

Ilkka Kallonen

**Gathering user insights to drive the design of an airplane cabin
for Northeast Asia**

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Supervisor: Professor Kalevi Ekman

Advisor: Samuli Mäkinen

Author Ilkka Kallonen

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Abstract

Airbus has predicted that by 2034, there will be a demand for 32,600 new airplanes. Asian markets will cover most of this demand - over one third of the total demand over the course of the next 20 years. This forecasted high demand naturally interests many actors in the industry, especially airplane manufacturers.

The number of Asian passengers is increasing all the time and their culture significantly deviates from Western culture. The cabin crew, more specifically, cabin crew who fly to Asia, was identified as an important reference group for this study. The cultural differences of Japanese and Chinese passengers and their habits were studied through interviews conducted with cabin crew. The interviewees were Finnish, Chinese and Japanese. The study consisted of eight one-on-one semi-structured interviews and one observation of a flight to Seoul, South-Korea. In addition, during the flight four shorter questionnaires were completed by the cabin crew. The interviews were based on various aspects of the FUCAM –project (Future Cabin for Asian Markets), such as groups of passengers, cultural differences, food and in-flight entertainment.

The aim of this study was to identify the special features among Asian passengers and how these features should be taken into consideration for the construction of future airplane cabins. The interviewees contributed their own observations of the Asian passengers and gave their insights into how the passengers' needs could be accommodated in a future cabin. The themes that stood out strongest and occurred most often were, for example, the increasing amount of Asian female passengers and their special needs, the etiquette of reclining the seat and the absence of a common language which caused communication problems. It was also surveyed whether the cabin crew had encountered any so-called lead users, i.e. those who have a special need for something and solve it by themselves before there is any commercial solution for it. These kinds of lead users were not identified which could have been because the cabin crew did not pay special attention to these people while they were working.

Keywords cabin design, lead user, FUCAM, cabin crew, Asian passengers, semi-structured interview

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Tiivistelmä

Airbus on ennustanut, että vuoteen 2034 mennessä kysyntä uusille lentokoneille maailmanlaajuisesti on 32,600. Aasian markkinat kattavat tästä suurimman osan, yli kolmanneksen kokonaiskysynnästä seuraavan kahdenkymmenen vuoden aikana. Tämä suuri kysyntä kiinnostaa luonnollisesti monia toimijoita, erityisesti lentokonevalmistajia.

Aasialaisten matkustajien osuus kasvaa jatkuvasti ja heidän kulttuuri poikkeaa merkittävästi länsimaisesta. Työssä identifioidiin tärkeäksi referenssiryhmäksi matkustamohenkilökunta; purserit, lentoemännät ja stuertit, joiden tyyppinen reitti suuntautui Aasiaan. Haastateltavat olivat suomalaisia, kiinalaisia ja japanilaisia. Japanilaisten ja kiinalaisten matkustajien tapoja ja kulttuurieroja kartoitettiin matkustamohenkilökunnalle tehtyjen haastatteluiden perusteella. Aineisto koostui kahdeksasta kahdenkeskisistä teemahaastattelusta sekä yhdestä havainnointimatkasta Etelä-Korean Souliin. Matkan aikana tehtiin lisäksi neljä pienempää lomakehaastattelua matkustamohenkilökunnalle. Haastattelujen aiheet pohjautuivat FUCAM-projektin aiheisiin, kuten matkustajaryhmiin, kulttuurieroihin, ruokaan ja matkan aikana tarjolla oleviin viihdepalveluihin.

Työn tavoitteena oli tunnistaa erityispiirteitä aasialaisissa matkustajissa sekä miten nämä piirteet tulisi huomioida matkustamoissa tulevaisuudessa. Haastateltavat kertoivat omista havainnoistaan aasialaisista matkustajista sekä antoivat näkemyksiä tulevaisuuden tarpeista lentokoneessa. Useimmin ja vahvimmin toistuvina teemoina nousivat esille mm. aasialaisten naismatkustajien kasvava määrä sekä heidän erityistarpeiden huomioiminen, penkin selkänöjan laskua koskevat etiketit sekä kielitaidon puuttumisesta johtuvat kommunikaatio-ongelmat. Samalla kartoitettiin, mikäli matkustamohenkilökunta on tavannut matkustajien joukossa niin kutsuttuja edelläkäyttäjiä, eli matkustajia, jotka ovat ratkaisseet omat erityistarpeensa itse, ilman että siihen olisi vielä kaupallista ratkaisua. Tällaisia ei havaittu mikä voi johtua siitä, ettei matkustamohenkilökunta työnsä ohella ole erityisemmin kiinnittänyt huomiota kyseisiin henkilöihin.

Avainsanat matkustamosuunnittelu, edelläkäyttäjä, FUCAM, matkustamohenkilökunta, aasialaiset matkustajat, teemahaastattelu

Preface

First I want to thank my instructor Samuli Mäkinen for all the support he gave me in my both my theses – Bachelor's and Master's. Without him this would not have been possible. I could not have had a better instructor.

I am thankful to Finnair for helping me to arrange the interviews with the Asian cabin crew. Without their assistance, I would not have been able to have so many interesting interviews with such a variety of people from different countries. I am also very thankful to all the cabin attendants who participated in my work - I really appreciate their help and co-operation. Special thanks go to the 'Finnair family' and to pilot Jari Tikka, who arranged the whole observation flight to Seoul. I will never forget it.

Also, I want to thank my closest friends for supporting me and believing in me as well as my mentors whom expedited my graduation a lot.

Biggest thanks and love goes to home and my family. I made it!

Espoo, 22 December 2016

Ilkka Kallonen

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1 Introduction

Airbus has forecasted that there will be a global demand for 32,600 new commercial airplanes by 2034. Asian markets cover an overwhelming share of this demand. More than 12,500 new airplanes are going to be delivered to Asian markets within the next twenty years. This massive demand for new airplanes interests many actors - especially airplane manufacturers. The Aviation industry is set to grow more than ever over the course of the next couple of decades and IATA (International Air Transport Association) claims that revenues from the industry grew from 350 billion Euros to 700 billion between 2004 and 2014.

In 1903, The Wright brothers, Orville and Wilbur, made the world's first flight in their airplane called "Flyer". It flew 37 meters and the flight lasted 12 seconds. During the same day, they managed to fly for 59 seconds and reach a height of 260 meters. (Kärkkäinen 2012) Over the last century, the development of the aviation industry has been tremendous. Nowadays, airplanes include Wi-Fi-connectivity, standing bars and lot of other high quality features. It will also be possible for the future airplanes to be made from transparent materials which will enable the people onboard to see the outside from anywhere inside the cabin. They can be more like floating cities in the future, carrying up to 2400 passengers and containing one to four person cabins, with their own toilets, showers and satellite links (Haglund 2011).

There is a large body of literature on air travel, trends in aviation, future studies and airline service quality (Park et al., 2004; Space et al., 2000; Kuhn et al., 2009). For now, we know that significant differences exist between Asian and Western passengers and airplane cabins have mainly been designed to meet the needs and requirements of Western travelers.

To familiarize ourselves with the needs and expectations of different passengers, methods for user involvement come into play. It is important to involve users in product design today. Companies must identify and understand the needs of the users and be able to provide something to fulfil those needs. There is a myriad of approaches suitable for different design contexts. These include: market oriented approaches relying on quantitative user information, human-centered design where users act as a source of inspiration, participatory design where the user is an active participant in the design process, and additionally, user innovation where the lead users create solutions to meet their needs that no commercial solution can answer.

This study is a part of the FUCAM -project (Future Cabin for Asian Markets) and it is aimed towards developing a conceptual cabin design for the Asian market for 2025 onwards. It is coordinated by Airbus Group Innovations and its nine partners; seven from different European countries and one from Japan. Once the design of the future airplane cabin reaches a stage where it satisfies the demanding needs of Japanese passengers, it will most probably also meet the requirements of passengers from other countries.

Japanese people and their behavior has been studied, (Kallonen, 2016) which provides a basic understanding of their behavior and characteristics.

In this study, both quantitative and qualitative approaches are used to acquire and utilize the user information needed to meet the expectations of future Asian passengers. An objective of the study is also to find out whether cabin crew members are able to aid in identifying innovative solutions for passengers, or even *lead users*, that is, people who encounter the need for a particular product years before solutions become available in the marketplace (von Hippel 1986). A lead user can be an actual user, like a cyclist who wants to modify his bike for extreme conditions to make biking more interesting and in order to be able to go out into the wilderness. A lead user can also refer to a group of users, such as blind or deaf mobile phone users. Lead-user experts, also known as domain experts, are people who specialize in the user domain area but are not necessarily lead users themselves (Hyysalo et al., 2014).

This study attempts to identify the common features of Asian passengers; what problems they encounter during the flight, what kind of things they appreciate, how they behave on board and what kind of different groups of passengers exist. The goals of this study are twofold; firstly, to involve cabin crew in the identification process by utilizing them to identify lead users and secondly, to identify both the current and future needs of Asian (specifically Japanese and Chinese) passengers and the cabin crew themselves by gathering insights from them using semi-structured interviews and the discussion of topics related to the FUCAM project. The topics were *Seating, Food, Sleeping, Restrooms, Safety* and *Stowage*, just to name a few. Purser, flight attendants and stewards from Finland, Japan and China gave their own perceptions with reference to these topics and their answers were then collated.

2 User involvement

To be able to succeed in today's competitive markets and in any industry, companies must understand their users' needs and also be able to respond to those needs. Traditionally, companies and organizations have relied on internal innovation where a theory has been that successful innovation requires control. This is a so-called *closed innovation* (Chesbrough, 2003) when companies produce their ideas and develop, market, service and support them on their own. Involving users in developing products and services is becoming more and more important. In some industries, such as extreme sports and medical surgery, the equipment that the actual users invent accounts for more than 30% of all innovations (Lüthje and Hertstatt, 2004; Schreier and Prügl, 2008). Nevertheless, there are different concepts and approaches for utilizing information for new innovations directly from users. The three general approaches are user-centered design, user innovation and participatory design. These approaches will be presented later in this chapter.

Hyysalo (2009) gives a very concrete example of the importance of involving users; a Finnish company started developing a safety device in 1993 that could monitor the user's health both during the day and night and set off an alarm if significant changes in the person's condition emerged. This device was expected to generate billions of Euros in the global market and it was launched in Finland in 1997. Although the device won several innovation awards following its launch; it was only reliable enough for use six years later in 2003. Hence it took more time for this innovation to be usable than the time it for the development of the initial product. This example demonstrates distinctly the importance of involving users in the innovation process. The timing of involvement plays a key role and many researchers state that involving users especially in the early phase of product development is reliable. Pitta and Franzak (1997) discuss how users should be involved, especially in the idea generation phase and Gruner and Holmburg (2000) state that user interaction during the early as well as the later stages in the product development can increase the success of a new product.

Designing an airplane cabin differs a lot from design processes in other industries. For example, developing a website that then does not work as expected, can be fixed quickly at no significant extra cost. Whereas building a new cabin or renovating one in a similar timescale is almost impossible. The next possible opportunity to make any changes or implement new inventions is only possible every six years when aircrafts are required to be serviced in a so-called D check, where the airplane is completely dismantled and even the paint is removed.

In service design, Alam (2002) states that user involvement is especially relevant in three of the stages: idea generation, service and process design, and service testing and pilot run. Often the reason why user involvement fails in the very early stages is due to costs (Kok et al., 2003).

Alam (2002) lists six different user involvement methods:

1. Face-to face interviews
2. User visits and meetings
3. Brainstorming
4. Users' observation and feedback
5. Phone, faxes and e-mails
6. Focus group discussions

In face-to face interviews, users are interviewed in-depth in order to gather information about the existing market, preferences and desired improvements. Face-to face interviews are used as a research method in this paper. User visits and meetings are settings where users are invited to discuss the different aspects of a product and give their thoughts on it on at the development stage. Brainstorming is a technique where a group presents and discusses different ideas aloud and the most innovative ideas are chosen. Users' observation and feedback is a process where users are asked to observe and give feedback. Phone calls, faxes and e-mails are used as tools in the new service development process. Users are invited to discuss several issues in the focus group discussions, this is not as intimate as face-to-face interviews but several ideas can be gathered from multiple contributors at the same time.

Kaulio (1998) reviewed different methods for customer involvement in product development. Kaulio wanted to highlight the different forms of interaction between users and actors in the design process. He chose seven methods for his study: quality function deployment (QFD), user-oriented product development, concept testing, beta testing, consumer idealized design, the "lead user" method and participatory ergonomics. QFD and beta testing are methods to help transform customer needs into engineering characteristics, or computer systems and software. User-oriented product development is applied to products with man-machine interface problems. Concept testing is an approach that tries to involve customers in the concept evaluation phase. Consumer idealized design is a process where consumers are involved in the actual design of the product or service. A lead user method is a research tool with an aim to find breakthrough products by collecting data from lead users. He found that different methods support the involvement of customers at different phases of the design process, and at three phases in particular: the specification phase, concept development and prototyping. There are also different ways of promoting customer involvement, such as design *for* customers, design *with* customers and design *by* customers. He concluded that there is potential for improvement in the customer involvement process. But instead of selecting only one specific method, it is a matter of designing a whole system of methods that together inform an overall process that focuses design efforts towards the future satisfaction of the customer.

2.1 User-Centered Design

The main objective for user-centered design is to ensure the satisfaction of future users and customers by incorporating the users' needs into product specifications. It is crucial to create products that are convenient and beneficial from the users' perspective – in the early stages; information obtained from users will save on manufacturing, testing and marketing costs because a well-designed product will sell itself eventually (Hyysalo, 2006).

User-centered design is often called human-centered design or usability engineering which is where users are actively involved in the design process so that the user and task requirements are clearly understood.

There are a variety of methods in user-centered design approaches for the assessment of user needs, such as interviewing, observation, probing and contextual inquiry. The aim of these methods is to help and support the designer to learn about the needs of the target user. The company first learns about the user's needs and later develops a corresponding product to meet that need. User-centered design is often confused with user innovation although their methods and goals have a lot in common. One of the most significant characteristics of the user-centered design method is that the designer of the organization plays very important role. Users provide the ideas and information for new solutions but the designer is still the one who makes the final decisions in terms of any new implementations. In user innovation, the actual user is the one who innovates – with or without the designer.

Users and developers can also be concentrated on the nature of their actions and Keinonen (2009) recognizes these different kinds of contributions in his Design Contribution Square, figure 1. In this context, *silent design* refers to design without the explicit participation of developers or designers. *Reflective design* means that there are no users that participate actively and if users participate fully in the design effort then the approach to the process becomes *co-design*. *Do-it-yourself* design is where proactive users and inactive designers occur and this is a widely-used method in design.

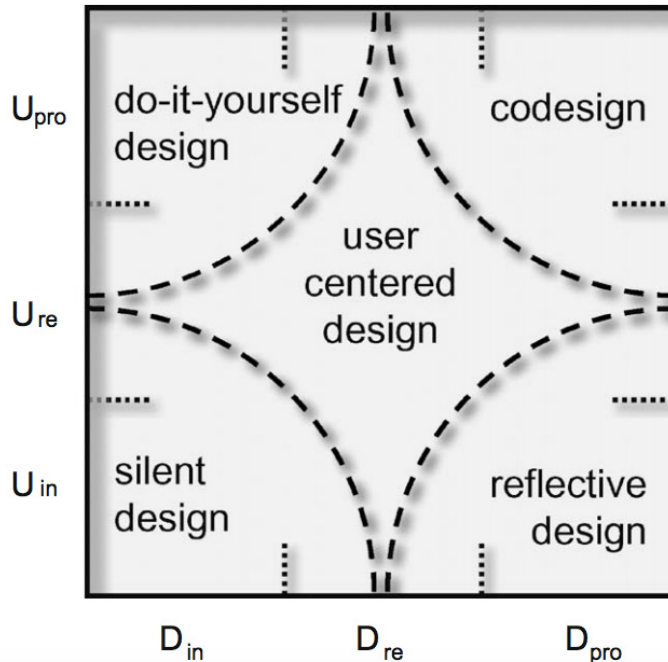


Figure 1. Human centered design approaches positioned on the Design Contribution Square (U_{pro} : proactive user contribution, U_{re} : reactive user contribution, U_{in} : inactive user contributions, D_{pro} : proactive designer contribution, D_{re} : reactive designer contribution, D_{in} : inactive designer contribution). (Keinonen, 2009)

The idea of user-centered design is to determine the users' requirements which is easier if the developer is close to the actual user and vice versa. It gets much more difficult if there are degrees of separation between them. (Suchman, 2002) This distance between the developer and the user can be called *developer-user social distance*, (Johnson, 2013) which describes the gap between the two, resulting from differences in for example, nationality, lifestyle and ethnicity. This social distance defines what involvement method would be the most suitable: if the distance is small then the involvement method is less formal and vice versa, if the distance is bigger then the developers need to make efforts to better understand the users' needs. (Johnson, 2013)

The social distance between the cabin crew and passengers in my study was found to be relatively low – the cabin crew see passengers every day and were therefore used as an information source in this study. In terms of the FUCAM project however, the distance between the developers (who are professionals from the project) and the users (who are Northeast Asian passengers) is relatively big.

2.2 Participatory Design

Participatory design tries to convey design to users, facilitating the innovative activities of the users while also including elements where designers develop solutions for the users (Voss et al., 2009; Bødker et al., 2004). It is an approach where all stakeholders are

reviewed and involved in the design so that as many needs as possible are met. At first, it was used to align the goals of academics and people from trade unions in 1970. Its fundamental objective is that instead of always analyzing the impacts of technology on people, it should be investigated in the opposite way – the impact of people on technology (Muller and Kuhn, 1993). Users are regarded as experts in knowing how to best improve their work and professional lives making this approach an interactive one by utilizing users to present and identify the actual needs of users to designers (Schuler and Namioka, 1993).

As the name “participatory design” indicates, this approach typically relies on a design collaboration between users and designers and that is why this is not an innovation directly from users, although users do play a significant role in this approach too. Participatory design consists of different user involvement methods. Muller and Kuhn’s (1993) study presents many of these via a two-dimension matrix where the vertical axis explains the relationship between user and designer by indicating if the method involves the user participating in the designer’s activities or vice versa. The horizontal axis indicates the time and the position of specific activity in the development cycle. This matrix is presented in figure 2.

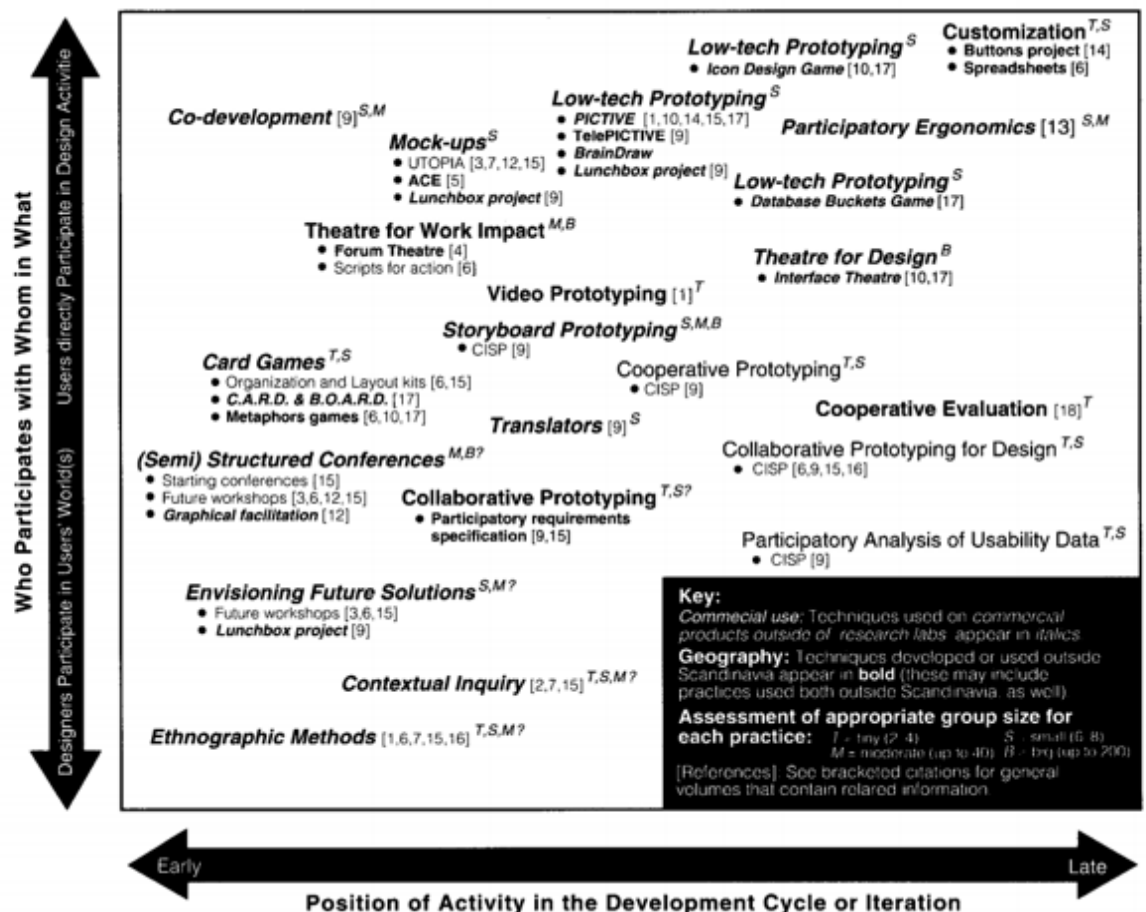


Figure 2. Participatory design practices (Muller & Kuhn, 1993)

Nevertheless, participatory design is quite flexible and it can be utilized in several ways. There are three basic stages in almost all participatory design research (Spinuzzi, 2005) which are:

1. Initial exploration of work
2. Discovery processes
3. Prototyping

The first stage (initial exploration of work), is where designers meet the users and familiarize themselves with the ways in which the users work together. This exploration includes the different technologies used but also includes workflow, teamwork, routines and other aspects of the work. During the second stage (discovery processes), designers together with users employ several techniques to plan for the future workplace and prioritize work organization. This stage involves several users and here, designers and users clarify the values and goals of users in order to agree on the desired outcome of the project. In the final stage (prototyping), designers together with users iteratively shape technological artifacts to be suitable for the workplace as envisioned in stage 2. (Spinuzzi, 2005)

As well as for all other approaches, participatory design has its pros and cons. A limitation of participatory design is that it is time consuming; it requires an enormous amount of time. In addition, it is unlikely that anything completely new will be created, as it has been cautioned, participatory designers' work is "evolution, not revolution" (Beyer and Holtzblatt, 1998). This approach also typically requires the continuous participation of workers which makes it hard to manage and also a very laborious approach.

2.3 User innovation and Lead Users

The third most common approach is called *user innovation* and this is different from the two previous ones mentioned in the way that the user innovates with or without the designer. The initial innovation is realized specifically by the user and after this, the manufacturers are responsible for the commercialization of these products (Shah and Tripsas, 2012). Despite the fact that user innovation differs from other approaches, there are a lot of similarities as well. User innovation and participatory design both emphasize the end-users' innovative capacities, both of the approaches consider their work to be empowering and democratizing (von Hippel, 2005; Bjercknes, Ehn and Kyng, 1987) and both have set-ups and techniques that facilitate the design and collaboration with end-users (Hyysalo et al., 2014).

As mentioned earlier in this paper, users have often been the source of new innovations. These innovative users have been studied and some resemblance with regard to characteristics has been found among them and often these are recognized to be lead-user characteristics (von Hippel, 2005). To identify these innovative users can be challenging

and a study in this specific area has tried to argue the importance of the process of finding these rare users (Hyysalo et al., 2015; Churchill et al., 2009). Lead users are often found among these users.

Figure 3 demonstrates and simplifies how the lead users are positioned in the curve (von Hippel, 2005) – their prototypes are available before any commercial solutions exist to accommodate the demand and this is why involving them to in the product development cycle is important.

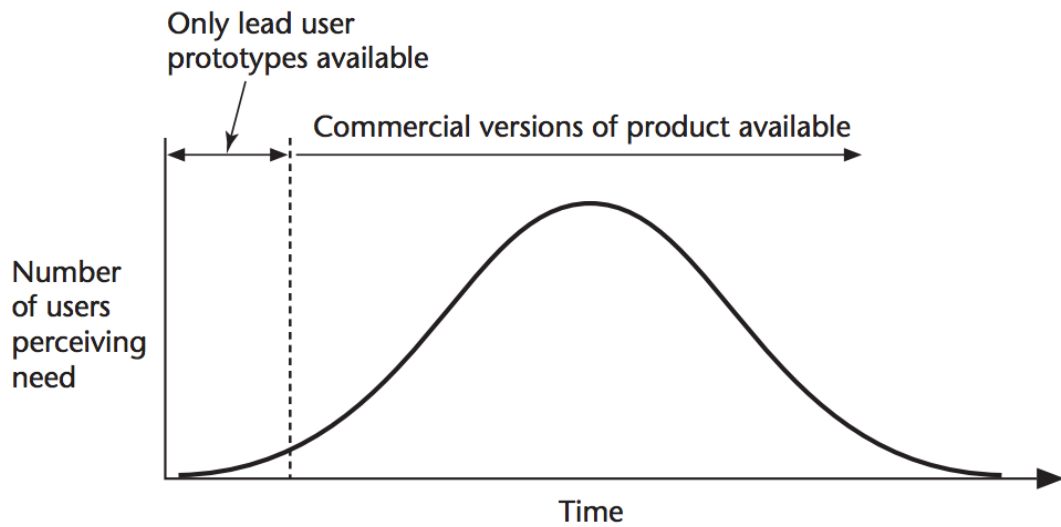


Figure 3. Innovations by lead users precede equivalent commercial products. (Von Hippel, 2005)

A lead user is someone who is trying to improve his or her way of working rather than trying to invent something new. The term “lead user” was created by Eric von Hippel (1986) and he defines lead users as:

1. Lead users face needs that will become general in a marketplace – but face them months or years before the bulk of the marketplace encounters them.
2. Lead users are in a position to benefit significantly from obtaining a solution to those needs.

Lead users are not usually inventors or innovators - they solve their own problems in a unique way without commercial or economical aspiration. However, there are several examples of lead users and their innovations. Tim Berners-Lee, who created the World Wide Web said; “it was something I needed in my work” (Brody, 1996). Berners-Lee wanted to solve the problem by sharing information while working as a consulting software engineer at CERN. He was able to develop a system that enabled easy-to-follow links between documents stored on a number of different computer systems created by different groups. The idea was first developed at CERN, the European Organization for Nuclear Research and which eventually became the Internet in 1991. (Brody, 1996)

The World Wide Web is one example where an innovation has been conceived by a lead user. Another good example of an area where innovations are made by lead users is sporting equipment. The innovating users are characterized as being relatively young and technically unsophisticated and they tend to develop innovations from learning-by-doing in rapidly evolving fields. Mountain biking has evolved from lead users. It involves cycling in challenging environments including mountains, rocks, trees, snow and ice. Mountain biking began at the beginning of the 1970s when one young cyclist started to use their bicycle off-road. The existing commercial bicycles were not suited to the rougher terrain so the tires of the bike were replaced with thicker tires to improve its performance. Also the drum brakes were removed from motorcycles to improve braking. A few years later, the commercial manufacture of mountain bikes began when some of the early users started to build bikes for others. (Lüthje et al., 2005) Before this, the mountain bikes were only made by their owners for their owners. In another example, the prototype for protein-based hair conditioners came from inventive women who washed their hair with home-made conditioners which contained beer or eggs to give their hair more shine and body. (Churchill et al., 2009) This just goes to show that lead users can be found anywhere.

Lead users can be categorized as three different types: (Churchill et al., 2009)

1. Lead users in the *target* application and market
2. Lead users of similar applications in advanced “*analog*” markets
3. Lead users with respect to important *attributes* of needs faced by users in the target application

Lead users can be identified by using different sampling methods, such as *pyramiding*, *snowballing* and *screening* and their combinations. Snowball sampling is a method where rare individuals are found in the target population by asking questions like “*who else would know more about the subject?*”. As the research proceeds, more and more people are found with the desired characteristics. (Welch, 1975) Pyramiding is a similar method but the core idea is to find the people at the “top of the pyramid”, meaning that a person with a strong interest in a topic or trend tends to know other people with more knowledge about the given topic (von Hippel et al., 2009).

Screening as a research method is useful when the number of users is not too vast and the whole market along with its users can be screened. (Lüthje and Herstatt, 2004) The main idea is to screen and investigate the whole population in order to find those who possess the desired characteristics. If the size of the population is large, this method will naturally require a lot of time as the whole of the market needs to be studied.

Broadcasting has been combined with pyramiding in several lead user projects (Hienerth et al., 2007). In this context, broadcasting means advertising some a certain need for a solution hoping that the relevant people will respond to it voluntarily (Lakhani, 2006; Jeppesen & Lakhani, 2010). One typical method for this approach is to post a question or

a problem on the Internet and targeting the desired segment of the population (Droge et al., 2010).

Mountaineering is a relatively novel approach that combines these different methods using sequentially, in order to reach the most cutting-edge users (Hyysalo et al., 2015). Pyramiding, which is one essential method in mountaineering, is based on the assumption that individuals who share a strong interest in a specific subject or trend seem to know people that possess more knowledge about this subject. This can also be done through domain experts who know more about the subject and could therefore attempt to identify any possible lead users in this field. The principle of mountaineering is presented in figure 4. In mountaineering, it is important to find the right tools for different circumstances, both in actual mountain climbing as well as in lead user mountaineering. “Traversing upwards” towards those persons or intermediary leads who have the sought-after characteristics, with an arsenal of means from which one can select the most appropriate one to deal with the situation at hand (Hyysalo et al., 2015).

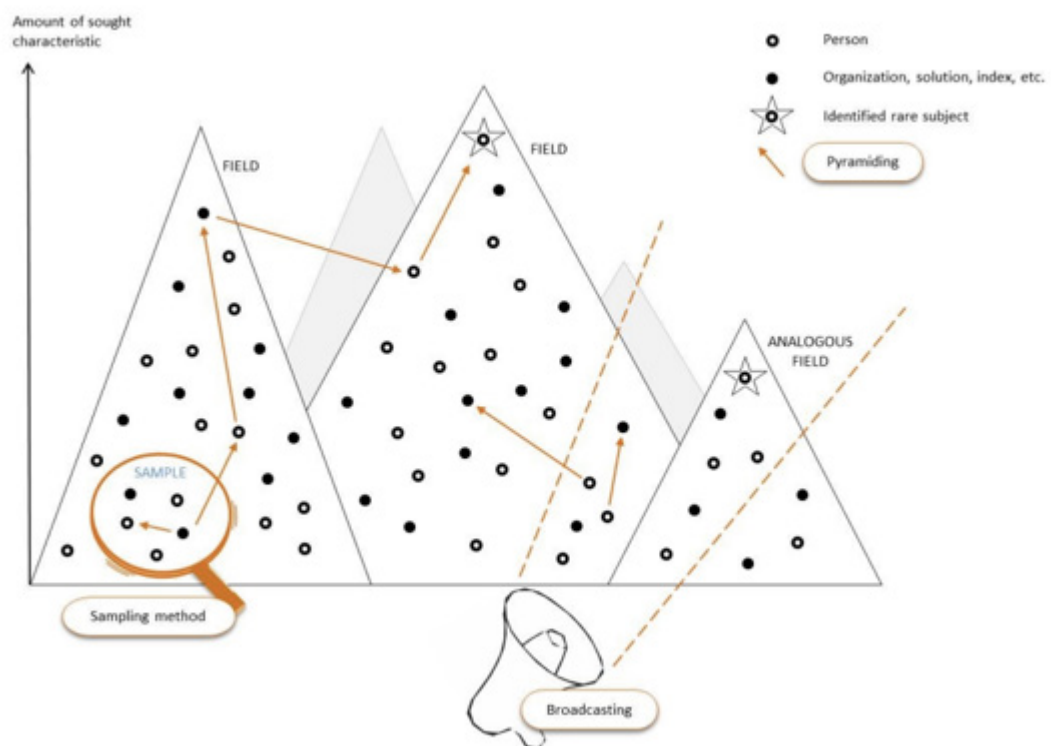


Figure 4 - The process of Mountaineering, Hyysalo et al., 2015

3 Methodology

3.1 Data collection

The empirical data used in this paper was gathered from eight semi-structured interviews. All the interviewees were working as part of Finnair's cabin crew. The interviewees were Finnish, Chinese and Japanese. The Finnish cabin crew members were asked to take part in the interviews through personal connections but other interviewees from Northeast Asia were acquired with the assistance of Finnair's Inflight Manager and Vice President of Inflight customer service. The interviews were conducted in Finland individually although they could have been carried out in group settings such as focus groups. The main reason for choosing individual interviews over group interviews was that Northeast Asian countries have highly hierarchical cultures where the Confucian traditions still endure (Graham and Lam 2003). These cultural factors and traditions could have led to a more closed interview where the eldest (the person with highest position in hierarchical ranking) could have dominated the conversation leaving the younger ones with less time to answer and contribute to the conversation. Another reason for choosing to carry out individual interviews for this study was that the Northeast Asian cabin crew only stayed in Finland for a day so organizing group interviews with personnel who could guarantee their attendance would have been nearly impossible.

In a semi-structured interview, the interviewee becomes an active creator of knowledge and is enabled to contribute specifically personal observations as freely as possible. (Hirsjärvi et al., 2010) Semi-structured interviews also enable the interviewer to follow and pay more attention to topics outside the original themes (Hirsjärvi and Hurme, 2010). This research method was selected for my study because it increases the potential for new insights and findings to arise – it is relatively difficult to predict all of the relevant topics before the actual interviews take place.

Although the semi-structured interviews formed the main body of the data, notes were made during an observation flight to Seoul, South Korea, over the course of 44 hours. Additionally, four questionnaires were completed during the observation flight by the cabin crew, in which the purpose of this study and the research topics were presented to them. The answers from these questionnaires were subsequently added to the collection of data.

As the purpose of this study was to gather insights from cabin crew with a view to influence the design of an improved airplane cabin for Northeast Asia, the obvious choice of participants was local personnel from Northeast Asia, which was arranged with the assistance of Finnair. All the Finnish cabin crew members that were chosen for this study needed to have experience of flying to Asia to ensure they had experience in dealing with Asian passengers. Cabin crew members from Northeast Asia naturally had experience of Asian passengers. The interviewed cabin crew were between the ages of 26 and 54 and possessed from 1 year to 34 years' experience working as a cabin crew. This helped to

ensure a range of different answers and insights with reference to the topics discussed. Both men and women were interviewed, five were women and three were men. The profiles of the interviewees are presented in table 1.

Interviewee	Sex (F/M)	Nationality	Years as a cabin crew	Typical route
1	F	Finnish	1	Hki – Northeast Asia
2	M	Finnish	34	Hki – Northeast Asia
3	M	Chinese	4,5	Chongqing – Hki
4	F	Japanese	9	Osaka - Hki
5	M	Finnish	32	Hki – Northeast Asia
6	F	Japanese	30	Osaka - Hki
7	F	Japanese	34	Narita - Hki
8	F	Japanese	11,5	Osaka - Hki

Table 1 - Interviewees profiles

3.2 Data analysis

The interviews lasted between 42 and 84 minutes with most lasting approximately 1 hour. The audio-recordings were then transcribed, producing nearly a hundred single spaced pages of data. The four questionnaires completed during the observation flight were collected after the flight from the volunteers who wrote their answers during their breaks. The notes from the observation flight were hand-written during the flight and were then transcribed. Notes that were gathered from the observation flight related to the FUCAM project.

The collected data was then sorted into different categories and subcategories such as FUCAM project aims and other topics that arose from the interviews. Attention was paid to the problems that Northeast Asian passengers encounter in the cabin, what kind of groups of passengers exist, what needs they have and what do they appreciate. Another goal was to identify any potential lead users that might have been seen on board; this was determined by whether any passengers were observed to be coming up with their own solutions to improve their experience in the cabin. Other topics that were discussed during the interviews related to the FUCAM project; these topics included but were not limited to: entering the plane, food, sleeping, social areas, restrooms, IFE (in-flight entertainment), hygiene and safety.

All of the data was inputted into one single table, producing hundreds of rows of different answers. The data was sorted into subcategories such as behavior, spending time, communication and equipment. After the data was categorized, it was quite convenient to search for certain criteria in the table. I was able to refine the search results to view a

profile of a passenger who was for example: Japanese (nationality) elderly (passenger type) and what their needs were (category and results). This example is demonstrated in table 2 below.

Nationality	Passenger type	Category	Results
JPN	Elderly	Needs during flight	"Toilets need to be clean for Japanese elderly passengers."
JPN	Elderly	Needs during flight	"Japanese elderly passengers ask about everything: coffee, tea, etc.."
JPN	Elderly	Needs during flight	"Japanese passengers require the information in on actual paper, elderly people in particular are not familiar with using technology."
JPN	Elderly	Needs during flight	"Elderly people want to have Japanese entertainment programs."
JPN	Elderly	Needs during flight	"They (elderly Japanese) need help with language – they don't speak English."
JPN	Elderly	Needs during flight	"Older Japanese passengers are very famous for requesting blankets on board."
JPN	Elderly	Needs during flight	"The quality of rice is very important to Japanese passengers."

Table 2 - Example of data analyzing

Several different categories and subcategories were found and some overlapping between the categories also occurred. For example, while discussing the airplane's restrooms, there were responses that implied that passengers appreciate their cleanliness but also that problems occurred when using them. To get a better understanding of these examples, of the categories and subcategories are presented in table 3 below.

Category	Subcategory	Example segment
Restroom	Problems	"Chinese passengers have problems with trashes in the restrooms, they don't know where to dispose of them."
	Needs during flight	"Restrooms need to be very clean and need to smell good too."
	Communication	"If something is missing from the restroom, Japanese passengers immediately tell us about it."
	Appreciation	"Asian passengers appreciate clean toilets and good hygiene."
	Culture	Chinese passengers might stand on the toilet seat."

Food	Specialties & Own Solutions	“Chinese passengers carry their own rice cooker with them and eat rice from it.”
	Needs during flight	“At some point during the flight, Japanese passengers request sushi.”
	Appreciate	“Japanese passengers appreciate food that is made by top chefs.”
	Communication	“Older Japanese passengers ask us about everything - coffee, tea and other food.”
	Spending time	“Young generation in Japan carry own food on board for example, from McDonalds. They want to do their ‘own style’ of flying.”
Personal space	Specialties & Own Solutions	“Japanese passengers lay plastic bags on the floor to keep their feet clean.”
	Characteristics	Having your “own space” and a “base” you have built is very important for Asian passengers.”
	Behavior	“Japanese passengers are extremely tidy, they arrange their own space quickly and after this, they just sit down and wait for assistance.”
	Problems	“Reclining the seat is a problem for Chinese passengers. They feel like their own space is occupied and also the angle of the screen changes which can annoy the passenger.”
Western & Asian comparison	Culture	“Asian people are more family oriented and that is why they want to travel in groups.”
	Problems	“Certain nationalities sitting close to each other can cause problems. For example, if a noisy group of Russian passengers sit next to a tired and quiet group of Japanese passengers - this can cause some conflict.”
	Communication	“Native English speakers can get confused by blunt communication on our part (cabin crew).”
	Equipment	“Chinese passengers carry more neck pillows than Western passengers.”

Table 3 – Categories and subcategories

4 Results

4.1 Impressions / Western Asian comparison

At the beginning of each interview, the interviewees were asked about their assumptions impressions of Northeast Asians. Everyone agreed that the Japanese are quiet and polite. Chinese were considered to be more active people that don't pay that much attention to other people surrounding them, compared with the Japanese. Koreans ended up somewhere in the middle. One chief purser from said of the Koreans: "*Koreans are not as active as the Chinese but not as modest as the Japanese.*". There were also other similar comments made about Koreans. Table 4 below includes some comments made about each nationality (Koreans, Japanese and Chinese) that came up often in the interviews.

Nat.	Impressions of Northeast Asians
KOR	"Koreans are like sophisticated Chinese and not very sophisticated Japanese."
KOR	"Koreans are very straightforward."
KOR	"Younger Koreans can be aggressive."
KOR	"Koreans talk loudly."
KOR	"Koreans are not as active as the Chinese but not as modest as the Japanese."
JPN	" The Japanese are really polite."
JPN	" The Japanese are quiet and polite."
JPN	"The Japanese are very patient."
JPN	" The Japanese are very modest and discrete."
JPN	"The Japanese are very quiet."
CHN	"The Chinese don't follow instructions."
CHN	" The Chinese are noisy."
CHN	"The Chinese talk loudly."
CHN	" The Chinese have very rough manners."
CHN	"The Chinese don't care about other passengers – they litter a lot."

Table 4 - Impressions of Northeast Asians

It was also important that the interviewees compared Asian passengers to Western passengers to highlight any contrast in their needs and behavior. As mentioned earlier in this paper, cabins have been designed to meet Western passengers' needs and requirements which is why this question was asked. Responses varied a lot and there was no clear consensus. Though many pointed out the Asian passengers' calmness: "*Asian passengers are calmer except the Chinese passengers*" (Chief purser of the observation flight).

Many respondents claimed that Asian passengers are more quiet and behave more discretely on board than Western passengers. Some respondents still claimed that the behavior of Chinese passengers is different from that of other Asians, “*they (Chinese passengers) don’t know how to behave on board*”. This may be a case of cultural differences, as a Chinese cabin attendant said of some Chinese passengers who were flying for the first time; “*They are not demanding at all. They are happy and thank you for everything very often. They feel shy to ask for something and accept everything you give to them.*” (interview 3)

4.2 Behavior

After establishing the basic characteristics of Asian passengers, the next questions considered the passengers’ time spent in the cabin. Many identical answers were given, such as sleeping, watching movies, playing games and doing lots of stretching. Only one respondent mentioned listening to music. This is one thing that you cannot see while you are working in the cabin. For example, you can see if someone is reading a book or playing a game, but you cannot “see” if someone is listening to music. This and similar findings will be discussed in my “discussion and conclusions” chapter.

In table 5, most of the answers were in line with the phenomenon that the Japanese are quiet, act discretely and respect other passengers, whereas Chinese passengers litter, are more active, are less discrete and act more unpredictably overall.

Category	Behavior
Entertainment	"Japanese passengers play games on their own smartphones, that is very common in Japan nowadays."
	"Younger Japanese passengers bring their own laptops to watch series or movies they really like."
	"Asian passengers read books on a Kindle or on a similar gadget."
General	"Chinese passengers sleep and stretch – they take care of themselves."
	"Japanese passengers stretch quite a lot."
	"Asian passengers go to the cabin's kitchen to stretch."
	"Chinese passengers that don't fly that often walk a lot in the aisles and fetch snacks/drinks for themselves."
Towards others	"Japanese passengers complain after the flight - but never directly to cabin crew."
	"Chinese passengers start to pick up their bags immediately on upon landing, even though the "fasten your seatbelt"-sign is on."
	"If a Japanese passenger has something to complain about, and if he/she decides to talk about it, it is only mentioned to the Japanese staff."
	"Chinese passengers listen carefully to personal safety demonstrations, this contradicts their other behavior(s)."
	"Chinese children behave very well on board by using words like "please" and "thank you"."
	"If a Korean or Chinese passenger wants something, he or she will poke you to get your attention."

Table 5 – Behavior.

Many responses supported the fact that the Chinese act differently in the cabin. Many of the Chinese passengers are first-timers, that is, a person who flies for the first time in his/her life, which might also affect these findings. Their culture also differs from others cultures and the next excerpt from one of the interviews seems to clarify some of the issues that tend to arise:

"The Chinese are not used to signs like western people are. The Chinese, haven't seen these kinds of signs anywhere, so they don't know what they mean. Toilets are also a problem because they don't how to lock doors etc. but all these problems are due the language barrier, they don't understand what the signs say and they are not used to these signs." (interview 3)

According to this statement, Chinese passengers' culture differs greatly from other cultures. If a person has never seen a warning sign, it is impossible to know what it stands for.

Another interesting finding was how the passengers went about complaining about the service. Most of the interviewees answered that the Japanese never complain directly to the cabin crew but do complain quite often afterwards. They also might just say nothing and never use the same airline again, like one Japanese flight attendant stated; *“If they (Japanese passengers) don’t like the service, they don’t come back to the same company. It’s the same thing with restaurants, if they are not happy, they just don’t go there anymore.”* (interview 4). This is a problem for the service industry – if you don’t know what you are doing wrong it is difficult to improve. That is why involving users in the development process is so important, especially for the sake of these kinds of customers.

4.3 Problems

One part of the interview considered the problems that Asian passengers encounter in the cabin. Table 6 presents the problems that were mentioned several times during the interviews.

Category	Problems
Seating	"The biggest problem for Japanese passengers is when someone reclines the seat in front of them without asking permission."
	"Reclining the seat is problem for Chinese passengers. They feel like their own space is occupied."
	"Reclining the seat is a bigger problem than ever for Asian passengers nowadays, earlier it wasn't an issue."
	"Western passengers are very angry if someone reclines the seat in front of them."
Communication	" The main problem for Chinese passengers is the language. They have difficulties in communicating with the cabin crew."
	"The biggest problem for Japanese passengers is communication with the crew. They are very quiet passengers."
	"Asian passengers have a total lack of English skills, this causes problems for us."
Stowage	"Chinese passengers have problems putting their bags in the right place."
	"Stowage is always a problem for Japanese passengers, especially in winter time."
	"Asian passengers might start arguments if they cannot keep their bags close to them."

Table 6 – Problems on board

Although there were some other problems mentioned, two main problems were repeated in almost every interview. These two problems were *reclining the seat* and *communication problems* that usually arose from a lack of language skills. Reclining the

seat was mentioned as a problem among Northeast Asian passengers as well as Western passengers. Communication problems usually manifested when Asian passengers came into contact with Finnish cabin crew, but this was also noticed from the Asian cabin crew's perspective.

One Japanese flight attendant explained the dilemma of reclining the seat in more detail and the possible reasons behind it:

“Even the Japanese don't talk to people just behind or in front of them so we always have to tell the customers about this problem (reclining the seat). 'Cause sometimes in trains in Japan there are announcements made about reclining the seat like; “Please consider the people behind you.” Most Japanese people are used to people asking them if it is okay before reclining their seat. If they don't say anything, this starts a conflict.” (interview 4)

The other main problem, communication problems, usually arises from the lack of a common language. The next excerpt describes well how a misunderstanding can cause more severe problems (although there would not have been a big problem initially):

“Problems occur sometimes for example, when a Chinese person is asked to sit down for first time in a language that he/she doesn't understand, it puts them into stress mode because they don't understand so they remain standing up. When the cabin attendant has to say it a second time, they start to lose their patience. By the third time this cabin attendant starts to be angry but the passenger still doesn't understand and that is what leads the passenger to think that the service is very bad, “why are they yelling at me? etc.” (interview 3)

The third most common problem was stowage, where Asian passengers argued/complained if they were not permitted to keep their belongings close to them. All in all, three topics, seating, communication and stowage were repeatedly mentioned as problematic among Asian passengers. A common factor among these could potentially be the lack of a common language which could be solved by increasing the amount of local cabin crew.

4.4 Needs and appreciation

In addition, passengers' needs during the flight were asked about. Food was mentioned several times and there were a lot of responses where passengers' local food options were mentioned. The cleanliness of the restroom was most frequently mentioned by the Japanese passengers and also the smell was mentioned many times. Needs in terms of language was also mentioned often – menus, safety brochures and other information provided on behalf of the airline should be presented in the passenger's own language. Also, requesting blankets came up in the answers in terms of needs. These needs are presented in table 7 below.

Category	Needs during flight
Food	"Chinese passengers want to have Chinese food alternatives."
	"Japanese passengers need to have rice - serving mashed potatoes to them is only a waste of time."
	"Japanese passengers want sushi at some point during the flight."
	"Asian passengers require a lot of options in terms of food and they need to be included in the price of the ticket."
Restroom	" The restroom's cleanliness is very important for Japanese passengers."
	"Restrooms need to be clean and smell good."
	"We need to keep an eye on the restrooms and keep them clean."
	" The restrooms should be clean for Japanese passengers."
Language	"Information needs to be offered to Asian passengers in their own language."
	"Chinese passengers need to have different language options for menus and safety brochures, etc."
	"Older Japanese passengers require actual written brochures."
	"Japanese passengers are very famous for needing blankets."
Blankets	"Asian passengers need clean blankets and lots of them."
	"Japanese passengers need blankets. They feel the cold easier than Finnish people."
	"Chinese passengers feel cold on board and ask for several blankets."

Table 7 – Most common needs during the flight

The cleanliness of the lavatories seemed to be very important for the Japanese. There may be different standards for cleanliness and hygiene. One flight attendant from Osaka, Japan described this “problem” in the following way:

“Restrooms should be clean for the Japanese passengers. At Finnair, the lavatories are very clean because the Finnish attendants clean them very often. But from my point of view, I don’t think they are clean enough. Japanese passengers really appreciate it if they look clean and smell clean. And also using colors is very important, such as paintings and flowers. Finnish people just think of hygiene in terms of sterility, Japanese passengers appreciate the look and scent and feeling. So, I always feel sorry for Japanese passengers, in that “Sorry it is clean though it doesn’t look clean”.” (interview 8)



Figure 5. A clean restroom in Airbus 350

This is a good example of how we appreciate different things and that there is no right way to do things. As the previous excerpt describes well, cleanliness – where there is no dust or other litter might still not feel clean enough to some other people. This also supports the importance to of understanding the customers and their real needs. Figure 5 illustrates a clean toilet in the Airbus 350 which has been decorated with a plant. The Asian concept of cleanliness might have already been taken into consideration in this newer plane.

The things that passengers appreciate on board were discussed with the interviewees. Various different answers were given but the cabin crew’s personal touches were mentioned occasionally:

“Japanese passengers appreciate it a lot if the Finnish crew or the pilot himself says something in Japanese.” (interview 4)

One interviewee explained about where their needs and appreciation comes from. She claimed: *“They (Japanese passengers) have standards for flying and those standards are set by Japanese Airlines and so they expect the same standards for other airlines. Sometimes it’s very difficult because the local Japanese crew has been trained to meet these standards and they know the culture here is not the same as Japanese culture, so sometimes it’s really difficult. But if they got the same standards that they are used to, they would appreciate it. And we are trying to do that but it’s hard sometimes – we are not trained for it.”* (interview 4) This excerpt gave one insight into where these standards and highly demanding character derive from. If someone is used to great service during a flight, it will be hard to appreciate lower standards when using other airlines.

4.5 Specialties

Category	Specialties & Own solutions
Food	"Chinese passengers carry their own rice cooker and eat rice from it."
	"Chinese passengers take a lot of food with them on board."
	"Many Chinese passengers carry their own thermos flasks with them and we refill them with hot water."
	"Japanese passengers bring salted plums on flights, which is good for their stomachs."
	"Japanese passengers have heated eye masks for relaxing."
Equipment	"Japanese women use a lot of masks on board especially in winter time when the air is dry."
	"Japanese passengers carry toiletry kits that contains perfumes, eye pads, earplugs and a small towel."
	"Chinese passengers wear slippers on board and use them for the whole flight."
	"Japanese passengers carry different kinds of massage tools with them."
	"Japanese passengers lay plastic bags on the floor to keep their feet clean."
	"Some Japanese passengers carry their own footrests onto the plane."
	"Japanese passengers use a cushion under their thighs to rest their feet."
	"Once I saw a young Japanese woman with a massive "pillow-motorcycle-helmet" that covered her whole head."
	"One time I saw one Asian couple that had this small device which enabled them to use their own headphones in one screen."

Table 8 – Specialties & Own solutions

We asked the interviewees if they saw any passenger coming up with their own solutions on board to somehow improve their time in the cabin. The idea of this question was to discern whether they could identify any lead users with creative solutions but there were no significant results for this. The most unique result was the helmet pillow that most likely was the *Bonkers Ostrich pillow*, shown in figure 6.



Figure 6 - Bonkers Ostrich pillow, picture by Chris Winter



Figure 7 - Tools used in relaxation on board, presented by interviewee 3

Another unique observation from the interviews was the use of a device that enables one to use two headsets simultaneously with one gadget. Two Japanese flight attendants mentioned the same massage tools and footrests that are missing from the aircrafts that they are working in nowadays. Two examples of these are presented in figure 7.

In terms of food, many answered that Chinese passengers carry a lot of their own food with them, such as noodles, snacks and rice. Also, in three out of the eight longer interviews it was mentioned that Chinese passengers bring their own rice cookers with them where they cook rice in during the flight. Also, almost everyone mentioned the Chinese passengers' thermos flasks that are filled with hot or warm water.

When it comes to the different equipment passengers carry with them on flights, the masks that Japanese women use were mentioned in every interview. Also, light slippers were mentioned to keep passengers' feet clean. Japanese passengers lay plastic bags, or newspaper on the floor to keep their feet clean while seated.

4.6 Other topics

Table 9 presents the interviewees' ideas about the other topics we discussed during the interviews. The importance of Wi-Fi was mentioned relatively often.

Category	Answers
Social Areas	"Older Japanese passengers go to the back part of the plane to stretch."
	"Chinese passengers gather to meet at the back of the plane."
Lighting	"Lighting is extremely important for Asian passengers. It directly affects a person's mood and vitality."
	"Darkness is important for Japanese passengers but they don't know how to switch off their own lights."
Connectivity	"Wi-Fi should be provided on every flight."
	"Chinese passengers appreciate the Wi-Fi in the new aircrafts. They like to post photos on social media."
Soundscape	"It is important to have calm and quiet planes. Quietness decreases the level of stress and improves everyone's time on board."
	"Chinese passengers are noisy and they don't care about noise."

Table 9 – Other topics

As the table shows, the social areas are also used quite frequently. Passengers gather in the aisles or in the kitchen to stretch, talk and socialize. One interesting point of view with reference to social areas came from a flight attendant who was a little concerned for the women on board. She said: "*We could have a specific space for Japanese ladies, like some airlines already have in their cabins. There can be harassment on board which is why ladies need their own space to stretch.*" This result was unique and no one else mentioned anything similar during these interviews. Although one chief purser mentioned the new "ladies' toilet" that is designed specifically for women:

“We have this specific ladies’ toilet, with lotions and other ladies’ things they use. In my opinion, women should be considered more (in terms of cabin design) now because they are going to travel more in the future.” (interview 5) These answers show that taking into account the different needs of the different sexes is also an important consideration in cabin design.

One other interesting point was the importance of the experience when entering the plane, including the tunnel, along which usually commercials are displayed but during the observation flight to Seoul the adjoining tunnel in Helsinki-Vantaa airport from terminal to plane looked as shown in figure 8.

“Entering the plane is one of the most important aspects. This covers the whole journey from boarding to reaching the airplane. The importance of the tunnel is enormous.” (interview 5)

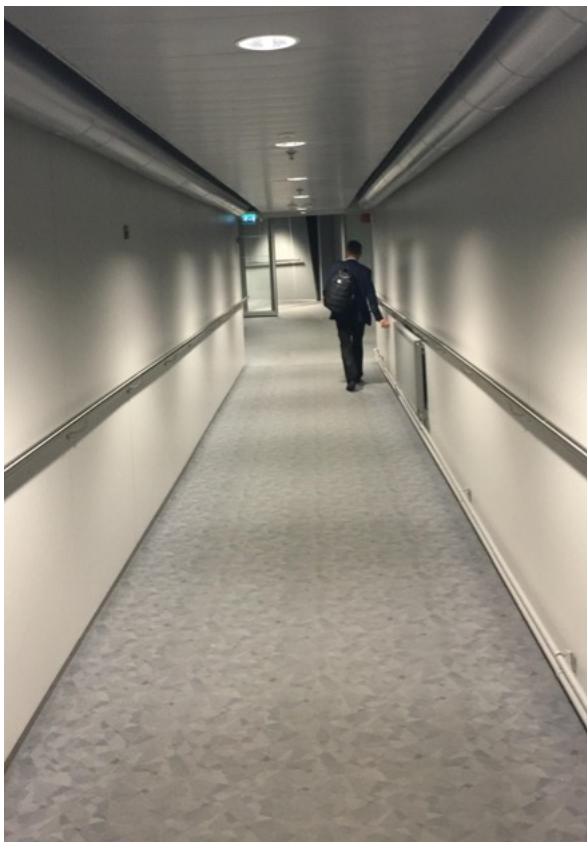


Figure 8. The tunnel to A350 in Helsinki-Vantaa

4.7 Most innovative solutions

In the final part of each interview, the interviewees were asked what they would change in a future airplane cabin if they had a magic wand and could disregard safety regulations, costs or any other technical issues. Almost everyone said that there should be more space

for passengers as well as for the cabin crew. The most innovative solutions for a future airplane cabin are listed in table 10 below.

Innovative solutions
"I would build a sauna for the Finnish passengers into the cabin."
"I would install grab handles, similar to those in trains and buses. If a plane is overbooked, then the passengers could stand on board while holding on to these handles."
"The announcements could be more personalized - the face of the speaker could be displayed, either one of the cabin crew or pilot himself could be shown while speaking to passengers."
"Japanese passengers like to play videogames, there could be good game consoles provided for them."
"Koreans and the Chinese love to gamble, there could be some opportunities to gamble during the flight, for example betting with other passengers what time the plane will land."

Table 10 – Most innovative solutions

There might be various technical, ethical or legislative problems with regards to these ideas, however, the idea where the face of the speaker is displayed while an announcement is being made would be feasible. Aircrafts are equipped with multiple cameras already, including some in the cockpit as well, so it wouldn't incur a big cost and it could have other positive outcomes, such as in terms of safety; *"If an Asian passenger is afraid of flying, we try to let them visit the cockpit before the flight, this might ease his/her fear."* (interview 5)

Another interesting suggestion was the installation of handles to hold on to during the flight for the passengers who would not otherwise fit on board. Passengers in subways and buses that are crowded often travel standing but if it were implemented in an airplane cabin, it could significantly affect the cost of tickets. Seats are heavy and they require a lot of space in the cabin, if they could be removed then there would be enough space for hundreds of passengers. Safety is the number one priority in aviation so this would not happen but it is still an idea to think about.

In addition to these suggestions for innovation, the interviewees were asked what they would change in the cabin to make their work easier, (again without needing to take any restrictions into account). The most pertinent answers are presented in table 11 below.

To ease own work
" Receiving training on cultural issues is very important for Western cabin crew."
"Functionality should be increased. We don't have a place to dispose of liquids. So we need to pour them into the toilet which is not good."

"More storage space for our personal items, we only have lockers where we have to put everything, iPads, shoes, etc. This could be easily improved."

"More spacious aisles would be good so that we could move around more freely."

"No consecutively stacked boxes should be allowed in the kitchen. If we want something we need to move many boxes around to get to what we want."

Table 11 - Solutions to ease facilitate own work from the cabin crew's perspective

Although this study focuses on the requirements and needs of passengers, we asked the cabin crew what kind of improvements could be made to facilitate their own work. Two suggestions in particular were mentioned several times; first was that more space is required everywhere in the cabin, especially for storing the cabin crew's personal items and clothes. The second thing was the structure of the kitchen. In Finnair's newest plane; the A350, problems to do with the consecutively stacked boxes were mentioned. This supports one of my findings during the observation flight where I saw one flight attendant taking some ice out for customer, but the ice was stored behind two boxes. She needed to put the two boxes on the ground, open the last box, pour the ice into the glass and then put the boxes back. This was not very efficient and it was also mentioned a few times in these interviews.

The only intangible solution not to do with the organization of space in the aircraft on this topic was the first excerpt in table 11. One Finnish flight attendant on the observation flight mentioned the importance of cultural issues. This was an interesting finding that was different from the other respondents' suggestions, which concentrated solely on having more space.

4.8 *Traveling in groups*

Many Northeast Asian passengers make their first trip abroad in groups. In Asian culture, traveling in groups in general is very common. This is why in many of the interviews, "groups" was deemed as a passenger type. The cabin crew were asked what kind of groups tend to travel currently and if there are likely to be any changes in the kinds of groups that will be traveling from Southeast Asia in the future or by 2025. Results are listed in table 12 below.

Traveling in groups	Quotes
Characteristics of groups	"Common Chinese groups consist of first-timers, who don't speak English and have difficulties in applying for a visa."
	" The Japanese travel in big groups where group leaders have a big role. Normally they continue to bigger cities in Europe, such as Paris, Rome or Milan."
	"Japanese people travel in groups also inside Japan. Groups offer support for handicapped persons."
	"The Chinese can have financial reasons for traveling in groups, such as being entitled to discounts as a result of traveling in a big group. "
	" Japanese groups depend a lot on the season - when the tickets are cheap, and elderly people travel because they are retired. These groups usually consist of 20 people and they don't speak English."
	"Asian groups that travel consist of usually first- or second time passengers. They are dependent on the support of the group."
Change or trend in groups	"30 years ago only rich people traveled. Young people couldn't come to Finland. Now everybody can travel to Finland."
	"Graduation trips are a huge trend now in Japan - everyone does it. When they finish their studies at university they travel together with their schoolmates first inside Japan and then abroad."
	"New high-end personal travel agencies arrange trips to overseas for rich people where they travel in business class and stay in luxury hotels."
	"Within the past 5-10 years, the amount of Japanese ladies has increased. They don't have their own houses; they live in a rented house and use their money for traveling."
Groups in 2025	"There are going to be more ladies in the future who travel from all the Northeast Asian countries."
	"Groups of Chinese passengers don't consist of first-timers anymore because after you have applied for a visa once, the next time and thereafter it is much simpler to plan the trip by yourself."
	"I'm sure we will have more individual people traveling in Japan because we have the internet and other things that we can now use. New technology helps us to travel by ourselves."
	" The next generation in Japan is not going to spend that much money on traveling. They won't want to travel that far in 2025 - they'll want to stay closer to their home country."

Table 12 - Groups

Most of the groups tend to have a group leader that takes responsibility for the whole of the group. Some other similar answers were given – women are likely to travel more in the future. Also, the amount of groups might decrease when people are more familiar with using smartphones for navigating and accessing other important travel information.

One interviewee said that *“if they were able to travel themselves then of course they would.”*



Figure 9 – Group of people waiting in line 20 minutes before boarding

Figure 9 above shows how the Asian passengers were comfortable to queue for even 20 minutes prior to the announced boarding time. This picture was taken prior to boarding the flight to Seoul at Helsinki-Vantaa airport. The atmosphere in the boarding zone was very calm and no one attempted to push in front of anyone else in the line which is something that can be seen in other queues. This demonstrates that Asian passengers are more comfortable queuing and standing in large crowds than, for example, other Western passengers.

4.9 Summary and referrals

To summarize, the purpose of the first part of the interview was to discern any impressions of Asian passengers, and how they are characterized. The next part of the interview dealt with the behavior of Asian passengers and it was concluded that Chinese and Japanese passengers aren't homogenous and it is important that their differences are acknowledged. The problems that arise due to cultural differences were also discussed. The main factor that seemed to cause problems and was most frequently mentioned was

communication issues, more specifically the lack of a common language. Later on, the interviewees listed the biggest needs of the Asian passengers and what they tended to appreciate most, and hygiene and cleanliness played a big role here. It was also stated that Asian people have different perceptions of what cleanliness means in practice, such as the importance of pleasing scents. Some special features among Asian passengers, such as bringing their own rice cookers on board, were also mentioned repeatedly. Asian passengers also bring other special items with them, such as massage tools. The importance of Wi-Fi on the flight came up quite often during the interviews. When asked about potentially innovative solutions, sauna and gambling possibilities during the flight were mentioned to name a couple. When asked for concrete examples of improvements to facilitate the cabin crew's own work, the need for more storage space came up often. Asian people like to travel in groups because they perceive it to be safer than traveling alone, especially when lacking in communication skills. The trend to travel in groups might decrease in the future because of the Internet and more Asians learning to speak English.

The final question of each interview was "*Considering the topics we have discussed, who might know more about these?*" This was an example of the pyramiding method – asking people who they would suggest to share more information about the subject in order to identify the lead users. Some interviewees suggested their colleagues who I managed to interview eventually, but otherwise there was a lot of variation among the answers. Here are the answers to this final question in table 13.

Referrals
"Colleagues that are now working with Finnair but have previously worked for Chinese airlines or Hong Kong airlines; so they could point out some differences better."
"Ground staff because they meet all the passengers."
"Passengers themselves. Because interviewing the cabin crew gives only one side of the story."
"Maybe my daughter. She has worked at for Finnair for 10 years and probably has fresh ideas on certain topics."
"Maybe very fresh Finnish crew members that have just started working. They might have better views on these topics because they don't much experience in the aviation industry. We already know the standards and everything."
"A Japanese friend of mine. He is a designer that flies a lot and used to live in Finland and he worked at Nokia."

Table 13 - Referrals

5 Discussion and conclusions

Among this sample of 12 people and over 250 years of flying experience in total, the results regarding actual lead users and user innovations remain scarce. However, many passengers and crew members showed innovative potential in bringing some unconventional items on-board to improve their experience of the flight. Those were still mostly limited to something you one can purchase from a store, although not intended for use on airplanes, by neither the manufacturer of the product or the airline – such as a rice cooker. For example, a bamboo stick brought on board to aid stretching, is not based on a future need as stretching remains a common need. But the purchased product combined with the practice of using it on the plane and walking around is worth noticing. It is also worth considering that this peculiar choice of carry-on equipment may seem novel to us but trivial to a Japanese passenger and thus not necessarily a sign of being a lead user.

With reference to connectivity, Wi-Fi, turned out to be very important and a highly appreciated factor in today's cabin due to the fact that the vast majority of passengers carry smartphones while traveling (SITA, 2013). Wi-Fi is provided on board by several airlines but it has not yet been universally implemented. During the observation flight, I was able to connect to the Wi-Fi but the use was limited due to a poor connection – I was able to read my emails and read some news after waiting for some time. However, once the passengers are able to connect to a stable and fast Wi-Fi connection and are thus enabled do whatever they want then some changes could be made to the design of the cabin. One idea that came from an interview was to remove all the screens and the whole IFE-system that airlines provide from seats. This would enable more spacious seats, lighter aircrafts and would eventually allow passengers to really use the internet connection how they like with their own gadgets. In addition, the seats caused one of the biggest problems, reclining them irritates the majority of passengers according to the cabin crew and therefore a whole new seating design should be seriously considered. One solution would be installing thin seats with no possibility to recline the seat backwards, it would only be adjustable within the space allocated for each seat. One possible solution is demonstrated in the figure 10 below.



Figure 10 - Meerkat seat concept. Designed by James Lee, Paperclip Design Limited.

Other implications and topics that should be considered in the future based on the interviews are listed below:

- The cleanliness of the restrooms. This subject was mentioned in every interview and the importance of it, especially to Japanese passengers, was emphasized. In addition to hygienic cleanliness, the smell, decoration and other similar things need to be implemented.
- Many problems occurred due to communication issues. There were mentions of the total lack of common language which is why the safety instructions and other brochures should be provided in the most common languages. Also, the importance of the language skills of the cabin crew was highly appreciated, especially any knowledge in the passengers' own language.
- Food seems to be very important for Asian passengers. The future cabin should be equipped with rice cookers to provide good rice on board. Many passengers from Northeast Asian countries carry their own rice with them and this would not be a huge financial investment in order to meet the needs of the passengers. The quality of the food also emerged from many interviews.
- Healthy equipment and space to stretch and walk around. Northeast Asian passengers stretch a lot and carry tools that enhance their health and wellbeing. In a future cabin, there needs to space for passengers to stand up, walk and stretch.
- Women need to be taken into account more in the future and there need to be solutions that serve them specifically. One idea given in the interviews was a designated place for ladies, where they could stretch and walk around freely without being afraid of being harassed. Finnair seem to have already acknowledged this to some degree as they have a restroom exclusively for ladies in their newest aircraft, A350.

- Groups also need to be considered. From the results chapter, we know that the groups consist mainly of people that have not travelled that much. There could be an aircrafts designed specifically for groups where there could be a cabin crew present who speak the passengers' native language(s). Everything should be clearly presented in a culturally sensitive way, such as restrooms, signs, menus and other brochures. The cabin could also be divided into compartments where each group could be contained –so that they wouldn't disturb other groups and also to enhance the feeling of safety by ensuring that the members of each group are seated close to each other.
- Functionality to facilitate the cabin crews' work. There were problems with some simple things. The waste liquids needed to be poured into the toilet, the boxes were organized consecutively, hindering access to the ice in the furthest box from the front. Furthermore, storage space for the cabin crews' personal items such as bags, shoes and tablets turned out to be insufficient. There was enough space in the aircraft but no shelves to store these items appropriately.

Wi-Fi or a mobile app could tackle many of these problems. An application that one could use before the flight (that some airlines already have) could contain the safety instructions for the flight, menus, the option to order food and drinks to their seats straight away of the flight and other useful information about the journey. The implementation of such an application would prevent communication problems and create a smoother and more efficient service during the whole of the flight.

Organizations are trying to beat their competitors in today's increasingly competitive environment. Understanding the needs of the user is significantly important and moreover, to respond to these specific needs. Aviation as an industry is highly regulated due to the safety specifications, environmental issues and other factors. These statutes obviously limit the most ambitious and daring implementations.

Cabin design does not encounter many of these constraints. Though safety is the number one priority in aviation and weight must be especially considered when designing the cabin if any changes are to be made in the future cabin. Onboard Wi-Fi is probably the most concrete example of this although it does not involve any "physical" design. This research gleaned some suggestions for new practical implementations for the future according to the cabin crew's opinions on the subject, for example solutions for seating, which was presented as one of the biggest singular problems in the cabin.

Lead users, i.e. those who are faced with needs that then go on to become common in the future marketplace and who are not satisfied with existing solutions, turned out to be challenging to identify during this study. The cabin crew have their own routines to follow and regulations for how to behave on board so they weren't able to point out any users that might have been lead users – they are so used to the environment in the cabin thus gaining insights from them to help identify lead users, which was one of the aims of this study, was not achieved.

5.1 Limitations

One of the biggest advantages of the lead user method is the possibility to come up with ideas for new, breakthrough products (von Hippel, 1986; von Hippel, 2005). The airplane cabin in my study did not turn out to be the most suitable environment to find ideas for these kinds of breakthroughs. The Passengers have limitations in terms of luggage and other carry-on baggage which led to a restriction on items that could be taken on board. Liquids, cosmetics, canned food, prescription drugs and various batteries are forbidden in the cabin with some exceptions. Also, the size and weight of the passenger's bag is limited. This obviously affects the likelihood of identifying the lead users on board – some items that might have drawn our attention to any potential lead users might be prohibited.

Another problem for identifying lead users among the passengers could have been the information sources used in this study. We only heard the cabin crew's side of the story, who work daily in the cabin and do not pay attention their environment in that way. One indication of this became apparent during the observation flight I included in this study. Many of the passengers used USB-chargers to charge their personal devices such as smartphones and tablets but charging was not mentioned in any of the interviews with the cabin crew and I know that many people who travel a lot need a charger, especially during a long flight. This suggests that there may have been some other significant phenomenon that was not discussed at all due to the relatively homogenous sources of the information used in this study.

Things that seem obvious or like a “no brainer” for the cabin crew might be crucial to gather insights for new ideas that could implemented in the design of a cabin in the future. Another thing that was missing, as mentioned in the results, was all the intangible solutions that the cabin crew cannot visually see on board. Listening to music was mentioned only once but watching movies and playing games was pointed out in almost every interview. If a passenger is listening to music, it not something that you can see. Equally, this same passenger could be listening to an audio book, a podcast or just using the headset to block out the surrounding noise to feel more relaxed and comfortable. There are other similar things that cannot be seen but are still used. For example, many passengers wear compression socks that are designed for long flights. These socks help reduce the risk of developing a blood clot. Some people I know who travel a lot also use melatonin or other similar medicines that relax them and help them get to sleep easier during the flight. This also serves as evidence that there are many things that cannot be discerned visually. That is why passengers themselves could have been more effective as an information source but it would have required much more time and as this study was focused on the Asian market, the decision to use cabin crew for generating data was probably the most feasible method to execute this study here in Finland.

5.2 Future research

Although the focus of this thesis was on gathering user insights to drive the design of an airplane cabin for Northeast Asia, the users and passengers that fly in Northeast Asia, were not interviewed personally. The data was generated through the interviews conducted with the cabin crew so a suggestion for future research could be to involve the users themselves in this kind of study. As one interviewee answered; “You should interview the passengers themselves, to get the other side of the story”. This and many other aspects, however, were covered in the project but they were unfortunately beyond the scope of this study.

There are millions of passengers so addressing or evaluating every one of them individually through qualitative research would be an insurmountable challenge. However, by dividing passengers into user groups, for example categorizing them by age, sex, nationality, how often they travel, traveling for business vs. leisure and where they travel to usually, would make the research process more manageable. This could provide new insights from the passengers’ perspective. Another solution would also be to formulate a survey that could be accessed online and where Northeast Asian passengers could offer their opinions on the following question: “In the future, what would your dream cabin be like?”.

As mentioned earlier in research paper, the importance of knowing users’ needs and being able to meet them is crucial. The interviews did not produce the range of insights I had hoped for with reference to lead users, perhaps due to the fact that it is impossible to know what the travellers have done before the flight, if they have any special clothing underneath their outerwear or if they use any medicines or supplements to improve their time on board. This information could only be acquired by involving the passengers themselves in this kind of study in order to gain credible answers for things that cannot be seen.

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