explained below. The stakeholders of this project were the **economy class passengers** and the **crew**. Spatial or product stakeholders (involvement of other elements) were the **catering trolleys**, the **galley** and the **inflight entertainment screen** (IFE). Refer to fig.1

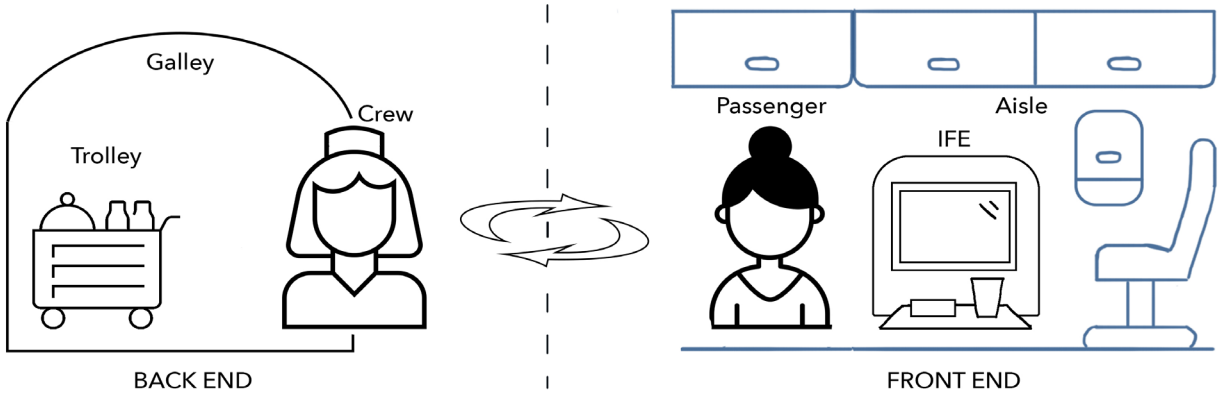


Fig. 01 **- Onboard service stakeholders (Own ill., 2019)**

The actions taking place in the galley enable the interactions in the aisle. The **galley is the back end** for the users. The back end consists of the systems enabling functions between the trolley and the galley. The crew prepares meals for the passengers.

The interactions taking place in the aisle is the front end to the passengers as they are the end users. The **front end consists of the passengers** and the IFE.

User focused journey

Differentiation in passengers' journey experiences has become the key in recognising different airlines from one another. It is important for Safran and their clients as well to incorporate a passenger experience focused on board services. Hence, this project's research has been mainly based on passengers', their previous experiences, insights and concerns. In the final phase of the project, crew members had also been interviewed to understand their concerns in the current context and the desired context of letting passengers make choices. The findings from the research on crew members can be found in chapter 8.4.

Long haul, low cost carriers

The focus of this project is also the long haul flights that are a **minimum of 6 hours journey**. These flights usually involve more than one serving of a meal. Higher scope of service is usually identified in these flights.

These airlines are focused mostly on minimizing the operational costs. They also provide extremely economical and cheap fared tickets to passengers. Unlike the other airlines, these carriers usually have very minimal services and comfort provided onboard. Hence it results in those cheap tickets for the passengers. Some of these airlines fly single class, only with economy passengers. These airlines mostly only allow a single carry on piece of luggage per passenger with strict restrictions on dimensions and weight. If a passenger happens to exceed any limit of these restrictions minimally, they charge a high price. They usually make revenue by these methods. Some airlines charge

passengers if they have not checked in online and would want to check in at the airport. They usually make revenue by these methods. And a few airlines charge for printing the boarding pass as well if the passengers haven't printed it out themselves. But these are mostly for very short flight journeys. This may not always be the case with long haul low cost carriers.

Some examples of short haul low cost carriers are Ryan Air, Wizz Air, Indigo, Vueling and others. And a few examples for long haul low cost are IcelandAir, SouthWest Airlines, Air Asia, Norwegian and more. The flow of tourism to a region is highly dependent on its accessibility and the cost of travel.

"The arrival of low cost carriers (LCC), with cheaper air fares, greatly leveraged the tourist flow around the world." (Santos & Cincera, 2018)

This is why they are now being highly preferred by passengers and they are a fast growing industry, especially in Europe.
Due to the increasing demand, Safran is focusing on building systems and products for them: i.e: onboard services project.

Fig. 02 **- Examples of LCCs** (Wikipedia contributors, 2019)

1.3 PROJECT GOALS

Given the project brief, the main goal was to find options that enabled passengers in **eating whatever they want, whenever they want**. Additionally this project's end result should also help in managing crew efficiency. This project could be considered as a major step in expanding Safran group's user centric innovations. Passengers currently view flying as a hassle mainly due to the onboard services.

"The feeling that people have in a plane, it's kind of like you are a prisoner"

Research participant, Italian.

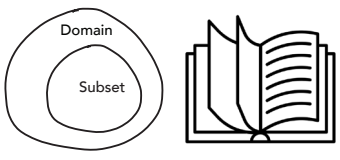
The goal is to make this journey **more pleasant and welcoming for the passengers** through more user friendly onboard services.

1.4 RESEARCH OBJECTIVES OF THE PROJECT

The need for a passenger experience based approach and the scope mentioned previously drives this project to focus on "**How to provide control to the passengers on their experiences and their time on board** ?" The answer to that question can be provided by researching "**what does each individual perceive control as**?" through participant research.

1.5 PROJECT PHASES EXPLAINED

DISCOVERING THE CONTEXT



This phase explains the desk literature research, trend analysis and expert interviews.

Fig. 03 **- Discovering the context**
(Own ill., 2019)

DISCOVERING PASSENGERS' EXPERIENCES

This phase explains types of passengers, target groups and the participant research.

Fig. 04 **- Discovering passengers' experiences**
(Own ill., 2019)

UNDERSTANDING PASSENGERS' EXPERIENCES

This phase explains the reccuring situations passenger's face, what control means and the current context.

Fig. 05 **- Understanding passengers' experiences**
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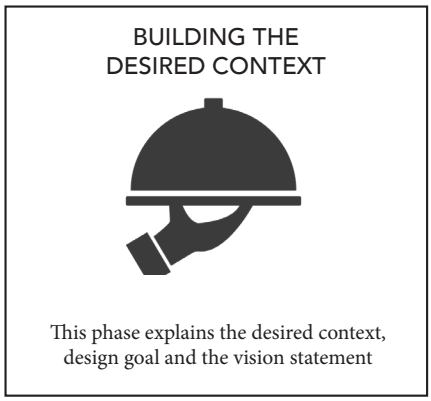


Fig. 06 **- Building the desired context** (Own ill., 2019)

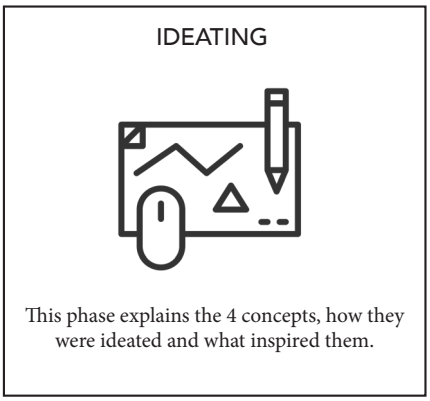


Fig. 07 **- Ideating** (Own ill., 2019)

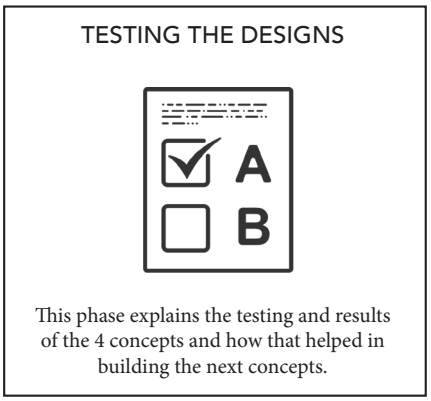


Fig. 08 **- Testing the designs** (Own ill., 2019)

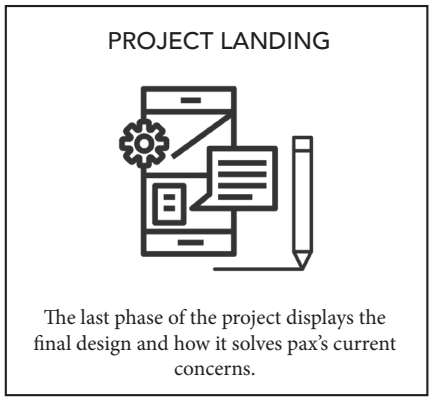


Fig. 09 **- Project landing** (Own ill., 2019)

The three most visible research methods used in this project are
1) Desk research
2) Minimal self-ethnography - Experiencing and capturing some moments from own experiences.
3) Participant approaches - Establishing a focus group, conducting interviews and participant studies and more.

In detail explanation of these methods and approaches can be found in the appendix 1

1.6 ABOUT THE COMPANY

Safran's Introduction

Safran is an international high-technology group, operating in the aircraft propulsion and equipment, space and defense markets. They are spread worldwide and have 92,000 employees.
Safran has three departments i.e: Safran Aerosystems, Safran cabins and Safran seats. They are the world's leading manufacturers of helicopter turbine engines, jet's landing gear, carbon brakes and wheels, aircraft wiring systems, cabin interiors, evacuation slides, seats for commercial airplanes and more.
This project comes under Catering department in Safran cabins. Below is an infographic that consists of all the departments that Safran cabins includes. More about Safran's work, their products can be accessed in the Appendix 1.

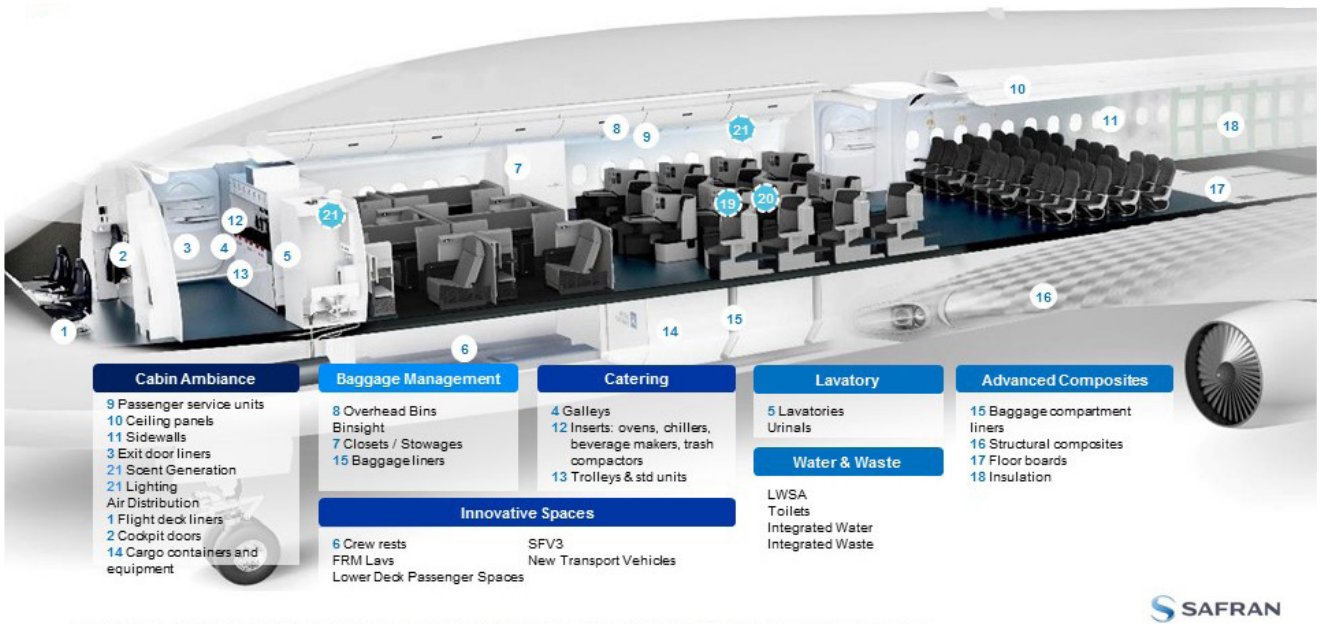


Fig. 10 **- Departments of products in Safran** (Safran group, n.d)

Safran's inspiration for the project: New vision

The manager of Safran's cabin R&T (Research & Technology) department had been building a future vision for Safran in which the idea of providing control to pax in economy class emerged. This project was born from that idea which raised a question - "**What if you can eat, whatever and whenever you want, on board?**". The next question that followed it was "**how can the technologies enable it?**" There are a few contrasting loose ends between these two questions. Like how could these services be different for economy and business class, time constraints, whether or not it is reasonable to fulfill all expectations of passengers, different mindsets of passengers, their perceptions and cooperation, involvement of different stakeholders and a few more.

The vision is to give passengers the best possible control and provide them a safe and comfortable environment to help them make decisions about their journey. It is also to make influence over their journey accessible to passengers by providing them information and letting them make choices.

One of Safran's trolleys' is Sophy. The project description in the brief included Sophy to be involved in the final design to be able to give control to the pax. But Sophy had not been involved in the final design and the reason has been mentioned in the chapter Discussion 8.7.

The project brief approved by the Board of examination of TU Delft can be found in Appendix 1.

1.7 TO CONCLUDE...

Takeaways

The methods implemented in this project are interviews, sensitizing and co-creation sessions. This project was born from Safran's vision of 'eat whatever you want, whenever you want onboard.'

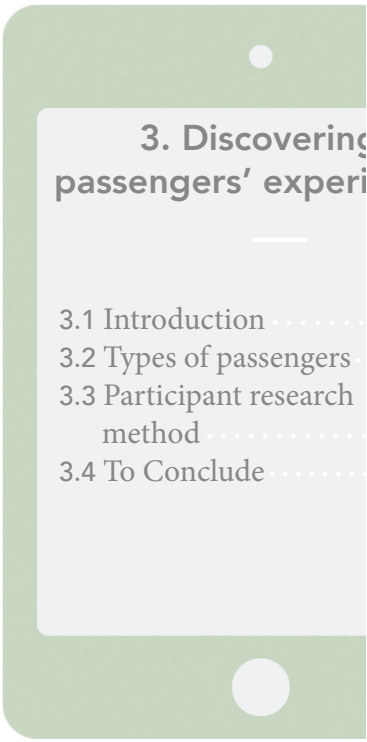
Therefore

The domain was identified as the onboard services and the next chapter will take a deeper look into exploring the onboard services and the subsets in it.

"As technology propelled planes' capabilities further, fliers witnessed the arrival of onboard kitchens in the 1930s, which turned the food offerings from mere sustenance to more thought-through experiences."

(Yehuda Rehman, 2019)

2. Discovering the context



This chapter explores the domain, onboard services and the subset, dining services through literature research and expert interviews.
The dining services are provided in three different models, they are the push model, Buy on Board and ondemand service. These models are explained in detail.

2.1 INTRODUCTION

When this project brief had been introduced, the topic had been looked at as one whole domain and the elements in it, as the subsets. Since the project's goal was to find options to enable passengers (pax) to be able to eat whatever and whenever they want, this phase discovers the domain (onboard services) through literature research. The domain and the subsets (experiences in onboard services) were identified and studied further into, in the next phase as well. The domain is the Aircraft onboard services and the subsets were the dining experiences which had more elements into it. These topics were explored through literature and participant research.

2.2 RESEARCH OBJECTIVES

The objective of this chapter is to understand more about
1) What are **onboard services, their types, processes followed and how the dining has evolved** over the years.

2) What other **similar services were the airlines already using** and also what are the other **similar services used in the market of the hospitality industry**?

3) Understanding the domain from the **views of experts**.

The understanding of the above mentioned topics created a foundation to conduct a participant research and understanding their experiences as first hand information.

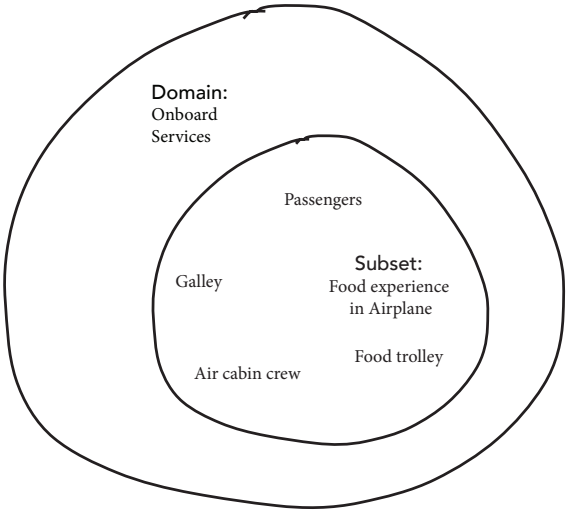


Fig. 11 - **Domain and subsets** (Own ill., 2019)

2.3 EXPLORING THE DOMAIN

Onboard services

What are onboard services?

Air travel is more than flying and flying, now exceeds just getting from point A to point B. Most of the airlines offer a personal inflight entertainment screen to every passenger with the latest movies in many languages, tv shows, music and games. The crew provides them with options of meals, snacks and beverages as per their schedules. These meals range from a simple snack or a beverage in short-haul economy class to a seven-course gourmet meal in a first class long haul flight. The types of food offered also vary widely from country to country, and often incorporate elements of local cuisine, sometimes both from the origin and destination countries.

Apart from this, the passenger can upgrade their seat as well. The trend of shopping on board has also grown over the past decade. Children are given a coloring book or a toy to keep them entertained.

This topic was explored as literature research from articles, scientific, academic research, Safran's repository and an expert interview with Raymond Kollau.

Types of onboard services

Apart from flying from one place to another destination, all services provided by the airlines, onboard are considered as services. These onboard services provided by airlines are meals, snacks, beverages (dining experiences), movies, music, games, news, magazines (entertainment), upgrading seats, shopping duty free products, in-flight connectivity and more. Most of these services vary between economy, business and first class. They also differ between airlines. These services have been evolving through years.

Historic overview of Inflight entertainment (IFE)

Before the Second World War, passengers were offered a Piano, lounge, dining room, smoking room, and a bar during long flights. But after the second world war, IFE services converted into food and drink services and a movie would be played occasionally through a projector commonly for long journeys. Personal audio players made their debut in 1985 on board. From the 1990's, an increase in demand for flying forced better IFE designs and services. And now every passenger's seat has a personal IFE on most of the long haul flights. The variations in the Inflight entertainment are as found in the Appendix 2.

Dining experiences onboard

The meals provided vary based on destination of journey, classes and airlines. Options in halal, kosher, vegetarian, vegan, gluten free and lactose free are available as well. But these special meals need to be pre-ordered, before boarding. These meals are usually either provided on one tray for economy class or through multiple courses with additional tableware and decorative cutlery like a tablecloth, metal cutlery and glassware for business and first class. Several companies like Kaelis Group make varied collections of cutlery and tableware for Airlines.

Breakfast	Dinner	Cuisines	Special meals
Long haul - pancakes or eggs, fried breakfast items like sausages or grilled veggies, pastries, fruit bowls for long flights. **Short haul** - fruits, muffins, bread rolls or bagels are offered.	Meat (most commonly chicken or beef), fish, or pasta; a salad or vegetables; a small bread; and a dessert. Condiments (typically salt, pepper, and sugar) are supplied in small sachets or shakers (mostly in business and first class)	Indian, Chinese, Korean, Japanese, Turkish, French or Italian are available based on destination or country of origin.	Meals for children, Medical, religious diets are offered on special requests. Need to be ordered at least 24 hours in advance. The catering companies prepare and deliver them.

Fig. 12 **- Contents of the meals** (Own ill., 2019)

How are the onboard (dining) services provided?

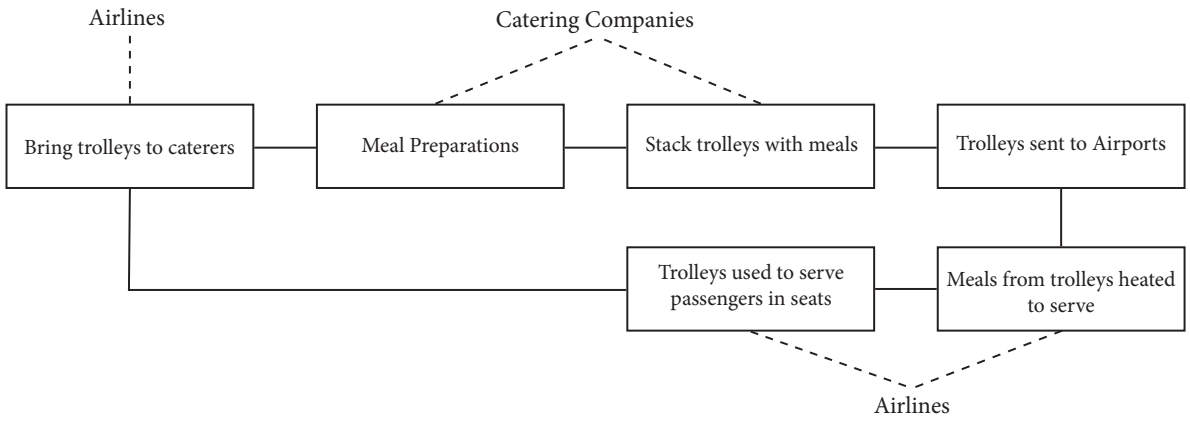


Fig. 13 **- Organigram of the provision of the services** (Own ill., 2019)

These IFE screens, trolleys, seats, are designed and manufactured by different companies like Safran.

Economy class	Not provided with highly personalised services, not many choices in food. No preferences presented to passengers on their choice of timing to eat. In some airlines' economy class passengers can purchase internet connection packages on board.
Business and First class	More diverse meals, beverages, comfortable seating, wifi connectivity and also care pouches, designer pajamas and toiletry kits for their premium customers.

Fig. 14 **- The level of service differs between the classes on board.** (Own ill., 2019)

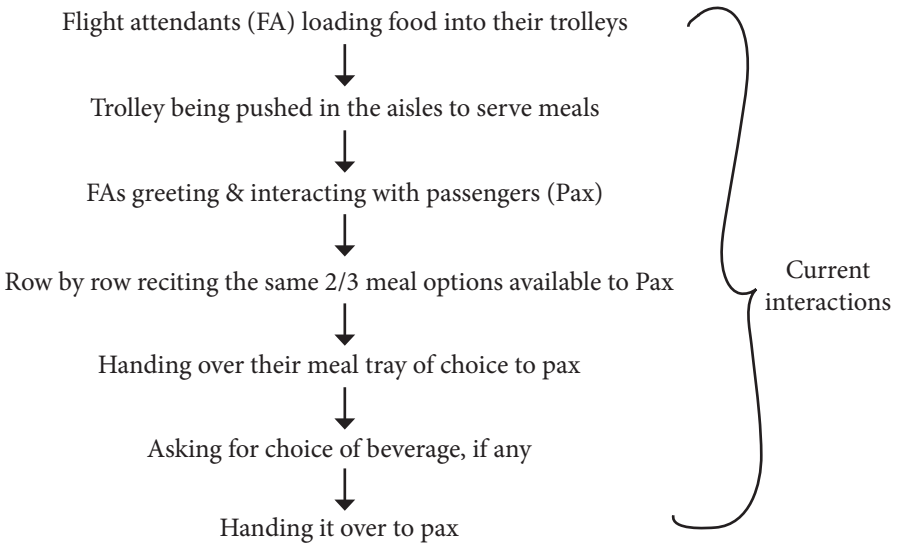
The dining services on the air crafts began back in 1919 and they have been evolving ever since. A table of onboard dining services evolution can be foung in the Appendix 2.

Current processes for serving meals or snacks onboard

There are currently three most common processes practiced. The push model, buy-on-board process and the on-demand catering. These processes are understood based on the result of research of Safran's repository and personal first hand experiences.

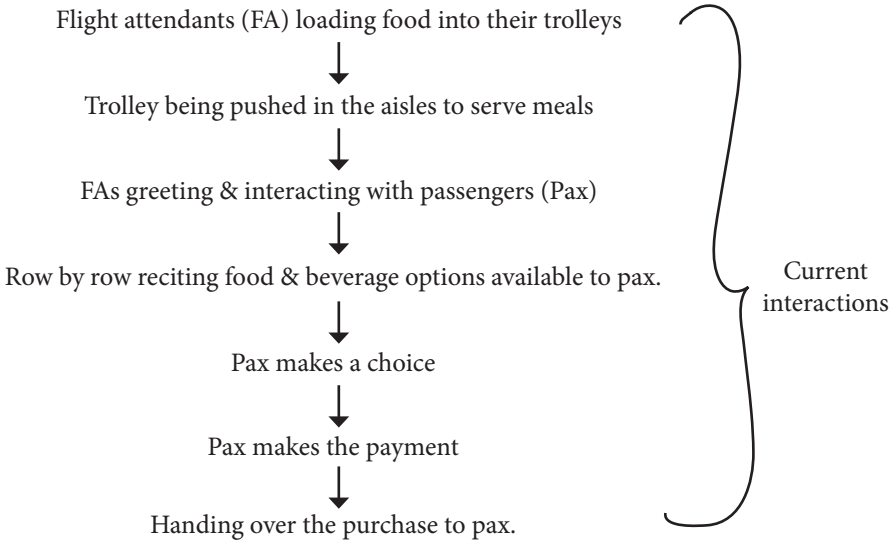
1) Push model

This is the regular service model that Airlines have been following. This model is not followed by most of the low cost airlines.



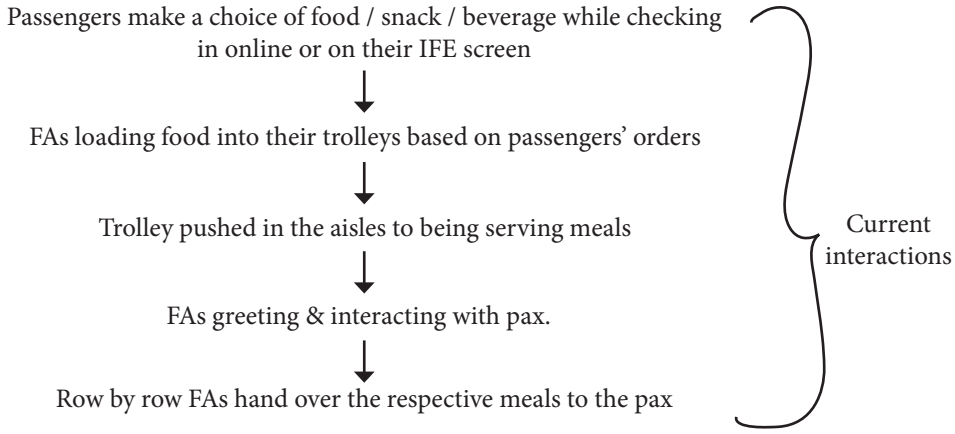
2) Buy on board process

This process is followed on most of the low cost Airlines.



3) On demand catering service

One of the highly preferred and growing processes is this on-demand type of service.



These current processes involved a few stakeholders as mentioned in chapter 1.3. In this project, considering the term 'stakeholder' as an element that can possibly influence the project positively or negatively, the passengers and cabin crew are the conventional stakeholders whereas the trolley and the galley are the unconventional stakeholders.

Conventional Stakeholders

Passengers are the most important part of this project as it is a user centric project. Control is to be given to passengers on their experiences. Their shared input about their journeys creates the current context.

Cabin crew is also a partially important stakeholder as they are highly responsible for the meal service. But the processes are designed by Airline service planners. –The findings from the research on the crew can be found in chapter 8.4.

Unconventional Stakeholders

Trolleys are the main means of the service. Trolleys could potentially be involved in the new system that provides control to the passengers. Galleys are where most of the back end systems function. The aisle and passenger seats will be the front end of the system.

In the current era, travel and flying is accessible to almost all. Due to the pocket friendly and economical prices of tickets, it has been made easy to purchase a ticket and fly. The low cost carriers have made flying very accessible, especially to students as well.

International student mobility is also increasing and seems responsive to the expansion of low-cost airlines in Europe, as students are usually constrained in their budgets and therefore responsive to lower airfares (Akgüç, Beblavý and Simonelli, 2018)

Passengers have a classification within them, and hence a target group has been chosen based on the growing number of that particular group. Five types of passengers have been identified based on online research. They are classified based on the frequency of flying. Younger generation classified passengers have been recognised to be a rapidly growing number due to the availability of the low cost carriers. Flying has been made easy for them.

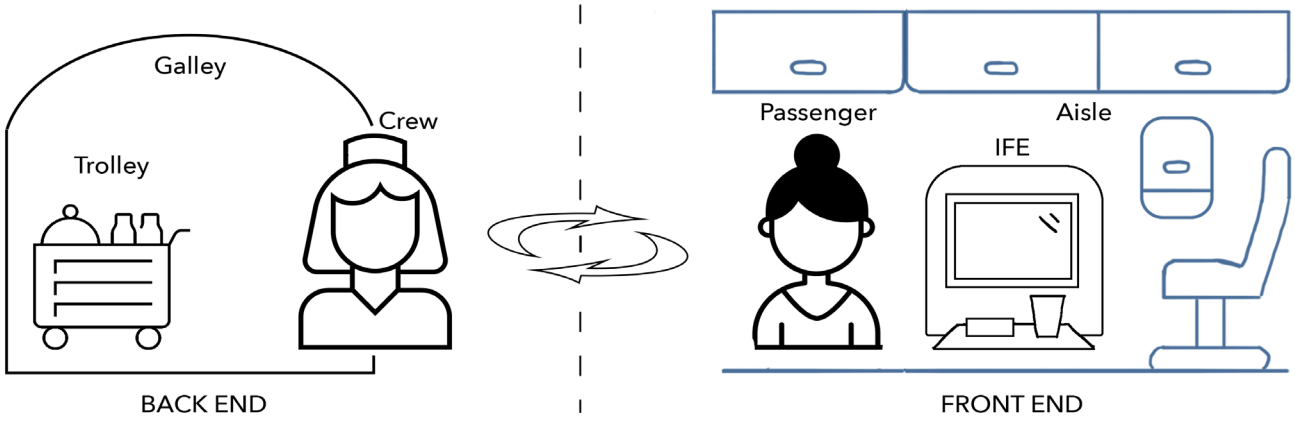


Fig. 15 **- stakeholders involved in onboard services** (Own ill., 2019)

2.4 TREND ANALYSIS

What does the market for dining services onboard look like?

Airline trends helps airlines understand and respond to changing customer preferences and unlock greater loyalty and higher yield through clearer, more meaningful differentiation.

Trend analysis regarding inflight catering

Now the airline industry is taking its first steps in this digitally-enabled F&B service. "***Besides the handful or airlines – including Air New Zealand, Japan Airlines, FlyDubai and Virgin America – that allow business class passengers to place orders via the in-seat IFE system, Emirates has recently issued so-called 'Meal Ordering Devices' to all its flight attendants who work in Business Class."*** (Kollau, 2017)
These MODs are usually phones that do not have sims and have blocked all the other applications from being downloaded in the phone apart from this meal ordering app.

"The orders are taken on a hand held device and are instantly reflected on a tablet in the galley. Each order is then prepared immediately making service faster, more efficient and more personal," said Terry Daly, Divisional Senior Vice President, Service Delivery at Emirates. (Kollau, 2017)

This cannot be put into practice in the economy class as the number of passengers is high and the ratio of cabin crew to passengers does not justify it.

However, 'restaurant' like services are mostly only offered in business class on many airlines. But there a handful of airlines that offer the opportunity of being able to order what they want on IFE through in demand or BOB for economy class currently. They are :-
1) Level Airlines for long haul
2) Finnair for long haul
3) Norwegian Airlines for long haul
4) Qantas for long haul departing from Australia
5) Air Newzealand airlines for long and short haul
6) Fly Dubai for short haul

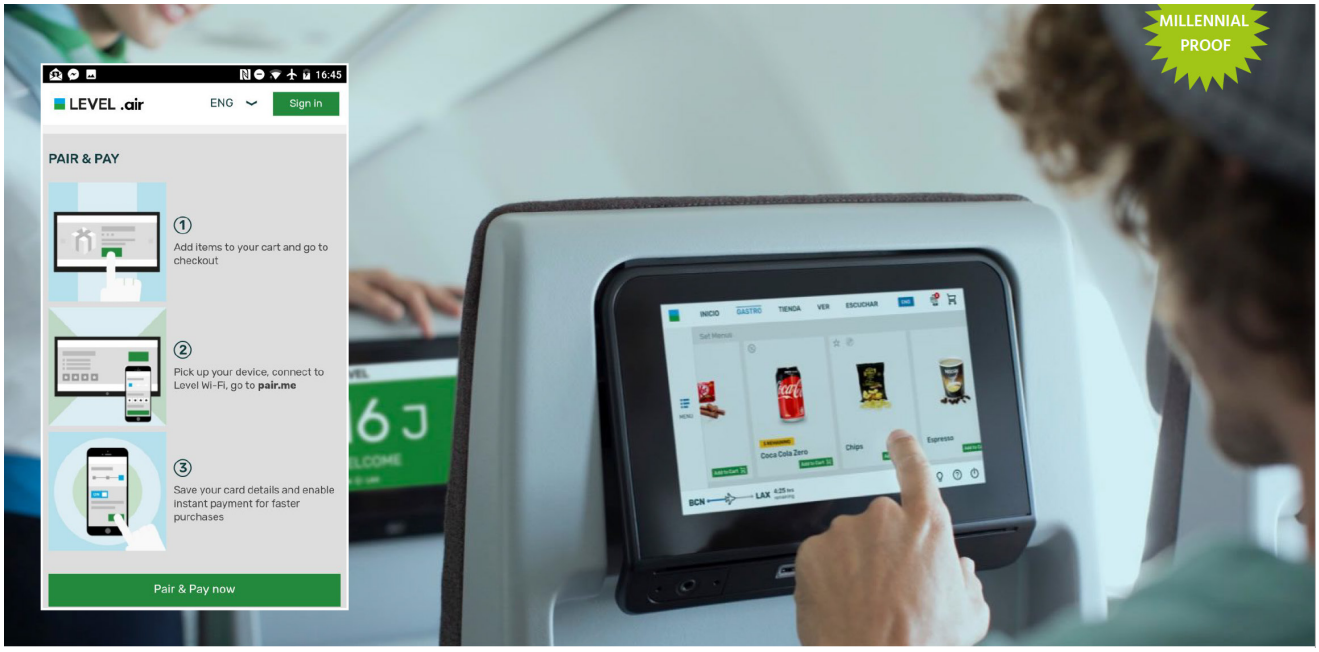


Fig. 16 **- Ondemand service in Level Air** (Kollau, n.d.)

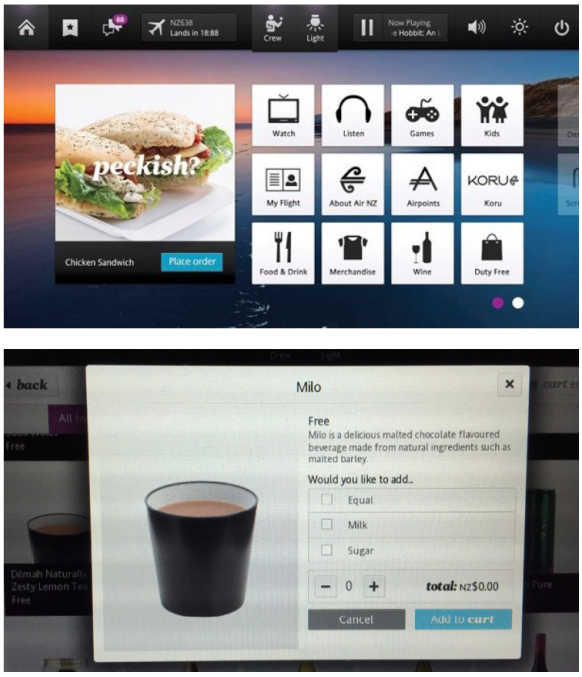


Fig. 17 - An option to order on IFE (Kollau, n.d.)

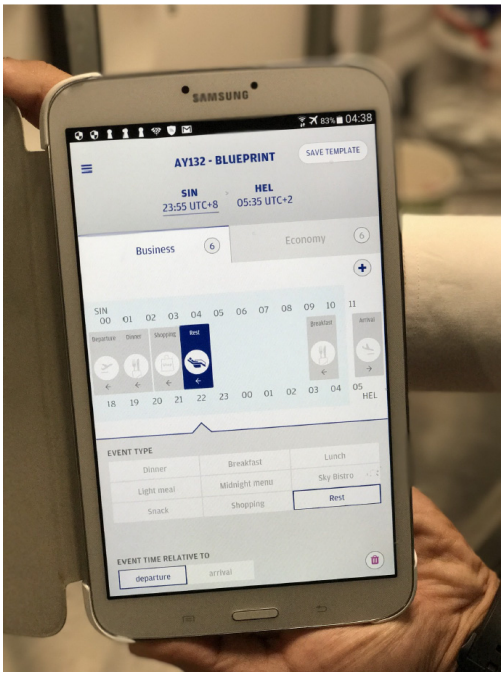


Fig. 18 - Information on flight in personal electronic device (Kollau, n.d.)

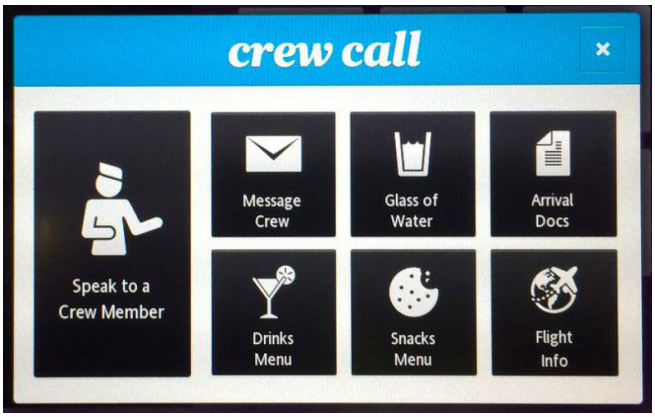


Fig. 19 - Ability to call for the crew through IFE (Kollau, n.d.)

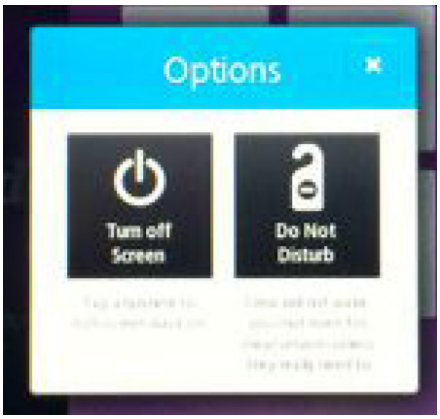


Fig. 20 - Extra options for passengers on IFE (Kollau, n.d.)

"And a growing number of airlines – including Virgin America, Air New Zealand, Norwegian, Azul and Finnair – allow passengers to order meals, snacks and drinks via the IFE system in between regular meal services, while passengers onboard leisure carrier TUI Netherlands can order drinks and duty free via their own smartphone." (Kollau, 2017)

Mcdonalds has a screen in store and an application that you can order from and then just go collect the meal. Starbuck in America has also launched an application on which you can pre-order and the drink will be ready by the time you reach the store. All in all, the notion of pre-ordering food and beverages (not on board) seems to have evolved from a rather dull thing to do towards a smart move that is about convenience and getting the things they way you want.

As Chris Chamberlin from Australian Business Traveller puts it, "It's a win-win for both travellers and [airlines]. Passengers can lock-in their preferred meal choice in advance, rather than take a chance on missing out on their first choice. On the other side of the coin, [airlines] can reduce wastage and ultimately its costs by serving every passenger the meal they'd prefer to eat, and by limiting the number of extra servings carried on board to provide a choice." (Chamberlin, 2015)

"Singapore Airlines' 'Book The Cook' allows passengers in First, Business and Premium Economy to choose their favourite dish from an extensive menu, while those travelling in Business and First can select from sixty menus on outbound routes from Singapore." (Kollau, 2016)

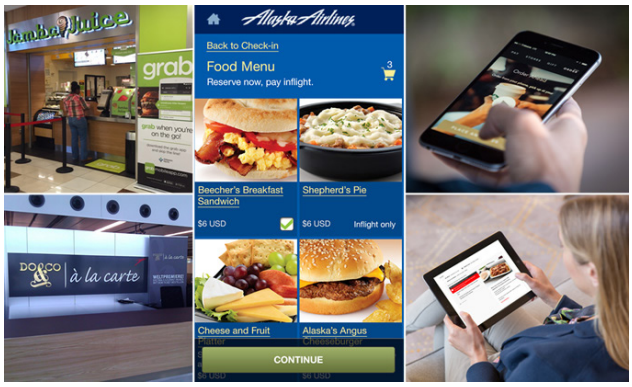


Fig. 21 **- Qantas 'Select on Q-Eat'** (Kollau, n.d.)

Qantas' 'Select on Q-Eat' pre-order service is also available in Economy on international flights departing Australia. Arke (Dutch Airlines) is also the first airline in the world to let passengers order their food and beverages through their personal device and the delivery will be made to their seats. But these services are currently on trials by Arke on long and short haul flights. The cabin crew receives orders on their tablet devices and passengers also receive a notification when their food is being prepared. Passengers are given two meals complimentary for the long haul flights and an option to order snacks in between meals. But snacks (additional items) will have to be paid for by economy passengers.

Apart from the research on the other onboard dining services, similar services in hospitality industry, concept restaurants and the trends impacting the hospitality industry had also been understood from research. They can be found in Appendix 2. Research done on concepts like - 1) Time well spent vs. time well saved, 2) Are we always eating due to hunger, can also be found in the Appendix 2.

2.5 INTERVIEWS WITH EXPERTS

In the early stages of the project, interviews with 2 experts from the field had been conducted. The two experts are Evy Dougali, a product manager in Sita on Air and Raymond Kollau, the founder of AirlinesTrends.com. These experts were Safran's one of the most resourceful contacts.

1. Interview with Evy Dougali

The interview with Evy Dougali was about the upcoming trends in the industry that will help in crew work efficiency and the kind of work Sita on Air does. This interview lasted twenty minutes. She spoke about the airlines' needs and how they cater to them.
Listed below is what Evy Dougali had to say about some important factors about services on board. They have been categorised for a better understanding.

About enhancing crew efficiency	- Providing awareness on - Passenger needs, special meals, what & when to serve, flight equipment, what is done and to do, stock in galley. - Enabling communication between crew, passengers & crew. - Capturing preferences for future use
About classes on board	- Focus on economy class more as there is no control & choice - Low value in economy class
About digitalisation	- Digitalisation of tasks and information - General need for digitalisation in air. Empowers, improves operations, saves time, man hours. Intelligent information & more automation.
About giving control to passengers	- Need to give passengers a balance of control - Cannot load the flight with everything - Give control to save waste & money - By placing some limitations

Fig. 22 **- Important factors from Evy Dougali's interview** (Own ill, 2019)

A transcript of Evy Dougali's interview will be found in the Appendix 2.

2. Interview with Raymond Kollau

Raymond Kollau spoke about what is happening in the industry in terms of the kinds of flying passengers, their mindsets, Ondemand services, connectivity on board, barriers in implementing on-demand services more, crew, Airlines, how services cost and how they are divided and much more. His interesting and informative quotes also have been categorised and listed down below:

About travelling in general	- Affordable air travel is a given now - Asia, one of the most emerging markets for buying Aircrafts - In economy class, big development is long haul, low cost for younger people
About types of passengers & their attitudes	- Younger generation is used to getting things when they want & having many choices & opinions - Generational attitude trickling down to expectations - Flying families is also a growing demographic - Everyone wants to travel now
About choosing target groups qualitatively	- Passengers that are sensitive to better services - Passengers that are open to realising the value of personalised services - Younger gen is into travelling much more often now
About some barriers	- Airlines leave barriers for the passengers because they are too busy. - Need the marketing around it. Let people know that the options exist. - Lack of adoption by the crew
About some ideas	- Giving a menu card also gives a bit of sense of control, it is that simple. - Self service kiosks

Fig. 23 **- Important factors from Raymond Kollau's interview** (Own ill, 2019)

A transcript of Raymond Kollau's interview can be found in the Appendix 2.

A knowledgeable opportunity provided by Safran in the early stages of the project, April, 2019 was a visit to World travel catering and onboard services expo (WTCE) , Hamburg, Germany. More about this trip can be accessed in the Appendix 2.

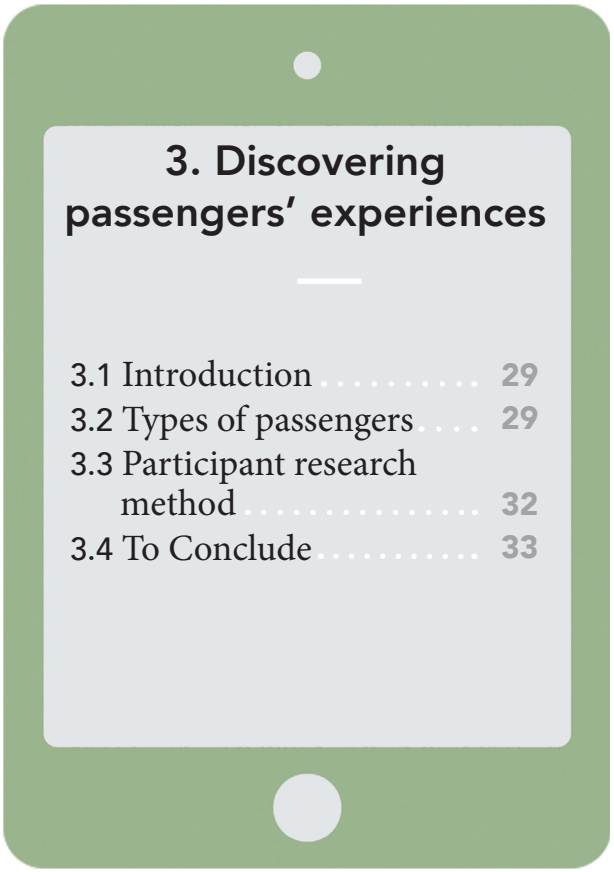
2.6 TO CONCLUDE...

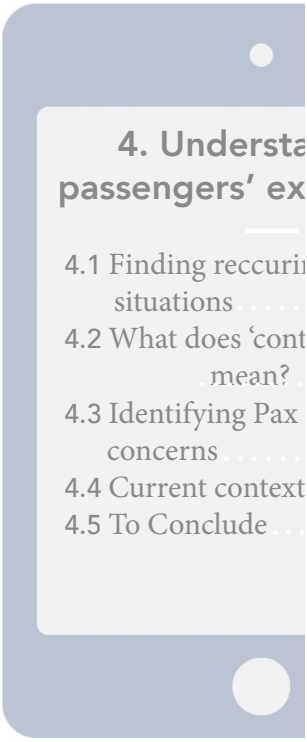
Main findings

1) Dining services have been evolving since 1919. Now, with the push from advanced technologies, ability to digitalise data and the need for enhanced user experiences, there is an obvious potential for dining services to change and improve further.
2) Airtravel is comparitively more affordable now due to the low cost carriers and passengers are from all around the world.
3) Providing control to passengers is essential, but it should also enhance crew's efficiency. A new system should act as a channel between the crew and passengers, so that the crew can hear their voice.
4) Younger generation is a passenger group that suits this project brief because they are sensitive to better services and are more opinionated.

Therefore

It is important to understand what the culturally diverse young generation percieves 'control' as.





This chapter identifies all the types of passengers and the target group of this project. Participants had been found for the research and were sensitized for the interviews about their personal onboard dining experiences.

3.1 INTRODUCTION

As this project is passenger centric, it is important to understand passengers' experiences in their journeys. Their experiences will talk about the situations they face and the concerns they have. For this research, the types of passengers were identified and then the target group was picked. A participant research was conducted to check if a problem exists. Participants were sensitized and interviewed. These interviews revealed many interesting situations the passengers face and how they feel about them.

3.2 TYPES OF PASSENGERS

These types of passengers have been identified through the expert interviews.
1) Flying families
2) Business front seat economy travellers
3) Typical Leisure travellers
4) Younger Generations
5) Miscellaneous

1) Flying families

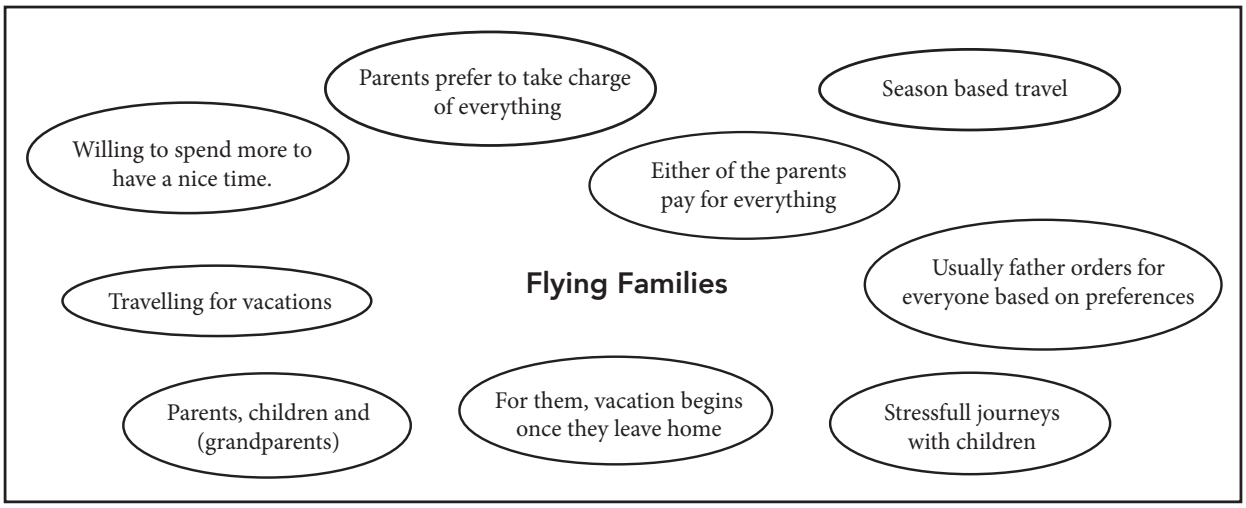


Fig. 24 **- Characteristics of Flying families as passengers** (Own ill, 2019)

Fig. 25 **- Example of flying families** (Hayward, 2015)

2) Business front seat economy class travellers

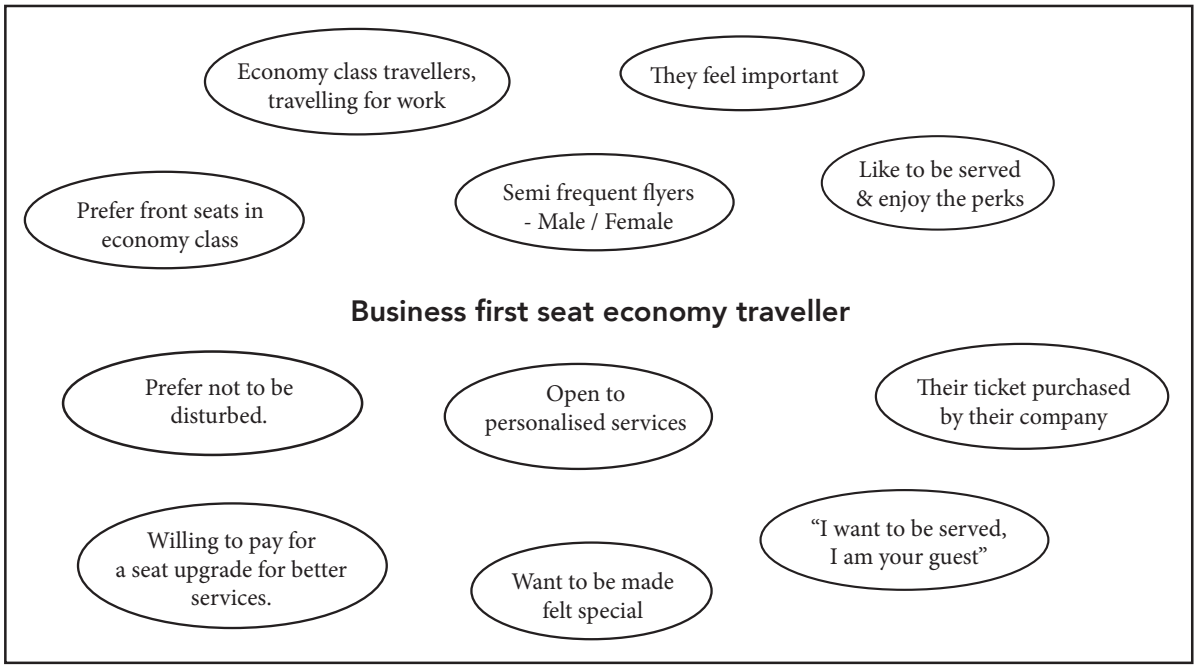


Fig. 26 **- Characteristics of Business first seat economy travellers as passengers** (Own ill, 2019)

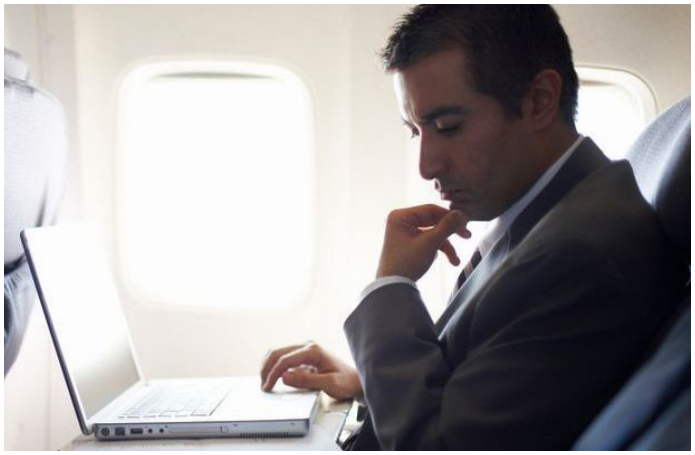


Fig. 27 **- Example of a Business first seat economy traveller** (Strutner, 2017)

3) Typical leisure travellers

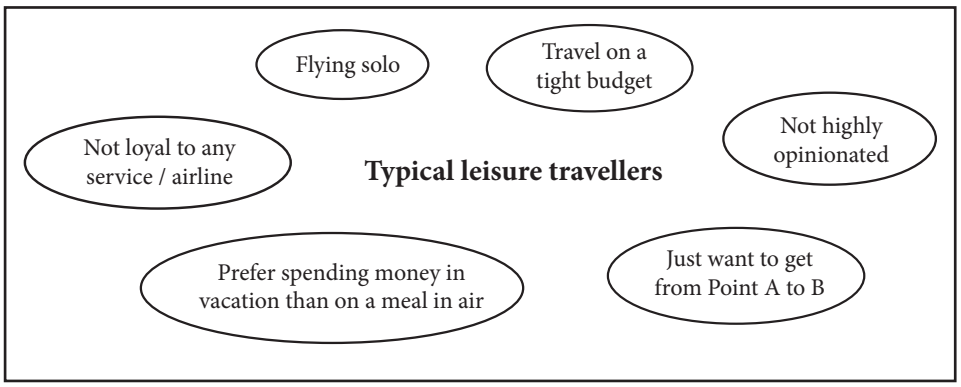


Fig. 28 **- Characteristics of Typical leisure travellers as passengers** (Own ill, 2019)

4) Younger generation travellers

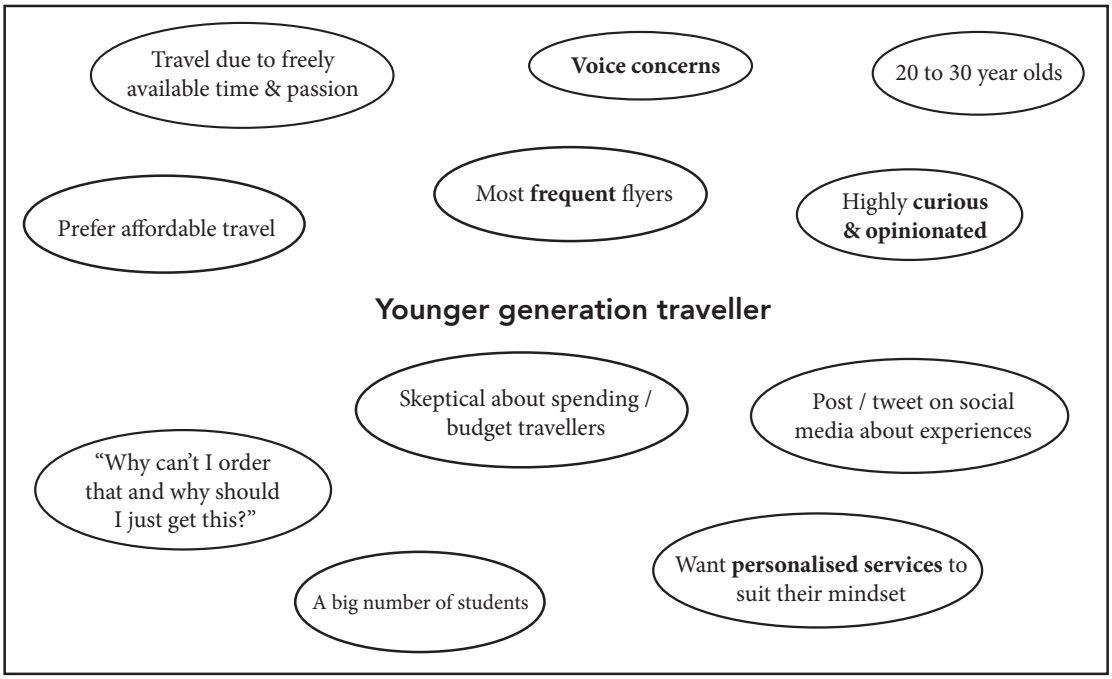


Fig. 29 **- Characteristics of Younger generation travellers as passengers** (Own ill, 2019)

Fig. 30 **- Examples of younger generation travellers** (Mom, n.d.)

5) Miscellaneous travellers

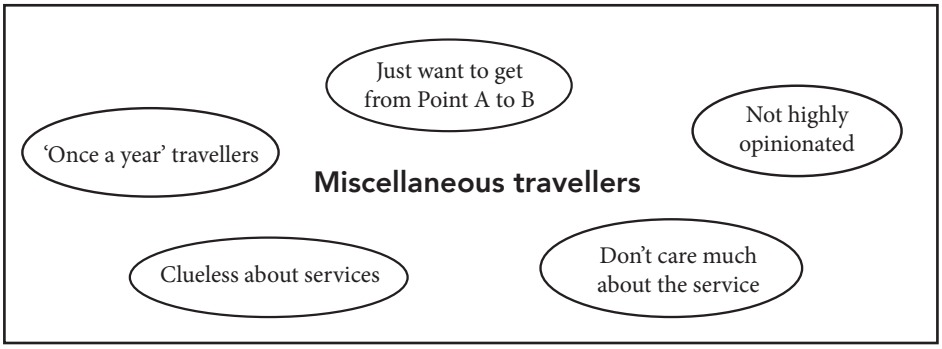


Fig. 31 **- Characteristics of miscellaneous groups of travellers as passengers** (Own ill, 2019)

Target group

For this graduation project, **"Younger generation"** was the chosen target group.
Younger generation travellers are chosen as they are one of the **highest number and frequent travellers**. They travel often as they are students and want to explore different cultures all over the world during their vacations. Also as students, they are given more vacations than an employee is. They are very **particular about feeling in control of their experiences** as they prefer personalised services. Another reason of choosing the younger generation passengers as the target group for this project set up was that they were the easiest and most accessible to recruit as participants from the TU Delft university.

Elena
24 years old

Student & Part time waitress
Single
"I like affordable travel to explore places while I am studying. I am very curious. I like things in a particular way."

Bio

Elena is currently studying her Masters abroad. She also regularly flies home to visit family and friends. Once in a while she saves up some money from her part time job to be able to afford international travel to explore some new cultures. So all in all, she air travels regularly and wants her journeys to be comfortable and as per her choice. "I appreciate affordable tours and if I can control how I do everything along the way in the tour. It will feel a little more mine"

Fig. 32 **- Persona of the target group**
(Own ill, 2019)

3.3 PARTICIPANT RESEARCH METHOD

As mentioned earlier, this research and interviews were conducted to verify whether passengers faced any problems with their dining experiences.

Research questions

For the next chapter of the project; the user research, an elaborate set of questions and a definitive plan had been made to carry forward this research. The questions are:
1) What does control mean to each individual passenger?
2) What are the passengers' expectations on onboard services?
3) What are passengers' concerns about their journey?
4) What is it that passengers look forward to the most on their journey?
5) Are there any external / other factors that affect passengers' journeys? And if there are, what are they?

Research Plan

This research process is a mix of the service design doing, context mapping and ViP used in the last stages. The research plan had been divided into steps. The plan was to find participants that matched the target group, sensitize them through the generative booklets and then interview them about their experiences. After the interviews were transcribed, factors were collected from them that helped in identifying reccurring uncomfortable situations for pax. These interviews also helped in understanding what contorl to meant to the participants, explained in chapter 4.4.

Step 1: Identifying and finding participants

The target group for this project is the younger generation. Participants that could be found closest to this criteria were students from TU Delft, Netherlands. So the checklist for finding participants is:

- **Aged between 20 to 30 years old**
- **Travel in one flight for a minimum of 6 hours, at least twice a year**
- **Culturally diverse participant group**
- **Economy class passengers**

Because the criteria was defined so well, the participant sampling approach picked for this project is known as snowball sampling from the service design doing method. In this snowball sampling, a criteria is built and relevant people are found and then they are asked for more relevant recommendations.
Hence in this research as well, the list started off with a handful of participants and then many recommendations were made by them which helped in finding more number of relevant participants. Finally seventeen participants were found, out of which fifteen participants had been interviewed.

Nationality	No. of participants	Participation
Indian Indian, brought up outside India	3 1	Booklet + Interview
Chinese Honk Kong Chinese	2 1	Booklet + Interview Booklet
Mexican	3	Booklet + Interview
Brazillian	1	Booklet + Interview
Columbian	1	Booklet + Interview
Dutch	1 2	Booklet + Interview Booklet
Dutch + American	1	Booklet + Interview
Taiwanese	1	Booklet + Interview
Italian	1	Booklet + Interview

Fig. 32 - Persona of the target group

Fig. 33 **- Participants and their participation** (Own ill, 2019)

The rest of the steps are explained in detail in the Appendix 3.

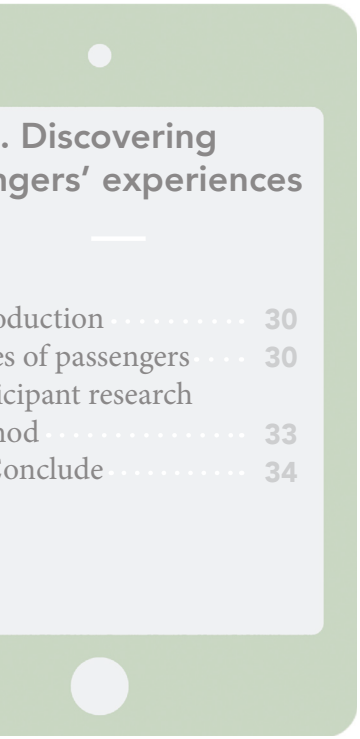
3.4 TO CONCLUDE...

Takeaway

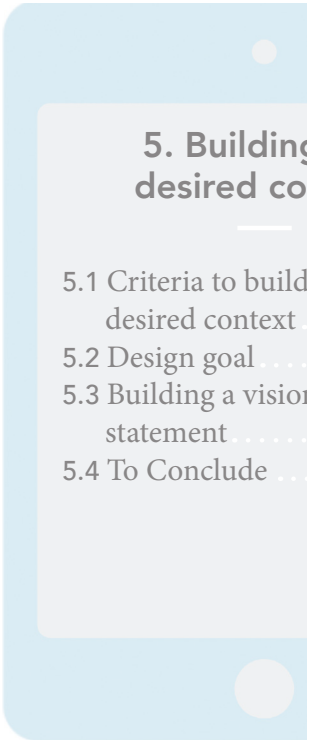
1) Five types of economy class passengers in general were identified:
   A) Flying families
   B) Business front seat travellers
   C) Typical leisure travellers
   D) Younger generation travellers
   E) Miscellaneous
2) Target group - Younger generation travellers (Majorly students)
   Why - Large in number, curious and opinionated travellers. Prefer pesonalised services to suit their needs.
3) A definite plan for conducting research

Therefore

All the findings from the interviews are analysed to empathise with passengers' experiences.



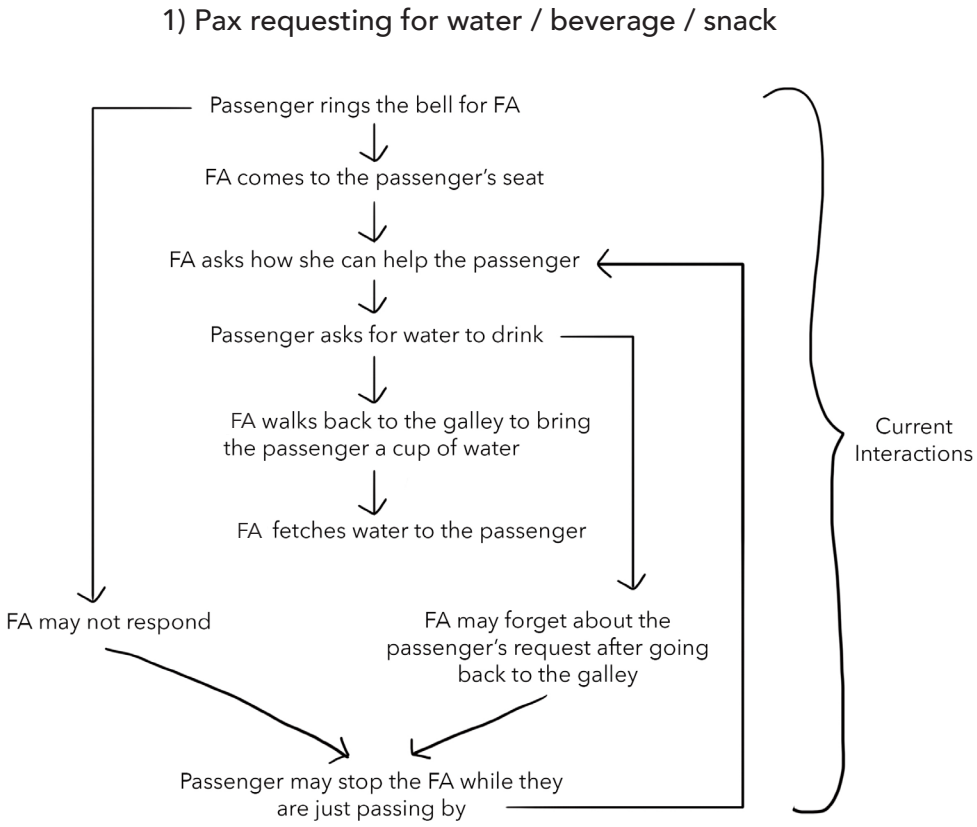
4. Understanding passengers' experiences



This chapter identifies the pain points of the passengers' experiences from their interviews. The factors collected from the interviews helped in building the current context.

4.1 FINDING RECURRING SITUATIONS IN CONTEXT

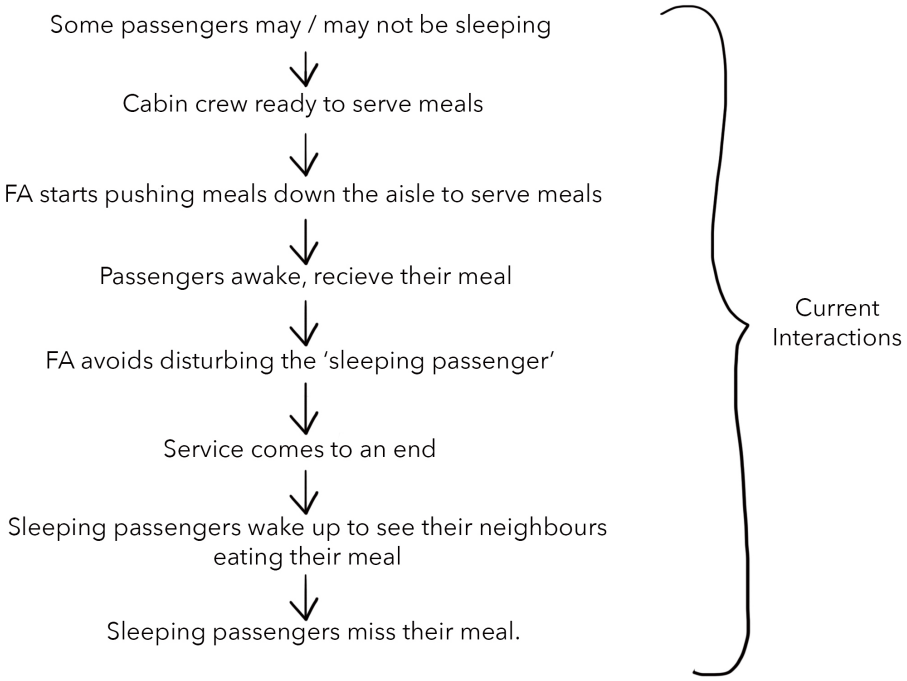
As mentioned in the step 9 of the previous phase, the interviews revealed a few situations that the participants found themselves in, repeatedly. These were uncomfortable situations that the participants wished, they did not face. Those situations, their effects and affects were identified and explained below.



Passengers asking for water / beverage / snack (more) but not receiving it: There are two situations in this case:	
Situation	(1) where the passenger rings the bell/asks the FA for it
Effect	The FA has neither responded to the call nor remembers
Affect	Feels Anger / frustration
Participant (Chinese, 22 to 30)	"He still forgets to give me a beverage and then I click the button twice and then he did come here"
Situation	(2) Passenger hesitates ringing the bell / asking the FA
Effect	Passenger does not want to seem demanding
Affect	Thirsty
Participant (Dutch, 22 to 30)	"I actually want something and I never dare to use that button. Everybody's like staring at me."
Participant (Indian, 22 to 30)	"it always feels a bit rude to ask for more food or anything"

Fig. 34 **- Effects and Affects of situation 1** (Own ill, 2019)

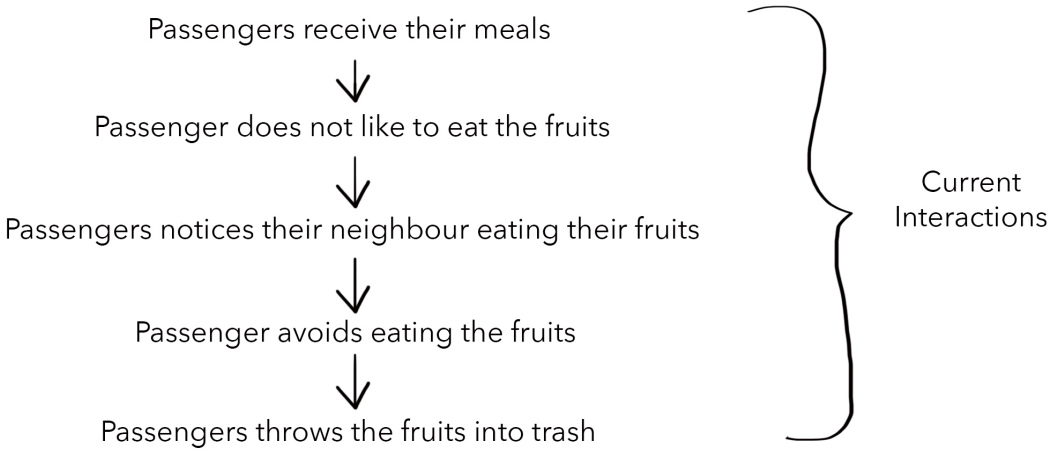
2) Passengers missing their meal while sleeping



Situation	Passengers sleeping while meals were being served
Effect	Passenger has missed the meal
Affect	Feels Anger
Participant (Indian, 22 to 30)	"there are times like, when we are traveling, and then it's late at night and everybody is sleeping around you and they're coming with food. It does not make sense."

***Fig. 35* - Effects and Affects of situation 2** (Own ill, 2019)

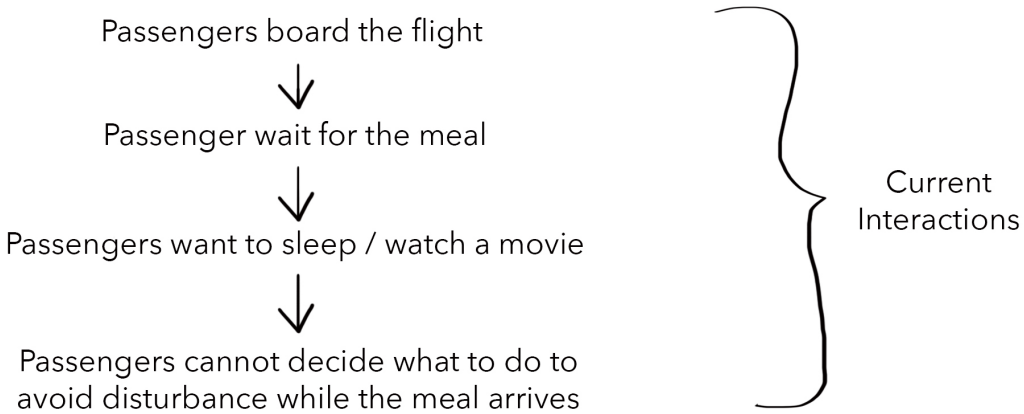
3) Passengers not eating parts of their meal



Situation	Passengers not eating parts of their meals
Effect	Food is being wasted
Affect	They feel that someone who likes it can eat it instead of wasting it.
Participant (Mexican, 22 to 30)	"I don't like yoghurt, so from the beginning I can tell them that I don't want it. So that they can give it to someone else."
Participant (Chinese, 22 to 30)	"And I didn't have the chance to choose like half of them. Because I think it's a bit waste."

Fig. 36 **- Effects and Affects of situation 3** (Own ill, 2019)

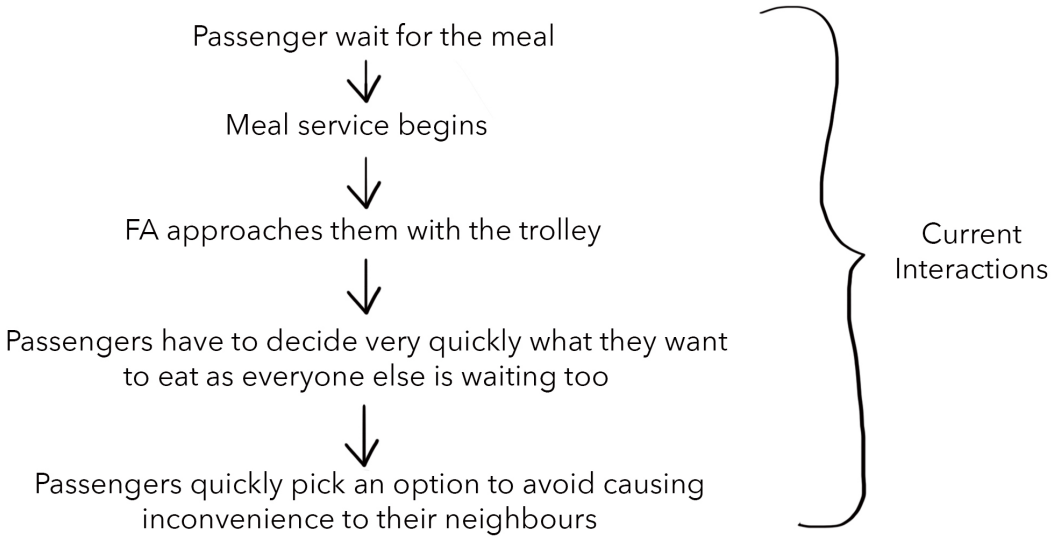
4) Passengers unable to anticipate the meal service



Situation	Passengers unable to anticipate when the meals will be served
Effect	They miss preparation and planning of their journey not just in terms of meals but also sleeping / using the IFE (inflight entertainment)
Affect	Confusion, discomfort, uncertainty
Participant (Columbian, 22 to 30)	"I think that that makes your waiting more, I don't know, uncomfortable. And your journey as well. Because you are just waiting for the food."
Participant (Dutch, 22 to 30)	"I didn't know it (when they served the meals) but I think it would be nice to know because I can sort of mentally prepare for it."
Participant (Mexican, 22 to 30)	"I feel confused about most of the flights. Because I do not know when exactly they are gonna serve the meals."
Participant (Taiwanese, 22 to 30)	"Then I can plan. Now I want to watch a movie or now I want to sleep. Because most of the time I skipped a meal because I was sleeping."

Fig. 37 **- Effects and Affects of situation 4** (Own ill, 2019)

5) Passengers not given enough time to decide about their meal choice



Situation	Passengers not given enough time to decide about their choice of meal
Effect	They feel rushed and choose an option they are not sure of as they do not want everyone else waiting.
Affect	They feel pressured.
Participant (Indian, 22 to 30)	"That is like a pressure. You know, that moment, I just need to say something. And also, I know that if I say like, I want to have this, and then I think " Will I get to try the other thing later on or not?"

Fig. 38 **- Effects and Affects of situation 5** (Own ill, 2019)

These 5 situations are considered as the concerns that are a major portion of the current context. They are further explained in chapter 4.5.

4.2 WHAT DOES 'CONTROL' MEAN?

Out of the final clusters of factors, one of the biggest cluster was about participants' definition of control or what it meant to them. That cluster gave an understanding to the term 'control' for this project. Two classifications were derived out of control which had another 5 sub classifications.

The meaning of control is two variations for the participants. Some participants believe that knowing information about 'what is done when' is enough to make them feel like they are in control. On the other hand some participants think that making a choice will be translated into feeling in control and exercising those choices. Few other participants thought finding information and exercising choices meant control. The sub classifications in this 'information' and 'control' sectors are displayed above with some participants' quotes examples as well. This classification shows majorly that Information and choice are the key to providing control to the pax.

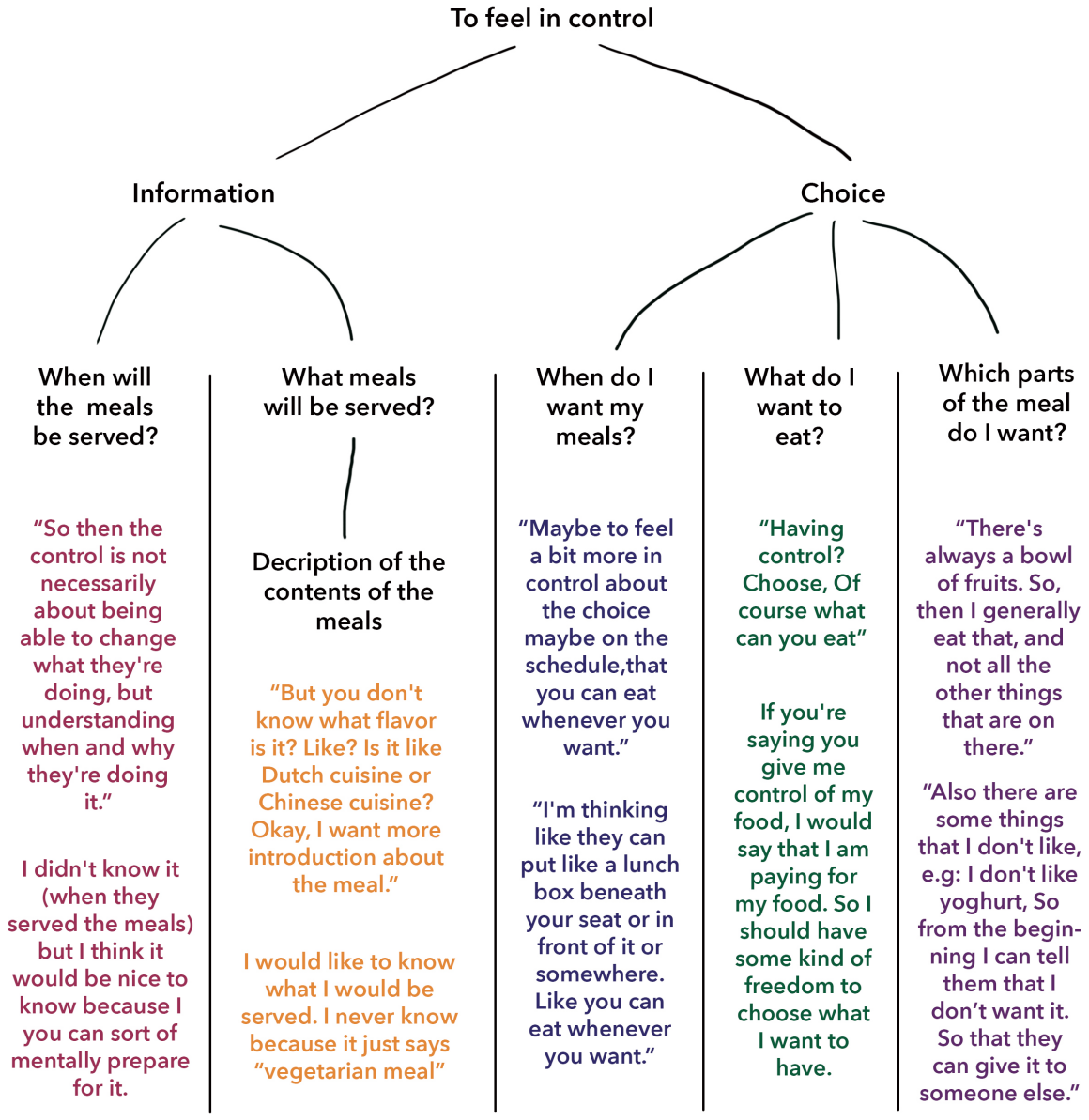


Fig. 39 **- Segregations in individual perceptions of 'control'** (Own ill, 2019)

4.3 IDENTIFYING PASSENGERS' CONCERNS

The final set of clusters that were made in the previous phase were 9 in number which turned as the concerns that pax faced in the context. Also the situations explained before have been translated into concerns. The concerns are mentioned below:

1) Economy class passengers in general are very **watchful of their actions** (do not want to disturb anyone, in any case) and **sensitive to experiences**. (derived from situation 1, page number 35)

2) At the moment, all the **processes happening onboard are done manually** and as a result they are slow.

3) The passengers want to **avoid interaction or communication with the crew** as much as possible (e.g: fear of judgement, or disturbance).

4) There is a lot of **waiting involved due to the passengers' state of cluelessness**. (e.g: They are waiting to be served and have no information about that.)

5) Apart from all these, there are some u**ncontrollable factors that affect passengers' journeys**. (e.g: time of flight, duration of flight, sitting next to an infant or more.)

6) Passengers have no idea about what is going on or will happen in terms of onboard services. (derived from situation 2 & 4, page number 36 & 37)

7) They feel like they are **not given enough time to decide their choice of food**. (e.g: They know that all the passengers are waiting to be served and they do not want to hold the flight attendant by taking too long to decide what to eat.) (derived from situation 5, page number 38)

8) They have **no information or control on what is going to be on their meal tray**. They end up wasting food that they did not want in the first place. **Passengers showed high interest in wanting to avoid that waste**. (derived from situation 3, page number 36)

9) They are currently **not given a chance to plan or prepare for their time and activities onboard**.

4.4 CURRENT CONTEXT DEFINED

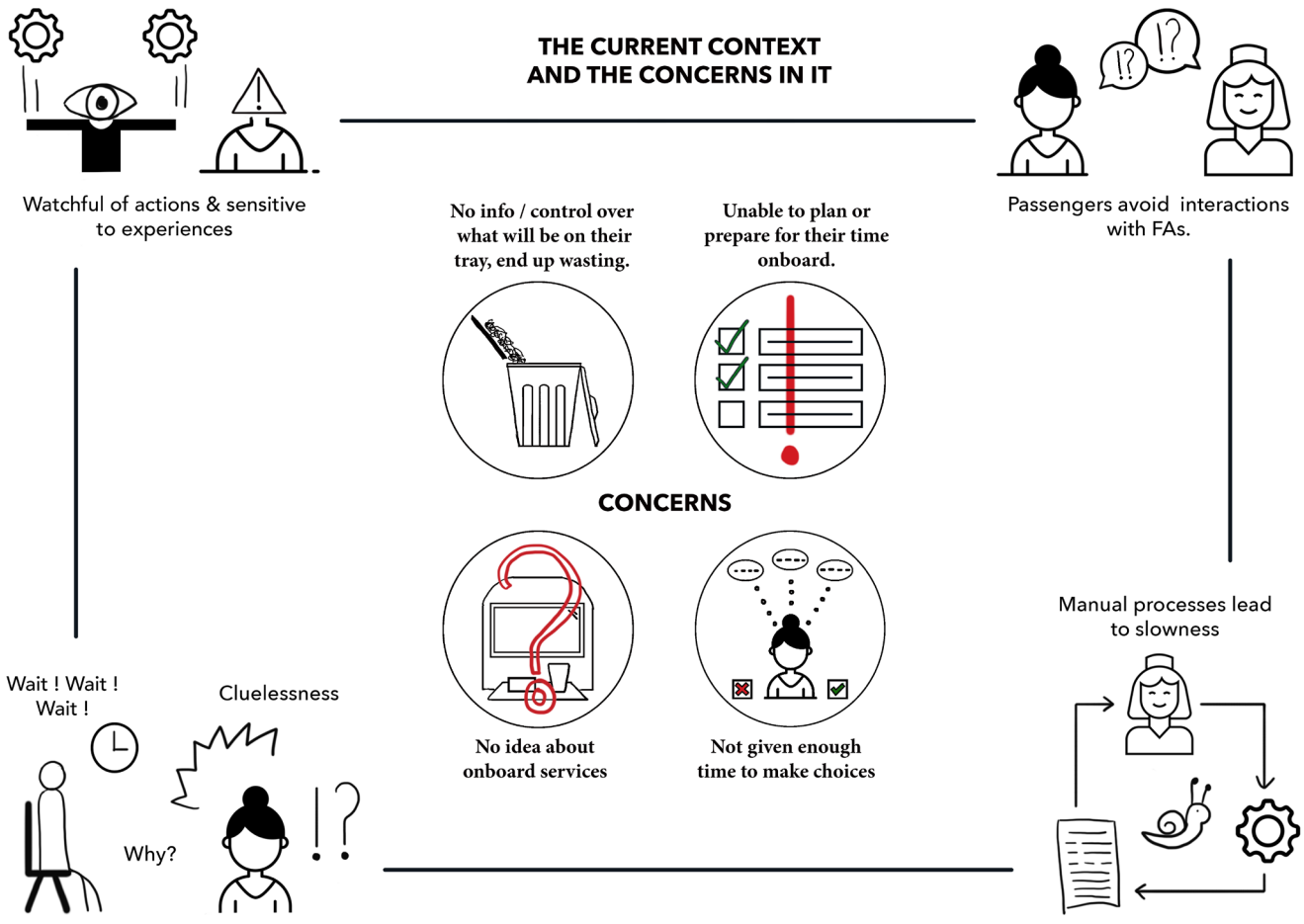


Fig. 40 **- What the current context withholds** (Own ill, 2019)

Qualities of current interactions

The interactions taking place in the current context have a few qualities and those interactions also result in some emotions by the passengers. These qualities of interactions help in determining how the interactions for the desired context should be designed.

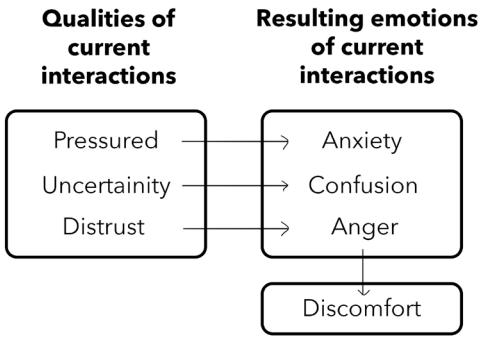


Fig. 41 **- What the current qualities of interactions result in**
(Own ill, 2019)

As explained in chapter 4.5, currently in the context or existing situations, the interactions that take place are pressured (forced, e.g: passengers have to eat when it is being served despite not wanting to). There is an uncertainty in the services from the passengers' perspective as they do not know **when** they will be served and **what** will be served. There is an uncertainty in passengers' activities as well as they are unable to plan for their time on board. Finally due to the lack of communication about everything (when food will be served, what food is being served, are any extras available, are any snacks available) the service is also distrusted and passengers prefer carrying their own food or water.

These interactions lead to anxiety and confusion about service details and anger towards the service. **Overall, these experiences lead to a discomfort in journey for the passengers.**

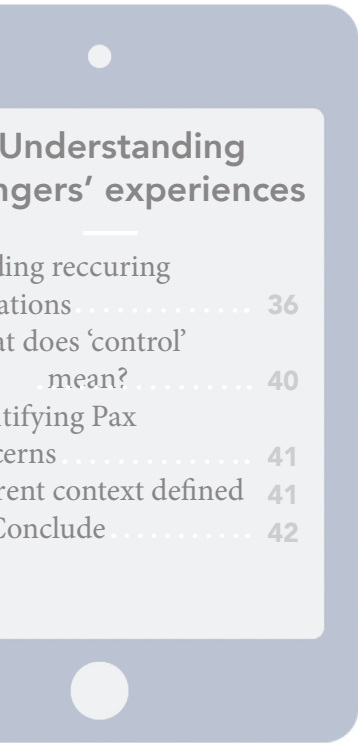
4.5 TO CONCLUDE...

Main findings

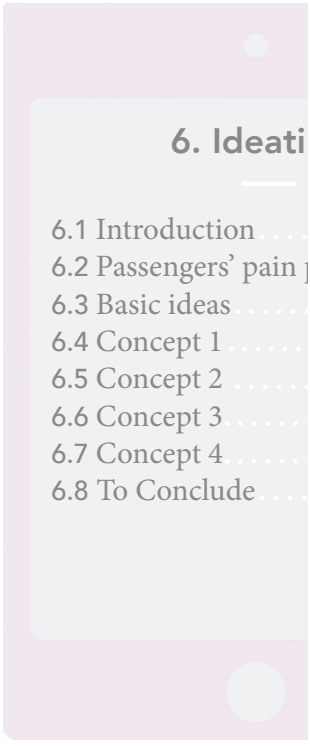
1) Control, to passengers (participants) is a segregation of recieving information and making choices which have more sub-classifications under them.
2) Main concerns' of the passengers are:
   A) They are clueless and confused about when and what they will eat (including choices, ingredients, cuisine and more). They lack planning their time onboard.
   B) Passengers feel a sense of pressure in making choices in the limited time and options given to them.
   C) Passengers are not given a chance to make any conscious decisions about their experiences like when then can sleep or what they want to eat. Hence, they are not prepared and uncomfortable about their experiences.

Therefore

Further, it is important to reverse the current context to build a desired context that can help in delivering better experiences to passengers.



5. Building the desired context



The aim of this chapter is to build a design goal and the desired context. This desired context has been built to fulfill passengers' expectations and also maintain a balance of control in giving information and choice.

5.1 CRITERIA TO BUILD THE DESIRED CONTEXT

Passengers should be given -
- A chance to **plan and prepare for their time onboard** in terms of activities and experiences. They also want to be prepared for what is coming their way.

"You don't know if it's going to be served or when exactly and I like to have that feeling of certainty of knowing, okay, I know that in three hours, food is coming. Okay, I know. So I can be prepared." Research participant, Mexican

- Because currently passengers find it **difficult to directly communicate with the flight attendants** or are unable to ask them for any extras, digital communication can be introduced and enabled.

"Either I see them passing or I go like I never use the button to call because I found it kind of awkward like i don't know. Makes me feel like I'm calling with the bell." Research participant, Italian

- They also want to **feel confident about their own experiences** and this confidence can come from taking things into their hands.

"I could just go and make myself a tea. So I like the fact that I can do stuff myself and it's not like I am just sitting and depending upon someone to ask them for tea." Participant Indian

- Most importantly, they want to **be able to control their own experiences**.

So as a summary, **passengers want to be able to make choices and at the same time want to enjoy their meal**. So as an inspiration, the goal is to provide '**restaurant like experience**'.

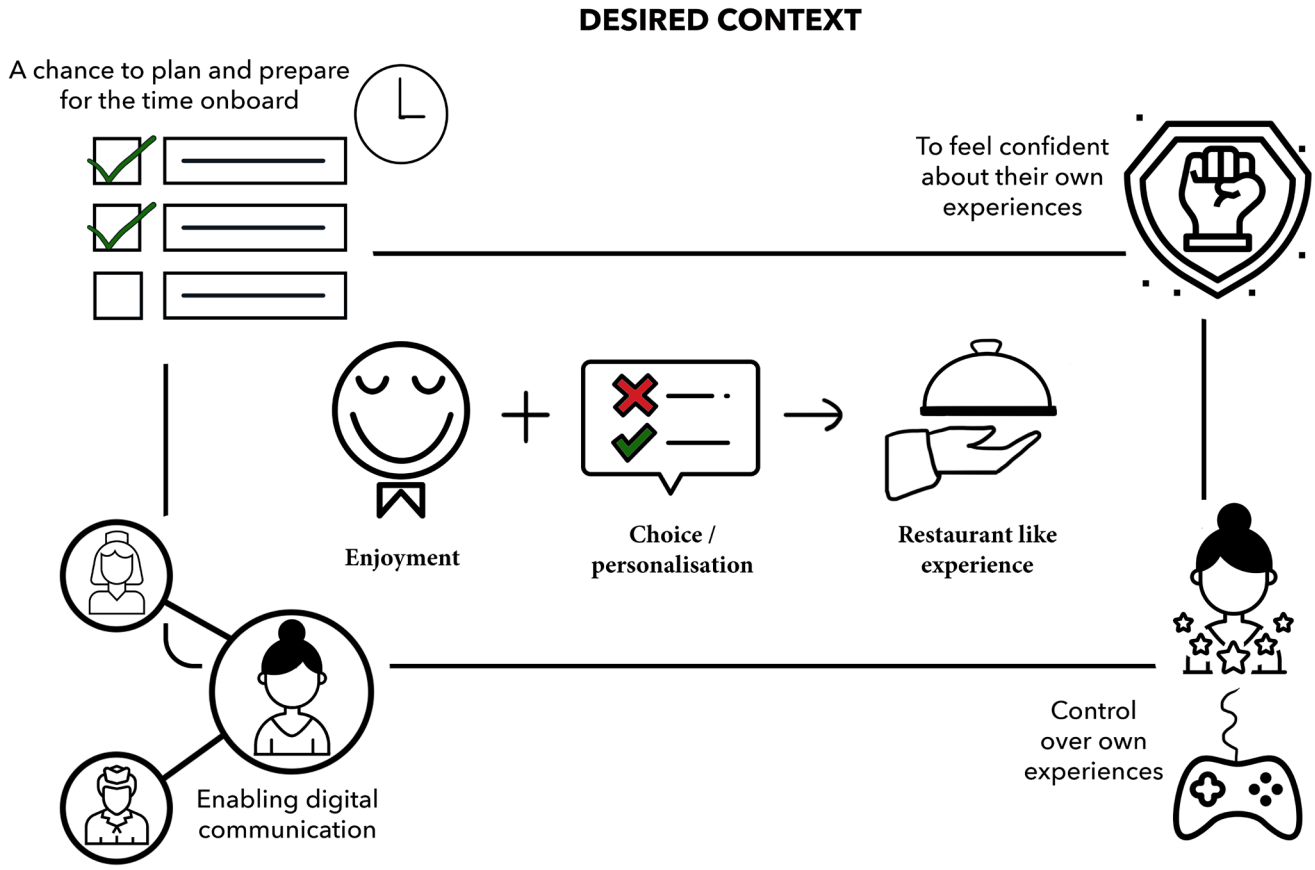


***Fig. 42* - what the desired context should withhold** (Own ill, 2019)

Qualities of desired interactions

These are the qualities that should be achieved by the desired context which will help in creating the desired emotions from the passengers.

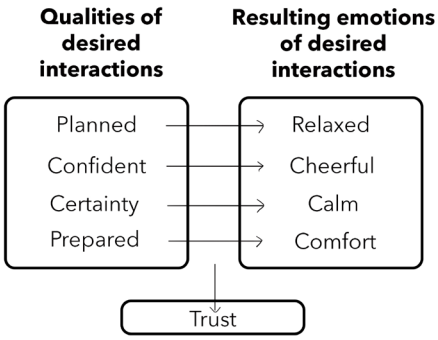


Fig. 43 **- What the current qualities of interactions result**
(Own ill, 2019)

5.2 DESIGN GOAL

The three most important activities for passengers onboard are **eating, sleeping and entertaining** themselves. Dining experience in air is more than just eating. It is also related to their sleeping and entertainment. Only if they can anticipate their meal timings, can they plan to sleep or consume some media on the IFE, that is why these three activities are interrelated. The design aim of this project is to provide passengers with a tool to plan their time on board.

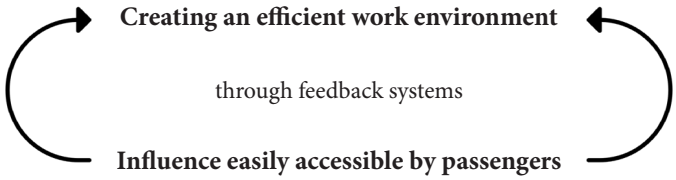
The design goal is to reduce the feeling of uncertainty in passengers about their onboard experiences in the economy class.

By providing the passengers with a tool to **plan** their experience, it **prepares** them for what's coming which makes them **confident**. This confidence brings **certainty** about their experiences. And once a **comfortable** experience is provided, **trust** will be earned.

5.3 BUILDING A VISION STATEMENT

A creative session had been conducted at Safran group with 5 colleagues who are also experts in the topic. This co-creative session had been organised to generate a vision and also for a kick start on the ideas.
The researcher acted as the facilitator and made a script / plan before conducting the session. The script, results and photos can be accesesed in the Appendix 5.
The result of the vision statement is explained below. Some ideas generated by the participants inspired this project's ideation. This will be explained in chapter 6.5.

Half of the participants' stated how important is was to create a smooth working environment for the crew as the new design should enable them to fulfill all their other responsibilities on the side to serving the pax. The other half of the participants added to their =statement that a channel for pax to create an influence in their experiences should be given. These discussions and the methods used in the session led to the vision statement. The most important takeaway from this session was the vision statement. This vision later helped in ideating.



To create an efficient work environment for the crew and making influence easily accessible to the passengers through feedback systems.

Efficient work environment for crew	Influence easily accessible by passengers
Why?	**Why?**
- They cannot be running around always to serve passengers - Creating an efficient work environment for the crew back in the galley will motivate them to provide better services and also enable providing these services	- So that they can make a few decisions for themselves about what and when to eat - This will allow them to plan their time onboard

Fig. 44 **- Reasoning for the vision** (Own ill, 2019)

5.4 TO CONCLUDE...

Takeaways

1) Passengers want to be able to make choices and also enjoy their entire experience onboard.
2) Design goal - To reduce the feeling on uncertainty about their onboard experiences in economy class passengers
3) How to achieve the design goal?
   By creating an efficient work environment for the crew (inspired from the expert interviews and creative session) and creating a channel for the passengers to influence their experiences.

Therefore

Ideating concepts and first ideas were a start to convert the design goal and the vision into a reality

6. Ideating

This chapter explores ideas to build four concepts from different inspirations .

6.1 INTRODUCTION

In this phase all the research was converted into definite concepts. Following the design goal and getting inspired from the vision statement, some concepts emerged. This phase had many iterative steps which helped in working and developing over feedback. Two tests were conducted in these iterations. The feedback from the participants for these tests majorly helped in being able to translate the requirements into tangible concepts.

The goal for this phase was to develop a tool that built a sense of certainty and confidence in passengers while using it to make decisions about their onboard experiences. This tool should also be able to solve passengers' concerns regarding the dining experience.

The project is about giving control to passengers and there the literature about giving control to users can be found in the Appendix 6.

6.2 PASSENGERS' PAIN POINTS

To begin ideation, the current context was broken down into a few passengers' pain points. This had been done to identify minor problems from the current context as well. It also helped in avoiding missing any factor that could be overlooked upon.
1) Passengers do not know what their meal consists of until they open it after they are served.
2) Passengers feel like almost everything is being decided for them.
3) Passengers hesitate verbally asking for something outside the service time.
4) Passengers are not given enough time to decide what they want to eat.
5) A few passengers involuntarily miss their meal if they fall asleep.
6) Passengers meal tray consists of a food item that they usually never eat or do not like (ends up getting wasted)
7) Passengers are sometimes hungry outside the service time as well.
8) Passengers do not know when their meal is being served.
9) Sometimes the passenger does not want to eat when the meal is being served but later.
Over all, passengers do not enjoy their meal because they did not decide to eat at that particular time.

Braindumping ideas for each pain point individually

The above pain points were first roughly ideated for, brain dumped as many ideas that seemed possible or wild. For the next step, there were combinations of ideas formed from these to be converted into some basic concepts.

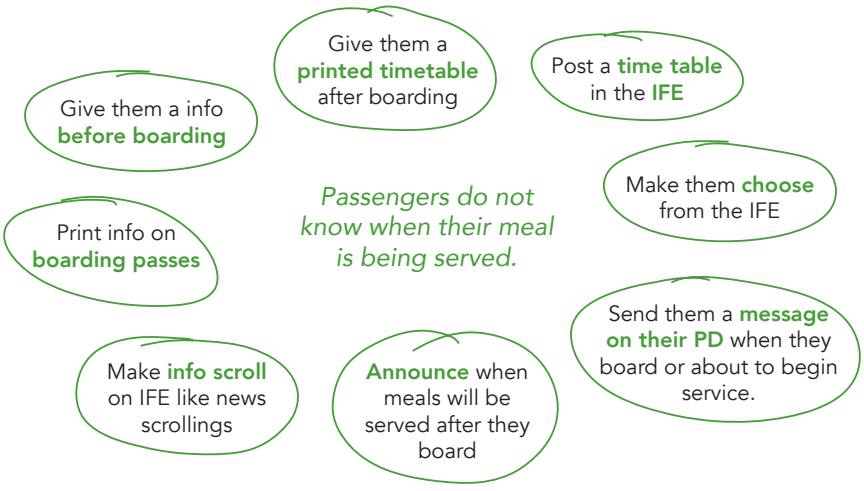


Fig. 45 **- Passengers do not know when their meal is being served.** (Own ill, 2019)

***Fig. 46* - Passengers feel like almost everything is being decided for them.** (Own ill, 2019)

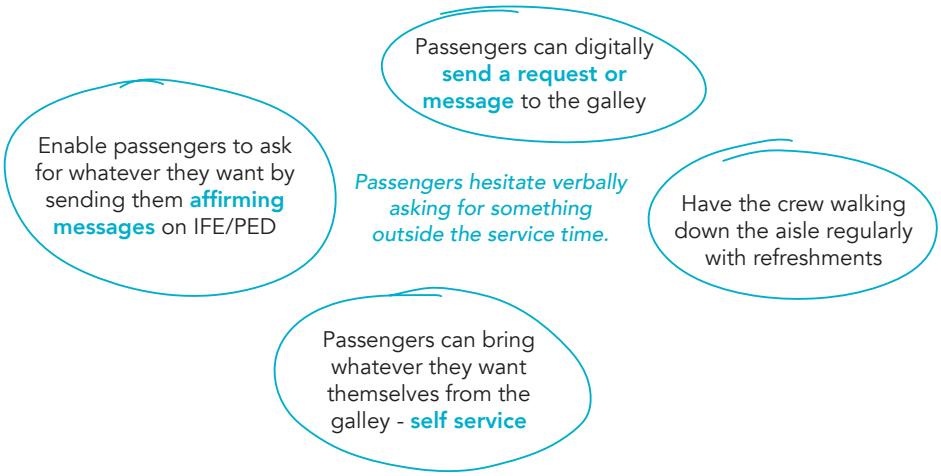


***Fig. 47* - Passengers hesitate verbally asking for something outside the service time** (Own ill, 2019)

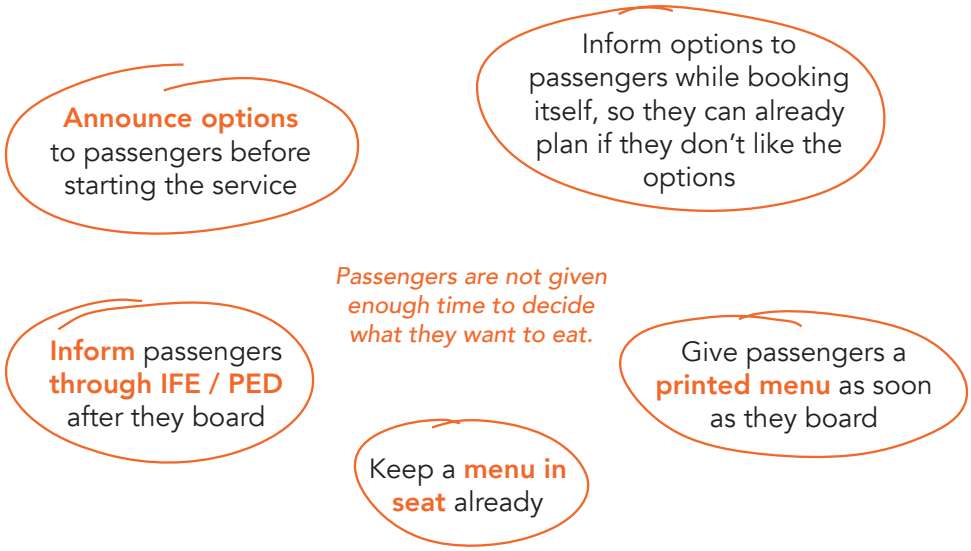


***Fig. 48* - Passengers are not given enough time to decide what they want to eat.** (Own ill, 2019)

Fig. 49 **- Passengers meal tray consists of a food item that they usually never eat or do not like (ends up getting wasted)** (Own ill, 2019)

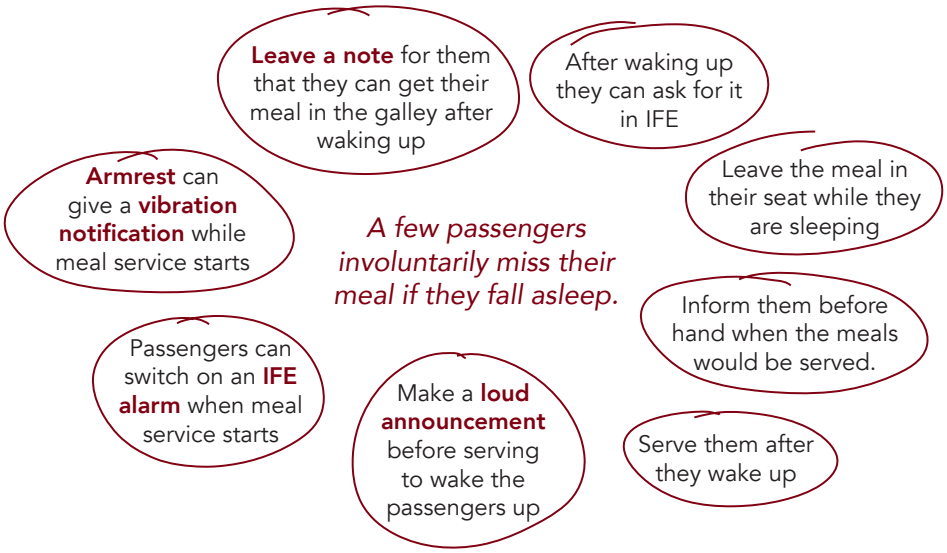


Fig. 50 **- A few passengers involuntarily miss their meal if they fall asleep.** (Own ill, 2019)

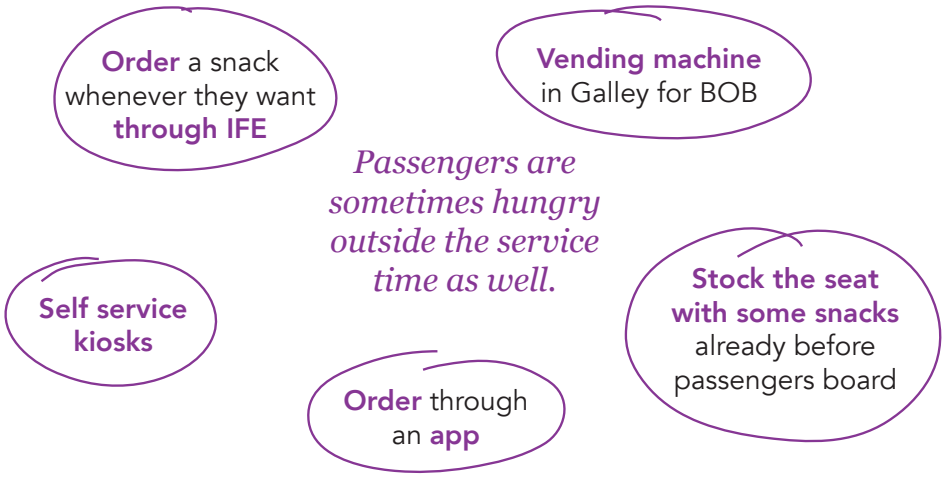


Fig. 51 **- Passengers are sometimes hungry outside the service time as well.** (Own ill, 2019)

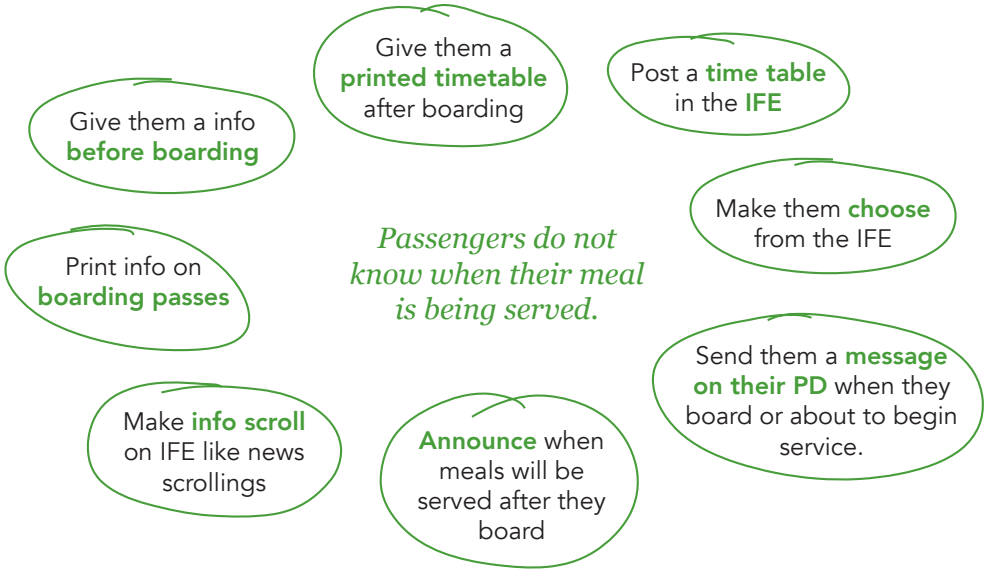


***Fig. 52* - Passengers do not know when their meal is being served.** (Own ill, 2019)

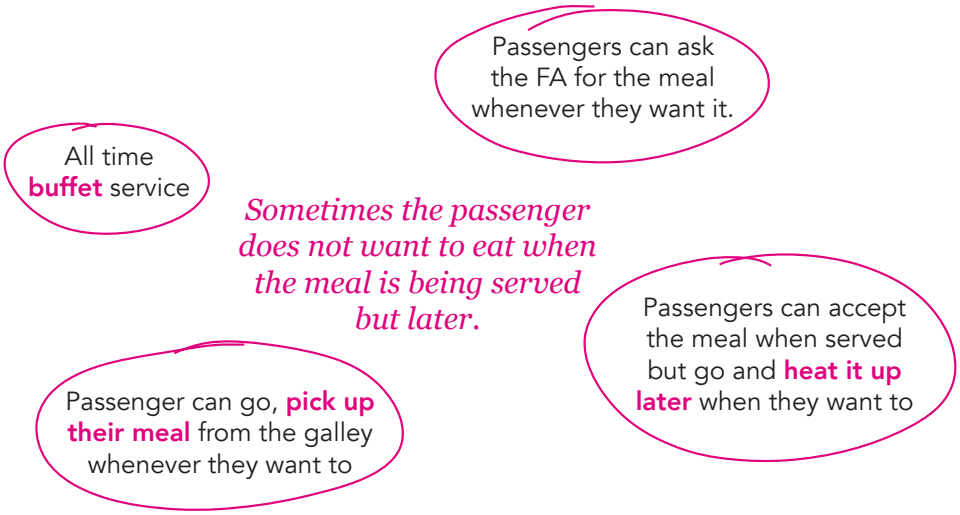


***Fig. 53* - Sometimes the passenger does not want to eat when the meal is being served but later.** (Own ill, 2019)

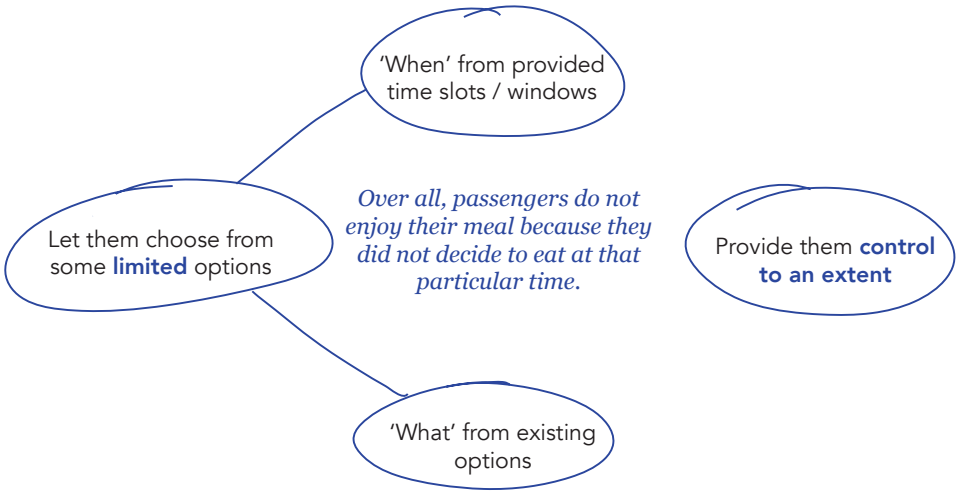


***Fig. 54* - Over all, passengers do not enjoy their meal because they did not decide to eat at that particular time.** (Own ill, 2019)

6.3 BASIC IDEAS

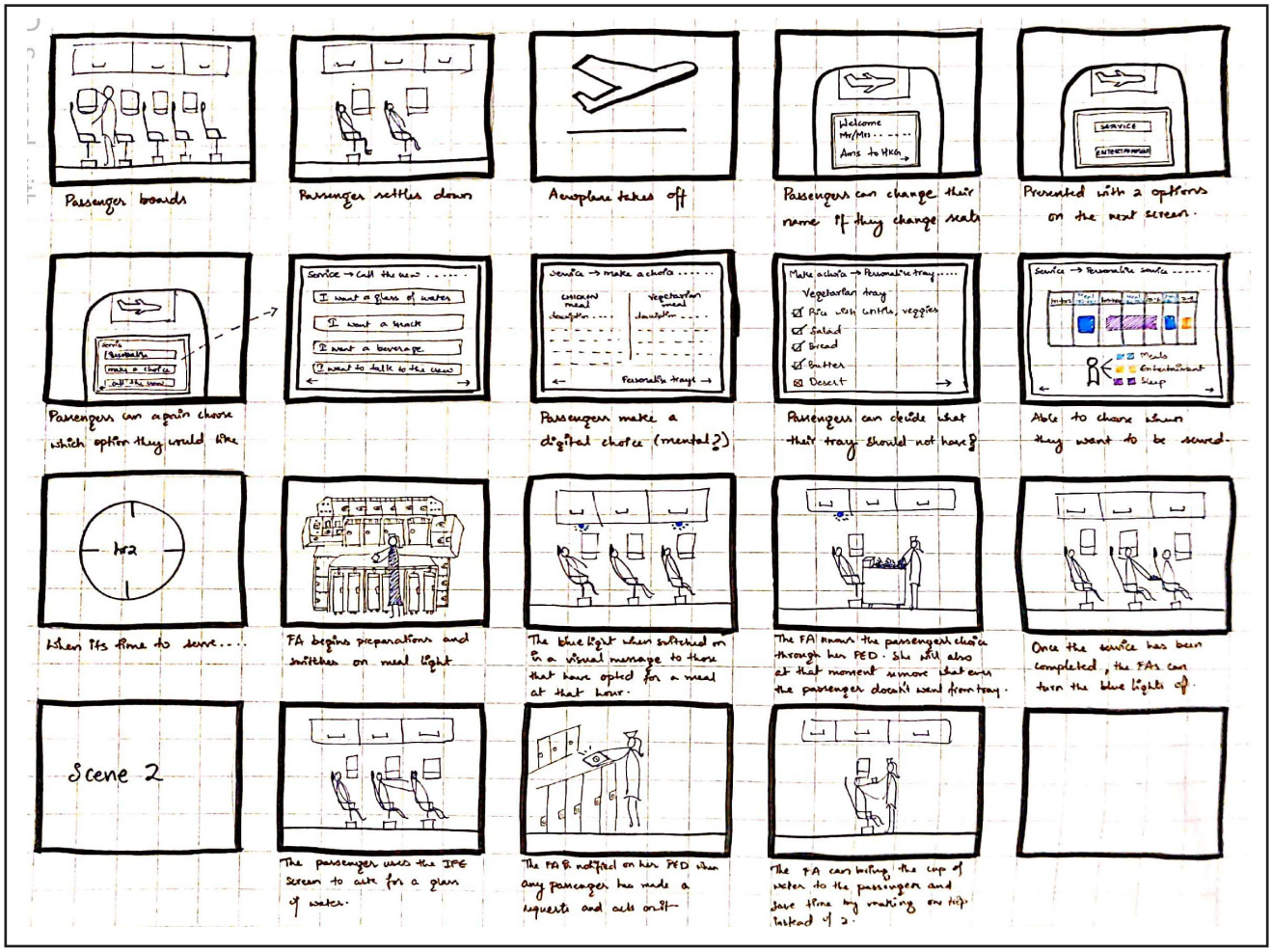


Fig. 55 **- Basic idea on ondemand service** (Own ill, 2019)

More basic ideas are found in the **Appendix 6.**

The basic design concepts still lacked novelty and problem solving aspect, but they were a start. A fresh perspective and new inspirations were necessary to bring out better ideas. At this stage, going back to the creative session with colleagues and looking for trigger words helped in ideating further. In this session, the following words were found as the important ones:

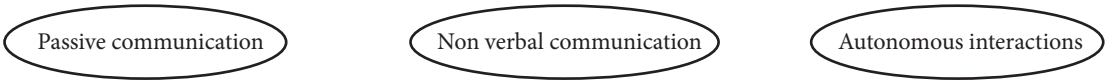
- Expectations management
- Efficiency
- Influence
- Accessible
- New channel
- A tool
- More opportunities to connect with the crew
- Data dump on FAs

Some more inspirations picked from the session

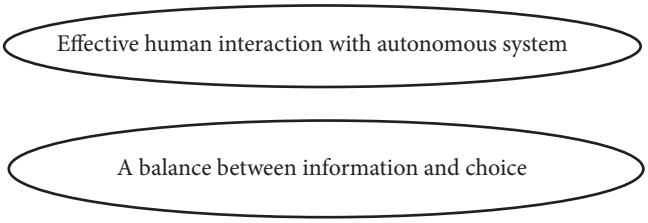
- IFE / smartphone based communication and a decision tool for setting expectations, making decisions and efficient organization for the crew.

What → Choice → less, more
When → Timing → Meet personal biorhythm
How → Personalisation

- A new channel of non-verbal communication for Pax to passively express their specific needs and desires to crew.



- How to distribute autonomy (roles and responsibilities) between the system, passengers and the crew?



Ideas inspired from the session

Chapter 5.4 explains the session. The plan for the session, the process, results and photos can be accessed from the Appendix 5.

- 'AI algorithms predicting pax needs'
Eg: If a passenger has requested for water, the crew could assume that may be a few more passengers could be thirsty and head out into the aisle with a few cups of water, Can predict the meals that are repeatedly being chosen

- 'An interactive map of the cabin given to passengers for any self service'
Eg: If a pax wants a snack they can go and grab it themselves or even water

- 'An interactive map of the seating can be given to the crew to see who is sitting where to understand their needs and choices'
Eg: This helps while serving them

- 'Involving pax to galley (imbibing a more welcoming environment into galley and promoting self service)'
Eg: Water / snacks in the middle of the night. Can send a message on all IFEs that they can grab something from the galley

- 'Biorhythm tool - to help passengers reduce jet lag'
Eg: Decide when to feed based on destination's time zones and inform them or let the passengers decide.

- 'Online preparation in advance'
Eg: Let passengers already make some decisions while checking in online (a few hours before boarding)

- 'Influence on flight starting at home'
Eg: Since the time online check in opens, give the passengers info / decision opportunities on their PED

- 'Connection between IFE / smartphone / PED and crew interfaces'
Eg: Communicating information back and forth

- 'PSU integration'
Eg: Can use it for feedback input / output

- Mcdonalds like IFE
Eg: choose and then go collect

- 'Menu hand out'
Eg: Menu and time table can be handed out or already present in seat.

App (PED), online based interaction

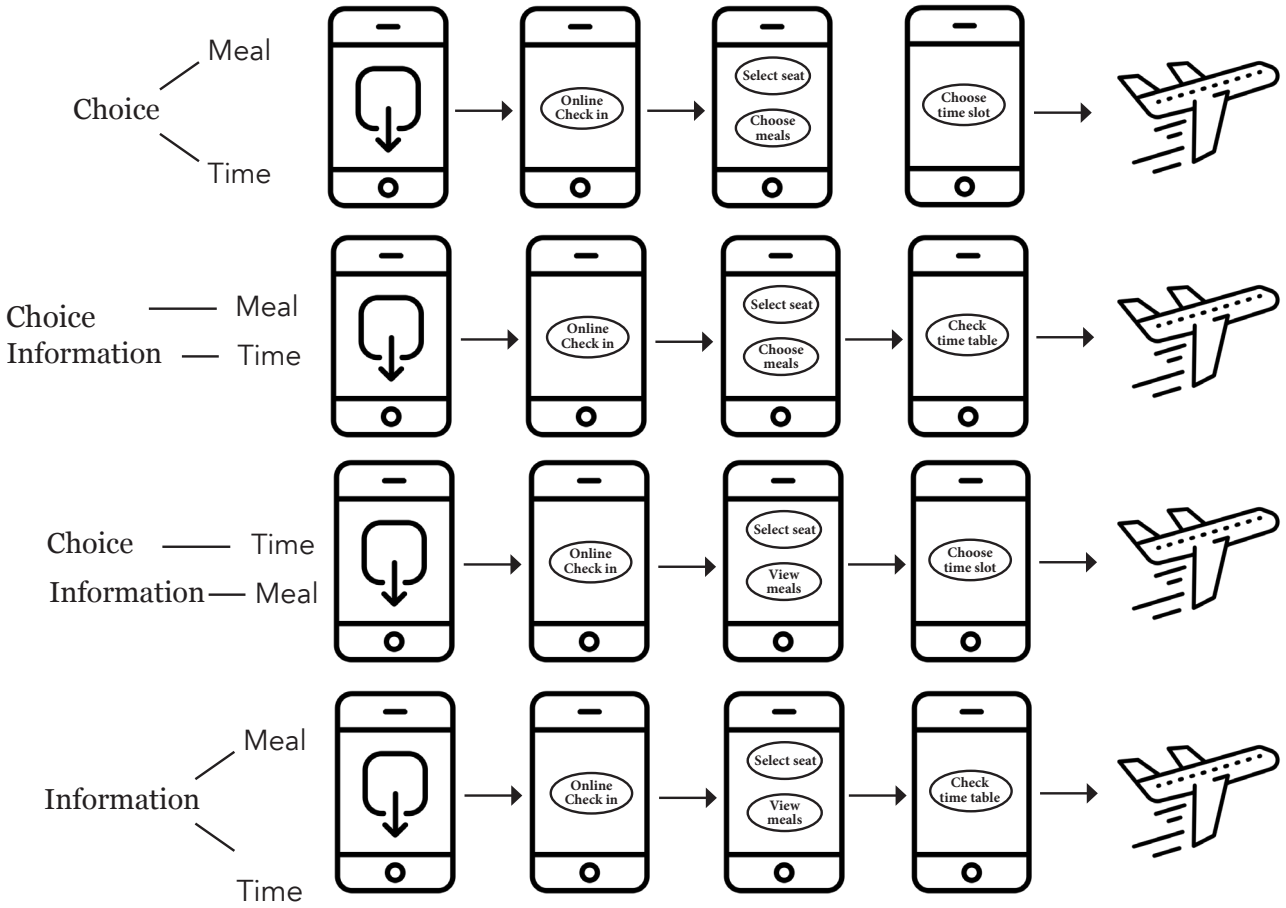
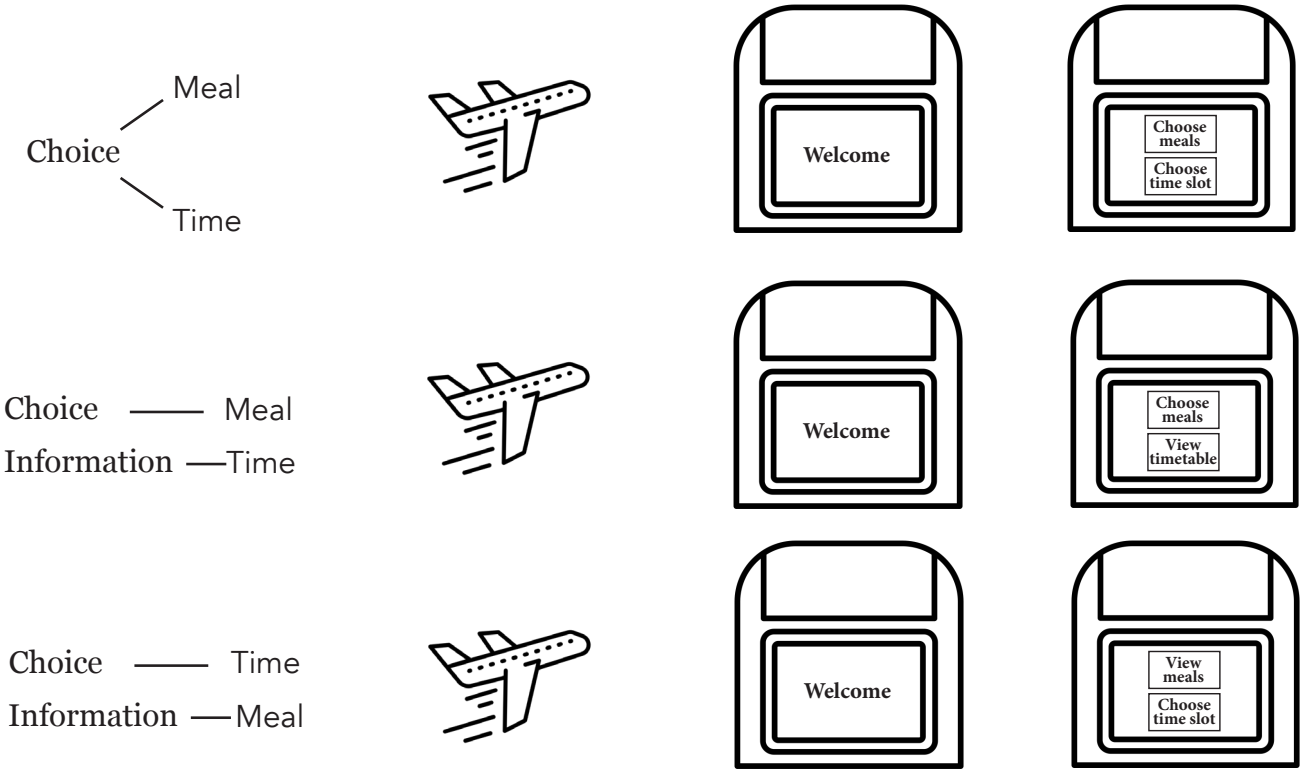


Fig. 56 **- Online interaction on phone for check in and meals** (Own ill, 2019)

IFE based inflight interactions



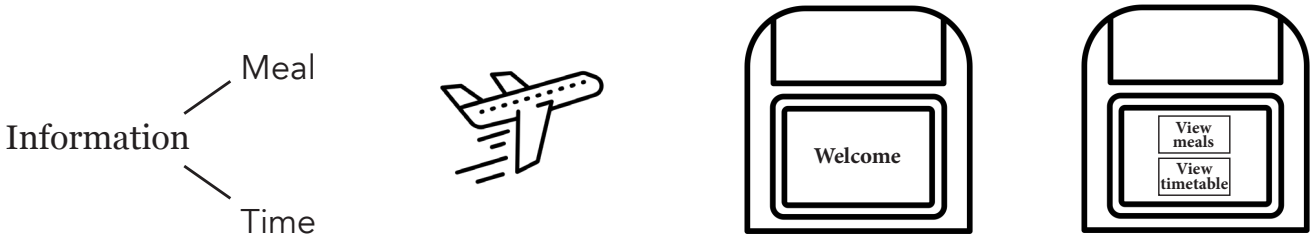


Fig. 57 **- Interaction on IFE for meal selection and serving time selection** (Own ill, 2019)

To bring a balance between giving choice and information for control, pros and cons have been weighed out for all the above shown combinations. But to proceed with, the combination of giving choice and time in IFE based interactions have been chosen as it solved most of the passengers' concerns. The online application based interactions had not been chosen as it was evident from the participant research as well that they did not want to decide about what they would eat on the flight so many hours later. Just as in a restaurant, we choose the restaurant and make reservations, but we don't already pick out items from the menu. This is the same as deciding what to eat in air through the mobile application a few hours prior. That is why IFE based interactions have been proceeded with. The pros and cons for this combination are displayed below and the others' can be found in the Appendix 6.

Although this does bring a complete balance, balance can be brought by posing some limitations on the pax.
1) Pax should not be allowed to choose to be served whenever they want but instead, the service managers can decide on three or four slots out of which the pax can choose two. This was a limitation as the crew has many more responsibilities than just serving the pax.
2) Some pax also want to choose quantities, which cannot be allowed as it involves many changes with catering too and more stock needs to be brought into the flight.
3) Pax cannot change their decisions once they choose something. If changes can be allowed, it will increase the workload for the crew.

Choice - Meal and Time for IFE based inflight interactions	
Pros	Cons
Allows passengers to plan their time on board	Cannot change any choices once made
Giving complete freedom and control to passengers	More coordination between the crew is required
Can avoid wastage	Information overload on crew
No unpleasant surprises	No surprises at all
Helps in stock management	Involvement of systems

Fig. 58 **- Pros and Cons of Choice - Meal and Time for IFE based inflight interactions** (Own ill, 2019)

6.4 CONCEPT 1

The first concept provides a 3 options of meals to the passengers in which they are allowed to edit their trays from which they can unselect what they not prefer on their meal tray. Only the important screens have been explained. Passengers get to choose 2 slots out of the 3 slots given to them for their meal service. Passengers are also offered preset options to be able to communcate with the crew. The entire prototype (all screens) can be found in Appendix 6.

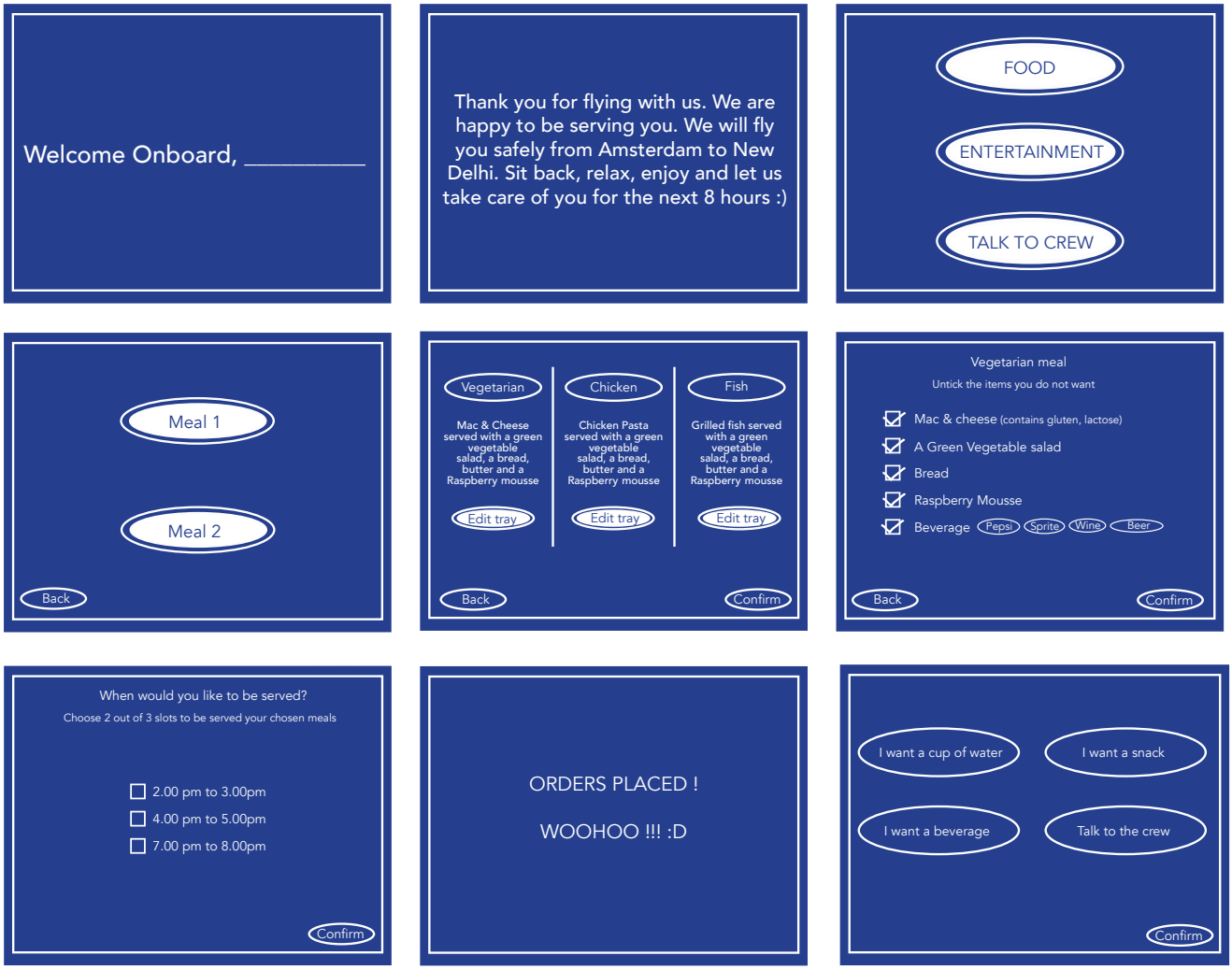


***Fig. 59* - Series of screens on IFE for meal and serve time selection - Concept 1** (Own ill, 2019)

6.5 CONCEPT 2

An inspiration for the next concept

For the next concept, the design went a step back. Instead of telling passengers what will be on their tray, why not let them build their own personalised meal tray? This also creates a DIY (Do it yourself) experience for the passengers which gives them something to do. Hence the next concept will allow passengers to create a meal tray for themselves, this may also help in decreasing food wastage. The interaction for this concept has been inspired from the children's digital picture puzzle solving games. This concept will involve a drag and drop interaction to fill the tray up with items, just like how children drag puzzle pieces to fill the voids in a picture.

Fig. 60 **- Drag and drop puzzle pieces inspiration for Concept 2** (Rvappstudios.com, n.d.)

The second concept offered a drag and drop menu of all the courses of a meal. Passengers can build their own tray instead of unselecting particular items from the tray unlike the previous concept. In this concept passengers are also allowed to plan their meal times by dragging the meal trays. In this concept, instead of providing preset options, pax can write a message to the crew and send it to them through the IFE.

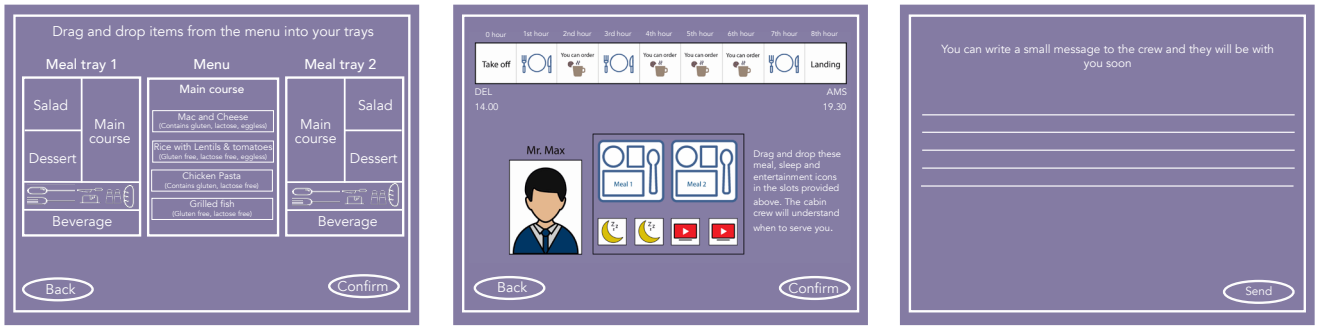


Fig. 61 **- Series of screens on IFE for meal and serve time selection with drag and drop interaction - Concept 2** (Own ill, 2019)

An addition to the Design goal

Giving a choice in meal and time to passengers for their meal experience is fulfilling the design goal, but is a simple fulfillment fthe design goal, but also an obvious one. This project was also identified as an important opportunity to add 'surprise' or 'delight' element to the dining experience onboard for the economy class passengers. A participant's storyserved as an inspiration to upgrade this problem solving concept. The participant said that once he had been given a turkish sweet as soon as he boarded the flight on his way to Turkey. He said that regardless of how the sweet tasted, it was a very memorable experience for him and that he would never forget it. The outcome of this project should also be something that passengers view as a delightful take away from their air journey. Therefore, from this step onwards, some 'out of the box' and 'unconventional' ideas were brainstormed for.

***Fig. 62* - Part 1 of 'unconventional ideas'** (Own ill, 2019)

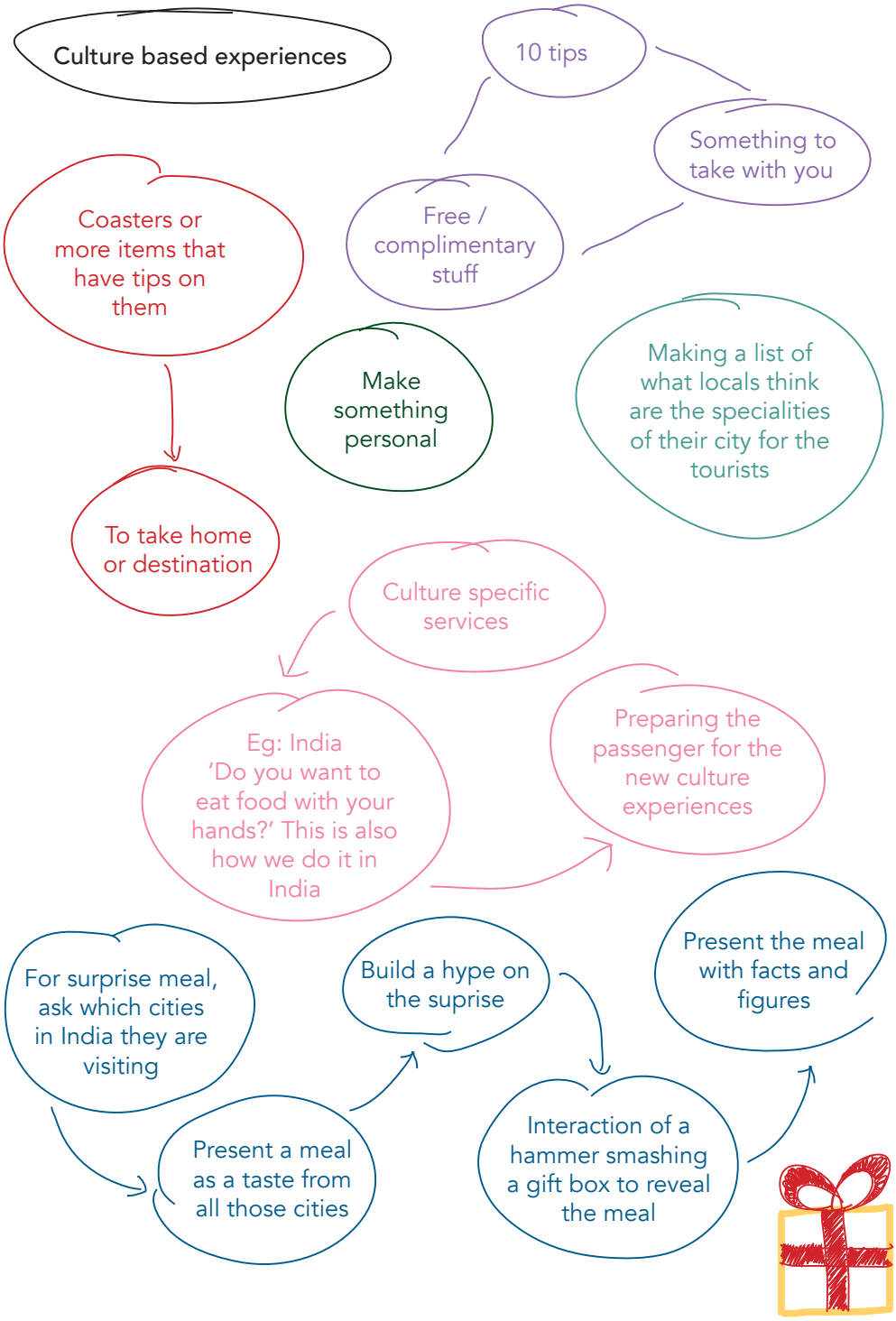


***Fig. 63* - Part 2 of 'unconventional ideas'** (Own ill, 2019)

From all the above (In the figures 57 & 58) concepts, the 'culture based experiences' cluster of ideas seemed most interesting and held potential to be converted into services. The surprise meal idea bubble had been picked and developed further. Imagining that this passenger is travelling to India for the first time as a tourist. Usually when tourists travel to India, they tend to travel to more than one city or state to experience its rich culture as it is also a vast country. So assuming that this passenger is travelling to more than one city, this service will ask the passengers to choose those cities. An algorithm should help in creating a meal for these passengers which presents each meal course of the menu from each of the cities they have picked.

6.6 CONCEPT 3

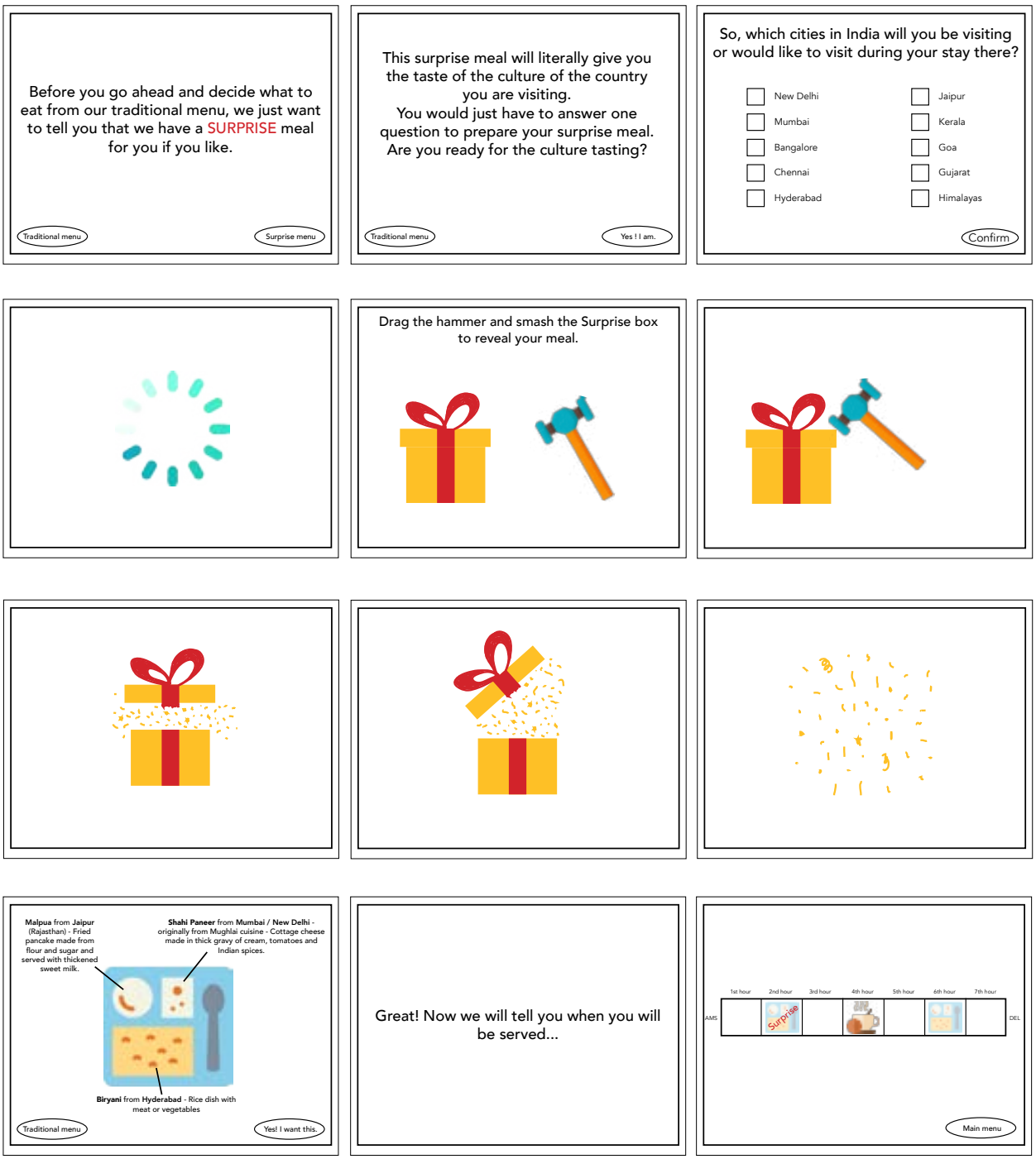


Fig. 64 **- Series of screens on IFE for meal selection and serve time information with surprise meal interaction - Concept 3** (Own ill, 2019)

The idea behind this concept is to give passengers a taste of the culture of their destination before they get there. It creates some hype and excitement before discovering what the meal is. As it is shown, the meal is presented with complete information of how it is cooked and its ingredients. This will help the participants in also deciding if they want to try the surprise meal out. In this concept, only the surprise meal has been rendered. But one surprise meal and one regular meal will be served for the passengers. This service also enables passengers to go back to choosing a traditional meal instead of the surprise meal after discovering what it will be. That means that passengers will be given one last chance to change their minds before confirming their order. This option has been provided in considering those passengers that may be skeptical about food choices in general and would not prefer risking eating new cuisines in air journeys.

6.7 CONCEPT 4

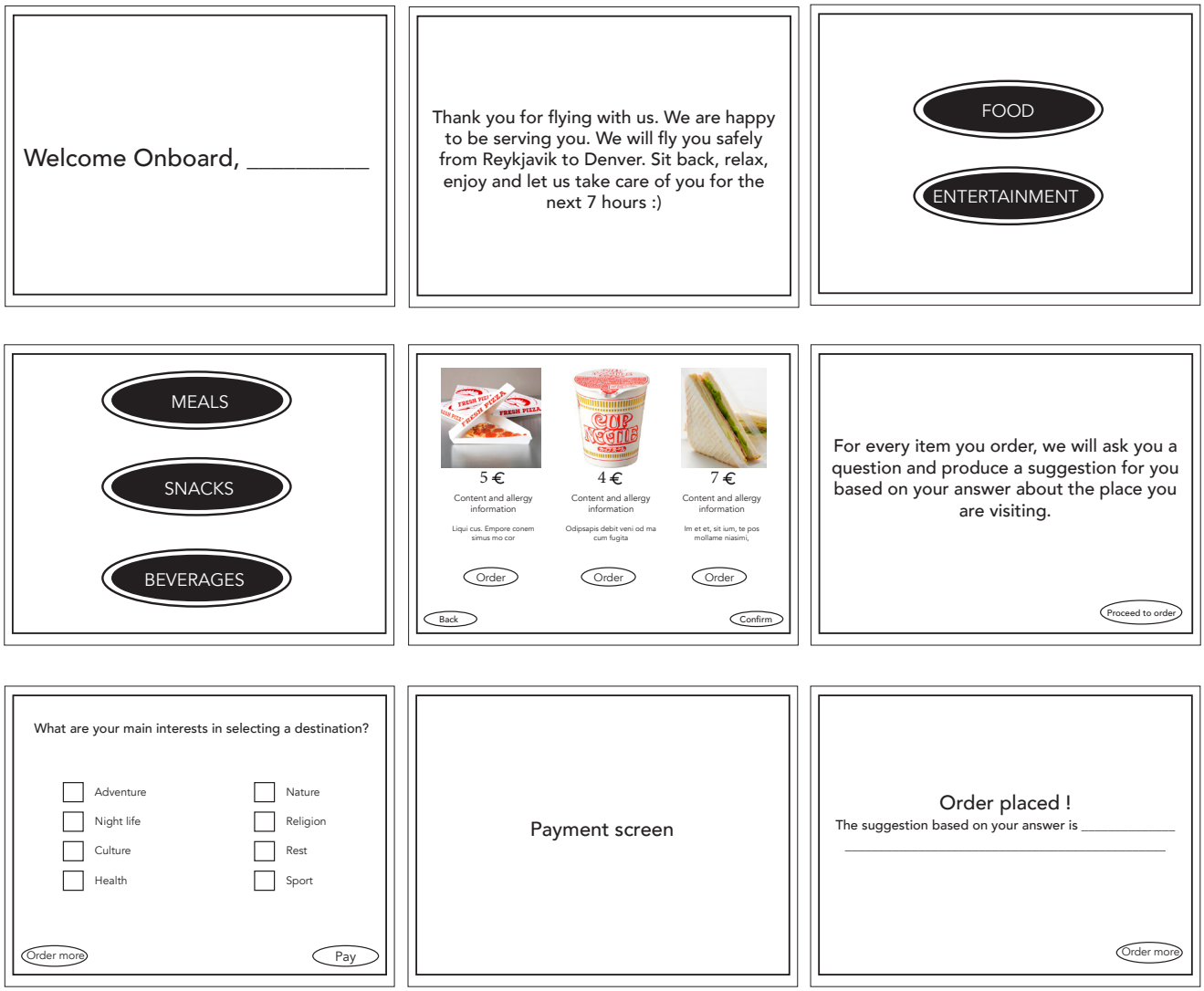


***Fig. 65* - Series of screens on IFE for BOB service - Concept 4** (Own ill, 2019)

Concept 4 was designed for the Buy on Board systems, where suggestions and tips are generated for the destinations based on some questions they are asked.
This concept wants to prompt passengers to buy more items so that they can unlock more suggestions for themselves. These tips / suggestions regarding the destination are not what can be found online as soon as they google the place. But these suggestions and more personalised and tailored to their personalities. For example, if the system identifies them to be foodies or great music enthusiasts, it will give a list of great food festivals in that place for that period of time or some great local bands playing in places. These are not something that a regular tourist would find online, unless looked for it particularly.

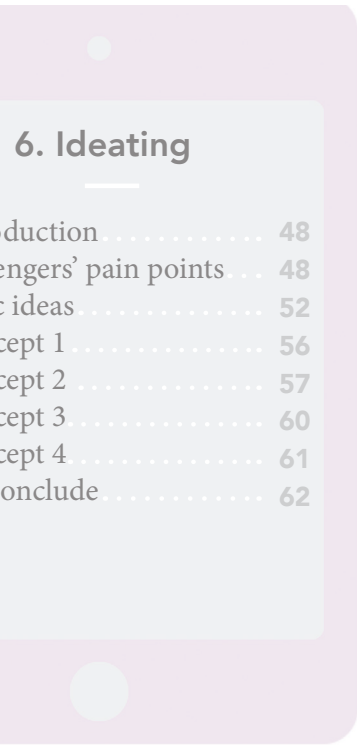
6.8 TO CONCLUDE...

Takeaways

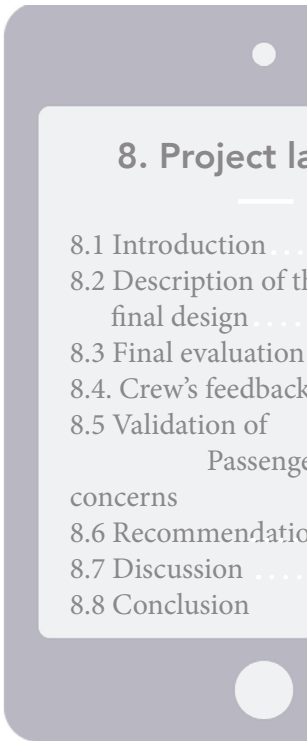
1) Bringing surpise / delight element to the experience is an addition to the design goal.
2) Two concepts were ideated based on letting passengers choose their meals from the given options like a menu. Also, enabling passengers to choose 2 out of 3 slots to be served their preffered meals.
   - A limitation on slots has been imposed instead of giving them the complete freedom to choose. This decision has been made to avoid the crew from involving themselves in service all through out the journey.
3) Concept 3 provides a personalised surprise meal to passengers as 'the taste of the culture' of the country they are visiting. Use case in this situation - Travelling to India.
4) Concept 4 is for Buy on Board where suggestions about the destination are generated upon ordering items.

Therefore

The four concepts have to be tested to assess whether they will work for passengers as intended. Then they will be improved based on feedback generated from those tests.



7. Testing the designs



The four concepts had been tested and the feedback is analysed to build the final concept in this chapter.

7.1 INTRODUCTION

This phase of the project explains two tests in total. The first test, is to evaluate the first 4 concepts and the second test is to evaluate the first version of the final concept.
In the first test the four concepts were evaluated with 6 participants out of which 2 of them have been the participants for the research and the rest also fit the target group. The second test, the first version of the final concept was tested with four participants. A script, an online qualitative questionnaire, a few more questions about some aspects of the designs and a final feedback form had been used. The online questionnaire consisted of likert scale questions.

7.2 TEST 1

Goals

The goal of the test was mainly to see which concept of the four fulfilled the design goal, the best along with providing them a delightful experience.

Then the goal had been divided into sub goals
1) Apart from this, each concept had been tested for how much confidence, comfort, intuitiveness, trust in use it provided them in comparison with each other.
2) As the participants' one of the main concerns was how they felt unplanned and unprepared for their journey, currently, that parameter had also been tested now.

The method of the test, the tasks for the participants, the question and interview can be found in the **Appendix 7**.

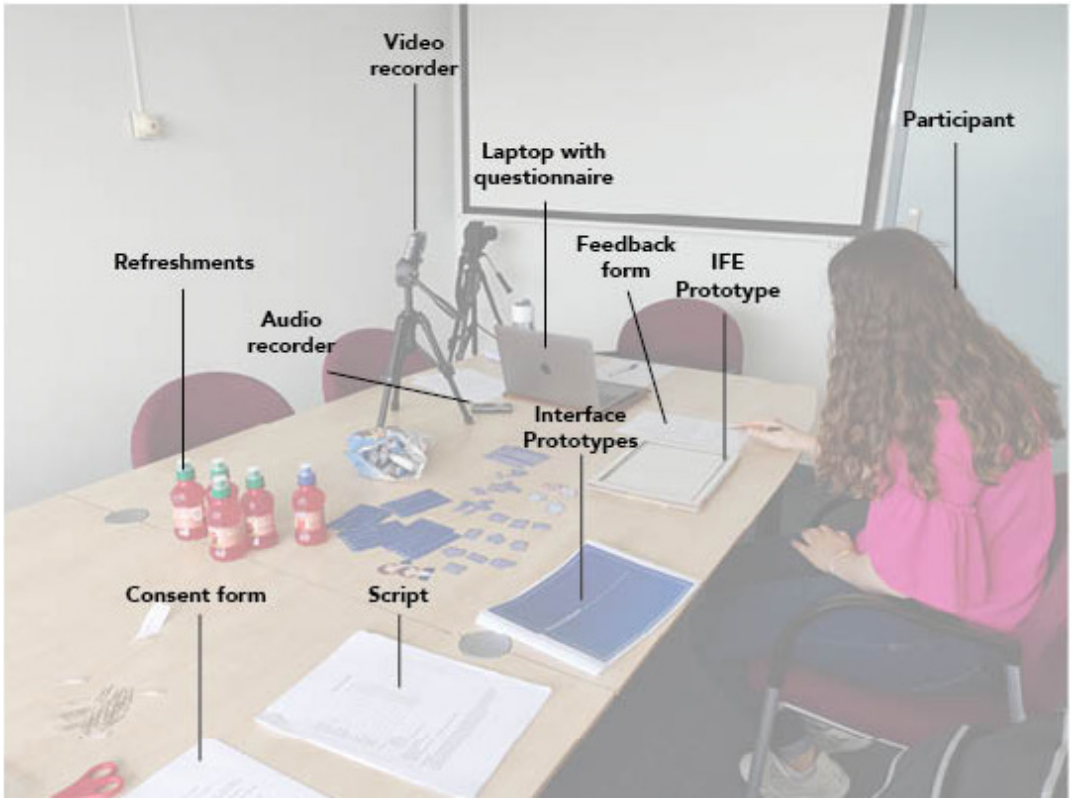


Fig. 66 **- Test 1 setup** (Own img, 2019)

Analysis of the test 1

These results are from the first part of the online questionnaire that had been made. The below table shows that the second concept fulfills all the qualities the most.

Quality	Concept 1	Concept 2	Concept 3	Concept 4
Confident about deciding & ordering	5/6 People	6/6 People	3/6 People	3/6 People
Different from usual experiences	6/6 People	6/6 People	6/6 People	2/6 People
Trust in service	6/6 People	6/6 People	4/6 People	4/6 People
Relaxed about making choices	4/6 People	6/6 People	5/6 People	4/6 People
Planned & prepared about time onboard	5/6 People	6/6 People	6/6 People	4/6 People
Confident about using the service	6/6 People	6/6 People	5/6 People	5/6 People
Comfortable about using the service	5/6 People	5/6 People	5/6 People	5/6 People
Comfortable about contacting the crew	4/6 People	2/6 People		
Interested in personalised tips				3/6 People

Fig. 67 **- Table of number of participants rating the 4 concepts as per parameters mentioned** (Own ill, 2019)

The second part of the questionnaire compares the concepts between the below mentioned qualities. Participants had been asked to rate from 1 to 5, 1 being the least and 5 being the most. Only ratings of 4 and 5 have been considered. It also mentions how many participants voted for 5 and how many voted for 4.

Quality	Concept 1	Concept 2	Concept 3	Concept 4
Problem solving	1p ●●●●● 5p ●●●●○	5p ●●●●● 1p ●●●●○	2p ●●●●● 3p ●●●●○	2p ●●●●○
Fun experience	1p ●●●●● 1p ●●●●○	4p ●●●●● 2p ●●●●○	5p ●●●●● 1p ●●●●○	2p ●●●●○
Intuitive experience	4p ●●●●●	2p ●●●●● 4p ●●●●○	4p ●●●●● 2p ●●●●○	2p ●●●●● 3p ●●●●○
User friendly service	2p ●●●●● 2p ●●●●○	3p ●●●●● 2p ●●●●○	4p ●●●●● 1p ●●●●○	2p ●●●●● 2p ●●●●○

Fig. 68 **- Table of participnats' rating with parameters for 4 concepts** (Own ill, 2019)

The last part of the questionnaire explained what the design goal of the project was and which of the concepts seemed closest in fulfilling the design goal.

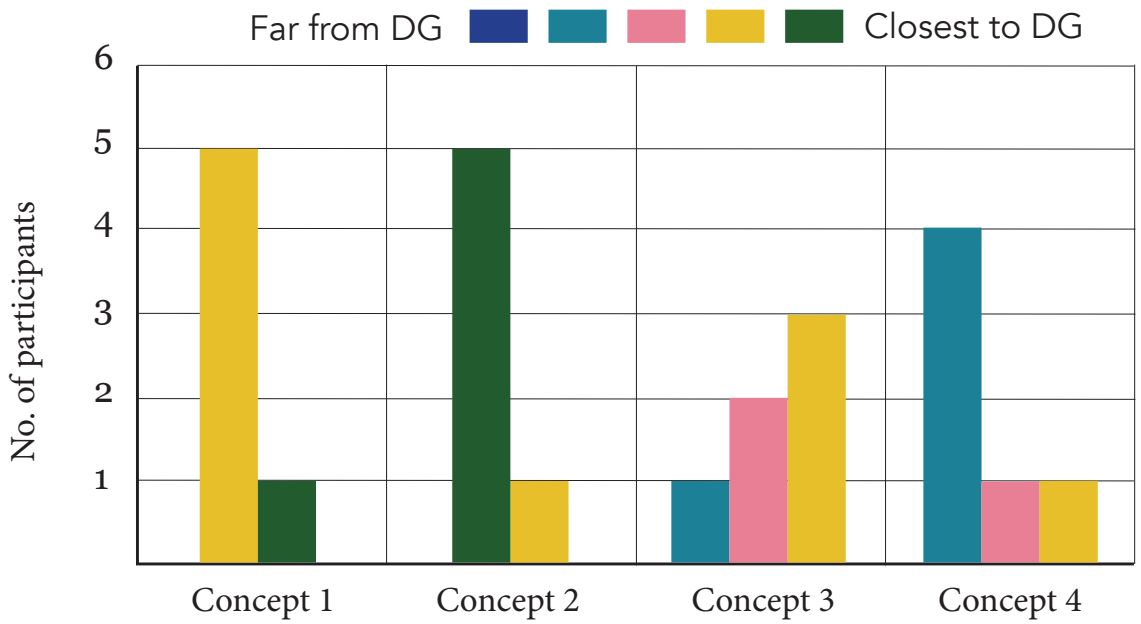


Fig. 69 **- Participants rating the 4 concepts that are closest to the design goal of the project** (Own ill, 2019)

Positive feedback	Constructive feedback
I really like having 3 options of meals (Concept 1&2) Like the overview of things concept (1&2) Good to see the ingredients (Concept 1, 2 & 3) This way, you can take your time to read (Concept 1, 2 & 3) Now I can sit back, watch movies or work without getting disturbed by the service. (Concept 1, 2 & 3) It's easy, simple and straightforward (Concept 1&2) I really like the dragging interaction (Concept 2) I like that I can add the same item in two meals. (Concept 2) This feels very personalised (Concept 2&3) It makes me comfortable in knowing all the details of the surprise meal (Concept 3) It is nice to taste something from the place you are going to. It is a nice way to welcome me into the country (Concept 3) I can plan around the slots they provided. (Concept 2) Normally the journey is pretty boring, this brings in some fun. (Concept 3) I like the question part, it connects you to the destination. (Concept 4)	Participants sometimes confused by too many steps All the same buttons should be in the same place in every screen They can always say that they ran out of my option (need assurance / confirmation) Real images of the surprise meal will give confidence to the users If I have to choose meals first, that should be the first option. Make the time slots page more simpler to look at Change of decision? Icons and fonts can be more serious Mix of preset options with an option to add notes Next button needed everywhere Real hours for time needed Want to choose not to have the surprise meal after discovering it and that should be made very clear from the beginning.

Fig. 70 **- A brief of the comments gathered from the entire test** (Own ill, 2019)

Suggestions :

- Want more insights into the culture of the place too
- I want earphones to hear the pronunciations of the meal name in surprise meal.

Photos from the test can be found in the **Appendix** 7.

7.3 CONCEPT 5

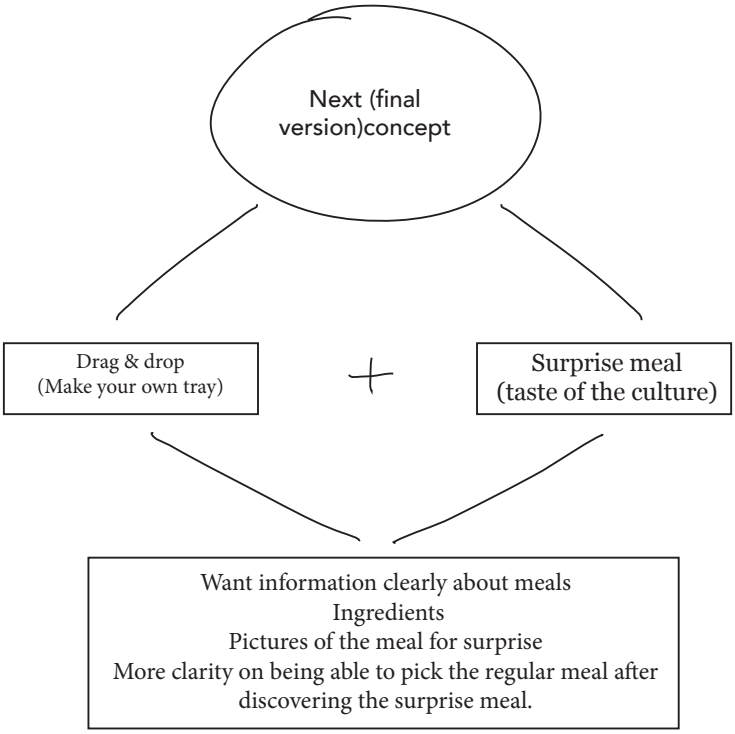


Fig. 71 **- How the next concept evolved from the previous concepts**
(Own ill, 2019)

This is the first version of the final concept. Passengers can drag and drop their preffered meal items into their tray and also are offered a surprise meal based on the destination. They can plan their meals, sleep and entertainment in the timeline offered to them. Passengers can either choose a preset option of their need or add a note with that option to send it to the crew in the galley. The surprise meals includes an interaction where pax can drag their hammer over the box to reveal their meal.

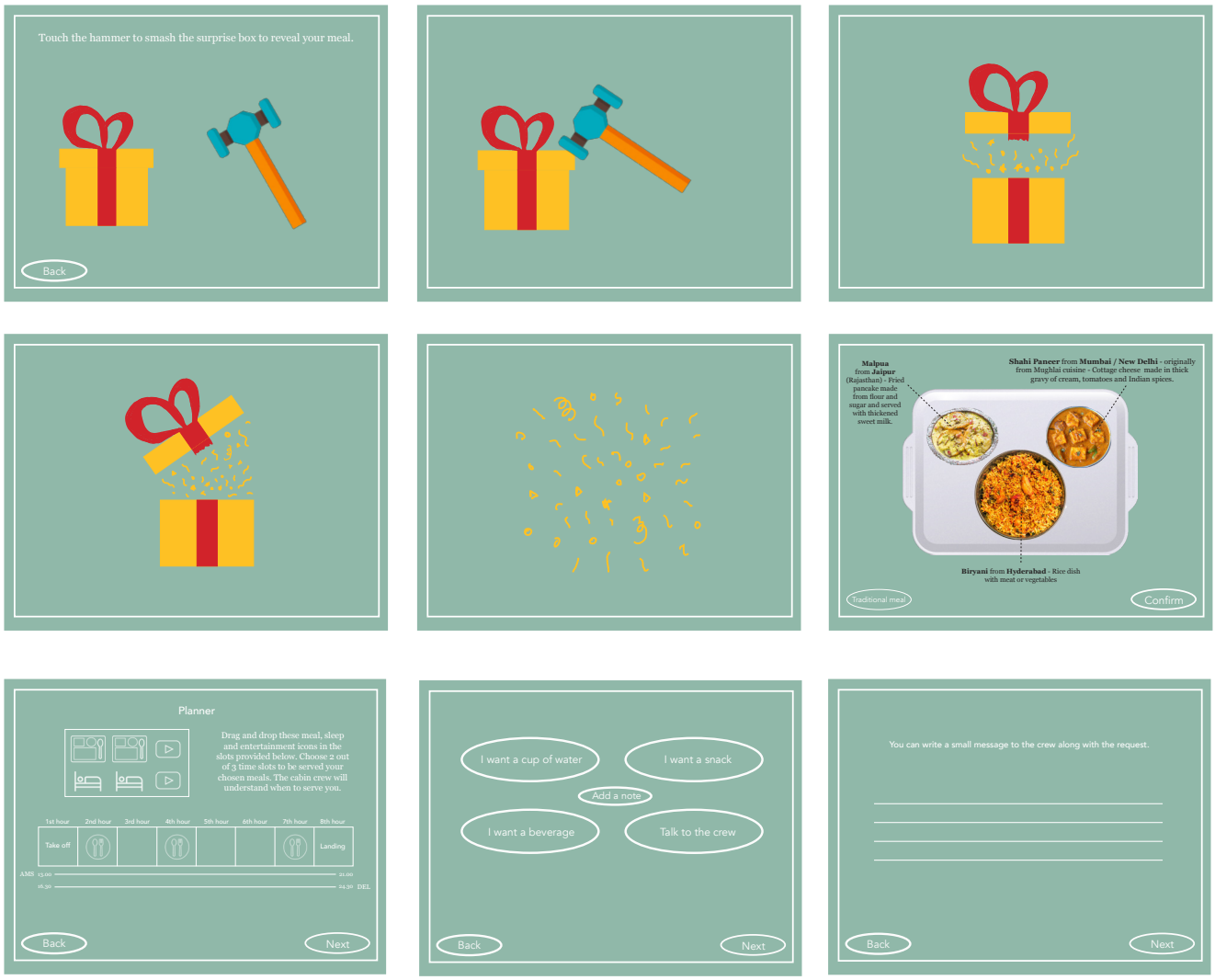


Fig. 72 **- Final concept's 1st version** (Own ill, 2019)

7.4 TEST 2

Introduction to test 2

The second test was conducted to confirm the first test's results. The analysis of the first test was understood as participants' more favoured concepts or qualities of the concepts had been a mix of the 'drag and drop' concept and the surprise meal. Therefore, concept 5 is a mix of the above mentioned two. To understand whether the first version of the final concept lacked any other necessary qualities (to solve participants' concerns, chapter 4.5), a second test was conducted.

Goals

The goal of the test was to understand if this concept fulfilled the design goal along with providing the participants a delightful experience.

The sub goals for the test were
- The concept was tested for how much confidence, comfort, intuitiveness, trust in use it provided the participnat
- As the participants' one of the main concerns was how they felt unplanned and unprepared for their journey, currently, that parameter had also been tested in this test.

The method of this test, the tasks for the participants, the question and interview are the same as the first test. The photos can be found in the Appendix 7.

Analysis of the test 2

These results are from the first part of the online questionnaire that had been made. The below table shows that this concept most closely fulfills passengers' concerns.

Quality	First version of the final concept
Confident about deciding & ordering	3/4 People
Different from usual experiences	3/4 People
Trust in service	3/4 People
Relaxed about making choices	4/4 People
Planned & prepared about time onboard	4/4 People
Confident about using the service	4/4 People
Comfortable about using the service	4/4 People
Comfortable about contacting the crew	3/4 People

Fig. 73 **- Table of number of participants rating the concept as per parameters mentioned** (Own ill, 2019)

The second part of the questionnaire rates the concept between the below mentioned qualities. Participants had been asked to rate from 1 to 5, 1 being the least and 5 being the most. Only ratings of 4 and 5 have been considered. It also mentions how many participants voted for 5 and how many have voted for 4.

Quality	First version of the final concept	
Problem solving	2p ●●●●●	1p ●●●●○
Fun experience	1p ●●●●●	1p ●●●●○
Intuitive experience	1p ●●●●●	2p ●●●●○
User friendly service	3p ●●●●●	

Fig. 74 **- Table of participnats' ratings with parameters for the concept** (Own ill, 2019)

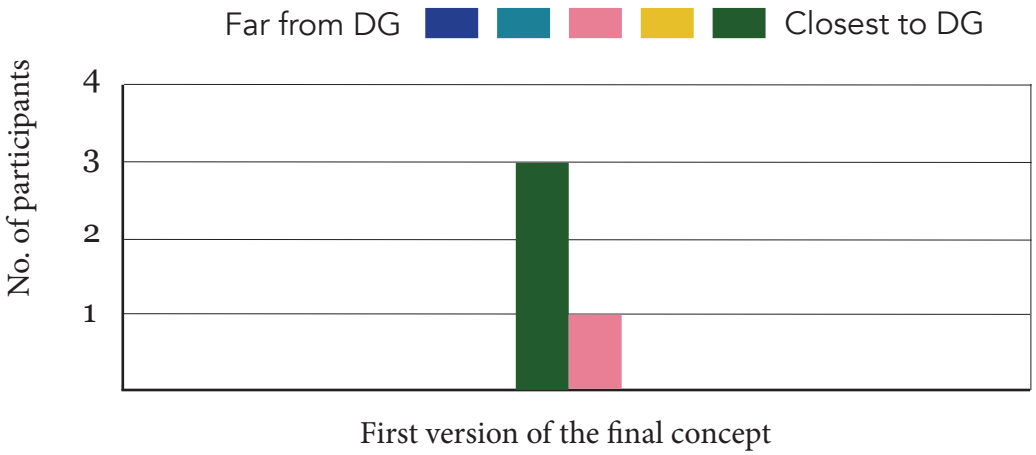


Fig. 75 **- Participants rating the concept on how close to the design goal it is.** (Own ill, 2019)

A brief of the comments gathered from the entire test are summarised below

Positive feedback	Constructive feedback
Participants like the overall concept of choice in both kinds of meals, even if its traditional meal or the surprise meal. Participants also thing that they still feel in control even if it is the surprise meal as they get to decide if they want it or not. The choice selection seemed smooth to the passengers. The messages with emoticons or afirmation about order confirmation felt personal to participants. example: ORDERS PLACED! WOOHOO !!! :D Participants also suggested that this surprise meal could be a converstaion starter between neighbouring passengers Passengers also like how detailed the interfaces (concept) are.	Interface could be clearer about having a choice of 2 meals. Want to be told how many minutes they have to choose. Would like to know the flavor of food too. Clarity on the fact that there are more menu pages ahead (maincourse, salads, deserts, beverages) "What if I choose two meals but change my mind later about when I want it because may be I am not hungry at that time?"

Fig. 76 **- Participants rating the concept on how close to the design goal it is.** (Own ill, 2019)

Suggestions :

- A video about how to eat the surprise meal and its history.
- Locals' tips about finding local culturally rich food in the coutnry of destination
- Printed recipes could be given
- Ability to choose food quantities as well.
- A audio explanation of everything that is in the text and the ability to be able to choose between text and audio.
- More interactive experience like dragging the hammer.
- Street food suggestions

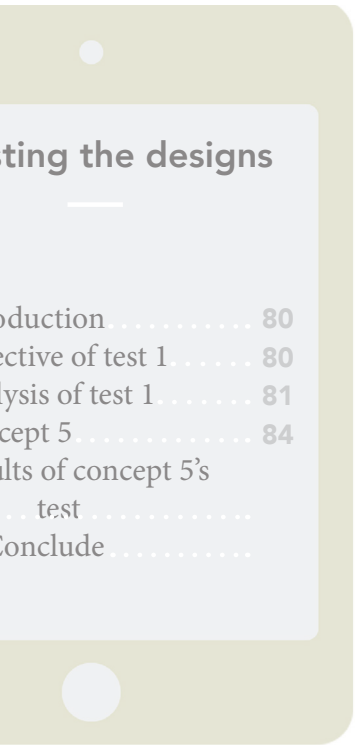
7.5 TO CONCLUDE...

Main findings

1) Participants like the overview of options and timings presented in concept 2.
2) Participants consider concept 1 & 2 to be easy, simple and straightforward in general.
3) Concept 3 is considered as a nice welcome to the country passengers will visit.
4) Simplification of screens and steps is required for the next concept
5) Concept 2 (Drag & drop) + Concept 3 (Surprise meal) ⟶ Concept 5 (Final).
6) Passengers prefer a simple and clear interface

Therefore

The final concept will be built and tested for further refinement. This service will require enabling technology and process from the back end which includes the crew's role as well. The next chapter will also talk about the recommendations for this project, the discussion as justification for many decisions taken throughout the project and the final conclusion.



8. Project landing

The final phase of the project displays the final prototype and its evaluation that result in recommendations and discussion.

8.1 INTRODUCTION

This is the last phase of the project. It explains the final design and what features it will offer the target group. The final design had emerged from the feedback of the second test. The final design is a refinement on details and the screens from the previous tests of the design. Many recommendations have been generated from the feedback of the tests and also as ideas. They are presented in this final chapter. Along with the recommendations, a discussion on what can be improved and the limitations posed on this project are given. This part of the report ends with the conclusion to the report.

8.2 DESCRIPTION OF THE FINAL DESIGN

This service has been named as "**À la craft"**. It has been inspired after the 'À la carte' menus as this service as well offers menus on the Air craft and the IFE takes their orders.

Application / service description

À la craft is an IFE service that enables the passenger to decide what they want to eat and when they want to eat it. Currently onboard, economy class passengers do not have any information or choice about what they will eat and when. But À la craft is designed to provide passengers with information and choice about their meals while onboard. À la craft allows the passenger to drag and drop their preferred meal items into their own trays. They can also be treated to a surprise meal of their choice based on their destination. À la craft will help them make these decisions while they can sit back, relax and enjoy their journey.

What does À la craft do?
Let's the passenger choose their preferred meal options by helping them build their own tray and also helps them decide when they want to eat.

How does À la craft let you choose?
À la craft is an application that can be interacted through the IFE on every seat in the airplane. Once passengers choose their meals and decide when they want to eat, the IFE lets them access media like movies, music or tv shows as to how it currently happens.

When does À la craft let you choose?
Passengers can interact with this service after they view the pre-flight safety demonstration video. But before they interact with it, another short video of instructions about using the service will be played to let passengers get acquainted with it. They will be told that they have 10 to 15 minutes to decide what they want to eat and when. A timespan of 10 to 15 minutes is given to them as the crew then has to begin heating the meals. As a participant said, *"this decision does not require 15 minutes, but at the same time, I cannot decide in 30 to 40 seconds"*

Why does an airplane require À la craft?
Airlines want their passengers to fly safe and **comfortably** with them. They are now building more user oriented services to enhance their passengers' comfort. This will ensure their passengers' loyalty towards their brand. Moreover, from the research, it is also known that passengers do not mind paying extra for basic comfort levels in knowing and choosing what they will eat and when. Hence giving passengers a control over their experiences onboard, provides them comfort and is also beneficial for the airlines in the long run.

Features

- An extensive menu with increased choices.
- Menu divided into courses
- Detailed descriptions of ingredients and allergy information
- Customizable trays to build yourself - a DIY experience
- A personalized surprise meal choice based on your destination
- Pick your preferable time slot to eat
- A planner for your journey
- Easy contact with the crew from your seat

The front end (Service in the aisle) and the backend (in Galley) process will now be explained in detail. Only the most important screens have been picked to be explained here. The rest of the screens can be accessed in the **Appendix 8.**

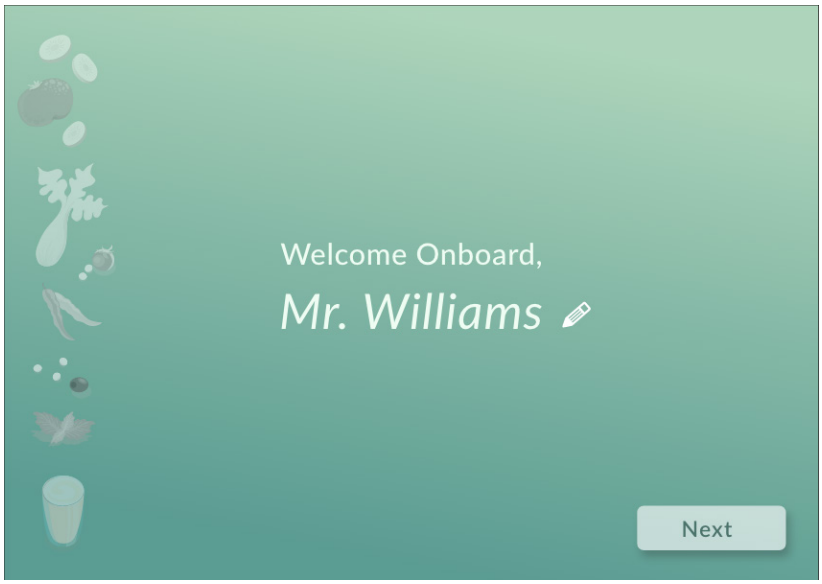


Fig. 77 - **Welcome screen** (Own ill, 2019)

This is the welcome screen on the IFE after the passenger boards the flight. This screen pops up after the pre-flight safety instruction video / demonstration. The passenger's name on this screen can be edited if passengers mutually switch seats.

Fig. 78 - **Mail dining service menu** (Own ill, 2019)

This is the screen that shows all the meal options in an order and passengers can choose between them.

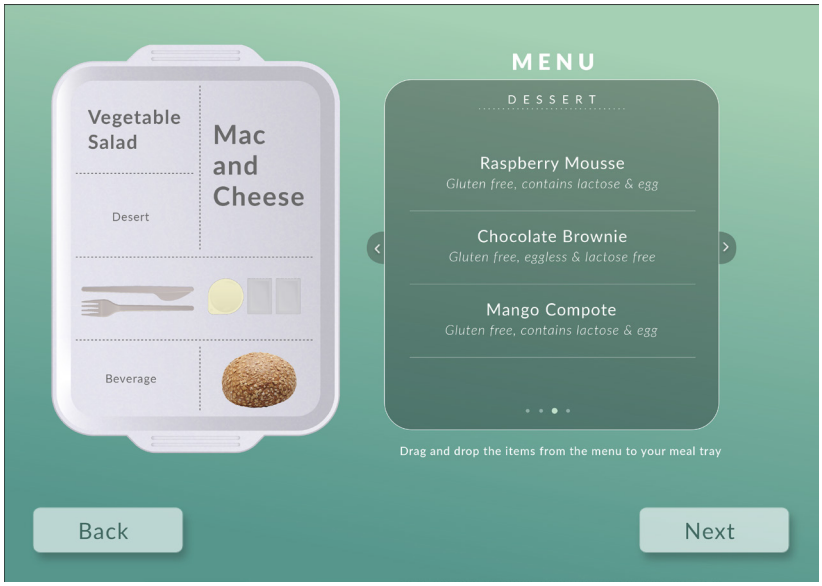


Fig. 79 - **Dessert menu** (Own ill, 2019)

In this screen, the traditional airline food menu is displayed like in a restaurant with detailed information on the food items. Passengers can access the main course, salad, desert and beverage menus by swiping on the menu or tapping the arrow button. Passengers are asked to drag and drop their preferred choice into the tray.

Fig. 80 **- Map to choose cities** (Own ill, 2019)

This screen is prompted before the reveal of the surprsie meal. This screen is asking passengers to choose which cities in India would they be visiting or would like to visit. The use case for this prototype is India.

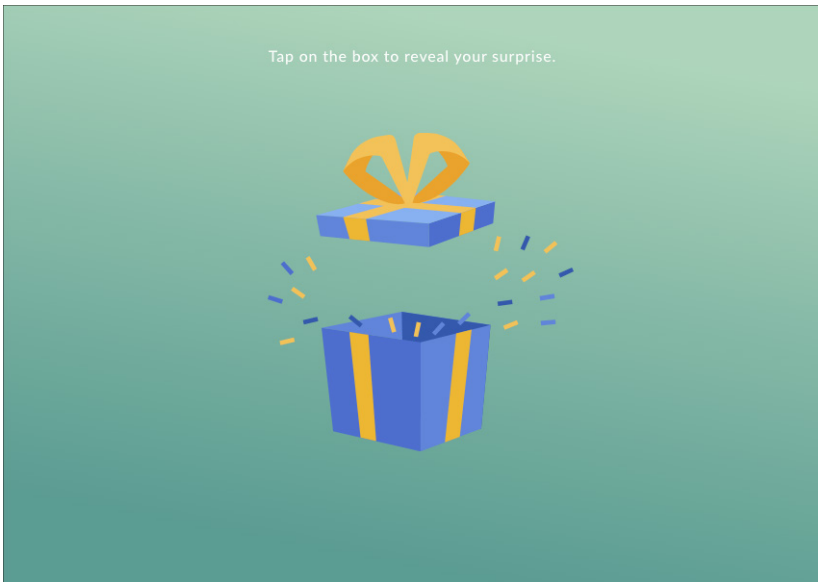


Fig. 81 **- Surprise box reveal** (Own ill, 2019)

This is a small animation to build up a level of surprise in passengers before revealing their surprise meal. The screen asks you to tap on the gift box until it reveals the meal.

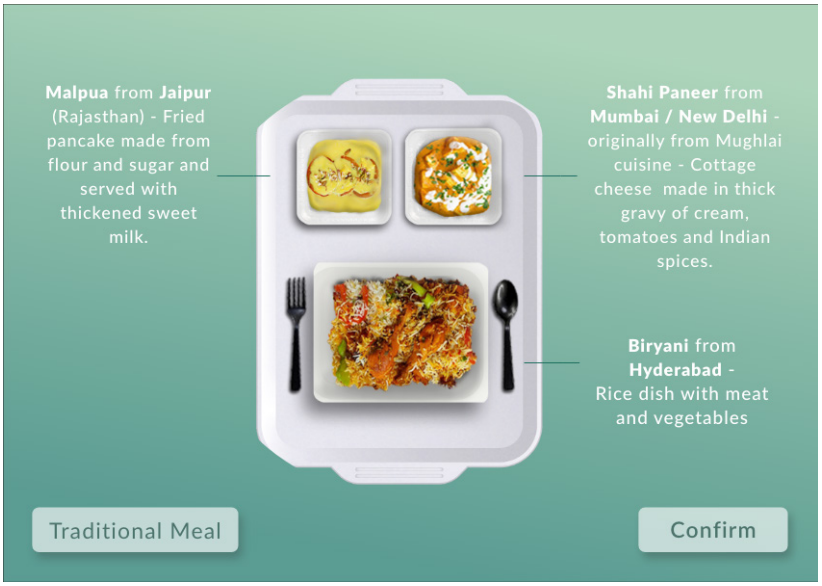


Fig. 82 **- Surprise meal** (Own ill, 2019)

This is the surprise meal curated from the cities chosen from the map. It contains detailed descriptions about the items which helps passengers decide if they want to try it out.

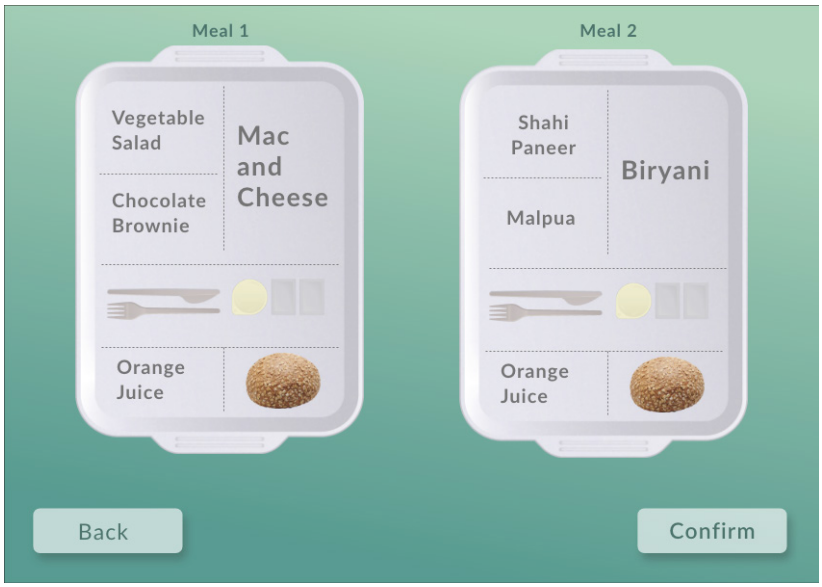


Fig. 83 **- 2 chosen meals** (Own ill, 2019)

Before proceeding to confirm, this screen lets you check your chosen meals and allows you to also go back and change some details.

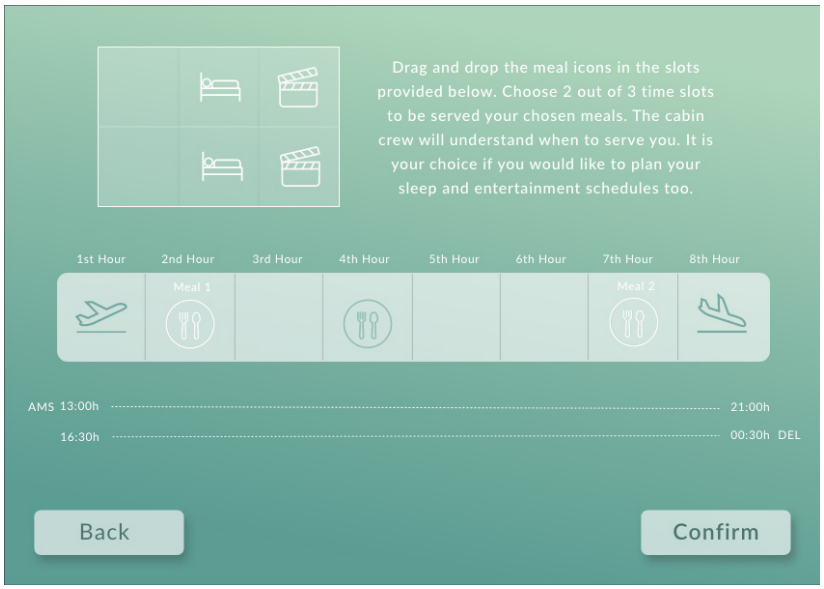


Fig. 84 **- Planner** (Own ill, 2019)

This is the planner that helps passengers in deciding when they want to eat their chosen meals. Passengers are allowed to choose 2 meal slots in the given three. They can also plan their sleep and entertainment schedules if they want to as per the time zone details given below the timeline.

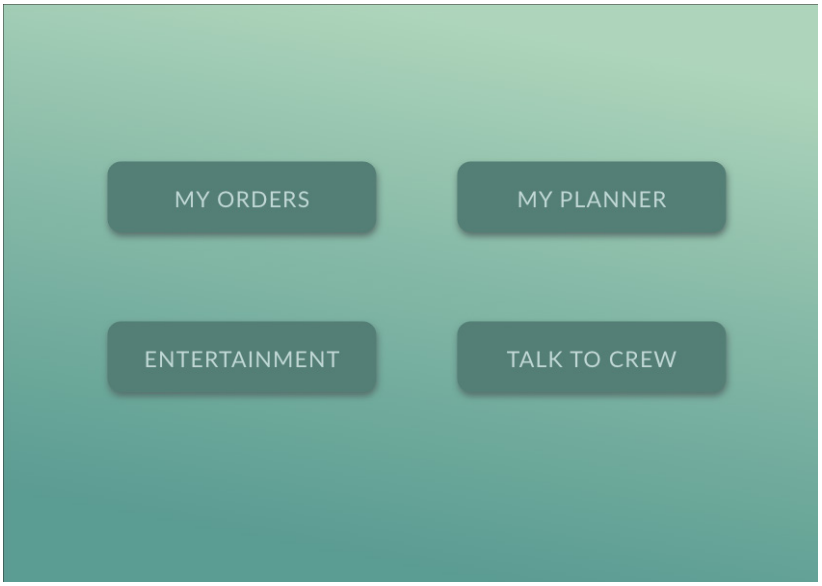


Fig. 85 **- Main menu** (Own ill, 2019)

This screen is the final main menu screen where media, orders and the planner can be accessed. 'Talk to crew' is an options that lets passengers communicate with the crew.

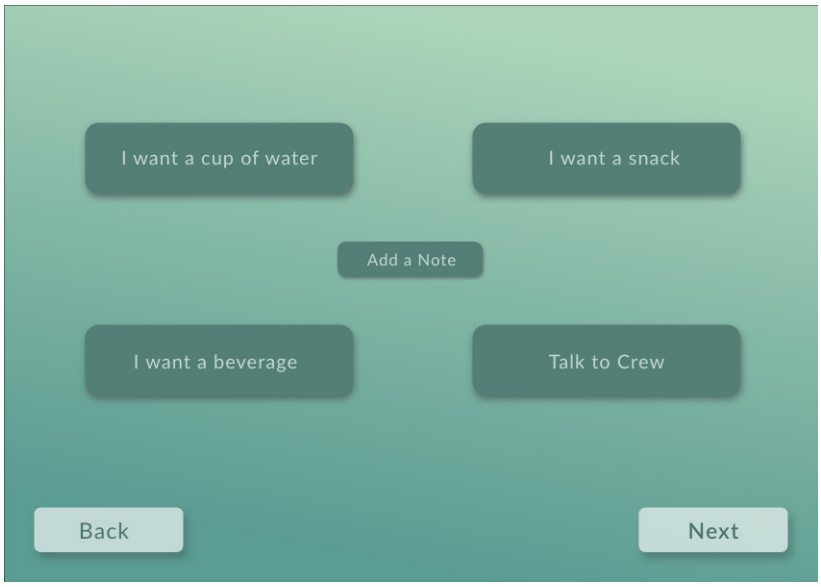


Fig. 85 **- 'Talk to the crew' preset options** (Own ill, 2019)

Passengers can just choose the preset options or add a note along with it.

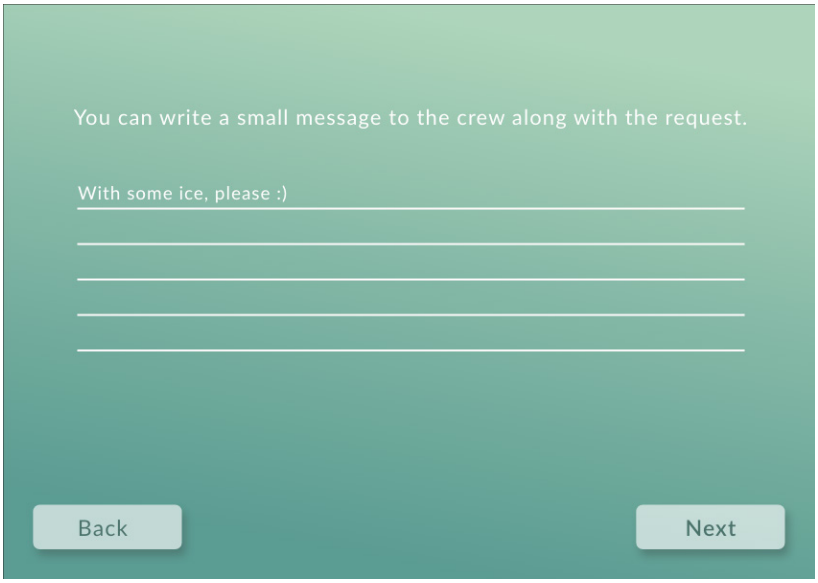


Fig. 86 **- Write a note to the crew** (Own ill, 2019)

The message is communicated to the crew and this reduces one trip to the aile for the crew.

Backend process

As mentioned in the 'Project scope' (page 14), the stakeholders are in the front end (Aisle) and the back end (galley). In order to enable pax to use À la craft service, the front end and the back end have to work hand in hand. After pax order their meals, these orders will be sent to the screen in galley. The technology in the galley has to enable and help the crew in carrying out this workload efficiently.
The system illustrated below is an enabler for À la craft.

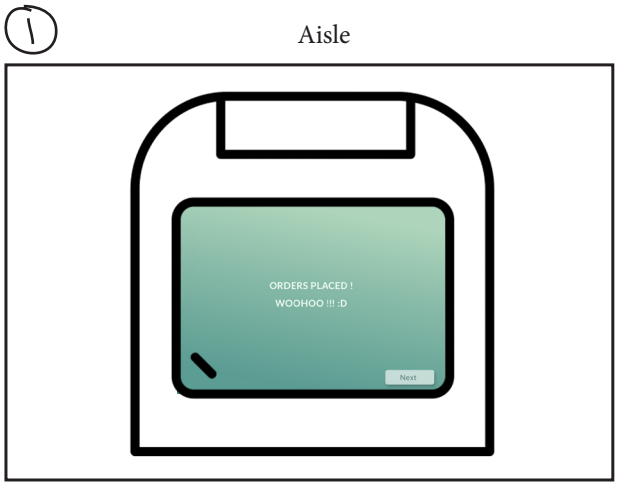


Fig. 87 - **Passengers place their orders and select their desired time slots to be served.** (Own ill, 2019)

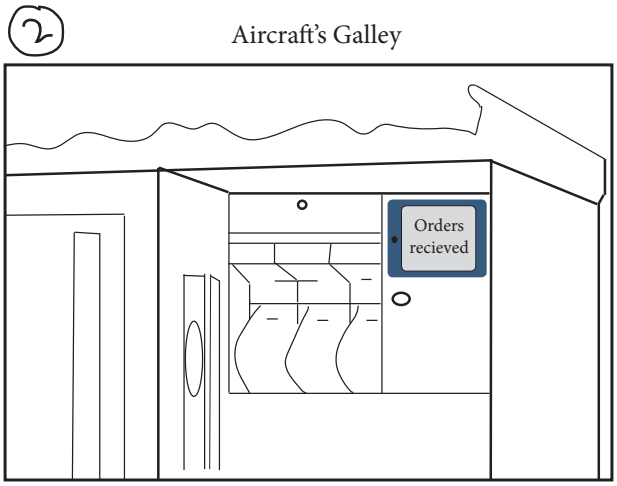


Fig. 88 - **Passengers' orders are sent to the Galley. There is a screen in the galley that will help the crew with instructions about arranging and preparing the orders.** (Own ill, 2019)

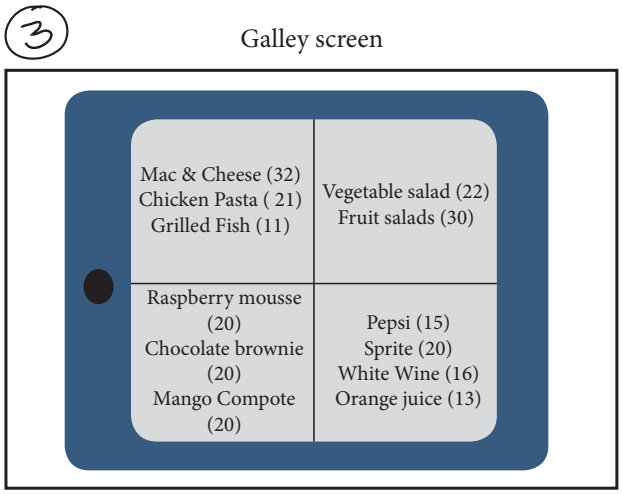


Fig. 89 - **Passengers orders will be displayed in numbers like this in the galley screen for the crew. With the number of each items in the brackets, crew will know how many of each item has been ordered by the passengers from the aisle.** (Own ill, 2019)

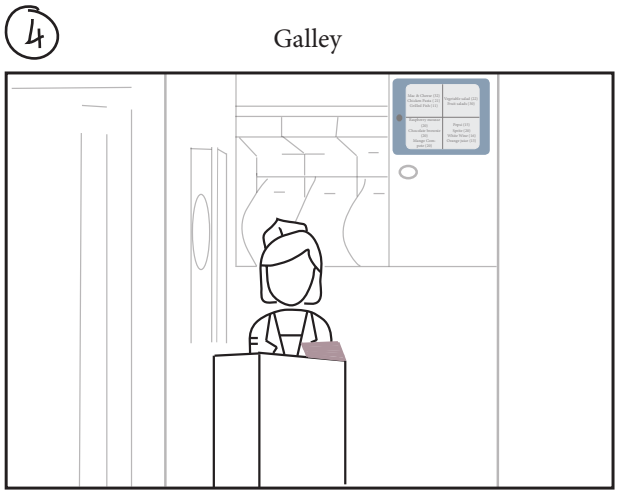


Fig. 90 - **The crew will prepare (heat) meals and just stack the ordered items in the trolley without placing them on the trays. There is also a screen on the trolley which will help the crew further in the aisle.** (Own ill, 2019)

5

Trolley screen

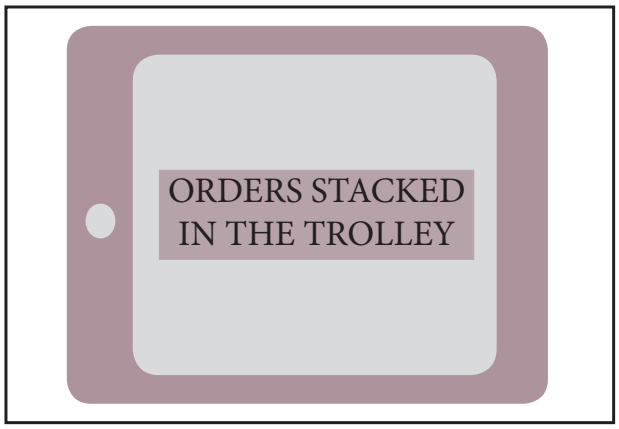


Fig. 91 **- Once crew stacks their trolley with these orders, they can confirm by pressing on this button on the trolley screen.** (Own ill, 2019)

6

Aisle

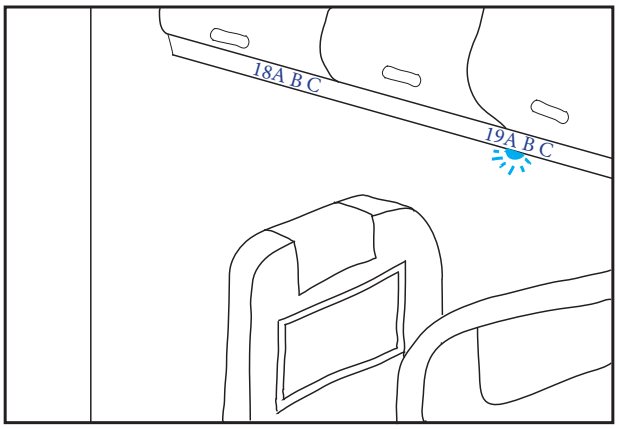


Fig. 92 **- After that button is pressed, a blue light glows in the PSUs of only those passengers that have ordered food for that slot. This blue light acts as a visual affirmation for those passengers waiting for their meals.** (Own ill, 2019)

7

Aisle

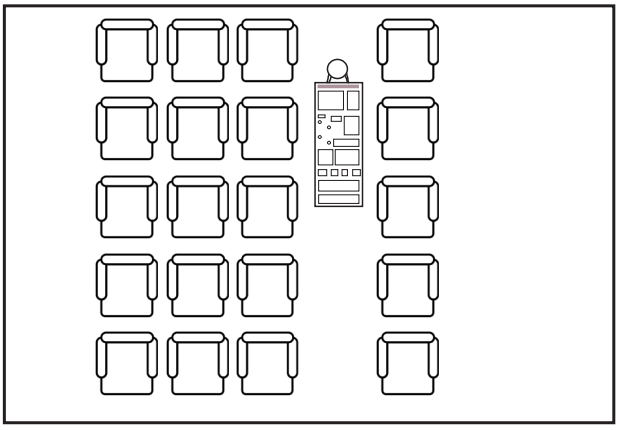


Fig. 93 **- The crew begins their service in the aisle for those passengers that have chosen to eat at that hour.** (Own ill, 2019)

8

Trolley screen

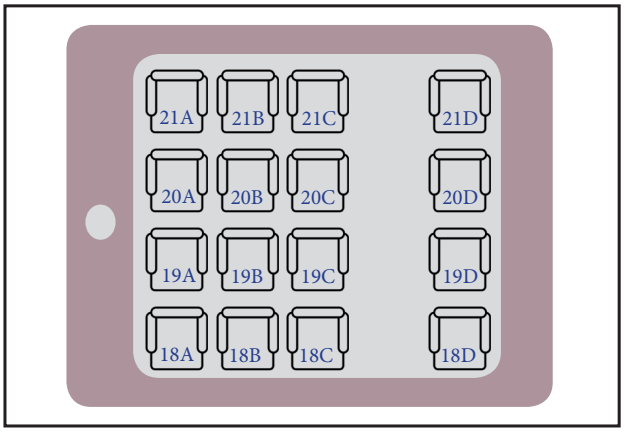


Fig. 94 **- A seat map can be accessed on the trolley screen. This seat map will help the crew in understanding whom to serve and what to serve.** (Own ill, 2019)

9

Trolley screen

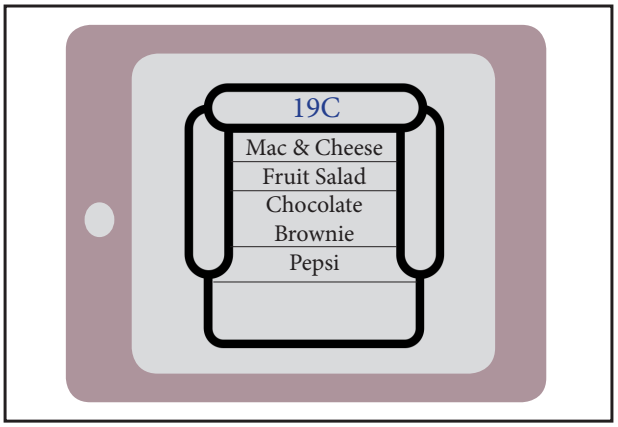


Fig. 95 **- By tapping on each seat in the interface of the screen, the crew can also access what the passenger has ordered for.** (Own ill, 2019)

10

Aisle

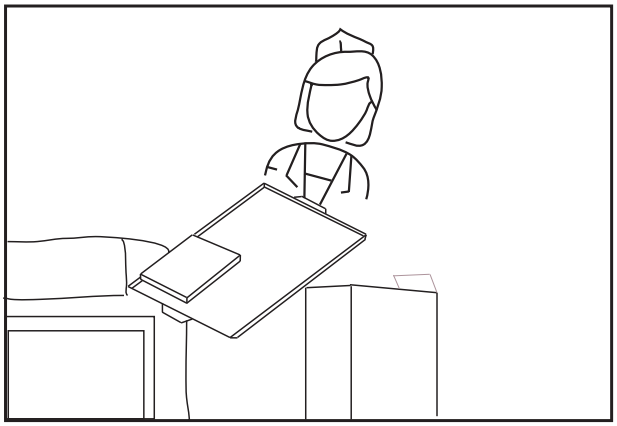


Fig. 96 - The crew will then place the particular items on the tray and hand it over to the passenger. (Own ill, 2019)

8.3 FINAL EVALUATION

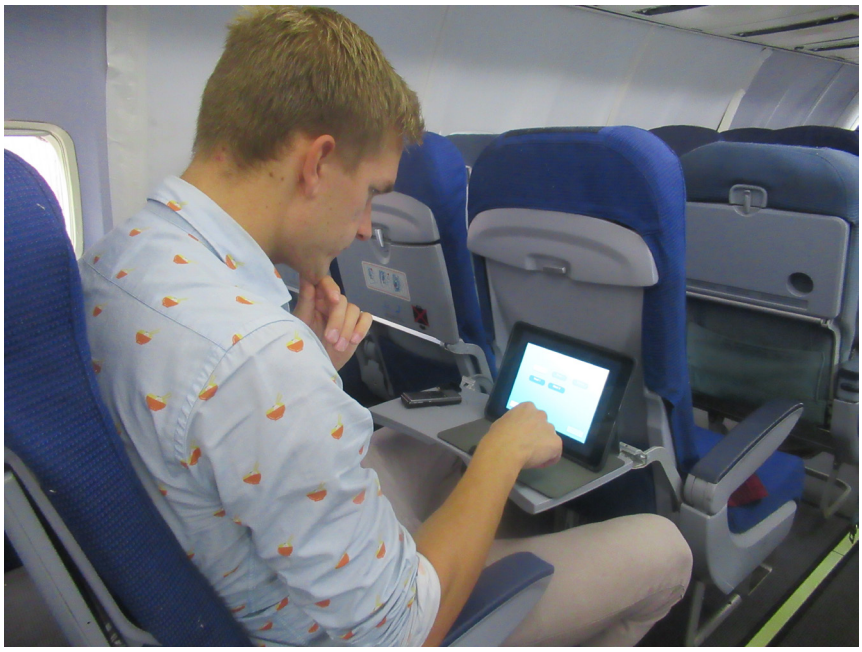


Fig. 97 **- Participant interacting with the service** (Own img, 2019)

Five participants had been invited for the final test. It had been conducted in a fuselage of an aircraft in an attempt to provide a more real context to the participants. They all interacted with the protoype and had been asked to choose two meals and decide when they would like to eat. The prototype of the application had been built on Adobe XD and was interacted through an iPad.
Participants were asked to consider the iPad as the IFE screen in their seats

Nationality	Age
Dutch	26
Columbian	29
Mexican	25
Brazilian	30
German	23

Fig. 98 **- Participant details** (Own img, 2019)

Positive feedback	Constructive feedback
"The 'planning' feature made me feel more confident because I did not have to worry about being bothered by the stewardesses" - Participant, Dutch *"The surprise meal is also a nice extra feature, nice that you can prepare for your visit to the different cities."* - Participant, Dutch *"I think the application would be very helpful. As I said, like the the timeline thing is quite nice, because for example, I have to fly again on September 26, and have a night flight and then I have to work at 9am in the morning again. So I really want to have my sleep then. So if I can plan like these hours, I can go to sleep and no stewardess stewardess is waking me up. And like that would be super ideal."* - Participant, Dutch The columbian participant said that because he was interacting with a digital interface, he could go wrong in making decisions, but when a crew member verbally recites information to him, he is not completely sure if he understood it right. *"I felt positive emotions because I liked that I was being considered to choose my own food. Also tone of voice and animations helped."* - Participant, Italian *"Contacting the crew like this makes me feel confident as it is like there is an open channel of communication."* - Participant, Brazilian	4 out of 5 participants could not figure out that they were supposed to drag the food item into the tray. All the participants commented about the interface having a lot of text and they would prefer to see less text and more visuals. Visuals and images are preffered for the traditional airline meal tray as well, after dragging and dropping it into the tray. The Brazilian participant felt overwhelmed about the amount of information and choice given to him. *"But then I also have to choose like when it happens, maybe I don't need to worry about it. Maybe they should worry about it. And like it's not really my problem."* - Participant, Brazilian.

Fig. 99 **- Final evaluation feedback** (Own ill, 2019)

Their feedback forms can be found in the Appendix 8.

8.4 CREW'S FEEDBACK

As mentioned in many parts of this report, crew's feedback and opinions on providing information and choice to economy class pax is very essential for this project. If the pax are the most important stakeholders in the frontend of the project scope, the crew are the most important stakeholders in the backend of the project. The project focus was the front end and redesigning the passenger' interactions. But also understanding the crew's feedback is necessary to understand how the front and back ends can connect. The feedback in this chapter has been collected from four crew members.

Profession	Years of experience	Journey type	Roles and responsibilities
Purser	10 + years	Short and long haul	Flight safety and seeing to it that collegues are able to do a good job on board; support them, challengethem and correct them if necessary so passengers onboard have a wonderful experience. Supervising crew and passengers to ensure safety and comfort for passengers.
Purser	10 + years	Short and long haul	
Senior Purser	15 + years	Long haul	
Senior Purser	15 + years	Long haul	

Fig. 100 - Crew participants' details (Own ill, 2019)

About the kind of passengers they serve -
Passengers' demands are getting higher day by day. They can be happy if everything has worked out for them but also if they did not recieve the seat or meal they requested for. They can also get angry if they loose their suitcase or miss a connection due to another flight's delay.

What do passengers usually approach them for -
Passengers usually interact with crew to talk about some problems that need to be told and solved and also tight connections in the airport. They ask about the meal contents regulary, or the availability of special meals also. They usually seek for attention to be taken care of.

Crew's opinion about giving choice and information about meals to passengers through IFE -
The crew prefers having to give passengers the choice through the IFE as long as their duties do not double. They prefer this particularly as they usually get exhausted of having to give the same information about meals to every row in the economy class over and over again. They also find it difficult to communicate the choices to passengers sitting at the window seat. Having to communicate to the window seated pax requires them to lean in which makes it physically heavy as well in the aircraft. This is why they find it convenient to provide choices about meals on the IFE to the pax.

About technology supporting efficiency -
" *The number of years of experience to set up a trolley or prepare a meal, etc. defines a lot of the pressure on the flight attendants and the service delivery. All of them feel very rushed but when it takes you a lot of time to find things or setup the Trolley the stress is even higher and does not contribute to the impression they give to passengers.*" - Flight attendant interviewee
Technology in the galley will help the crew immensely in speeding up their work by helping them in locating things and providing them information about passengers requests and meal orders.

Crew's opinions' about being contacted through the IFE -
They are neutral about this feature as they do not want to be running for every small need of the passenger. They think that it may increase their workload for them to be responding to every request of a passenger. But at the same this feature on the IFE also saves crew's time in walking back and forth to the passenger to find out about their request and then bringing it to them. The crew consciously recognises this advantage as well.

8.5 VALIDATION OF PASSENGERS' PAIN POINTS

These pain points in passengers' experinces have been refered from chapter 6.4. This chapter checks how many of those pain points have been solved.

1) Passengers do not know what their meal consists of until after they open it. How ? - The menu contains descriptions of the item	✓
2) Passengers feel like almost everything is being decided for them. How ? - Now they are allowed to decide for themselves what they want to eat and when.	✓
3) Passengers hesitate verbally asking for something outside the service time. How ? - They can contact the FA through their IFE and ask for a cup of water or anything that they want	✓
4) Passengers are not given enough time to decide what they want to eat. How ? - Passengers are now not rushed into deciding but have a few minutes to go over the menu again and again like in a restaurant.	✓
5) A few passengers involuntarily miss their meal if they fall asleep. Why not ? - Passengers can still fall asleep when their meal arrives in the time slot they have chosen. They do not have a reminder even if they require one.	
6) Passengers meal tray consists of a food item that they usually never eat or do not like (ends up getting wasted). How ? - Now passengers choose not to have the item they do not like, on the tray.	✓
7) Passengers are sometimes hungry outside the service time as well. Why not? - Passengers can still be hungry between their chosen meal serve time slots.	
8) Passengers do not know when their meal is being served. How ? - Because they decide for themselves in which time slot they would like to eat.	✓
9) Sometimes the passenger does not want to eat when the meal is being served but later. Why not ? - Passenger may be satiated from the previous meal and is not willing to eat in their next chosen meal serve slot.	
10) Over all, passengers do not enjoy their meal because they did not decide to eat at that particular time. How ? - Now passengers can relax and plan their time onboard around the slots they have chosen. They can decide to sleep before their meal arrives or watch a movie with their meal. "***We focus our attention on the dining experience and avoid distractions.***" (Dholakia, 2015). Distractions in this case are worrying about not liking that food, or eating when not hungry.	✓

Fig. 101 - Number of concerns solved by the service (Own ill, 2019)

8.6 RECOMMENDATIONS

This project has a greater scope to continue the research and build the design. Due to time constraints mainly, a few more ideas could not be implemented. All those ideas about the design or how the research could have been done better in terms of crew involvement have been explained as recommendations in this section.

About design:

- While passengers begin to enjoy their surprise meal, they can indulge themselves in a culturally immersive experience. My recommendation to further develop À la craft is to add a video to the IFE. The video options can be:

1) Information about the surprise meal - what the items are, the history behind them, how they are made, ingredients used in them and facts related to the food items. This video can also familiarise passengers with the pronunciations of the names of the food items they would be consuming.
2) Another video can be about 'culture around food and eating habits in India (destination country). Example - a) Some parts of India, eat their food with their bare hands, without using cutlery (explaining 'Why' as well).
3) Dedicated "recipe of the surprise meal" video
This video can be viewed while enjoying their surprise meal or later.

- Passengers can be given printed recipes of the food items they are eating along with their surprise meal. Printed instead of digital as from the interviews, participants expressed that it is nice to have something to take with them, like a souvenir.

- Passengers can be given brochures of suggestions about places to eat cuturally rich food from, by the locals of their destinations. These suggestions can specifically be anout street food that is not found on the internet.

- The surprise box on the IFE application should be the colors of the Airline under branding aspect.

- The entire service can be given an audio option as well. Passengers can choose to follow the audial instructions while choosing their meals instead of text.

About Research

- Involvement of Flight attendants or the air crew is crucial for the research in this project. It was very important to understand their roles, responsibilities and how they handle passengers' requirements and needs. Passengers' concerns were heard and most of them were met but the crew's concerns were not heard. Understanding crew's perspective in this topic would have helped in bringing more balance in the design. Currently the design is mostly inclined towards passengers' needs and requirements.

- Safran group is trying to build more contact with the crew and this would highly help projects in future, but unfortunately the current situation did not help this project.

- To be able to find boundaries in the implementation of this project's service design, the workload will have to be tested with the crew in a real or similar context to understand what the limitations are.

8.7 DISCUSSION

Service implementation

My personal assumption is that this service, À la craft may be percieved as an increased workload without any supporting technology to it. I have also assumed that crew in general would not favour this new service. They perhaps cannot see this system working in the economy class. But once, the right technology (explained in 'backend process', page 78) supports the crew, À la craft can be delivered efficiently. Currently the trays are being filled up with food items in the galley itself and brought into the aisle. They also serve the two meals in two shifts to all the passengers. In À la craft, the same workload is being spread out into three time slots as every slot will not require the crew to serve every passenger but only those that preferred to. Instead of filling up the trays in the galley, now they can fill the tray up in the aisle, without even having to ask the passenger what they would want on their tray. The three slots chosen to be offered to the pax will mostly depend on the hours of the flight journey. If it is a flight journey in which they usually serve a single meal, two slots of options should be provided to the pax. In this case, if three slots are given, the first slot should be the first hour after the flight takes off, the third slot should be the last hour before the aircraft begins to descend. The second slot should be closer to the first slot than the third if the departure is in day light as usually and mostly, pax are hungry and looking forward to eating before boarding. But if the aircraft's departure is the night time, the second option of the slot should be given close to the third slot.

Implementation into the future

À la craft is a step closer to providing more user centered services to economy class pax. Cooperation of many involved stakeholders like the crew, onboard service planners, technology, caterers, airlines is necessary for this service to be implemented. This service is a leap into providing utmost possible control to the economy class pax. But this change can begin by taking minor steps of implementation. In the first year, airlines can allow pax to choose their time slots of service. This already requires a level of technology to be built that can enable pax to choose from their seat and the crew in the galley recieves this information. Developing applications for the IFE is also a slow process. But even before the techonology can help, pax can choose these slots while checking in online. Although this may raise issues of pax not being able to decide already when they want to eat onboard. It will be a start. After the industry habituates into letting economy class pax decide when they would like to eat, a step towards providing extensive descriptions (information) on their meals can be introduced. This service can eventually be implemented in steps. I envision it to take shape in the next five years. Safran Group can play a mjor role in developing this advanced techonology to enable such user centric services. They have the experience, knowledge and facilities to further develop this project and the enabling technology.

- Why is it not suitable for the pax to choose their meals while buying their tickets or checking in online?
In the research interviews, participants expressed that they do not already want to decide what to eat so early as their moods and situations may differ while actually flying.
"I mean, the airline does give some kind of a thing like vegetarian or non vegetarian (while booking the ticket), but I don't know what I will actually get (after boarding). And if I had some kind of a problem, like, you know, if I have, like, a fever or anything, I'm not feeling well, yeah. And but when I booked the flight, that time, I was fine. But when I'm actually taking the flight, the situation can be different. I had

opted for meat but now I want vegetarian or something like that." (Participant, Indian)

- Another upcoming trend is that IFEs may altogether dissappear in the future. "***As onboard internet service improves and more people carry on at least one personal device capable of streaming video or other entertainment, IFE systems are looking less and less desirable to passengers for a variety of reasons.***" (Cortez, n.d.)
In this case, this service can be developed as Airline's PED downloadable application. Pax can then access it through the onboard internet service and still choose their preferred meals and timings. Then this application can be downloaded on a mobile phone, Ipad or a tablet.

- À la craft has been designed keeping in mind about the Push model as well as the BOB service. In the push model, pax do not have to pay for their meal onboard in this service. But for BOB in the new service, pax can pay for the meal they create for themselves.

- If stock management could be introduced in the technology, then pax will be notified when the galley runs out of an item. Stock management system helps the crew as well in keeping a check on their pantry. Once stock management is included then this service can be implement as ondemand service too.

Why are low cost carriers, the project scope?

As mentioned in the earlier phases of the project, LCCs have a growing demand in the commercial aviation industry. That is due to their low cost tickets and how they increase affordability of travelling for a wide range of pax all over the world. As it is a growing industry, Safran Group as a world leader for aviation manufacturing has been venturing into LCCs.

But À la craft may not be suitable for LCCs as of now as I personally think that the LCC Airlines are not ready to invest into the technology required for this service yet. However, I was aware of this aspect while developing my final design and yet went ahead to build it the way it is as the brief of the project is to give passengers the best possible control over their dining experience. I believe that my design is offering the optimal level of control to the pax, keeping in mind the limitations, like the workload for the crew. This service can still be integrated with LCCs when they would be ready to invest a little more in the service for the comfort of their passengers. It can be implemented as a BOB service for those pax in their flights that would like to buy and eat.

Why is Sophy (Safran Group's Intelligent trolley) not necessarily required for this project?

Sophy is a smart connectivity trolley that provides data about its location, status and more (page 17). This trolley can be integrated in the aisle as well to track the seat numbers and recognise their choices to help the crew in serving. But currently the tracking for Sophy is also not as accurate as it can recognise and distinguish between seat to seat. Moreover, the seat plan in an iPad or a tablet belonging to a trolley can also help in the same task. Therefore, Sophy has not been integrated into this design.

What is the impact of implementation of À la craft on the crew ?

After the crew's feedback, it was understood that they are in favour of this service as long as it does not increase their workload. They do not want new tasks added to their roles or new tasks disrupting their exsiting responsibilities. They believe that this is a good system for letting passengers already decide what they want as they do not have to repeat options to everyone and can focus on preparing the meals and serving them. But they are currently skeptical as there is no required technology in the galley to support this kind of work. I believe that with the help of techonology that enables and instructs them in preparing and serving the meals in the galley when pax order, their workload will be spread accross the hours but not increased. Coordination between the crew will be he highly necessary to carry out the tasks. Implementation of stock management will also help the crew in keeping a track of passengers' orders. The time required for the crew in preparing meals in the galley will take few extra minutes as it will require more accuracy in terms of stacking the trolley with exactly those items, that the pax have ordered for. That extra time taken in the galley can be made up for in the asile when the crew do not have to spend many minutes reciting the options to pax and letting them decide.

What is the impact of implementation of À la craft on the caterers ?

The meals ordered by pax are produced by caterers less than 24 hours before the flight departure. This service offers more options of meals than what airlines currently do. Therefore, caterers would have to produce more in quantity. But currently airlines already carry ample amount of extra food that is usually wasted. For example, if there are 300 economy class passengers and currently caterers produce 250 vegetarian options and 250 chicken options. But now due to more number of choices offered, caterers should produce 125 of the 4 options of main course options produced. This will not increase the production in number but in variety. It is not likely that all the pax will order for only two items in the given menu. But to reduce the number of meal production from 500 to 300 meals eventually, airlines have to begin understanding their pax's meal consumption. The supply chain has to work closely together. Airlines can begin predicting what the passenger would order on the IFE based on the cultural food eating habits or the destination of the aircraft. Then the airlines should collect data over a period of time and convey it to the caterers. This way the waste production can be decreased and more accurate predictions can be made over the time. Installation of stock management system in the aircraft can also help in collecting this data. The system can recognise what the pax are repeatedly ordering and what the galley is running out of. These numbers can also be used for caterer's production supply.

Design for stock management

Installation of the stock management system is a major step for À la craft. I percieve it to be implemented in the far future in the timeline of this service's implementation. Building a fully accurate working stock management system is one of Safran Cabin's future project goals. In this À la craft, all the passengers order in the same 15 minutes after the flight departure. The stock management needs to be extremely accurate to inform pax while they are ordering an item that it is out of stock in those 15 minutes. Therefore it has not been included as a feature in the back end system for this service. The stock management for the service needs to be fully aware of what is in the galley, what is in the trolley and what pax are ordering for. This will ensure that pax are well informed about their choices and the crew is well informed about what they have in stock.

8.8 PERSONAL REFLECTION

The fruit of this 20 weeks master thesis was more than just a final design. The journey has been very exciting, full of learnings, some victories and setbacks. The most important learning aspect for me has been about the importance of testing and iterating. Every test provided actionable results. The major setback in this project had been my time management. Writing an academic report along with conducting a research and designing had resulted in disruptions in my project planning. But I also learnt that I work well under pressure. Every individual that I introduced my project to, could related themselves to my research findings and this gave me a great sense of satisfaction. It was also very fruitful when the design resulted in validating and fulfilling most of pax's current concerns. But there is always a scope for improvement. I believe that my design is one of the ways to solve the existing problems in the current context but not the only one. It is a step towards providing a more user centered service. What I could not work on and what could have been improved is listed below in categories.

Providing autonomy to users

80% of my research's participants wanted control over their experiences and preferred making their own decisions. But also, a very few participants also mentioned that they would sometimes like to be taken care of. They would like to avoid having to make decisions as soon as they board and let the crew present them with choices and surprise them while serving meals. There can also be a category of pax who are not completely comfortable with being provided so many choices and making decisions. The choices presented in my design could likely overwhelm this set of pax. Hence this design does not bring comfort / certainty to all types of passengers but a portion of them.

Suitability to various types of passengers

Everyone travels now. There is a very large user group for commercial aviation. These users originate from different demographics and psychographics. It is very challenging to design for a user group that is so large and diverse as they possess variating needs.
As mentioned in chapter 3.2, five types of passengers have been identified. The target group was the younger generation. The reasearch had been conducted on the target group. Therefore the design is mostly suitable for the younger generation alone. This may or may not be the same case for the rest of the pax groups. For 'flying families' group of pax, I have found that it is usually logical and comfortable for the father with young children and older parents to order for his entire family through the IFE. But this design does not allow any passenger to order for other seats through their seat or IFE.
This design may or may not also be preferred by 'Business first seat economy travellers'. They may also want to specifically order what and when they want. But at the same time, most of them may want to be taken care of and made felt as a special guest. They probably do not want to order, but would prefer being surprised.

User Interface

The usual IFE screens are made in dark and bold colors. The existing style of the interface is also very serious. But in this design, the participants in the test have mentioned that the overall look of the the screens can be improved and it can be made to look more serious. A variations in icons could also have been tested by me with different participants to see what they understood best. Different languages can be incorporated based on the region for the diverse pax's readability. The user interface could have been more intuitive if I could have incorporated more visuals instead of text as too much text makes the interface boring. Also in the aircraft usually, pax do not prefer reading a lot of information. Also with involvement of text, when providing important information, there is a risk of pax skipping reading it assuming that it may not be important. Hence incorporating a right balance between text and visuals would make the interface more interesting and intuitive to everyone.

Usage of the design in real context

Due to time and resource constraints, I could not test this design in the real context. Testing in the real context would have brought in more constructive feedback from the pax. The crew and caterers would have been involved in the service as well. This way the crew's concerns would have been understood and incorporated into the design and the technology support from the galley. Pax's mindset and mood may be completely different in the real context as travelling in the air usually put passengers in discomfort. They may probably interact differently with the IFE service as well. To bring out richer feedback, these assumptions have to be tested.

8.9 CONCLUSION

The project brief was to redesign and improve economy class passengers' dining experiences onboard. The project goal was to provide passengers with the best possible control over their onboard experiences and enable them to eat whatever they want and whenever they want. Qualittive participant research has been conducted over 15 participants from different nationalities to understand what 'control' meant to these passengers. This research led to the findings about the uncomfortable situations that passengers onboard often find themselves in. Passengers feel that they are not given any choice or information about what food they will consume onboard and when it will be served. This frequently puts passengers in an uncomfortable position. It was discovered that most of the passengers prefer planning their time onboard, but currently cannot do so, as they are not aware of the meal serving timings. This disrupts their activities onboard and hence they feel out of control of their experiences onboard.
Overall, passengers perceive 'control' as two different variations. Some passengers believe that merely understanding or being able to choose when their meals will be served to them will put them in control of their experiences and time onboard. Some passengers prefer to be in control by understanding or choosing their meals and what they will receive on their meal tray. There is also a third set of passengers that consider choosing their meal and the meal serving time as being in control. Furthermore, passengers feel a time pressure in choosing their preferred meal in the two options they are given in a very short span of time. Therefore, these passengers would like to choose what and when they want to eat.

My proposal to solve passengers' concerns was to provide them with a tool that enabled them in making these decisions about their meals. This tool, known as 'À la craft' is an application on the Inflight entertainment screen that passengers usually interact with to access media. This application will provide passengers with a menu and give them a chance to build their tray by choosing all the courses of the meals they are usually offered. They will have to choose their meal timings as well from the given slots. Apart from this, they are offered with an option of a surprise meal that is made based on the destination of the aircraft.

À la craft has been validated to solve most of passenger's concerns (7 out of 10 identified concerns). The core research of this project had been focused on the passengers and their concerns. Exploring crew's experiences and concerns would improve the application further as the crew are also the important stakeholders as they are involved in providing the service to the passengers. The technology that enables this service in the galley by supporting the crew's workload should be developed by Safran Group.

Therefore, further study into the crew's concerns, experiences and workload along with the development and implementation of the required technology in the galley should be the way forward for this project.

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