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A STUDY OF TOUCHPOINTS ADAPTABILITY
AT HELSINKI AIRPORT

FROM CUSTOMER EXPERIENCE
PERSPECTIVE

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Abstract

Touchpoints design is the crucial parts of service design because touchpoints are the interface of service that customers have direct interaction. The quality of touchpoints affects directly to customer experience. Thus, customers' adaptability of touchpoint is the touchstone of touchpoint quality.

The target research place is at Helsinki Airport. The study involves perspectives from both customers and designers. Customers give the insights about the airport experience (touchpoints) through customer experience survey while designers give the thoughts of touchpoint design during interviews. Customer journey map is applied as the main framework during research. The study concludes a guideline for designers to create adaptable touchpoints. It is consisted with the elements of customer journey map, customer adaptability and designer's input.

Keywords touchpoint, service design, customer experience

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Acknowledgement

I would like to dedicate this paper to my dear parents, to thank them always being so supportive and help me fulfill my dreams. Without them, I could not make it to Finland. Also, this paper is to my dearest Bai, who is incredibly considerate to me. I love you all.

It is pleasant to study at University of Lapland where I met my life changing teachers and friends. I would like to thank Simo Rontti for making me fall in love with service design for the first place. The time that I spent at Sinco (Service Innovation Conner) is the most precious and educational time at university.

The first book I have read about service design is “Designing Services with Innovative Methods” and the author of the book later became my supervisor professor. I want to thank dear Professor Satu Miettinen. She is very kind and supportive with my dissertation. She gives me efficient and useful comments about my thesis so that I can continually improve it. Without her encouragement and understanding the thesis could not reach present form.

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Chapter 1 Thesis introduction

1.1 Purpose of study and thesis objectives

Products and manufacturing industry used to occupy the leading position of the economy. Since service based economy appeared in last few decades it becomes dominant, in many countries service industry takes up a large part of GDP and service related business is extending. Thus, service design becomes increasingly practical in many areas.

Service design is user-centered design and user/customer experience is crucial. The purpose of service design is to improve service quality in order to offering better service experience for customers. Touchpoint is an indispensable part of service design, and there have been many research carried on already. However, as the development of service design and integration of technology, touchpoints become more complex and diversified. For example, there are multi-interface touchpoints in terms of ATM; they are a partial replacement of bank counters with technology. Thus, it is necessary to continue research on touchpoint since it is very changeable. Furthermore, from designers' perspective service design has improved many touchpoints. However, there are rare evidences of showing whether these improvements are adaptable from the customers' perspective. There might be conflict between the ideal touchpoint design and practical usage. Moreover, the adaptability of touchpoint from customers' perspectives has not been researched enough.

There are researches focused on visualization of service design, as visualization is the most important aspect in the service interface. Most of them are from service designers' perspective. They studied how visualization tools are applied in service design processes, what role does visualization play in service design and what visualization tools can be used for service design.

Although visibility is the most efficient among human senses, it is only one touchpoints, which customers will encounter in the service process through vision. There are other elements in terms of senses of hearing and touching are neglected. Compare to the word "visibility", "awareness" is a better one to describe touchpoints from customers' point of view.

There is rarely a research about adaptability of touchpoints, let along the study about touchpoints at the airport from customers' experience. There is hardly any research evidence to show how customers adapt themselves and in which way customers aware of the touchpoints of service. Study adaptability of touchpoint from the customers' perspective can improve service processes; also it is helpful for designers to have a better understanding from the view of customers.

There are many discussions about designing better service for customers. In fact, many researches are carrying on in this area. Most of the researches stopped once they had evidence to prove that is a better service. Not many researchers concerned how customers adapt themselves to these new-designed touchpoints. I am curious about the potential study result of this area.

The aim of research is to study the customers' adaptability of touchpoints at Helsinki Airport. Customer journey map is a framework to research adaptability of touchpoints from the customers' experience perspective. In the end, analyze and combine the result in order to come up with a guideline of adaptable touchpoint design.

The aim of thesis is to gain knowledge about touchpoint by case study. At the same time have a better understanding about the relationship between touchpoints and customers, as well as exploring the customers' adaptability of touchpoints. The study is to provide an academic basis for touchpoint design and explore adaptability from the customer point of view towards service design:

1. To get a better understanding of touchpoint
2. To analyze adaptability of touchpoint from the customers' perspective

The practical objective of this paper is to develop a guideline of how to design adaptable touchpoint.

1.2 Research questions

Since the objective of thesis is to form a guideline of adaptable touchpoint design, the main research question is “How to design adaptable touchpoints?” The main question is followed by two sub-questions:

- What kinds of touchpoints are existed and how to categorize them?
- What is the result of customers’ adaptability due to different touchpoint categories?
- How to improve touchpoints adaptability for customers?

The research will find out how to defining touchpoints categories of airport service process. This definition phase consists two parts: find out main touchpoints and category them, and then analyze customer’s adaptability of touchpoints from the result of the survey. Finally, to find out how these touchpoints can be improved as experience.

1.3 Study value and limitation

Study value

This study might present a guideline for designing adaptable touchpoint from customers’ point view. It might be useful for service designers to know better about touchpoint for customers. It might be applied in other areas other than service design.

Limitation

It is not possible to include all individual customer’s expectation and opinion during this study. It is not able to represent everyone who involved in the same service process. The result is an average analyze exclude extreme situation.

This research also does not cover all the security and contingency plans. However, the security field, which is technologically complex, is beyond the scope of the present study.

1.4 Thesis structure

At the beginning of paper is the introduction part of thesis to present the study purposes, objectives and research questions. In the first chapter, the aim is to introduce the reason to choose the research topic, the motivation of study and what questions I want to study. The second chapter is for explaining research methods. The explanation includes data collecting methods and data analyzing methods. Chapter three is aimed at having a brief introduction of service design history, touchpoints and service design tools/methods. Then to describe preliminary research related to study. Preliminary research concludes references reading about visualization, customer journey map, customer experience (CX), user experience (UX) and adaptability. Followed by the fourth chapter is the case study of service design project for Termovisio. The case study shows the processes of service design, especially touchpoint design. Chapter five is the case study at Helsinki Airport for touchpoint adaptability, which is the core part of the study. The focus is to research on touchpoints at the airport from the customers' perspective. The following chapter reveals mostly the data (collected from chapter five) analyze result. The result is a framework for designers to design better touchpoints. At the end is the conclusion part of thesis. In this chapter is to make a reflection of study in terms of advantages, weakness, limitations and other elements.

Chapter 2 Research methods and data

2.1 Introduction

The study is about to discover a better way to design adaptable touchpoints. In order to do so, the research is to explore touchpoints at Helsinki airport as a starting point. The exploration is from customers' perspective, and the aim is to find out customers' adaptability about touchpoints at airport. The way to study customers' adaptability is to compare their expectation with the reality of touchpoints interaction; the comparison result reflects customers' adaptability of service. The research concludes three phases: background knowledge research, research about the service at Helsinki Airport and analyzing data to get the conclusion.

During the first phase of research, the purpose is to find out previous researched, and the potential possibility to research in touchpoint adaptability area, to have a fundamental understanding of the previous touchpoints research result. On the second stage, a practical research carried out at Helsinki Airport because it is an integrated environment with processes that include multi-touchpoints. Research focuses on touchpoints as well as having surveys and interviews with customers and designers separately. The third stage is to have a conclusion of the study by analyzing data collected from the second phase of research.

2.2 Data collecting and methods

In the processes of data collecting, these following methods are applied: existing references reading, case study (observing and interview), video recording and photography. Although methods applied for different purposes, some of these methods are integrated during application.

The first step of research was to do background knowledge research. In this phase, existing references are read. These references cover the area of service design, touchpoint, customer journey map, user experience, customer experience, awareness and adaptability.

Yin (2009) explains case study as a deep investigation on a phenomenon happening in actual-life. In the similar time frame, if the research question is about “why” and “how”; if researchers have nothing to do with the control of neither aspect nor the environment, these are the situation that case study can be applied as a method. Case study can help researchers to understand complicated context. The advantage of case study is that researchers are able to collect data through a period; also, the collected data can be highly related to the environment. (The University of Melbourne, 2010)

On the second stage, the case study included two phases: case of Termovisio and case of Helsinki Airport. Termovisio is an in-door air cleaning and maintenance company. Termovisio case is a project that I participated, which is cooperated with Sinco (Service Innovation Conner at University of Lapland). In 2011, a project carried out as Termovisio’s request. The project involved design activities as branding, service design and interaction design, from different perspectives of three stakeholders (Termovisio, customers and end users). In Termovisio case, the focus is mainly on introducing the processes of designing touchpoints that can be aware by users. Then, the related processes applied to the next case study, which is about Helsinki airport. The result of case study is to draw the conclusion of the final study.

I consider that Helsinki Airport offers high quality and impressive service among other airports that I have been. Furthermore, by the year of 1999, IATA already had honored Helsinki Airport as the world’s best airport. In 2013, Helsinki Airport was considered as the best airport in north Europe. (Finavia, 2013) Besides, there are more touchpoints at the airport than other transportation service locations. Thus, Helsinki Airport is a good study target for researching touchpoints, and it is possible to have a thorough study about touchpoints adaptability of customers’ experience. The study of touchpoints through two basic customer journeys at the airport:

Boarding: Starts from the moment customers arrive at the airport then ends before customers enter the boarding bridge.

Landing: Starts from the moment customers go out of the boarding bridge until customers leave the airport.

Yin (2009) also mentioned that observation and interview are two very important resources to support case study. There are two types of observation: direct-observation and participant- observation. Direct-observation is when researcher pays a visit to the research environment. Mainly, researcher gets data by visual sense while participant-observation is that research conduct activities as a participant in a research environment. Compare to direct-observation, participant-observation is more experience related. There are two types of observation in this study. They applied to observe the interaction between customers and touchpoints, including the processes, orders that customers deal with different touchpoints and their respond. Direct-observation is for collecting data related to touchpoints, whereas participant-observation is for getting data of customer experience and more information about the interaction between customers and touchpoints.

In this study, focused interview and survey are in the research. Focused interview means interviewees are interviewed within certain period with settled questions beforehand. In this case, focused interview also means experience survey, which is discussion or interview carried for people who have explicit knowledge in a certain area to share their insights. Prepared questions are asked to designers from a similar content of customer survey. The aim of the interview is to gain insights from designers about adaptable touchpoint design.

Survey is for getting insights about what customers think about service experience at the airport. Paper/online surveys are applied at Helsinki airport towards customers, in order to provide the data of customers' attitude and satisfaction about actual interaction with touchpoints. Survey contains questions related to awareness towards touchpoint, opinion about touchpoints interaction, satisfaction level of touchpoints interaction and so on.

Video recording applied in the study process in order to record the completed two customer journeys. Different from products, experience is the main target to be designed in service design and designers use video recording with eagerness. (Van der Lugt, 2009) Video recording as a tool for directly presenting the voice of customers also is a good one to bring customer data to life. (Temkin, 2010) The value of video recording is that it is capable of catching consequent interaction happened in a time frame. (Jewitt, 2012) Customer journey is the experience collection of customers'

interaction with touchpoints during a timeframe; thus, video recording is quite helpful for research purpose. Video provides rich information in a settled situation. (Gjedde and Ingemann, 2008) Applying video recording at the airport in first person gives a vivid live presentation of customer experience about airport service. Video recording is for the purpose to keep a completed track about the scenario of boarding and arriving. By taking videos from the first person perspective along the journey of boarding and arriving, the purpose is to get the perspective directly from customers regarding the processes. Meanwhile, there are not only visualized touchpoints, but also there is touchpoint as audio broadcast, which is sensed by hearing. Video recording is to keep a record of all kinds of touchpoints along the journey.

The best way to get to know a person is to see the environment that he/she is living in. Photography as a research technique is helpful to study how people (from different social and culture background) are getting information from the interaction of environment. (S. Schulze, 2007) So pictures are taken at the airport as a support of observation of customers' interaction with touchpoints, as well as highlighting important details. Photography is helpful when study cannot be carried out through verbal communication with research target. (Petersen and Østergaard, 2003) Meantime, photography provides objective evidence, which researcher can get the meaning from the context. (Schwartz, 1989) Touchpoints at the airport might be graphical materials, person-to-person interaction and person-to-machine interfaces. Thus, the interaction between customers and touchpoints is more than pure verbal communication. That is the reason to apply photography as a data collecting method. Photography is aimed to take a look at the detailed touchpoints. Since there are many touchpoints involved in the airport boarding and arriving service, photos are taken to keep a detailed record of these important touchpoints. Mainly photos can record touchpoints in detail, related to visualized materials in terms of visual guidance signs.

2.3 Data analyze methods

Data analyze methods include customer experience metrics, attitude scale (customer satisfaction level) and infographic.

Customer experience metrics (Manning and Bodine, 2012) is applied to design survey content for customer experience data collection. The book *Outside In* (2012) presents

three types of customer experience metrics: descriptive metrics, perception metrics, and outcome metrics. Descriptive metrics means what is happening in particular situation. It can bring direct data of customers' interaction with the service it shows the content of what happened during real interaction; Perception metrics shows the thoughts/feelings that customers have in their mind in that situation. The thoughts/feeling can be generated before or after interaction, which means customers' perception can be generated during any phase of service; Outcome metrics reveals the actual reaction of customers towards what is happening. Outcome metrics includes data of customers' intend behavior and actual behavior. These three types of customer experience metrics are applied together as a framework to design the survey. The customer experience metric is similar to a storyline, which can put customers in certain service/business scenario, with the processing of the story to get customers experience.

The customer experience metrics content is re-designed for touchpoint study. It is re-designed as touchpoint metrics, awareness metrics and outcome metrics.

Customer experience metrics	Re-designed metrics
Descriptive metrics	Touchpoint metrics
Perception metrics	Awareness metrics
Outcome metrics	Outcome metrics

Touchpoint metrics means the touchpoints collection that customers come across during certain process. Similar with customer experience metrics, the re-designed metrics is aimed for stating the touchpoints along service processes; awareness metrics show the customers' thoughts towards touchpoint. Normally customers will also have expectations in this phase, in terms of the convenience of interaction or the comprehensive level of touchpoints. The same as perception metrics, awareness metrics also reveal customers' mental processes and feeling; outcome metrics shows the practical result of customers' interaction with touchpoint. In this way, the information of customers' expectation towards touchpoint and the actual result of interaction are collected and compared.

Rating scale is an important method for measuring study target attribute. It is often applied to research, typically in surveys. (Friendman and Amoo, 1999) In this study,

attitude scale is applied as a method, to measure and collect data of customer experience at the airport. Attitude scale as a quantitative measurement is able for the researcher to explore people's attribute and opinions. Attitude scale helps the researcher to get data through summarizing the scores (Provided by the researcher) of people's responds towards certain research content. (Payne and Payne, 2004) Attitude scale includes single-item scale and multi-item scale. (Yadav, 2009) Single-item scale is used for my study. Itemized category scales (belongs to single-item scales) are adopted. For itemized category scales, people need to make the choice to select from limited categories that are placed in a certain order. (Yadav, 2009) Customer satisfaction level, which is itemized category scales, is used for customer experience survey. In the marketing area, customer satisfaction research method is applied often to get the outcome of customers' opinion about service quality. The method collects the data of customers' satisfaction by the points rated from 1-5. 1 point means minimum of satisfaction while 5 points is the maximum level, the final average points will show the result of the general customers' satisfaction.

Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Very satisfied
1	2	3	4	5

Table 1: User satisfaction level (Wikipedia)

Expect for five-point scale, three-point scale is applied to the survey. Jacoby and Matell claimed that three-point scale is good enough for survey. It is already able to meet the criteria of validity and reliability. (1971) Lehmann and Hulbert added additional explanation that if the researcher is aimed at studying the average amount then two/three-point scale is sufficient. (1972) Benson argued that for practical application two/three-point scales are strong enough to demonstrate the fact. (1971) Thus, three-point scale is capable of providing efficient data for touchpoint research at airport.

The customer experience metrics are combined with itemized category scales (Customer satisfaction level) and three-point scale. The aim for the combination of is to have a more suitable framework for the study. Customer experience metrics is helpful to create a survey content that able to related with customers' experience; meanwhile customer satisfaction level and three-point scale are providing a measure

framework for analyzing customers' attitude and satisfaction level result of service. The differences of expectation and reality reaction might be shown; at the same time customer's adaptability level of touchpoint can be generated from these differences.

Infographics can be called information architecture is adopted. It is varied in forms and makes data easy to be understood for others. Infographics enable huge amount of data to be presented in an appealing way. (Hachani, 2013) The visualized materials can be pictures, symbols, colors and even words. They are used to compose the content of information or to reveal the relationship among the information. (Emerson, 2008) Based on the presentation offered by David Mcandless that because people have needs for the visual aspect of information, visualize information is similar as reform information as a landscape so that people can explore with eyes. Infographic is like combining two languages (visual and texts) to dig out the hidden patterns and connections of information as reformed the information in a visual way. (2010) Infographic is telling a vivid story so that it makes information less complex and clearer; it helps to present information in an easy comprehensive and appealing way, as well as to find out the potential patterns and predict the trends of changing the system. (Emerson, 2008) Infographic assistants to analyze the data collected from the airport and make data visualized. It is applied to demonstrate all customer journeys (Including touchpoints) in order to enable core touchpoints to be easily selected and analyzed.

2.4 Customer journey map

Customer journey map is a visual method for studying service, which is different from a common blueprint. "A customer journey map provides a vivid but structured visualization of a service user's experience " (Stickdorn and Schneider, 2010) Customer journey map focuses on showing the interaction between customer and touchpoints of service through visualization. In addition, it emphasizes the user's point of view by applying user's language as journey experience. Customer journey map has become a common tool in service design.

"A customer journey map is a very simple idea: a diagram that illustrates the steps your customer(s) go through in engaging with your company, whether it be a product,

an online experience, retail experience, or a service, or any combination.” (Rechardson, 2010)

Customer journey is presented visually to describe the content that the customer will encounter during service. The content could be either tangible as an object to interact or intangible as experience. There are four aspects that should be taken into consideration when mapping a customer journey map: Action, Motivation, Questions and Barriers (Rechardson, 2010). Action is the bridge between different stages. Customers react and respond to a present stage of service, then move to the next stage. Motivation is the reason a customer reacts towards touchpoints. Emotion involves in motivation; and it is one of the main facts that affect customers’ decision whether to continue or end the service process. Questions are the doubt and uncertainties that the customer would have when they are in the process of service. If they can solve the questions they can move to the next step, otherwise it will become a barrier that blocks the process, even causes the termination of using the service.

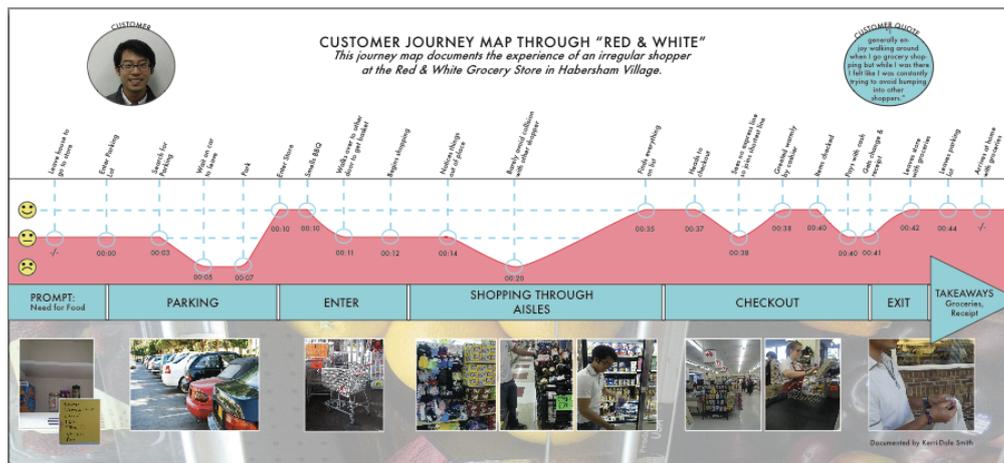


Figure 1: Version 2 of the Customer Journey Map through Red & White grocery store (Kerri-Dale Smith, 2012)

Figure 3 is a customer journey map created for the shopping experience of a grocery store. There are four layers in this map: Action, time, emotion, and motivation. The first layer describes customer’s actions, and then followed by emotion and time in the second and third layer. The fourth layer is about the customer’s motivation. The emotion of the customer changes due to time, action and the content of touchpoints.

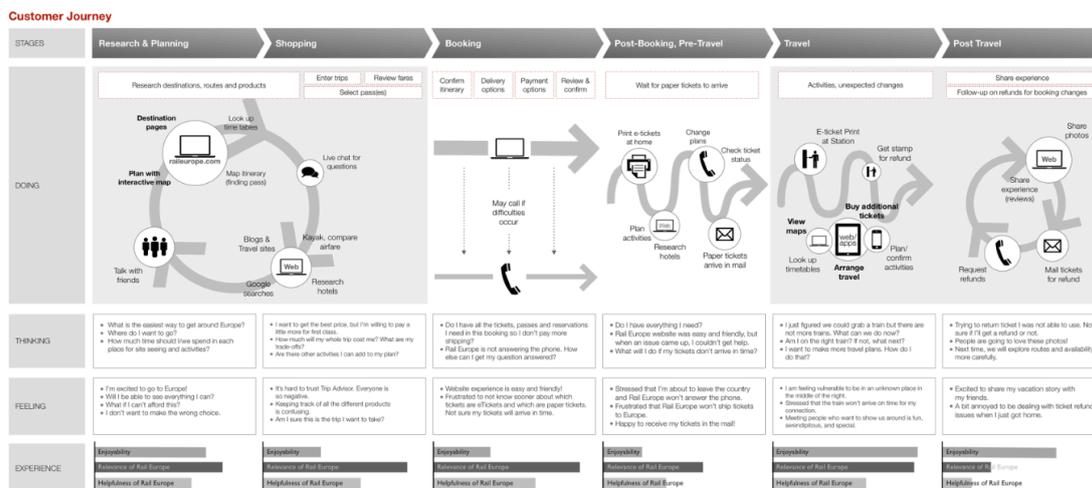


Figure 2: Experience map for Rail Europe by adaptive path. (Adaptive Path, 2011)

Figure 4 is a customer journey map, which is part of Experience map for Rail Europe. It has six parts: stage, Rail Europe, doing, thinking, feeling, and experience. This customer journey presents in details considering the touchpoints, motivations, emotional, as well as the quality measurement of service experience (Marked with enjoy, relevance and helpful). Furthermore, it not only analyzes the journey and experience of customer but also includes the actions as feedback towards service. With the involvement of “post travel”, it completes the whole service lifecycle.

Joel Flom demonstrates in his article as it also shows in Figure 3 and Figure 4, customer journey map can be varied by structure and graphic, though the basic content concerns about the customer’s needs, action, motivation, and emotion. It illustrates customer’s interaction with service providers from the customer’s point of view. (2011)

For this study, customer journey map is a framework to research touchpoints at airport. In addition, a customer journey framework involves in the study result.

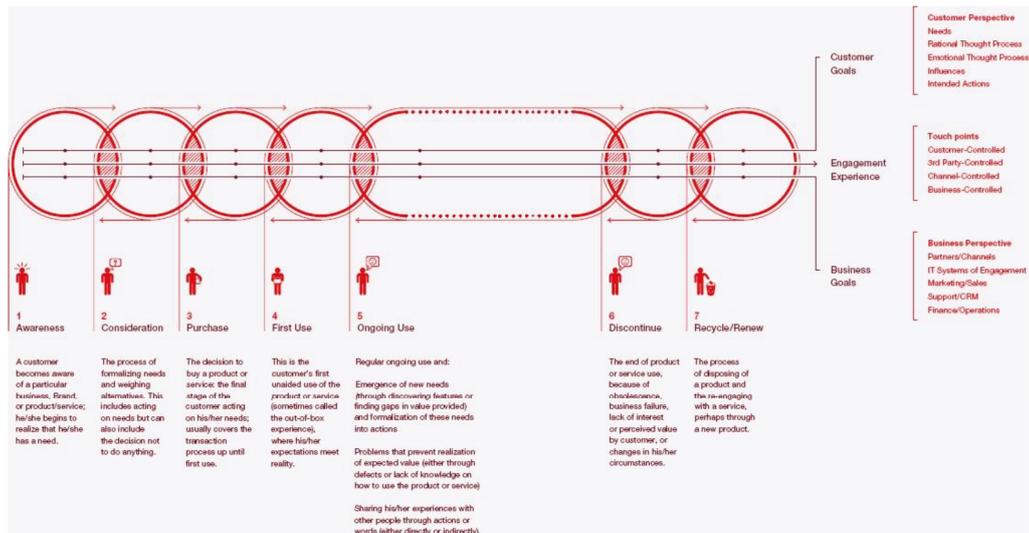


Figure 3: A prototypical customer journey framework. (Newbery and Farnham, 2013)

The framework lists out customers' interactive processes with service, customers' goals, business goals and engagement experience. Newbery and Farnham claim that this framework is a useful tool for designing experience. It is easy for others to see how and where is still potential for making more efforts and improvements. (2013)

The customer interaction processes (at the bottom part of the framework) are adopted to be a part of the final guideline. The processes include awareness, consideration, purchase, first use, ongoing use, discontinue and recycle/renew. In any service interaction processes, customers need to have awareness about service and touchpoints, then, they will think whether to participate and have interaction. Once they decide to purchase the service, the content of first time customer and frequency customer need to be generate differently. During the proceeding of service customer either stop the processes or they continue for a new service circle. Theses processes above are able to apply to any service scenario.

Chapter 3 Service design and preliminary research

3.1 Service design

Service design can be divided into two parts: service and design. Service design is on the demand of boosting of service industry. It is a conduct aims at improving service through design disciplines.

3.1.1 What is service

Service is an item that consisted with intangible components and unable to be separated (AMA Dictionary, 1995). Service defined as intangible. It is an outcome of the shifted attention from products, and it is a valuable support for products.

Service industry is booming in recent decades. It has become a promising industry with huge potential of development. Depend on the data of GDP sector by CIA (Central Intelligence Agency) service industry has taken a large part of GDP sector in most countries all over the world. (2012) People are surrounding by service every day; in daily life people use public transportation, go to shops and dine in restaurants. These activities consisted of processes and experience, are called services. Unlike a product, service's most identical feature is non-product and intangible. Service is intangible as processes, space, skills and time; it cannot be touched and sensed. A service is consumed at the moment it is ordered. In addition, service cannot be owned by anyone or transferred from one to others. It is processes offered by service providers, then purchased by customers as experiences.

In the past, service emphasizes person-to-person interaction. At present with the revolution of technology, service becomes diverse in order to fulfill the ongoing demand of customers. Technology enables services become efficient and offers many possibilities of improvement. The emergence of integration of technology and service is very trendy at this moment.

3.1.2 What is design

The word “design” came from Latin word “Designare”, it means make a mark on something. Design is a human activity that started a long time ago even before the word “design” was created. Since human civilization began, people start to create patterns, drawings and handicrafts without knowing they had already participated in the process of design.

ICSID (International council of Scientists of Industrial Design) gives definition to design as design is a series creative activity involves in the life cycle of products, services and the whole system. Design is crucial to the economy and technology development. Design is an activity with aims of bringing improvements. It is a system of creation, esthetics, engineering and technology.

3.1.3 Definition of service design

Service design is an emerging area in recent decades. It blends design thinking with service marketing and management disciplines.

“Service design is famously difficult to define and like most important things is something that is neither new nor totally unfamiliar. But just as product design is a discipline where formal design methodologies and approaches are used to make your Hoover, smartphone and car the best it can be for your needs and your lifestyle, service design does the same for experiences” (Gunatillake, 2011).

It is true that service is hard to describe at once due to variety categories and purposes, so as service design. Service is intangible; it varies by kinds, aims, time and space. Design is a process participates in the entire life cycle of object. Service design rearranges process, time and space; it gathers customers and service providers with the aim of improving service quality.

Birgit Mager describes service design as “Service design addresses services from the perspective of clients. It aims to ensure that service interfaces are useful, usable and desirable from the client’s point of view, and effective, efficient and distinctive from the supplier’s point of view” (2007) Service design is user-centered design; it emphasizes the role of customers and their experiences. Service design is to design a whole system including service processes, approach and the experiences triggered by

the system. (Moritz, 2005) Service design requires the thorough comprehension of customers, design thinking, marketing and development strategy. It is a persistent process through service life cycle with practical solutions.

3.1.4 A brief in history

At the beginning of the industrial revolution, industrial production was the main focus. In the 1920s, design was scientifically defined by Bauhaus in Germany. During that time product design was booming, then designers from United States also influenced the modern industrial design later. At that time, product design focused on satisfying basic human needs in terms of esthetics and function.

As massive production was able to produce enough products into the market, the market was quite satisfied year after year. With a new system called product service system (PSS) emerged service starts to fill up the gap between excessive products and over-satisfied market. Moreover, although the basic needs of customers are similar, there is still individual difference. When Apple released iTunes for the first time, customers just could not help to fall in love with it. Except for the amazing iPod, Apple offers iTunes as a service-oriented product to each customer and gives opportunities for customers to personalize their choices of music. This is one of the most successful model of combining product and service. Now technology is rapidly progressing, meanwhile service industry is booming. So technology provides a good platform for service to develop, it brings more possibilities to hybrid services with products.

Described by Design Council 75% of Britain's economy made up of service and it brings 80% of employment. As the economy structure changed, service has taken over the place of massive production and become a domain industry in many countries. Products used to be improved by design, then some people start to have questions: can service also be designed? Roman Aebersold once talked about service design that the service places in a scenario, and it needs to be attractive for customers; thus service is also need to better designed. (Forlano, 2010) Design for service was not mentioned until Shostack made a contribution to it. Shostack first mentioned service design in article *Designing Service That Deliver*. Shostack created a service blueprint for service. In 1991, service design was still part of the business approaches. Service design was formally introduced by Pro. Michael Erlhoff in KISD (Köln

International School of Design) for the first time. Later, service design has got its popularity. In 2002, the world's first service design company Livework was established. Later in 2004, Service Design Network was found as an international network for service design by Birgit Mager. Nowadays service design has been consistently developed and has been extended to many areas including finance, education, health care, transportation, etc.

3.2 Touchpoint

During the interaction phase of service, customers will encounter many service interfaces, which are touchpoints. Touchpoint is the point of contact that customers will interact with during a certain time of service. They are the dots that comprise service process.

The main purpose of touchpoints is to exchange information, and they are diverse. In the main category, there are three kinds of touchpoints: person-to-person, person to product, and person to technology. Recently, the latest category is rapidly growing with the development of technology involved interaction design. Harry Katzan mentioned about touchpoint in his article *Essentials Of Service Design*, and he states that there are two processes existed in touchpoint: customer process and service provider process. These two processes are happening at the same time during service based on interest of intensity and duration. (2011) Intensity means the amount of touchpoints that involves in the service process while duration is the length of time, which customers will need to interact with those touchpoints.

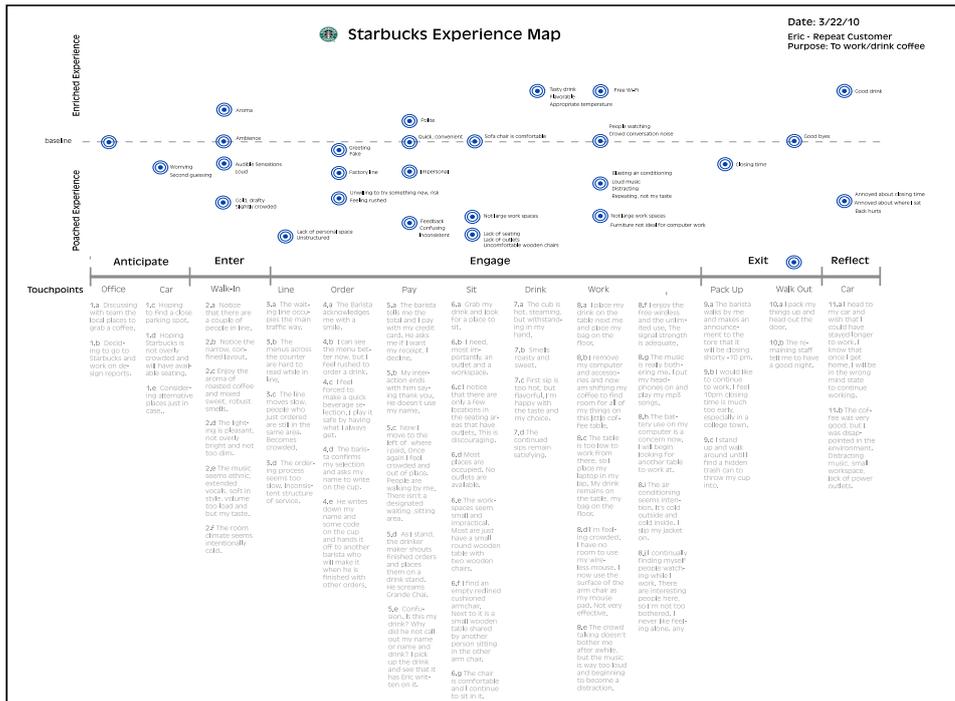


Figure 4: Starbucks experience map (Little Spring Design, 2010)

Figure 4 displays the experience journey of customer who is going to buy a coffee in Starbucks from work. The process divided into five phases: anticipate, enter, engage, exit, and reflect. There are twelve touchpoints involved in the process. The engage phase, which needs the longest time during service, includes touchpoints: queue, make an order with staff, payment, and sit on chair, drink coffee, and work. Service interface becomes complicate with the increasing number of touchpoints. In the vertical level, it shows the customer's demanding and thoughts towards touchpoints from his/her perspective. From the top half of the chart, it also reveals that if there are many touchpoints in a service process phase, it might cause more barriers and emotional change of customers.

Touchpoints are not isolated they consist service flow and connect to customer's emotion and motivation. At some point, the quality of touchpoints equals the quality of service. That explains well why touchpoint design is so important in service design.

3.3 Service design processes and tools

Service design process composes of four steps: exploration, creation, reflection, and implementation. (Stickdorn and Schneider, 2010) Exploration is about discovering the objectives of a client/company to offer the service; figure out the obstacles and

problems of service and the demand of customers or a promising target group; visualize all the data collected from the first phase. Commonly, ethnographic approach, which is often applied to social science, is integrated in this phase. Creation means concept generation. In the creation phase, designer will generate ideas as many as possible. These ideas need to be tested to find out deficiencies. Reflection follows the creation, the purpose of reflection is to do prototype of selected ideas and solutions of creation phase and test them. As the service is intangible, it is important to make service as concrete as possible by approaches and tools. In reflection phase approaches from theater performance will be engaged, in terms of environment prototype, experience prototype and role-play. Other tools, in terms of storyboard conclude photos, videos. The last step is implementing, which is the phase to bring a service concept to be practical. In this phase, clients and a target group might be invited for testing prototype as co-create approach.

In general, brainstorming, service blueprint, customer journey maps, storyboarding, and experience prototype are used very often in service design processes. Brainstorming is for looking for all kinds of ideas and solutions rapidly. Service blueprint and customer journey map are more systematic and rigorous. Both of them could include a target group, process, touchpoints, and actions. They display the details of service process in a visualized way. Service blueprint covers extensive stakeholders while customer journey map is mainly focusing on the customer's point of view. Storyboarding is a communication and evaluation tool for ideas and concepts. It can also assist the presentation of the customer journey map. Experience prototype is for service designers to have a concrete understanding of customer experience.

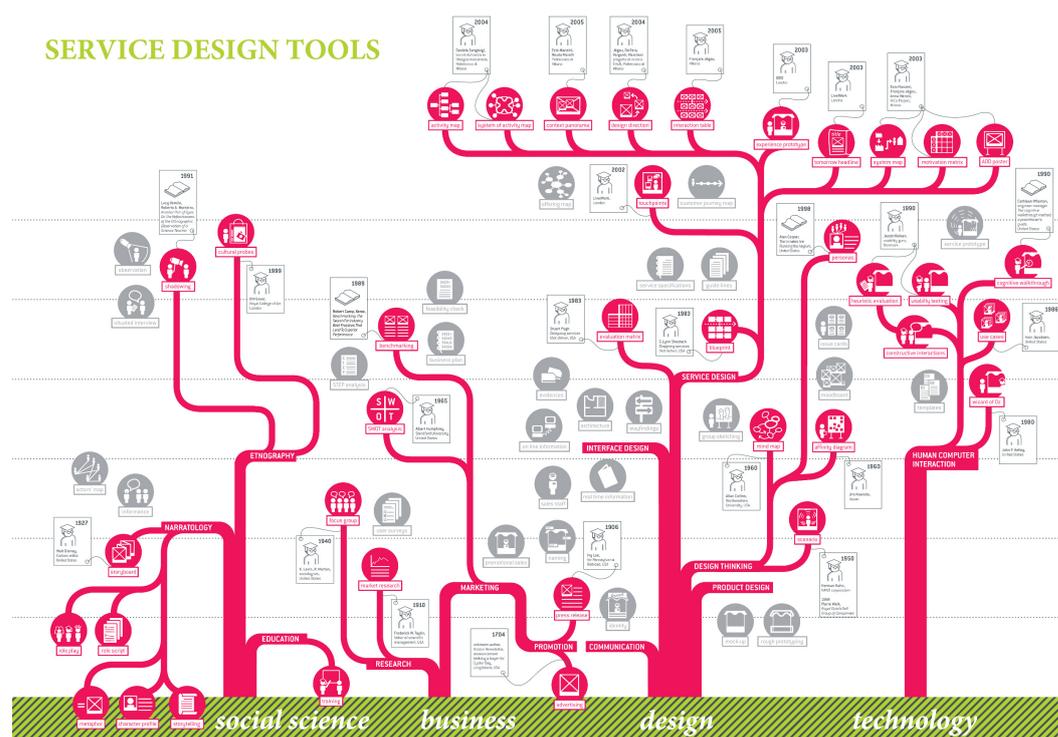


Figure 5: Service design tools (Roberta Tassi, 2007)

As seen from Figure 5, service design is an interdisciplinary design activity made up with many tools, other than those only for design area, but also includes tools applied for social science, business, and technology. The integration of tools is very flexible. These tools can be altered or mixed for application due to different purposes and motivations.

3.4 Preliminary research

3.4.1 Visualization

Visualization is the most mentioned aspect of adaptability of service design. Among these researches, majorities concentrate on how designers can apply visualization as a tool to service design process.

Customer journey map is a common tool for service design related to visualization. As user experience concerns in this paper, customer journey map is a framework in the case study for researching touchpoints of user experience. Thus, the material reviewed in the earlier phase is about service design visualization.

A research paper explores the role of visualization as a tool for service design. After an interview with service designers and analyzed technique tools they use for

visualization during design processes, they come to a conclusion that visualization techniques are fit for the earlier stage of interpreting user research. They are often used in the phase of finding problems and solutions. (Segelström and Holmlid, 2009)

Fabian Segelström did more research in his paper; he reveals visualization techniques play a role of communication tool in service design. He also points out that the application of different visualization techniques depends on different data resources. In addition, his paper introduces a group of basic visualization techniques for service design. (2009)

G. Lynn Shostack (1984) mentioned about highlighting tangible evidence in service designs. Then, the author claims that tangible evidences should be involved in service design as a way for customers to experience the effectiveness of service, which can be included for advertising, colors and graphic materials.

Yu-Ying Huang (2012) did research in exploring positive backstage visibility. By applying Critical Incident Technique (CIT) for data collecting, the author categorizes four types of backstage visibilities and analyzed them by five types of perceived values: sensory, quality, epistemic, emotional, and social values. It concludes that backstage visibility can be one of the redesign concepts of service design. In addition, the result of paper claims to support the idea that the dividing line between front stages and back stages will get blurred. Thus, visibility line can be moved back in order to enlarge the area of front stages.

3.4.2 User experience (UX) and customer experience (CX)

User experience (UX) is a mature discipline, which is the mainstream of design strategy developed over 10 years. User experience defined by ISO (International Organization for Standards) 9241-210 Ergonomics of human-system interaction as “a person’s perceptions and responses that result from the use or anticipated use of a product, system or service”. User experience also includes emotions, physical and mental behaviors in both before and after interaction. ISO 9241-210 lists three components that could affect the result of user experience: system, user, and context of use. Another definition is that user experience as a connection to customers, which based on digital interaction and innovations. (Jeannie Walter, 2012) These definitions related to human-computer and technology perspectives since UX focuses on the

interface. User Experience T-Model developed by Peter Boersma shows six core elements of user experience discipline: research, usability, information architecture, interaction design, visual design, and content.

User Experience					
Research	Usability	Information architecture	Interaction design	Visual design	Content

Table 2: User experience T-Model (Peter Boersma, 2004)

Among these six elements, usability is the main core value of user experience. When designers think about usability, they need to consider whether the interface is easy to access; the UI of the interface is friendly enough; the information offered by the interface is easy to understand, etc. User experience is a request for details. These details influence the usability of the interface.

Customer experience (CX) is a new concept of discipline mentioned mostly by people involved in marketing and business in recent years. As Kerry Bodine mentioned that business discipline of CX has become mainstream and a professional organization called CXPA (Customer Experience Professionals Association) was established. (2012) In service design area, service designers get used to emphasize user experience as the main discipline until present service designers start to pay attention to customer experience as more comprehensive way of thinking.

Jeannie Walters (2012) describes CX from product/service provider’s perspective that CX is to understand customer, interact with customers through every touchpoint and provide the experience to customers as good as possible. Continually, Jeannie also mentioned about the importance to combine CX to brand promises; the indispensable role of digital touchpoints can be assisted to generate experiences and necessary acknowledgement of trends and innovation.

A CX-focused company has a definition of CX: *“A customer experience is an interaction between an organization and a customer as perceived through a customer’s conscious and subconscious mind. It is a blend of an organization’s rational performance, the senses stimulated and the emotions evoked and intuitively*

measured against customer expectations across all moments of contact.” (Beyond Philosophy)

It emphasizes that more than 50 percent of CX is subconscious; CX is not about what customers feel but is about how customers feel. In general CX is how customers consciously and subconsciously feel about the experience. From the interview of Harley Manning (Vice president/Research director for customer experience at Forrester Research) gave the definition of CX as the perception of customers that occur during the interaction with the organization. (2013) The perception is more focused on how customers sense what is happening rather than what is happening. He mentioned about the differences between CX and UX. He considers CX fits in a case scenario while UX is mainly focusing on a specific channel. (2011) Samantha Starmer views CX as an extension of UX, which has the combination of digital and non-digital interfaces. (2011) UX can be considered as part of CX. CX is a holistic experience including both digital and non-digital touchpoints through the whole service lifecycle. In service design case, CX can be described as the perception that customer gained from interacting with all kinds of touchpoints during a certain time of service processes. Considering all above and the aim of this paper, CX is more suitable for this topic.

3.4.3 Adaptability

The Collins dictionary gives definition of adaptability two meanings:

“The ability to change your ideas or behavior so that they are suitable for different conditions, a new environment, etc,

Suitability for use in a variety of situations and for a variety of purposes”

In human behavior area adaptability means the ability or the level of acceptance of people towards new environment or situation. Adaptability is the level of applicable ability (of the system or objects) for a situation or solution. Laurie Brown explained adaptability as the capability of adapting and the ability of adjustment to different conditions. (2009) In the article by Tony Alessandra, he explained adaptability (Based on the concept of adaptability by Dr. Michael O’Connor) in detail from human

behavior point of view. There are five elements both in flexibility and versatility. The similar explanation with a service design language could be applied to the adaptability of customers dealing with touchpoint. (2008)

Flexibility	Versatility
Confidence	Resilience
Tolerance	Vision
Empathy	Attentiveness
Positiveness	Competence
Respect for others.	Self-correction.

Table 3: The content of adaptability (Alessandra, 2008)

Customers adaptability could be valued whether customers are confident to understand the context of touchpoint; they can put up with the dislike part of touchpoint; they understand the purpose of touchpoint existed in a process meanwhile customer has a sympathy with designers. In the duration of customer interact with touchpoint whether they have a positive attitude towards it.

During the interaction between customers and touchpoints, whether customers are able to overcome the difficulties and barriers they confront; whether customers can aware the existence of touchpoint; if customers cannot overcome some problems, whether they know how to ask for help. These elements above can be used to measure the adaptability of customer about touchpoint.

Dr. Tony Alessandra once mentioned adaptability as a crucial bond of all kinds of successful relationships. It is resulted from people's need and aims at fulfill it (2006). The adaptability between customers and touchpoints are essential for the success of the service. At some point, the adaptability of customer and touchpoint is the same but with different perspectives.

Chapter 4 Case study of Termovisio

4.1 Introduction

Chapter 4 is to introduce case study of Termovisio. The purpose of the chapter is to have an introduction of touchpoint design, processes as well as how to design touchpoints that can be aware by customers. The result of the case is to support design adaptable touchpoints.

The project is under the requirement of CEO from Termovisio. As a service oriented company, the CEO of Termovisio realized the importance of service design and was looking for cooperative opportunity with SINCO (Service Innovation Corner) at the University of Lapland. The project was carried out in earlier spring of 2011 and lasted for around 4 months. Six students from industrial design department participated in this project. The leader of the project was Project manager Simo Rontti from SINCO. The project included service design, interaction design, and branding. After the project, Termovisio applied the results and officially changed its name as airvisio.

4.1.1 Background

Termovisio is an indoor air cleaning and maintenance company based in northern Finland. They offer service including indoor air refreshment, equipment cleaning and maintenance. However, at that time Termovisio was a small company with huge ambitions to extend.

Termovisio's main clients are people from real estate and public buildings. These clients order the service directly, however, at most situations the clients are not the end users. Although clients acknowledge the quality of service, Termovisio offers services mainly on the backstage; end users are hardly noticing its existence. Termovisio wants end users to be aware their service, and know the service they offer. Besides, their service was not efficient due to the service flow they were applying at that time. The motivation of the project for Termovisio was to be known by end users in order to seek the potential opportunity for individual service in the future. They hoped that the new design would help their work efficiently, to bring clients the new service experiences.

Though in-door air system is very common in every modern and modernized building, usually end users do not have much knowledge about this area. Therefore, Termovisio concerns about rebuilding brand images and try to find a way to make this “invisible” service visible. The whole design duration lasted for 18 weeks. We decided to divide design into two directions:

1. Brand images

Redesign the VI (Visual Identity) set including new slogan for Termovisio. At the same time design the new advertisement strategy to get more attention from clients and potential clients.

2. Service

Simplify the complicated current service path, and design a new concept interaction device/software can assist the new service concept.

4.1.2 User awareness

As Termovisio wants to be known by end users, how to bring awareness of end users becomes one of the most important problems to be solved. Considering Termovisio is purely offering service rather than any material products; in addition, the service is operated within air fresh system hidden from public, it is difficult to show the service processes and result directly to end-users.

Service is intangible, customer gain awareness from engagement of service experience through human senses. In terms of a nice displaying shop; warm greeting at the front door; soft-touch sheet on the bed; inviting smell from a coffee shop and beautiful tunes playing as background music, these all needs customer’s awareness to feel. Customer obtains awareness from the interface of service consisted of touchpoints. Some invisible service processes need to be transformed into perceivable evidence that included in touchpoints of service experience. (Mager, 2007) These evidences can be sensed by hearing, vision, tactile sensation, olfactory sensation and taste sense, etc. Customer’s awareness is from those evidences; it could be generated by multi senses.

Therefore, the design of service should merge tangible evidences, which would confirm the facility of service from users perspective. (Shostack, 1984, P136) User

awareness is important feedback of touchpoint; it ensures the effectiveness and function of touchpoint.

To catch the user's attention about touchpoint needs innovation design. By transform immaterial processes into material evidences that could easily reach end users, that would significantly help the innovation processes. Adding sensible elements into the service process can raise the awareness possibility from end users. New touchpoints designed with the integration of these elements.

4.2 Methodology and methods

4.2.1 Data collection methods

There are several methods applied in data collection phases: interview, observation, and benchmarking.

Interview and observation are two common methods to get data from end users. They were in the earlier phase of design processes. Interviews and observation carried out in a public building from one of the clients of the company. We got research data through interviewing end users and observing the working environment. The benefit of interview and observation is to have the direct sight of end users. Later, Termovisio offered a scenario of cleaning and maintaining in-door air system at SINCO Lab. As designers, we had a chance to observe the way workers working and the environment they are. Through this scenario, we had knowledge about the service operation and service path from company's view.

Benchmarking applied to extend the content of data After gathering basic data related to Termovisio service Benchmarking is to find out the competitors inside Finland and in international range. The focus is to compare service and VI between Termovisio and the other competitors to find out more potential improvement possibilities.

4.2.2 Data analyze methods

SWOT matrix applied to analyze the data collected at the beginning phase.

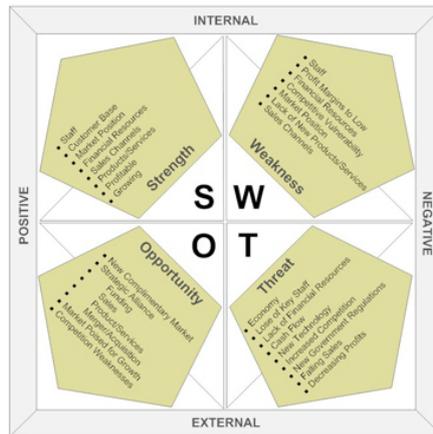


Figure 6: SWOT matrix (Lim, 2012)

It applied to analyze the present service and VI system of Termovisio from four perspectives: strength, weakness, opportunities and threats. The purpose of applying SWOT is to have solid knowledge and analyze Termovisio and related industry. From the matrix, we got to know how to enhance Termovisio’s strength part, to extend opportunities and reduce the threats of business and even turn some of the threats into potential opportunities. It also applied to compete Termovisio with its competitors to have a thorough comparison and at the same time seeking new possibilities.

Later in the phase of analyze whole design concept, the methods of Six Thinking Hats by Edward De Bono was applied.

COLOURED HAT	THINK OF	DETAILED DESCRIPTION
	White paper	The white hat is about data and information. It is used to record information that is currently available and to identify further information that may be needed.
	Fire and warmth	The red hat is associated with feelings, intuition, and emotion. The red hat allows people to put forward feelings without justification or prejudice.
	Sunshine	The yellow hat is for a positive view of things. It looks for benefits in a situation. This hat encourages a positive view even in people who are always critical.
	A stern judge	The black hat relates to caution. It is used for critical judgement. Sometimes it is easy to overuse the black hat.
	Vegetation and rich growth	The green hat is for creative thinking and generating new ideas. This is your creative thinking cap.
	The sky and overview	The blue hat is about process control. It is used for thinking about thinking. The blue hat asks for summaries, conclusions and decisions.

Figure 7: Six thinking hats (Kapelelis, 2012)

Six Thinking Hats helped us to analyze the design concept in six parts: The facts, related to the original purpose and objectives. (White hat) Elements related to target groups’ emotion. (Red hat) Give criticizing to the aspects. (Black hat) Highlight the optimism part of the concept. (Yellow hat) The potential opportunities related to the

creativity of the concept. (Green hat) Review and re-think of the processes/concept. (Blue hat)

4.2.3 Concept generation

During the design phase, methods of brainstorming and theme generating applied at the beginning. We had hundreds of ideas by brainstorming and these ideas selected by theme generating. Theme generating is very helpful to select the most valuable and potential ideas. The themes can be generated by categorizing ideas. Followed by research in details of different themes, the most possible one showed up.

The “10 Usability Heuristics for User Interface Design” created by Jakob Nielsen was utilized into interface design of the new interaction system, which assisted the new service path. The theory applied as a guideline for interface design of the system.

4.3 Design process

The project divided into four phases: finding, create, concretize and define. These are also the general steps that applied to almost all service design projects in SINCO. (Kuure and Miettinen, 2013) Finding phase is about to find customer insights, gather and collect necessary information about service, stakeholders and etc. Then designers can have a thorough understanding of service that offered by providers. At the same time, we are able to have knowledge of all the stakeholders (people and groups, including potential ones) that participate in the service and have a clear view of service structure.

In Termovisio case, we started the finding phase from setting three different target groups: real estate manager, lodger and end users. Three teams did interview separately with each target group. In my team’s interviews processes, we also observed the environment of the building, including offices, lobbies, kitchens, and storage rooms. The focus was on the air quality, in-door air system structure and solutions of end users if there happen to be bad air quality.

Through interviews and observation with different target groups, we gained more knowledge and customer insights about the service offered by Termovisio, which concludes the knowledge of current service processes, clients and end users’ feedback about service and Termovisio’s brand image. In order to have a better understanding

of the working process of Termovisio, the professional maintenance people from Termovisio came to SINCO to perform a typical situation of maintenance.

After gathering all the data, we applied SWOT chart in order to analyze the strength, weakness, threats, and opportunity of current service provided by Termovisio, as well as its competitors. At the end of the finding phase, we found out that end users rarely have noticed the existence of Termovisio, let along the service. The unnoticeable VI system of the company was also one of the reasons to block the image. Besides, the current service path was more complicated then necessary. With some unnecessary processes, it causes complicated communication problems between each stakeholder; thus, cause the inefficiency during the service.

The second stage of creating starts with brainstorming. We had hundreds of ideas about VI, service path, and the way to bring awareness from end users. With the aim of bring the end users' awareness and strengthen the brand image, we come up with a conclusion that replace all the current VI with a new design. In addition, we decided to get more visualized material involved in maintenance processes; meanwhile, we concentrated on improving the current service path. The interaction system can potentially support service path by integrating into the service processes; on the other hand, since each stakeholders can operate interaction system, it makes the service more concretized. Each stakeholder can be participated in the service processes through interaction system. As a result, the awareness towards Termovisio's service rose.

The third phase is to concretize those solutions and concepts in the creation phase. There were three directions of design: design related to visualization materials as well as other noticeable forms, service path design involved with interaction system, and branding.

At the beginning, we categorized ideas from brainstorming into there major themes: entertainment, science fiction and eco-friendly. The themes generation is helpful to set a correct direction for branding. After consultant with Termovisio about their will of self-identity, we picked the theme eco-friendly as the direction to design the whole concept.

The visualization materials included VI design, slogan design and materials that can be added to maintenance processes as visual evidence.



Figure 8: Logo of Termovisio



Figure 9: Newly designed logo with a slogan

New logo and slogan give a new meaning to Termovisio. It is more obvious that Termovisio is a company related to air and freshness. The brand image is close to eco-friendly.



Figure 10: Re-designed uniform



Figure 11: Visual material for cars



Figure 12: Visual material set

Re-designed VI set refreshes Termovisio's old brand image. The whole set has more consistence and delivers a positive brand promising. It is very noticeable and easy to remember.

Moreover, there were some materials that could be added during/after the maintenance as evidence of service.



Figure 13: Door hanger during maintenance



Figure 14: Air blooms with Termovisio's VI and business card floating after maintenance finished in the building



Figure 15: Termovisio's leaf on the in-door air system output (paper mockup)

This detailed design based on bring end users' visual awareness of the existence of Termovisio and their service. As visual awareness is the most common sense that human use to get information from, visual elements involved a lot in the concretize phase. The locations for adding these visual materials were in a process of careful selection. When we were doing the interview and observation where end users working, we noticed that the door handle is the object that everyone uses. As draw on the experience of door handle brochure in the hotel room, we decided to take the door handle as an efficient spot for adding visual material for raising awareness of the maintenance service of Termovisio.

After generating the design of door handle brochure, we thought it would be even better that there is visual material after maintenance. The problem is where to put the visual material. Normally, the maintenance area is in the hidden part of the building, so there are difficulties to leave evidence in the maintenance area that could be noticed by end users. Also, the maintenance could happen in the large space in terms of public lobby as well as a small place like tiny office rooms. The evidence must be very obvious that end users can notice at the first glance rather than looking for its existence. Since Termovisio is a service company dealing with the air, we came up with an idea that air bloom is the most suitable visual evidence to represent them. Air bloom costs less, and because the bloom is floating, it will not be disturbing for the end users. With the unique green color of Termovisio, the air bloom is noticeable as brand image.

Another chosen location was the output of air system. Because the in-door air system is working automatically, it pumps out the dirty air and brings the fresh one inside. Thus, it creates an invisible airflow in the environment. We decided to take advantage of the phenomenon. By adding a lightweight leaf-shape paper of Termovisio logo on the output fence, the paper will move because of the airflow created by air system. No matter end users are working in the office or walking through the lobby these papers are noticeable due to the movement. It also delivers a brand message that Termovisio is distributing the fresh air into the environment.

Meanwhile, we had an idea about having a special tune for Termovisio as another form for getting awareness. As NOKIA's ring tune is recognized worldwide, music can be a very good way for gaining awareness. Not only for advertising, Termovisio's tune can be played before or after service as well as the alarm sound for the sensor to notice others. This tune must be short and comfortable to listen.

Service path is conducting in parallel with material evidence. With the involvement of interaction system generated by sensor, new service path was designed.

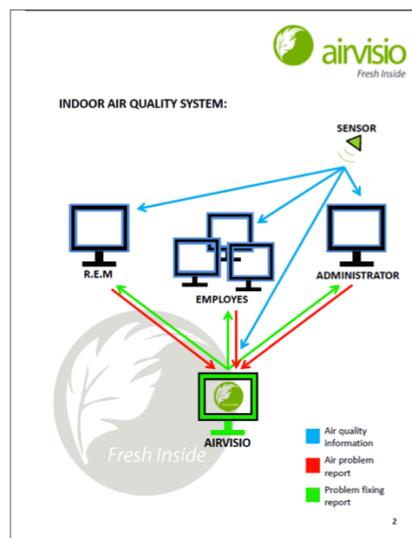


Figure 16: Working flow of new system



Figure 17: Sample location of sensor



Figure 18: Sample of sensor design

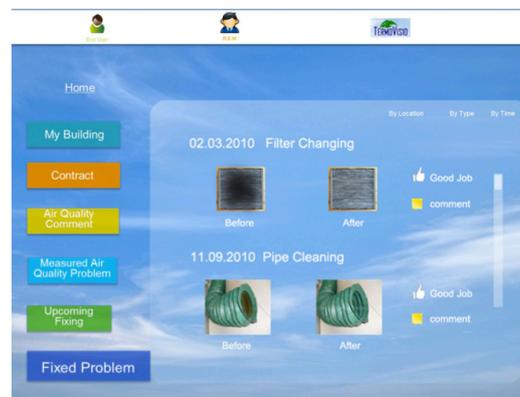


Figure 19: Sample of interface mock-up of interaction system

The new service includes two working flow: automatically report and manually report. The report based on sensor detective error in the environment, while the manually report reported by end users if there is any problem in the air system and not been reported by the sensor. With the integration of sensor, Termovisio can find out the problem efficiently. Additionally, it is useful to remote control in the case that Termovisio also has a plan to extend to Asia in the future. The sensor system can continue the consistent of the service.

From end user perspective, the interaction system invites end users being part of service processes. As a result, their awareness towards the service of Termovisio is brought up. In the interaction system also enable end users to gain knowledge about in-door air system.

The focus of branding is about enhancing brand image of Termovisio to health and eco-friendly. As Termovisio offers service of in-door air system, it relates to people's health and environment protection. People are also paying much attention to these perspectives. Thus, doing campaigns and advertisement of health and eco-friendly share the same value with many end users and clients. We suggest that Termovisio can be a sponsor of sports games and eco-friendly events, which represent these two values. In this way through common concerns, awareness would be brought among users.

At the define phase, which is also the last phase, we had a reflection of the whole concept. We carried out a mock-up testing in SINCO to make sure the whole concept is valuable and practical.

4.4 Conclusion

The main purpose of the project is to draw attention from users about service, strengthen brand image, and at the same time perfect the service. In this project, the design of awareness focuses on design visualized materials, as well as some other forms such as a tune, which sensed by hearing. Awareness is triggered mostly by human senses; also it is gained by common knowledge among people, in terms of touchpoint interaction. Besides these above, sharing the same value with other users, in terms of sports campaigns, also brings up the awareness. This material and immaterial forms are the touchpoints involved directly / indirectly of service. Making touchpoints as evidences, which able users to sense, feel and experience, is the most efficient way of getting awareness. The brand image can be promoted by raising positive awareness among users.

With the new VI set and branding channels, Termovisio has a totally new brand-promising image, which is noticeable and easy to remember. The design of other visual materials and tune will enrich the brand image and bring more awareness from users towards Termovisio's service. The concept of new service path brings convenience to both Termovisio and their clients and simplify the service processes as well as easy to manage all kinds of maintenance. Though it will take time to build up such complex and sophisticated software system, in the long run, it will be the most competitive part of Termovisio.

Chapter 5 Touchpoint adaptability study at Helsinki Airport

5.1 Background

With a purpose of narrowing thesis topic arrangement, a location has to be chosen as an environment of touchpoint study. Since touchpoints varied in different kinds and they have to be strongly related to customer experience, I consider the airport to be the perfect location.

As the airport is a competitive service environment, it has multi-dimensional space full of all kinds of touchpoints as well as many customers. There are touchpoints belong to the three interaction categories: person-person, person to technology, and person to products. At the airport, visual materials, audio, technology, products, and human interaction are composing the service. So the content of touchpoints is rich enough for a study. At the same time, the airport situation is applied to universal design theory. Many customers despite the age, gender and physical condition are considered in the same environment.

Thus, I decided to choose Helsinki airport (Helsinki-Vantaa Airport) as the target place for studying touchpoint adaptability. Helsinki airport has a history of sixty years and comes along with lots of awards. In 2013, it was honored again as the best airport in Nordic countries. Helsinki airport is continually improving. It is one of the most popular airports for passengers in Europe.

From personal experience, Helsinki airport is my favorite airport in Europe. Although the size of Helsinki airport is smaller compare to other famous airports in Europe, it is well organized and efficient. As a designer, every time when I go through Helsinki airport I can notice small changes happening at the airport. The details reflect the efforts that Finavia is putting into it. Finavia operates Helsinki airport, which is a specialized company in aviation area that operates airports all over Finland. During one of the projects that I participated at the university, Finavia shows its high interests towards service design. As an enterprising company, Finavia is willing to cooperate with students and universities for research purpose. Because of this reason it is very convenient to have contact with Finavia for my research and have an access into the whole airport area.

5.2 Process

Four-steps-processes (applied to the Termovisio project) are for the study at Helsinki Airport: finding, create, concretize, and define. In finding phase, the main goal is to collect data for creating customer journey map. These data include service flow/ service processes of boarding and arriving; touchpoints along the journey from the customer perspective and interaction between customers and touchpoints.

The next step after finding is to create customer journey maps at Helsinki Airport. The maps contain two parts: boarding and arriving. The main processes of boarding and arriving listed out including touchpoints existed along the processes. Customer journey map is useful for organizing service processes and touchpoints. Data can be visualized in the customer journey map due to many aspects. Touchpoints are organized in visualized customer journey map. Thus, it is more convenient for further analyze in terms of re-define the touchpoints category at Helsinki airport.

The third phase is about carrying out survey for customers and interviews for designers. The surveys are the focus on getting customers' experience about the airport service while interviews are for designers to talk about their ideas of touchpoint design. Since customers and designers might have a different view about the same touchpoint, the concretized data is focusing on the different opinions about touchpoint among customers and designers.

The last step is about defining the proper principle about touchpoint design regarding the consideration of customer perspective. The guideline reveals the processes of how to do adaptable touchpoint design. Because service design is the design for better service, the final goal is for customers to enjoy better service. If designers can understand better from customers' point of view and design touchpoints with a customers' language, the content of touchpoints will be easier for customers to understand. Therefore, customers can adapt themselves to new-designed touchpoints and service quickly, and it also makes service design efficient.

5.3 Customer journey map

Customer journey maps are made of the data collected from the finding phase. After analyze data that collected from observation, photography and videos, the journeys of boarding and arriving are divided into several stages. In each stage, there are detailed touchpoints listed out.

The customer journey maps are focusing on necessary processes that customers go through of boarding and arriving at the airport. The attention is paid on the service routine offered at Helsinki Airport by Finavia during boarding and arriving. Touchpoints involved in the maps are the most essential ones; commercial touchpoints are not the main concern of this study.

5.3.1 Customer journey map for boarding

Generally, the boarding processes have three parts: check-in, security check, and wait for boarding. As can be seen from the map below, boarding can be divided into three areas based on location and space: Check-in area, Security check area, and boarding area.

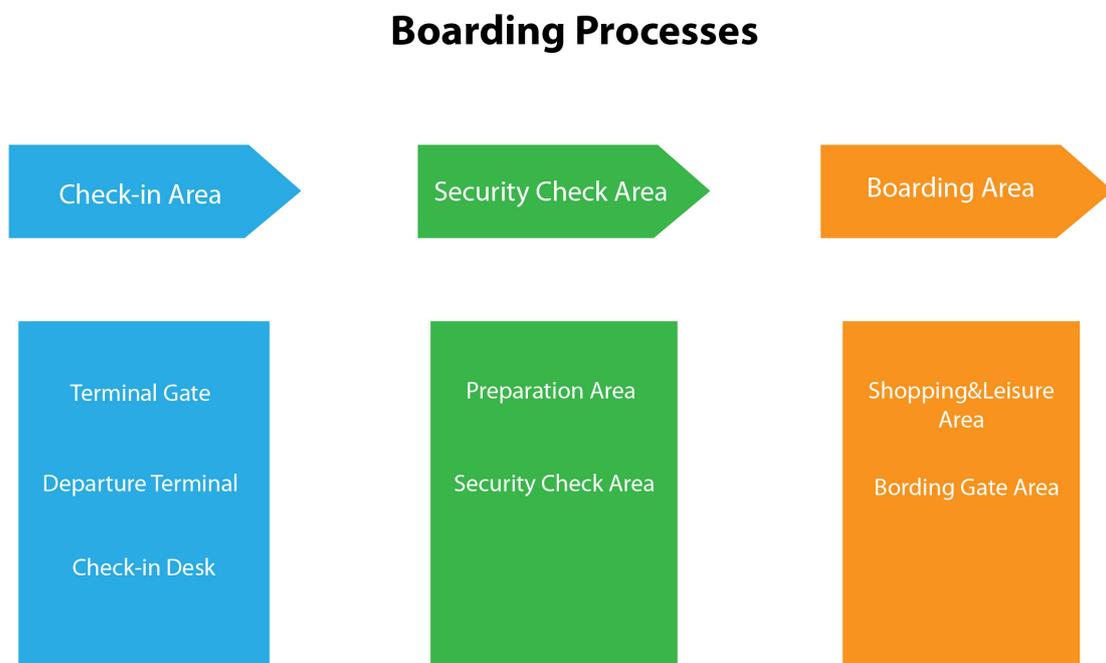


Figure 20: Boarding processes map

Detailed area divisions are created by the experience of customers of going through places based on personal needs. From the moment of customers entering the terminal gate before preparing for security check, customers are staying in the area of check-in. In this phase customers will go through terminal gate area, departure terminal hall, and check-in desk. (Check-in desk area is not compulsory because some customers might check-in online) Then followed by security check area, which is the essential part at the airport that cannot be skipped. The security check area is divided into preparation area and security check area based on the actions of customers. After customers pass the security check, they enter the boarding area and are able to wait for the flights peacefully.

Customer Journey Map of Boarding

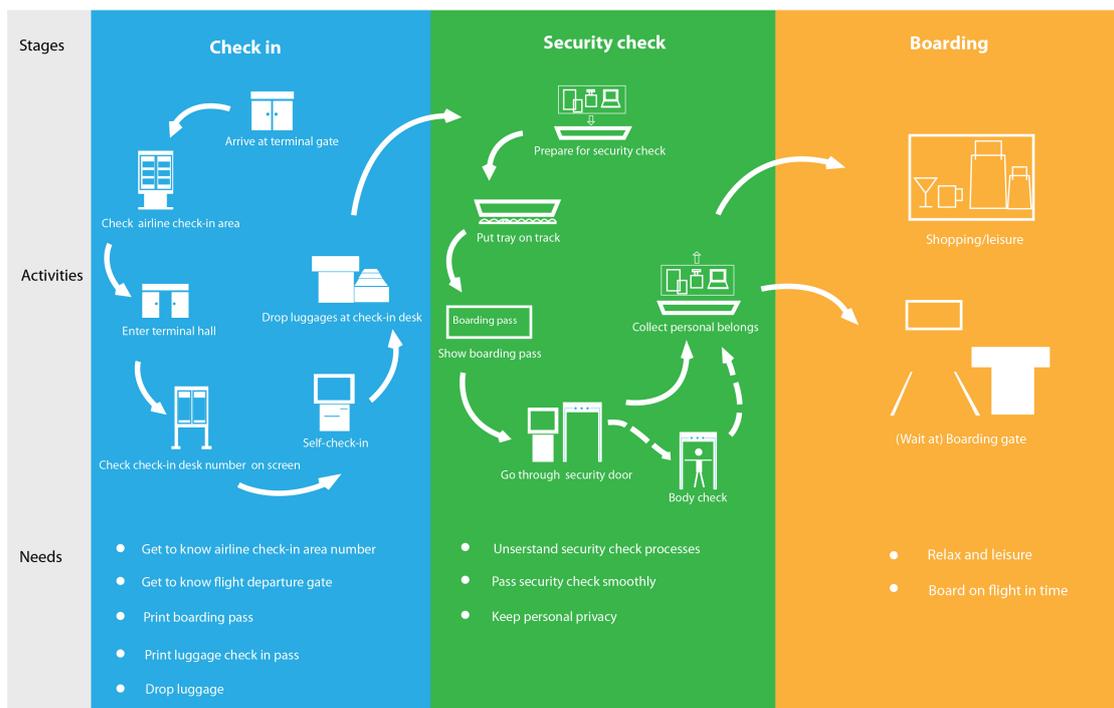


Figure 21: Customer journey map of boarding

Customer journey map of boarding has three parts: stages, activities, and needs. There are three stages, which are check-in, security check, and boarding. These three stages based on the map of boarding processes. Activities are a series of actions that customers react during stages in order to accomplish needs. The needs are the requirements that customers demand the most about the service during stages.

In the first stage of check-in, a customer will start the boarding experience at the airport with the arrival at the terminal. Then, the customer need to check which terminal gate should go depend on the airline company who operates the flight. As soon as the customer gets into the terminal hall he/she can get the information of the check-in desk of flight. If the customer has not checked in via online service or mobile app, then he/she can check in by either self-check-in machine or do it on the check-in desk. Then he/she drops the baggage at the check-in desk to complete the check in processes. (Not compulsory.)

When customer finishes the check-in stage, he/she can move to security check, which is the most important stage during the boarding and cannot be left out. Before customer encounters with a security check staff and machine, he/she needs to prepare everything ready in the preparation area by following the instruction around the area. After that, customer will carry personal stuffs on the track and go through the security check gate. The final step is to collect personal belongings. Until this phase, security check is finished. The third stage happens in the boarding area where customer can enjoy varying kinds of entertainment and leisure. Also, customer can wait for boarding peacefully.

On the first stage, getting the necessary information is the major concern of customer. In order to finish check-in processes, customer depends a lot on the signage system at the airport, interaction with staff and interface of machines. During the second stage, to pass the security check smoothly is the main interest of the customer. Customer pays more attention to boarding in time and relaxation on the third stage.

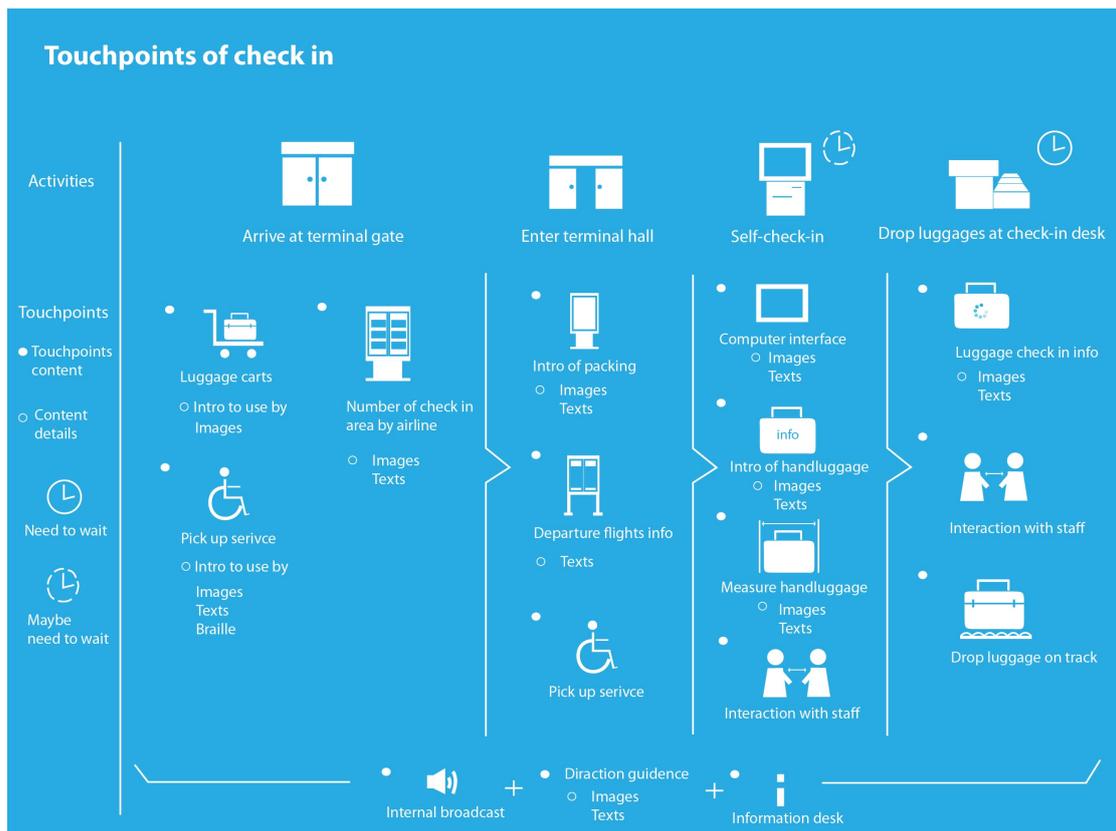


Figure 22: Touchpoints of check in

Figure 22 is a map of detailed touchpoints of check-in processes. Touchpoints consists of content and content details; they are listed according to customer activities. Touchpoint content is the very touchpoint that customer encounters while content details describe the elements that compose the touchpoint. At the same time, whether the activity is time consuming is also in consideration, as a matter that affects the experience of touchpoint. There are three common touchpoints involved in all activities they are internal broadcast at the airport, direction guidance and information desk. In this case direction guidance means the part of signage system at the airport that related to location guidance purpose, it does not include the part that offers information of flights and similar information other than locations.

When customer arrives at the terminal gate, there are three main physical touchpoints that he/she might encounter on the basis of needs: luggage carts, pick up service, and flight check-in area guidance. There are instructions of how to use luggage carts consisted by images printed near the handlebar of cart. The pick up service is located next to terminal gate, and it is for people who need special help due to the physical inconvenient reason. The content of pick up service is made up with images, texts,

Braille as well as a button for calling service staff. Customers might check the right terminal gate number of the check-in area by searching for the airline company. Usually the information content is consisted of airline logos, arrows and texts for the direction, it is displayed in front of terminal gate.

As soon as the customer enters terminal hall there are three main touchpoints: introduction of packing, departure flights info and pick up for assistance service point. The introduction of packing usually located next to terminal gate, self-check-in machine and security check area. Most of the content of instruction is icons, which is more visualized, except for the ones next to terminal gate that contain more texts. The departure flights info displayed on the screen; the screen can be seen in front of terminal gate inside terminal hall as well as in many other places at the airport. In general, information is texts. Inside the terminal hall there is pick up for assistant point available, which is next to the terminal gate, there is wheelchair and telephone available to use.

If customers have not checked in online, they need to use self-check-in machine. At Helsinki Airport, almost all airline companies are available in self-check-in machine, and customers usually use these machines to check in unless they have to go to the check-in desk. When customers operating the machine, interface of the operating system is the major touchpoint that they need to confront. The interface content of the machine consisted of many elements; mainly are two kinds: images and texts. However, during this phase customer might have interaction with staff and ask for help, which is person-person touchpoint, if they have a problem with the interface. Furthermore, there are two other touchpoints near the self-check-in machine: introduction of hand luggage, displayed as icons and measurement box for hand luggage.

In case, those customers have extra luggage for check-in they need to go to the check-in desk and drop the luggage. Customers will likely contact with three touchpoints: the introduction of hand luggage made of images and texts; communication with staff at the check-in desk; and finally customers need to drop the luggage on the track by themselves. By far, customers complete the check-in processes. In this phase customer might spend more time in self-check-in machine and check-in desk, in case that there might be a queue or problems.

Security check area is from the moment customer stands in front of the area of security check until customer leaves the area. As it shows in Figure 22, at Helsinki Airport, customers go through security check in three steps: preparation for security check, go through the security door, and collect personal belongings.

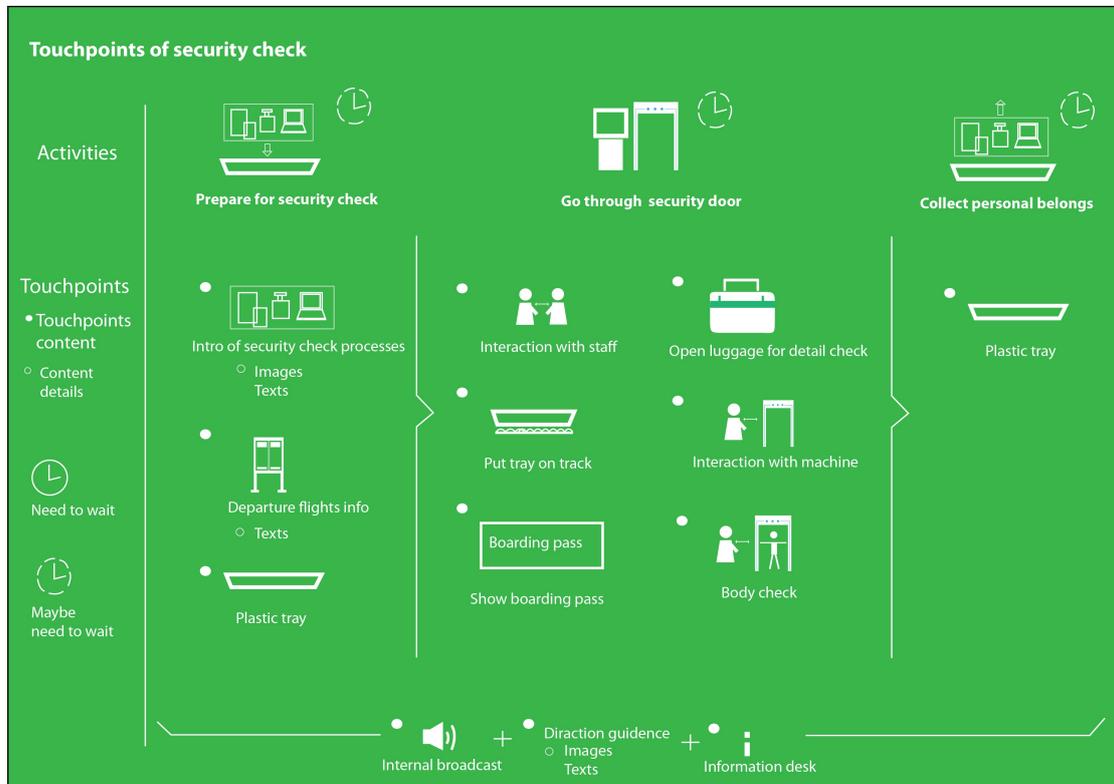


Figure 23: Touchpoints of security check

At Helsinki Airport, the security preparation area is independent of security doors. There are separate tables in front of security doors for customers to prepare themselves. During the preparation, there are some touchpoints that customers will face. The instructions of security check are along the way from the entrance of security check area to preparation tables, and usually they are comprised of images and texts. Departure flights information is again available on the screen in security check area. The third physical touchpoint is the plastic tray, which customers need to put personal belongings into it and carry it to the security door area.

The experience of security door starts from customers carrying plastic tray with personal belongings to the track, once the tray is on the track; customers show the boarding pass to a staff and then go through the security door. There might be an extra process if customer triggers security door alert then customers need to have a body

check by the staff. Also if there is a problem with personal belongings, customers need to wait for the detailed check of their belongings. After go through all these, customers can collect their belongings and leave the security check area. As in check-in stage, the touchpoints of internal broadcast at the airport, direction guidance, and information desk included. In the whole boarding processes, security check is the most time consuming phase, which is also a compulsory process.

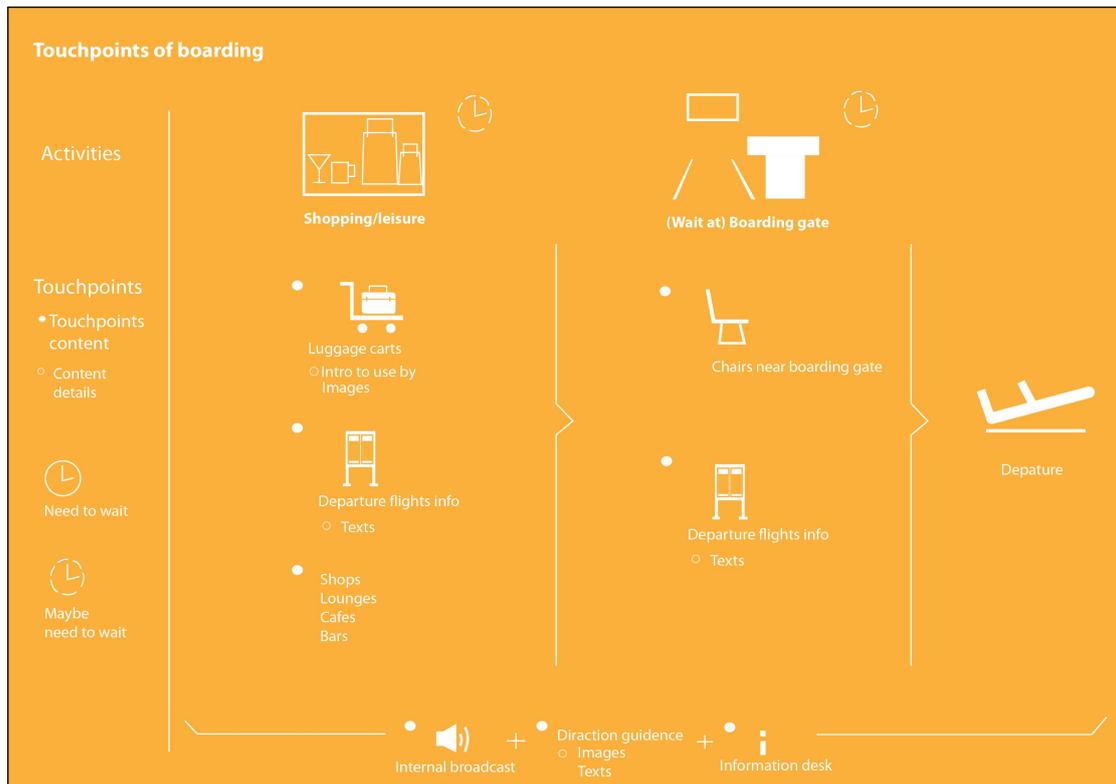


Figure 24: Touchpoints of boarding

After security check, customers enter to the boarding area where they can enjoy peaceful mind. In boarding area customers can have shopping, coffee/food or wait for the flight near the boarding gate. Customers will meet these main touchpoints: luggage carts, departure flights info, shopping / leisure area (shops, lounges, cafes and bars.), chairs near boarding gates, as well as internal broadcast at the airport, direction guidance and information desk. Usually in this phase customers have to wait for a set time before getting on board.

5.3.2 Customer journey map for arriving

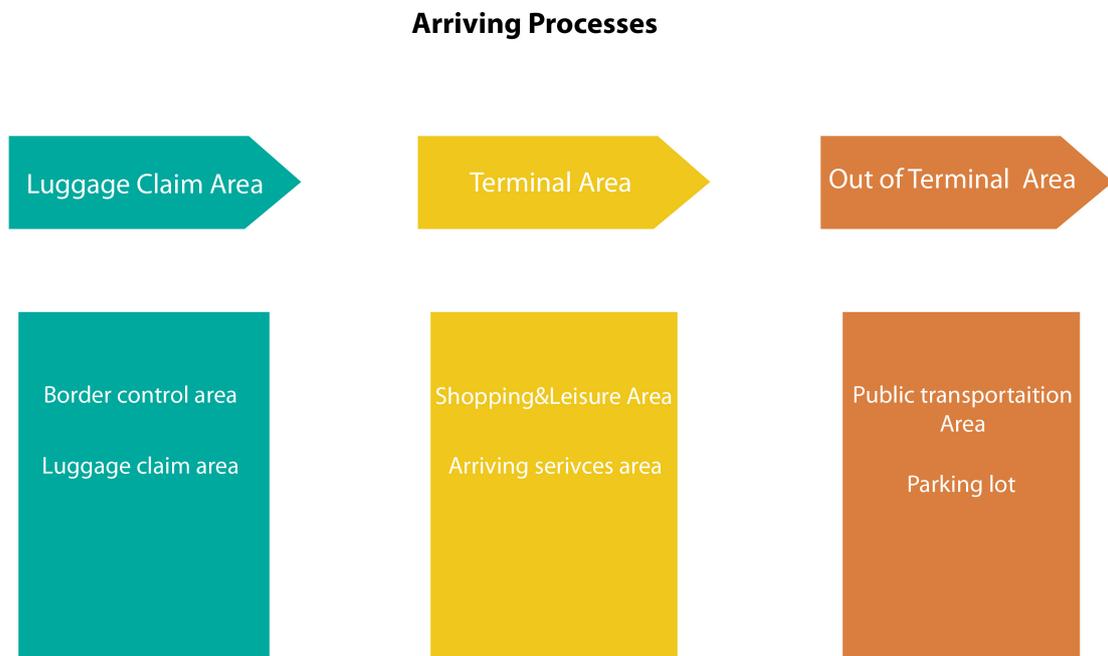


Figure 25: Arriving processing map

The processes of arriving can be divided into five major processes by location and space: Border control, transfer area, luggage claim area, terminal area and before-leaving-airport-area. Border control area in this case is the area that for customers of non-internal-European flights to claim identity. Transfer area in this case is not the main consideration since the transfer processes are repeat and similar as go through final boarding gate. Luggage claim area is the area that customers take check-in stuffs and report to customs. Terminal area means terminal hall. Before-leaving-airport-area is the area that outside the airport building where customers board on transportation.

Customer Journey map of arriving

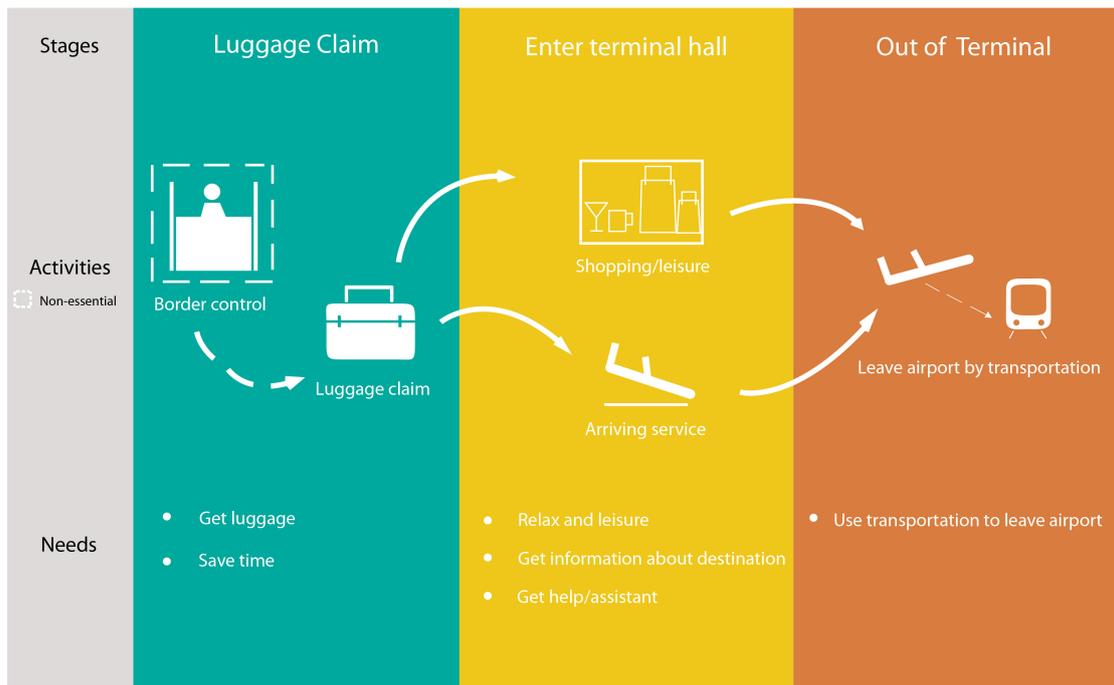


Figure 26: Customer journey map of arriving

The same as customer journey map of boarding, arriving process is divided into three stages based on the location: customers go for luggage claim, enter terminal hall, and go out of terminal then ready to leave the airport. Major activities are to pass Border control (not compulsory) to claim luggage; then go into terminal hall either having a relaxation or arriving services; later customers prepare to leave the airport by transportation.

The needs of customers towards luggage claim is to get luggage smoothly in order to save time; while the requirements in the terminal is to relax and have leisure, find out useful information about the destination as well as get some help and assistance from the airport staffs. When customers are ready to leave the airport, they need to find all kinds of transportation that can take them to their destinations. Mainly the information of transportation is their concerns.

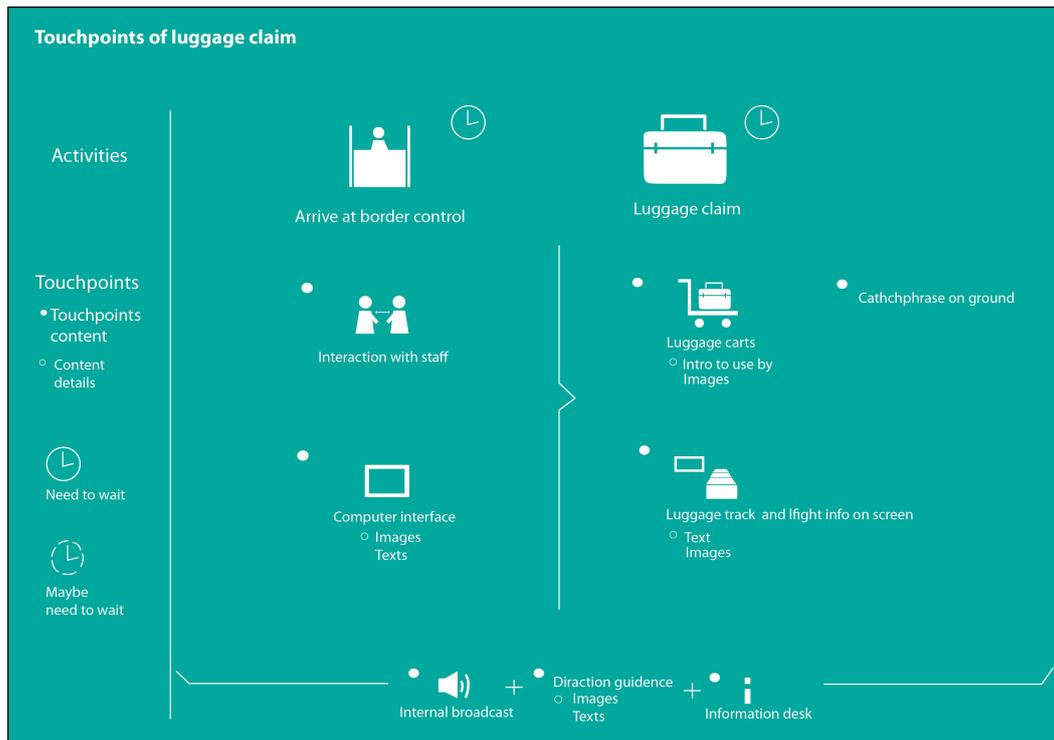


Figure 27: Touchpoints of luggage claim

At Helsinki Airport customers from out-European flights need to claim themselves at border control. There are two kinds of border control at Helsinki Airport: traditional ones, which require interaction with airport staffs; the second ones are digital machines provide the touchpoint of digital interface. The digital ones are mainly working for European passports. In the traditional border control, customers need to spend more time than on border control machines because of the queue.

After border control customers who have check-in luggage need to go to luggage claim. Customers will follow the signage system of direction guidance and get to the area waiting for luggage. In this area customers will get in touch with touchpoints as luggage carts, displaying screen of the flight number to show luggage location and catchphrases that on the ground to comfort customers while waiting for the luggage. At the same time, the three general touchpoints (Internal broadcast, direction guidance, and information desk.) are included. Whether customers will spend more time in luggage claim area depends on the efficiency of staffs.



Figure 28: Touchpoints of enter terminal hall

When customers get out of luggage claim area, they enter the terminal hall where they can be relaxed or search for extra services and information. The main touchpoints are similar to those in the boarding area. Additionally, customers might encounter touchpoints of airport services in terms of car renting service, travel information and pick up service. However, in this case these commercial touchpoints are not in the consideration. Meanwhile, touchpoints of internal broadcast, direction guidance and information desk are consisted.

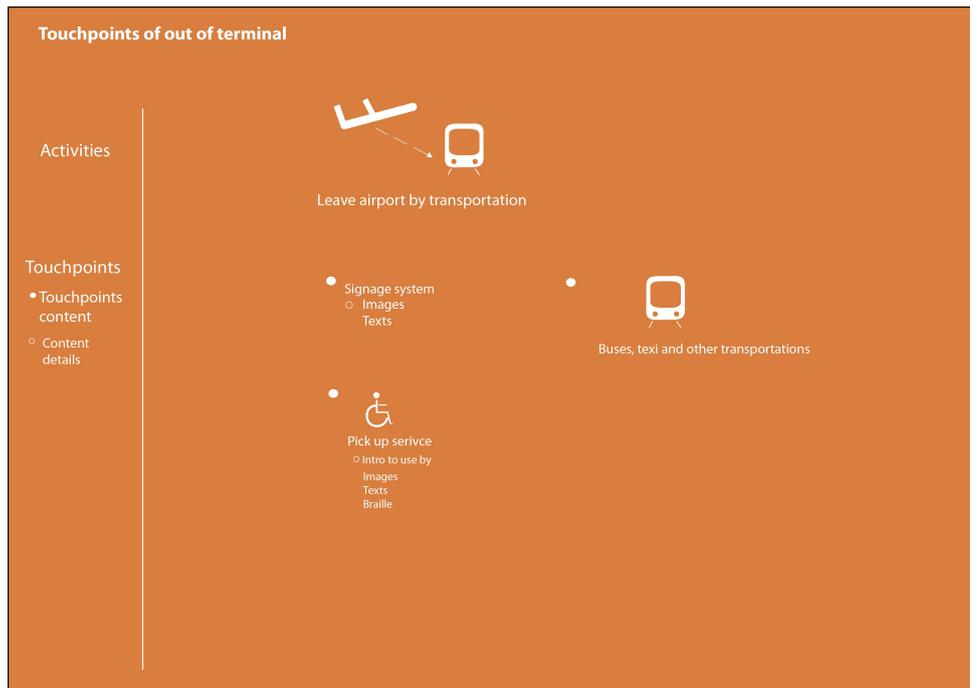


Figure 29: Touchpoints of out of terminal

The area outside airport is the place that customers take all kinds of transportation to leave the airport. In this phase, the main touchpoints are signage system of direction guidance and information about the transportation as well as transportation. When customers are out of the airport building, there are no touchpoints as internal broadcast and help desk. Customer journey map of arriving is simple compare to boarding journey map, and there are few main touchpoints involved.

5.3.3 Touchpoint analyze (category)

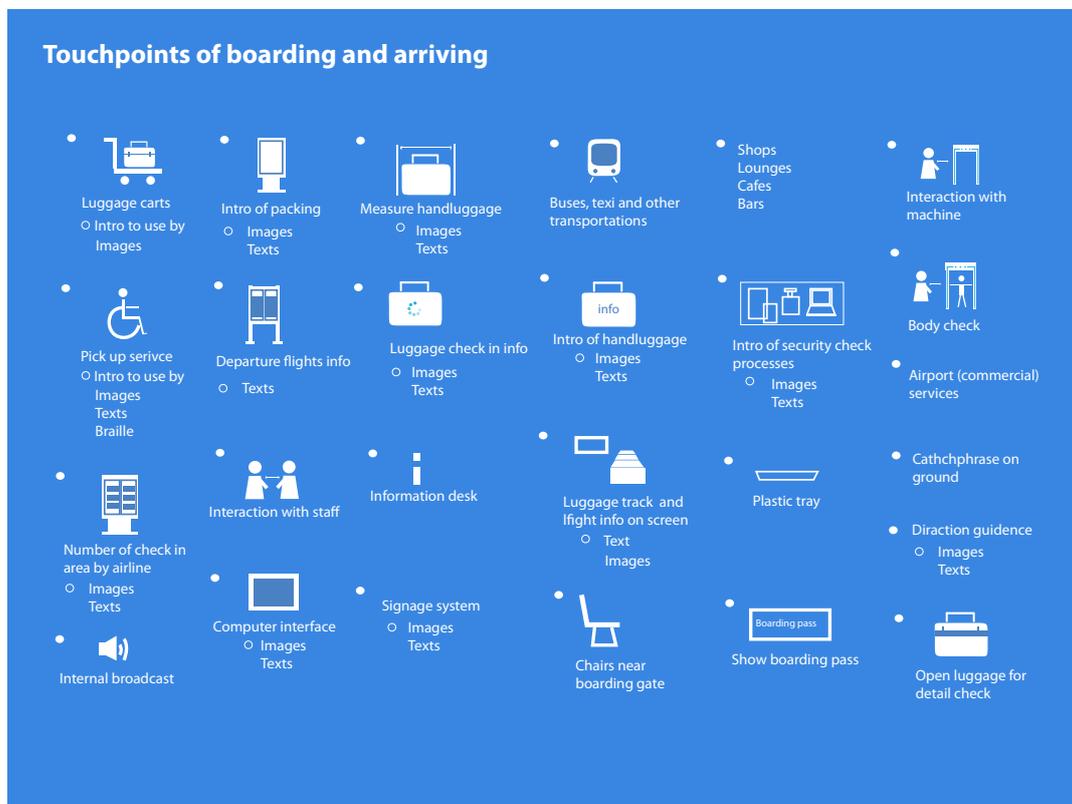


Figure 30: Touchpoints of boarding and arriving

In figure 29, there are all crucial touchpoints in boarding and arriving processes. These 26 touchpoints are primary touchpoints from the customer journey map. Customers use mostly visual and physical interaction to connect with these touchpoints. At the airport, these touchpoints are in varied space in terms of height, angle and location. Most of touchpoints, which belong to the signage system, are perceived by visual; also there are physical touchpoints as luggage cart and chairs that customers will have physical interaction with; some of the touchpoints require interaction between people and machine, for example, security check and information desk. Meanwhile, there are multi-touchpoints, which means they have multiple way of interaction.

Touchpoints are for exchanging information, however, in this case touchpoints in terms of chairs, and many other solid objects are also taken into consideration. Even the customers' interaction activities of solid objects involve less information

exchange; they still affect customers' experience of service. Since the study is focusing on customer experience, as a physical touchpoint and objects are concerned.

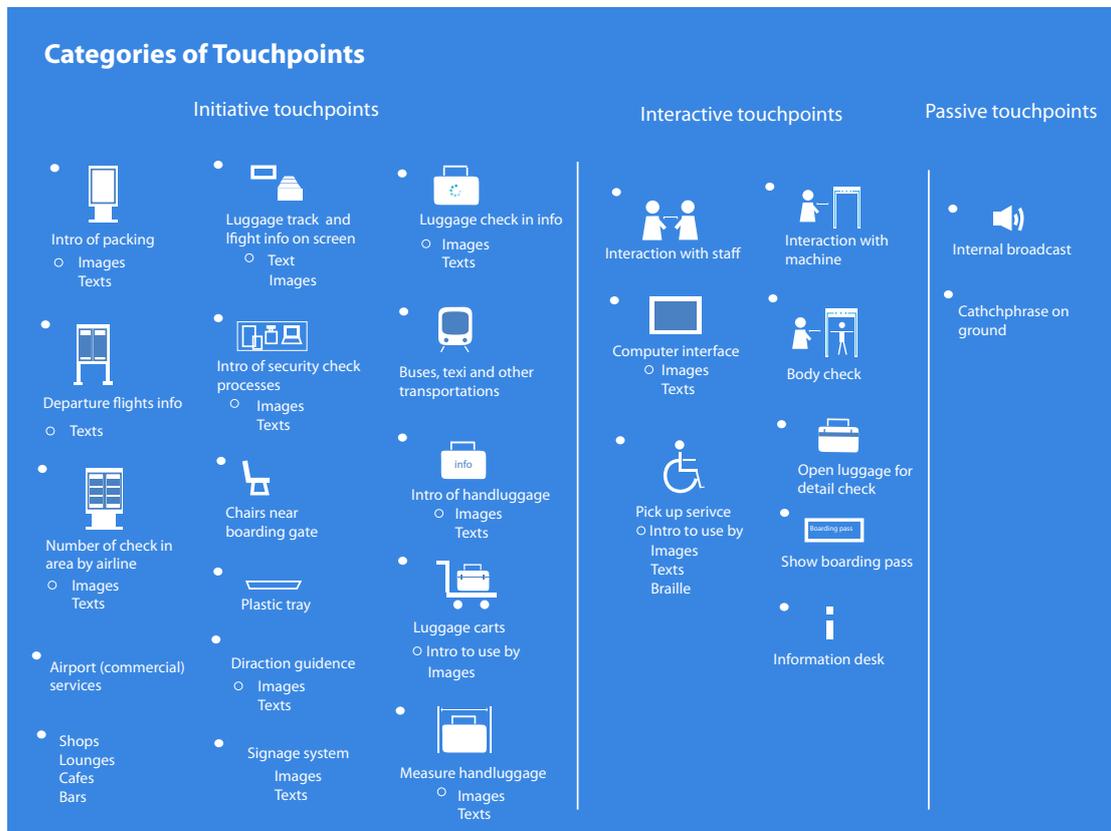


Figure 31: Categories of Touchpoints

Based on figure 30 and further study of touchpoints, these main touchpoints can be categorized in three types: initiative touchpoint, interactive touchpoint and passive touchpoint. The way of category is concentrating on customer experience and from their point of view.

The word “initiative” has a meaning of an act that carried out in order to achieve some goals or solve problems. Initiative touchpoints emphasize that customers are looking for these touchpoints on purpose depends on individual needs; these touchpoints need less interaction involved. In general situations, initiative touchpoints are one-way communication, which means either customer search for those touchpoints to get information or act to have a solution. Signage system, instructions, and screen displaying offer information directly to customers; while objects as luggage carts and plastic tray at security area are mainly for assisting the processes.

Interactive touchpoints are those demand major interaction. The interaction is two-way communication, which can happen between people and people-machine/object. Customers make input interact with these touchpoints, and then get a result or output from it. When customer use self-service machine as self-check-in machine, the interaction happens on the machine interface. Customers need to make choices and put information into the interface to get the check-in process done. At the security check area, customers not only have interaction with a staff, but also with security check machines. During the security check, customers need to show the boarding pass to a staff, further they might have the body check by a staff or detail check of the hand luggage. These processes are interaction happening between people, the same as in information desk. When customers go through security check door that is the interaction of people and machine while pick up for assistance service requires the interaction of people-to-people and people to machine. In addition, the interactive touchpoints are time-consuming compare to initiative touchpoints.

Passive touchpoints are those that customers do not pay attention to purpose, but at some point they will get information from them. As the internal broadcast at the airport, customers might listen to it if the content is related to them. As well as the catchphrases at luggage claim area, customers might take a glance at them unconsciously.

The categories of initiative touchpoint, interactive touchpoint and passive touchpoint are on the basis of customers' perspective of interaction with touchpoints. In these categories touchpoints are described as customers' subjectively experience by using the words of "initiative", "interactive" and "passive". In this way, touchpoints can be closely related to customers so that they can be better understood.

5.4 Customer experience survey

Customer experience survey is mainly focusing on the study question “What is the result of customers’ adaptability due to different touchpoint categories?” It is formed of 37 main questions and categorized into 10 types based on different locations and contents of touchpoints. The objective for the survey is to get data of customer experience about Helsinki Airport service in order to answer the research question.

5.4.1 Customer experience survey questionnaire

The design of customer experience survey questionnaire is under the frame consisted of re-designed customer experience metrics (Based on customer experience metrics by Manning & Bodine) and user satisfaction. (Chapter 2)

Customer experience survey were carried out at Helsinki Airport and online. At the beginning, paper version of the survey was carried out, but there were fewer people willing to fill out paper ones at the airport. Thus, instead of the paper version, online survey was carried out later. In general, there are 19 people participated in the online questionnaire and 6 people took part in the paper version questionnaire at the airport. Participants for the survey include junior less than 20 years old and people between 20- 50 years old of both genders. All the participants were picked randomly at the airport and online. As the airport is an international environment, the questionnaire is in English.

The figure displays ten individual survey questionnaires arranged in a grid. Each questionnaire is a page from a larger survey, featuring a title, a set of questions with multiple-choice options, and a satisfaction scale. The questionnaires cover various touchpoints at Helsinki Airport:

- Customer survey about touchpoint at Helsinki Airport:** Focuses on the overall touchpoint experience.
- About guidance signs at the airport:** Asks about the usefulness and clarity of guidance signs.
- Information about departure/arrival gates:** Inquires about the accuracy and helpfulness of gate information.
- Airport broadcast:** Checks the effectiveness of airport announcements.
- How you use "pick up for assistance" service:** Explores the use and satisfaction with the assistance service.
- Luggage claim:** Assesses the process and staff for baggage claims.
- Security check area:** Evaluates the security check experience.
- How you use the service of transfer counter:** Looks into the transfer counter service.
- Additional questions:** Provides space for other feedback.
- Check-in area experience:** Focuses on the check-in process.
- What is your impression of the experience of baggage check-in:** Assesses the baggage check-in process.
- What is your impression of the experience of luggage check-in:** Assesses the luggage check-in process.

Figure 32: Customer experience survey at Helsinki Airport

Figure 32 is the customer survey about touchpoint experience at Helsinki Airport. The survey is designed of 10 main parts:

1. About guidance signs at the airport.
2. Instruction of packing guidance.
3. Information about departure and arrival.
4. Airport internal broadcast.
5. The service for “pick up for assistance”
6. Check in area.
7. Security check area
8. Luggage claim area.
9. Additional.

10. Please give a mark by your satisfaction of service experience.

Each part above includes sub-questions for more detail information collecting. The 10 main parts and the sub-questions are organized and designed on the basis of touchpoints categories (Figure 31). Because touchpoints are existed in all space at the airport regarding to different locations and purposes, in order to get accurate data and help customer get involved in the survey gradually, the questionnaire is divided by location orders based on the service processes that customers experience at the airport. In this way, questions follow the storyline of service, which are easy for customers to recall their memory of the experience.

Some of the questions are focused on touchpoint content in terms of signage system (Direction guidance, instructions, flights information, internal broadcast and pick up for assistant service.). The section 1-5 of main parts are concerned about these above. According to location, questions about the experience of the check-in area, security check and luggage claim area (6-8 sections) are taken into consideration. Unlike the touchpoints of signage system, the touchpoints of the check-in area, security checks area and luggage claim area are more concentrated in a certain area rather than spread in many places and spaces at the airport.

Furthermore, in “Addition” section, there are three questions listed to have a comprehensive understanding of touchpoints from customers’ point of view. These questions are about the solution when customers confront of the problem during interaction with touchpoints, the information resources and understanding of touchpoints content. In the last part of questionnaire, questions about experience satisfaction are listed to get the overall satisfaction level of the service at Helsinki Airport. The satisfaction level is adopting five-point scale marked with 1-5 points.

However, some other parts of the survey are applied with three-point scale. The three-points scale is not accurate enough to describe survey content with the same standard marked with 1-3 points. Thus, each question of the survey is marked with addition hint, in terms of “easy” “should be easy” “very easy”. The extra message can bring actualize customers’ comprehensiveness

5.4.2 Questionnaire results

Overall the survey result shows that in general customers have a positive attitude towards the service at Helsinki Airport. As can be seen in Figure 33, which is the result of the survey.

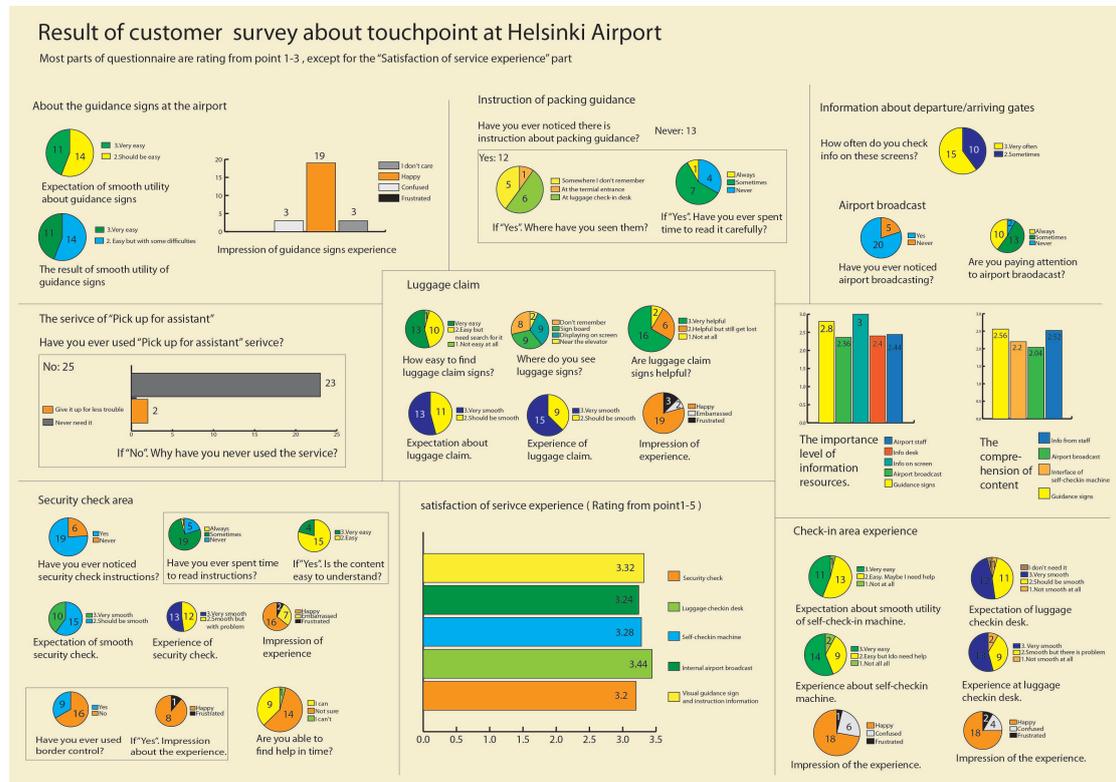


Figure 33: Result of customer survey about touchpoint at Helsinki airport

There are 10 parts in the survey. The part of “About the guidance signs at the airport” shows that most of the customers are consider direction signs are easy to follow, though 3/25 people still think sometimes it is confuse for them to understand the content. The questions related to packing guidance reveals that almost 52% of customers never noticed about packing guidance before, while only 66.7% of customers who paid attention to packing guidance read the instructions. All of the customers took part in the survey notice the information displayed on screens, and they all get information from those screens every now and then. However, approximately 20% of customers never paid any attention to internal broadcast at the airport.

No one participated in the survey has ever used the service of “pick up for assistant”, and 2 of them gave up the service because they consider the service might be complicated, and they want less trouble. Customer experience about the check-in area

is better, the result is based on compare their expectation and experience. However, there are still 4% of customers feel the experience is frustrate for them, and 24% of customers feel they confused sometimes. Some of them mentioned that the self-check-in machine is one of the barriers. Customers also stated about they confused about the purpose of the existence of both self-check-in machine and check-in desk; it would be easier if they only need one of them.

64% of the customers are happy with the experience of security check at Helsinki Airport, and 28% of them are embarrassed during security check and 8% are frustrated about it. Majority of customers noticed the instructions of security check area and almost all of them read them, most of them consider the instruction is easy to understand. However nearly 24% of customers did not pay attention to those instructions. One out of 25 customers claims that he does not have need for luggage claim service, the majority of other customers consider that luggage claim experience (include luggage claim area guidance) is smooth, and they are pleased with it even though some of them once had a small problem with it.

In addition, 56% of customers not sure whether they can find help in time at the airport, while 36% of them sure they can, and 4% of them cannot make it. From the customers' point of view, the most important information source is the information displayed on screens. The second important source is the guidance sighs, then followed by staff communication, information desk and internal airport broadcast. For customers, the content of guidance signs are the easiest to understand and then the information from staff is easier. However, the content of interface of self-check-in machine and internal broadcast are relatively not very easy for everyone to follow.

In brief, the experience of luggage check-in desk ranks the top of customer satisfaction of service experience; visual guidance sings and instruction information rank in the second; the third one is the experience at the self-check-in machine then followed by internal airport broadcast; the least satisfied experience happens in the security area.

According to touchpoint categories (Figure 31), the 8 parts of questionnaire can be categorized.

Touchpoint categories	8 Main parts of survey
Initiative touchpoint	<ul style="list-style-type: none"> • About guidance signs at the airport. • Instruction of packing guidance. • Information about departure and arrival.
Interactive touchpoint	<ul style="list-style-type: none"> • The service for “pick up for assistance” • Check in area. • Security check area • Luggage claim area.
Passive touchpoint	<ul style="list-style-type: none"> • Airport internal broadcast.

The result of the survey shows that customers consider that initiative touchpoints are the most important information source at airport; interactive touchpoints rank the second and passive touchpoints are the least important one among the categories. As customers experience that the content of initiative touchpoints are also the easiest ones to understand, then followed by interactive touchpoint and the last one is passive touchpoint. Therefore, the comprehension level of content is consistent with the result of how important customers consider these touchpoints.

However, the result of experience satisfaction level is slightly different from results above. From customers perspective the experience at the check-in desk, which belongs to interactive touchpoints, is the most satisfied one. Later comes initiative touchpoints of guidance signs as the second satisfied experience. Self-check-in machine as interactive touchpoints ranks the third followed by internal airport broadcast as the passive touchpoint. On the contrary, security check, which belongs to the interactive touchpoint category, is the least popular one among all experiences.

Despite the importance and comprehension factor, interactive touchpoints, especially the interactive of person-to person is more likely to generate customer satisfaction. In interactive touchpoints category, self-check-in machine as person-to-machine touchpoint, can bring convenience, but at the same time it can cause customers’

confusion due to technology reason. In addition, the confusion can trigger emotion change, which can affect customers' experience of service. Speaking of emotion, the reason that security check (it is also part of interactive touchpoints) has the lowest satisfaction level is because of it. Security check related to the most sensitive part of customers, which is personal privacy. It is comfortable to have stressful feeling before or during security check, let alone taking off shoes, clothes and belt in front of others. Sometimes customers even have to be touched by staff, these factors can cause mood swings, which can easily impact experience.

In general, customers get the most information directly from initiative touchpoints. Interactive touchpoints are at some point as a supplement of initiative touchpoint, in terms of interaction with staff. Compared to initiative touchpoints, which offer immediate information, interactive touchpoints need customers' efforts to accomplish information exchange processes. That is why from customers' experience, they are more satisfied with initiative touchpoints than interactive touchpoints overall. The passive touchpoints are mostly likely to be overlooked. Because customers are not looking for passive touchpoints spontaneously, even some customers are not sure whether they can get useful information from it or not. Depend on the feedback from the survey; customers do not consider passive touchpoints as important information source. For example internal airport broadcast, it is immaterial and depends on customers' sense of hearing, it is not like other material interact (visual and physical contact), customers can miss the information exchange channel easily.

5.5 Interviews with designers

Interviews with designers were carried out after customer experience survey. The aim of interviews is to hear from designers' point of view about touchpoint design. There are three interviews targeted to three different designers focusing on a different area. My interviewees are Mauricio Manhaes, Antti Lindström and Yiyun Zha.

Mauricio was my colleague when I had my internship at SDN (Service Design Network). He is an expert in service design area and is working as a researcher at Livework in Brazil. He has solid knowledge about service design theory and is very experienced in service design projects. Antti was working as a researcher at SINCO (Service Innovation Corner) at University of Lapland. He is focusing on technology

aspect and is a specialist in technology. Yiyun is a doctor candidate at University of Lapland. Her direction is about graphical communication. The reason that I interview them is that airport touchpoints consist of many elements, in terms of visual and graphical materials, technology touchpoints. Designer working on a different direction are helpful to have a thorough look at touchpoints design.

The interviews questions are almost the same; only some specific additional questions were asked based on designer's own expertise. The questions are:

- How to make the content of touchpoint more understandable for customers?
- What do you think is the key elements of customer adaptability towards touchpoint?
- What do you think about the relationship between customer awareness and touchpoints?
- Can you tell something about technology involved touchpoint design?
- In airport case, from your own experience, what should designer pay attention to when design the touchpoints consider customer experience and adaptability? (Visual guidance, check-in, security check and luggage, etc.)
- How designers keep updates with touchpoints in order to design more adaptable touchpoint?

5.5.1 Interview results

At some point design activity is a knowledge creating process. When customers interact with touchpoints, it is the moment of information data exchange, also called experience. Design creates new channels of information exchange as well as customer experience. To make touchpoints content understandable, designers should be able to predict customers' ability of understanding. Each service can be seen as a whole system, so it is designers job to translate the system into an inviting common language, which can be understand by customers. To gain the perspective of customers, the best way is to invite customers to participate in design and get them involved because eventually the service is for them. In addition, the co-creation processes can also be considered as a socialization process/activity. Thus, the content of touchpoint should be trust worthy, explicit and easy to communicate.

Co-creation gives designers opportunity to create common knowledge among customers and service providers. The common knowledge helps customers

understand service phenomenon. Then it is possible for customers to adapt service. Homogeneity facilities are easy to adapt while service is not always homogeneity considering of culture and other reasons. That is why it is very important for the designer to understand what information does the customer need and what to give back to customers. Designers can start touchpoints design based on the core information exchange aim. In other words start touchpoint design from information selection. It is crucial to pay attention to limit information, balance the relationship between complexity and simplicity. Designers should also take experienced user and in-experienced user into consideration at the same time. Designers should have a better understanding of needs so that touchpoints can be simple, functional and apparent to the eye. For example, the user interface does not necessary to be fancy, but the main point is understandable. Just as the revolution of flat design happened in UI area, it is back to the core focus of understandable rather than good-looking icons. Likewise if the touchpoints can be consistent, it can have a deep impression for customers and make service integrity, in this way touchpoints are easier to adapt. Moreover, it is significant important to identify the touchpoints that are nonadaptable then build re-connection and combination between them to fix the gap.

For better understanding and adaptability it requires customers awareness toward touchpoints. Designers should make touchpoints predictable so that customers can have a correct expectation of touchpoints. The predictability is depending on touchpoints, which are information related; thus, customer can expect to have information exchange from them. In this way, designers can raise customers' awareness through information. The elements, which can affect the awareness, are the attractiveness, timing, location, culture, etc. These touchpoints better be less disturb and stressful so customers can feel related to and have a sense of belongs.

There is no significant fundamental difference between person-to-person and person-to-technology interaction with the technology involved touchpoint design. Just the way of interaction is different as well as interface and system language. Nowadays technology help to speed up information exchange processes dramatically. However, it does not mean that low-tech touchpoints are no longer needed. In contrast, there is a trend that low tech touchpoints are recalled since it is less expensive and easy to afford. Especially for undeveloped area, low-tech touchpoints are more suitable and efficient. Besides, low-tech touchpoints can be the “luxury” in the future. Recently the

gasoline company Shell has brought fillers back at the gasoline station in Finland. This person-to person touchpoint, which has been replaced with the machine, can bring more benefit to customers in terms of the cold winter in Finland. At the same time, it can add more profits to the company since customers are willing to pay for more expensive and better service.

In airport case, designers should be always aware that customers are human beings with varied needs and individual characters. So human centered is the core value of friendly design work. Information should be logically imported so that customers are able to understand. Elements of design should be easy to use, easily to find, noticeable and friendly. Designers need to have a solution for customers just in case the information is wrong, or the information exchange channel is blocked. The solution can help customers find other way out. In this way, customers will not be insecure, stressful and powerless. Besides, the role of airport staff will be more in the backstage in the future, and technology involved touchpoint will become the main stream at the airport service. Designers need to explore different perspectives towards this trend.

Since service design/touchpoints design is a persistent activity, it is very important for designers to keep update with touchpoints. Design can never be finished, as there is always space for improvement. Touchpoints is changing with customers' needs and times, especially nowadays technology affects touchpoints development. One of the best ways to keep up with touchpoint is to get feedback from customers. Also, consistent research and observation could help as well as new technology and tools. At the same time, designers also need to pay attention to the way to document this information above concern that there might be personal privacy involved.

From the interview, all three designers agree that design still should be customer centered and friendly regardless the service types. Designers should think beyond time and customers' vision and design needs to be centered with information.

Chapter 6 Result and discussion

Previous chapter is a reveal of data collection from customer experience survey and interview including the result. In this chapter, the result of study will be sum up as a guideline for designing adaptable touchpoints.

6.1 Reflection to sub-research questions

There are three sub-question of the study:

- What kind of touchpoints is existed and how to categorize them?
- What is the result of customers' adaptability due to different touchpoint categories?
- How to improve touchpoints adaptability for customers?

There are mainly 26 kinds of touchpoint (non-commercial) at Helsinki airport (Figure 30), and there are three categories. (Figure 31) In this study touchpoint category is based on human subjective initiative. Initiative touchpoint is the touchpoint that customers interact without putting any efforts while interactive touchpoint needs customers' input to get the output. Passive touchpoint is the touchpoint that does not involve much of customers' interaction and intention.

In general, customers' adaptability towards three categories are very different. Based on the result of chapter 5, customers adapt easier to initiative touchpoint than interactive touchpoint and have the lowest adaptability of passive touchpoints. Because initiative touchpoints are interacted depend on customers' needs and they are mostly sensed by visual, customers understand the content of touchpoint well. The interaction result of initiative touchpoints is almost equal as customers' expectation while the outcome of interactive touchpoints is polarized. Customers are pleased with person-to-person interaction, and the adaptable level of is higher. If the interaction refers to technology and privacy, customers' adaptability is lower. Usually customers will also have negative emotion if the experience is not smooth as they expected. However, passive touchpoint has the lowest adaptability. Customers do not consider passive touchpoints as very important information resources. The awareness towards passive touchpoints is quite low. This is the main reason why passive touchpoint has the lowest adaptability.

There are not many differences of opinion from customers and designers about touchpoints. Only the standpoints are different. Customers think that the most important information resource is from initiative touchpoint because they can get information directly. However, if the touchpoint contains too many texts customers are hesitate to read. Then customers have mixed feeling about interactive touchpoint. Interactive touchpoints include personal interaction and person-to-machine and it is two-ways information exchange. Thus, interactive touchpoints are complex. Human emotional feeling is easily getting involved and has practical effects of service experience. Meanwhile, the passive touchpoint is considered the easiest one to be neglected. In terms of internal airport broadcast, although the content of information is very important (It is related to boarding information.) customers still prefer material touchpoint rather than it.

From designers perspective, that initiative touchpoint is important as it always be. The main focus should be paid to the information of touchpoint content as well as the logic of information flow that customers can follow. Interactive touchpoint will become more important in the future as technology development. Although from the survey most customers consider that they can understand better from staff rather than interaction between machines, the trend of more technology involved in touchpoint design at the airport will not be changed.

6.2 Reflect to main research questions

The main research question of study is “how to design adaptable touchpoint?” Alessandra gave supplement explanation of adaptability based on the concept of Dr. Michael O’Connor. (Table 3) Flexibility is a person’s attitude about whether willing to adapt while versatility emphasizes on the ability of adapt. Thus, versatility is more fit to be adopt for customers’ perspective. There are five elements of versatility: Resilience, vision, attentiveness, competence and self-correction. Resilience means if a person knows how to conquer difficulties and barriers, and it also relevant to emotion changes. Vision is the capability that a person has to be creative and with a vivid imagination about certain things. Attentiveness is referring a person’s awareness of the surrounding. Competence means a person has a positive attitude and can generate knowledge for solving a problem. Self- correction means a person can adjust himself/herself with a better solution or attitude in order to overcome difficult,

or problem (Alessandra, 2008) Versatility is the content of adaptability while customer journey map framework is the framework to design touchpoints. The result of study as followed:

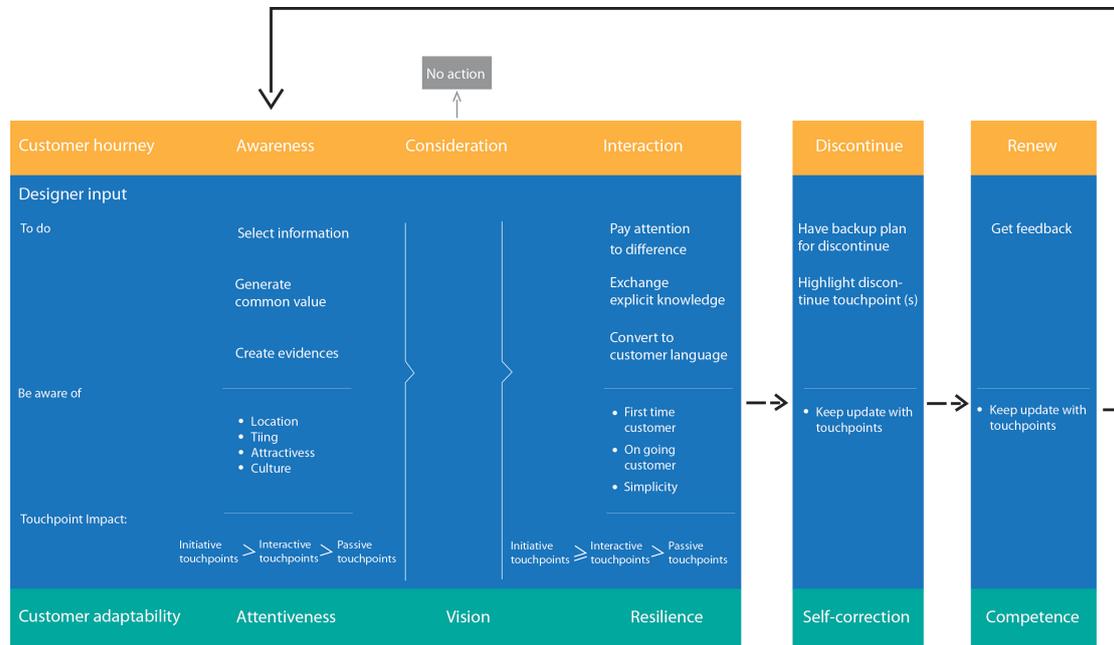


Figure 34: Guideline of designing adaptable touchpoints

The guideline for designing adaptable touchpoints is combined with three main parts: customer journey, designer input and customer adaptability. The guideline is built on customer journey framework. (Figure 3) However, in Figure 34, the same processes is kept but with a few elements changed.

Figure 3	Awareness	Consideration	Purchase	First use	Ongoing use	Discontinue	Recycle/Renew
Figure 34	Awareness	Consideration	Interaction (First use, ongoing use)	Discontinue	Renew		

When Newbery and Farnham generate the customer journey framework, their perspective is focusing on experience-based business, whereas this study is design oriented (touchpoints) and less business concentration involved. Thus, “purchase” is replaced with interaction, because customers built contact with touchpoint through interaction. Also, the elements of “first use” and “ongoing use” are categorized into

“Interaction”. Since the guideline is for service design purpose, “renew” is chosen to replace “recycle”, which is more fit for describing service life circle.

The second part is designer input. The section is to explain from the designer’s point of view, how to do to design adaptable touchpoints: what to do and be aware of certain things. The third part is the customer’s adaptability according to customer journey processes and designer input.

Awareness has two means: the awareness of service and awareness of personal needs for service. (Newbery and Farnham, 2013) Awareness is a trigger for customers to purchase service; it occurs before customers interact with the service and is enhanced during interaction with touchpoints. To raise awareness of customers toward service, designer needs to start design with information selection. Customer experience is a consequence of touchpoint interaction, and experience is a set of information customers sensed, felt with emotional responds. Experience design cannot be carried out without the amount of the right information. (Newbery and Farnham, 2013) In the case study, Termovisio (Chapter 4) customer awareness also brought by creating shared value between customers and service provider. Not like material touchpoints, the common value can be shared with the service provider and customers through service and brand is immaterial. Service design is customer-centered, and it emphasizes co-design. (Kuure and Lindström, 2012) Shared value is the core content of co-operation; it might stimulate the new wave of innovation. (Porter and Kramer, 2011) Shared value is stand for customers’ value, which is beyond the average understanding of performance, price and convenience. It reflects to social awareness that able to bring social or educational value. (Zumio) Shared value means to create a connection that between customer and service so that customers can understand the service content and feel related to it. The value here is referring to immaterial ones (mental or psychological) rather than material ones. Meanwhile, designer needs to make information and value as evidences. Evidences can be tangible and intangible, as long as they can be perceived by human senses.

Besides, designer needs to be aware of particular elements: location, timing and attractiveness of touchpoints, social differences and the impact of touchpoint adaptability by categories. From case study Termovisio (Chapter 4) and the result of interviews for designers, we know that awareness is affected by the location, timing

and attractiveness of touchpoint. From touchpoint study at the airport, we are informed that initiative touchpoints are the main information resources compare to other two types of touchpoints. Initiative touchpoints are mainly accessed through sight. As agreed that sight is the primary way for people to perceive the surrounding, however, people also use hands, voice and the other way to receive the world. (Newbery and Farnham, 2013) Thus, despite considering the importance of location, timing and attractiveness of touchpoints, designer has to pay attention to the content of initiative touchpoint. In addition, social difference is again reflecting to shared value. So customers will gain better attentiveness and be more aware of touchpoints.

When customers have enough awareness of service and needs, they pause and start to consider whether they will participate in or do nothing about it. If they decide to continue the process, they will have interaction with service. Pinheiro mentioned about explicit knowledge exchange in his article about the new experience in hair salon. In his article, he said design or co-creation can be considered as processes of explicit knowledge exchange. (2013) Designers have a better understanding about customer through explicit knowledge exchange, to get to know what customer already know about a certain thing. So that designer would know at least how customer predict or expect the interaction and interaction content. Then the most important thing is to convert the knowledge to a “language” that customer speaks and understand. It means that the interaction content can be fully understood by customers, and they know how to react on it. The language should follow customers’ logic of experience. Designer needs to make the service as customer experience so that customers have no difficulties to follow the processes of service.

Again, in this phase designer needs to beware of whether the customer is the first time customer or ongoing customer because that makes differences. First time customer has less experience, and less understanding of interaction content compare to ongoing customer. They would need guidance to help them through certain processes and get to know touchpoints and processes better. Also, designer should reinforce ongoing customers’ impression about touchpoints. Additionally, it is very important to balance the complicity and simplicity of the content. Meantime, designer should again pay attention to social differences. When consider the impact of touchpoint adaptability by categories, during interaction phase, interactive touchpoints are almost as much as necessary as initiative ones, still more important than passive touchpoints. Designer

needs to avoid polarized situation when designing interaction touchpoints at this moment.

After interaction, customers either continue to a new service circle or there is the problem to make them discontinued. When problem occurs, there should be the back-up plan for this situation, and it is very crucial that designer keep a record of why customers stop and mark the essential touchpoints. For both conditions, it is necessary to get feedback from customers and keep updated with touchpoints. Hence, customers are able to self-correct and competence the service.

6.3 Discussion

The result of study is a basic guideline for designers to design adaptable touchpoints. It is based on two case studies (Termovisio and Helsinki Airport), customer journey framework (Newbery and Farnham, 2013) and the content of adaptability (Alessandra, 2008)

Validity refers to how well the study fulfills the concept of what research what to study has been measured. (Colorado State University Writing Center, 1993) In order to keep validity of thesis, data collected in material. Photos, videos, notes and paper/online survey are carried out. Notes are re-organized right after interviews and applied as data. Besides, I have been talk about the thesis with classmates and opponent to see whether I have presented it correctly.

Reliability, which means if the study is carried out twice the result, would be similar. (Colorado State University Writing Center, 1993). Due the lack of time I am not able to do the study twice to see its result. However, since the data is gathered in a scientific way and professors prove the research plan of how to collect data and how to analyze data. I would assume that if the study were conducted twice, the similar result would be generated again.

The advanced part of the result is that it shows the relationship of the customer journey, touchpoints and customer adaptability for the first time. Because very few researches about touchpoints have been conducted let along touchpoint adaptability, it is very difficult to find suitable references. The finding is hard to find previous result to have a comparison. Since the study result is a basic guideline, there are possibilities

to add more content. Due to the lack of time, proper methodologies cannot be analyzed and applied in the “designer input” section.

Chapter 7 Conclusion

7.1 Conclusion

The study of touchpoint adaptability at Helsinki Airport researched the possibilities for designing better touchpoints so that customers can easily adapt. The guideline (Figure 34) offers guidelines to design adaptable touchpoints. The guideline can be applied as a basic framework at the beginning of the design process to the post-design phase.

The challenge of study is that there is limited previous researches have been done in touchpoint adaptability area. Because adaptability is abstract, it takes more time and efforts to get data. Also, when the surveys for customers are carried out, it is important to encourage customers to be active to do the survey. When it comes to the result of study, it is a challenge to minimize large data into small ones in a visualized way.

7.2 Further explorations

Based on the result of study, further study could be focused on the content of designer input part. In terms of methodology that related to "what designer should do" and "beware of" can be put in content. In addition, some tools of designing adaptable touchpoint can be innovated as well as tools for measuring adaptability in service design area.

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Appendices

Appendix 1: Questionnaire for Customer survey about touchpoint at Helsinki Airport

10/6/13 Customer survey about touchpoint at Helsinki Airport - Google Drive

Customer survey about touchpoint at Helsinki Airport

A survey for customers about Touchpoint experience at Helsinki Airport.
All the answers are single choice, unless it is marked with "Multi choice".

* Required

About guidance signs at the airport

Guidance signs include direction guidance, location guidance and maps, etc.

1. **How is your expectation of smooth utility about these guidance signs? ***
Your expectation of easily getting information from guidance signs.
Check all that apply.

1 (Not easy at all)
 2 (Should be easy)
 3 (Very easy)

2. **From your experience what is the result of smooth utility of guidance signs? ***
The experience about getting information from these guidance signs.
Check all that apply.

1 (Not easy at all)
 2 (Easy, but with some difficulties)
 3 (Very easy)

3. **What is your impression of guidance signs experience? ***
Describe the impression in general about the guidance signs at Helsinki Airport.
Check all that apply.

Frustrate about the signs
 Confused about the signs
 Happy with the signs
 I don't care

Instruction of packing guidance

Instructions at airport about guidance for packing.

<https://docs.google.com/forms/d/1cYwAqWgKwWfBpYtLkRhyvNjTt2ZyQKk3hE1cd> 1/10

10/6/13 Customer survey about touchpoint at Helsinki Airport - Google Drive

4. **Have you ever noticed there is instruction about packing guidance? ***
At the airport there are specific guidance for packing.
Check all that apply.

Never
 Yes

5. **If "Yes". Where have you seen them?**
The area/location where you see the instructions.
Check all that apply.

At the terminal entrance
 At luggage check-in desk
 Somewhere I don't remember

6. **If "Yes". Have you ever spent time to read it carefully?**
Do you read the instruction about packing?
Check all that apply.

Never
 Sometimes
 Always

Information about departure/arriving gates

The information about departure and arriving gates displayed on screen.

7. **How often do you check these screens? ***
Frequency of checking departure/arriving gate on screen.
Check all that apply.

1 (Not at all)
 2 (Sometimes)
 3 (Very often)

Airport broadcast

8. **Have you ever noticed airport broadcasting? ***
Internal broadcast at the airport, including ask for final boarding, changing gate issues.
Check all that apply.

Never
 Yes

<https://docs.google.com/forms/d/1cYwAqWgKwWfBpYtLkRhyvNjTt2ZyQKk3hE1cd> 2/10

10/6/13 Customer survey about touchpoint at Helsinki Airport - Google Drive

9. **Are you paying attention to airport broadcast? ***
Check all that apply.

Never
 Sometimes
 Always

The service of "Pick up for assistant" ?

"Pick up for assistant" is the service offered for people who need special care or help. In terms of wheel chair.

10. **Have you ever used "Pick up for assistant" service? ***
Check all that apply.

Yes
 No

11. **If "Yes". How is your expectation of smooth utility of this service? ***
How easy have you expected to use the service?
Check all that apply.

1 (Not easy at all)
 2 (Should be easy)
 3 (Very easy)

12. **If "Yes". What is the result of experience of this service? ***
Is this service as helpful as your expectation?
Check all that apply.

1 (Not at all)
 2 (A little)
 3 (Helpful)

13. **If "No". Why have you ever used the service? ***
The reason that you never use the "Pick up for assistant" service.
Check all that apply.

Never need it
 Give it up for less trouble

Check-in area experience

The service in check-in area includes self-check-in and the luggage check-in.

<https://docs.google.com/forms/d/1cYwAqWgKwWfBpYtLkRhyvNjTt2ZyQKk3hE1cd> 3/10

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14. **What is your expectation about smooth utility of self-checkin machine? ***
Is the self-checkin machine easy to use in your expectation?
Check all that apply.

1 (Not at all)
 2 (Easy, maybe I need help)
 3 (Very easy)

15. **What is your experience about self-checkin machine? ***
After you use the machine what do you think of it?
Check all that apply.

1 (Not easy at all)
 2 (Easy, but I do need help)
 3 (Very easy)

16. **What is your impression of this experience? ***
In general how do you feel about the usage of machine?
Check all that apply.

Frustrate about it
 Confused about it
 Happy with it

17. **Additional opinions**
Drop any recommendations if you are not happy with self-checkin machine.

18. **What is your expectation of the experience of luggage checkin desk? ***
The experience includes the communication with staff and the process of luggage checkin.
Check all that apply.

1 (Not smooth at all)
 2 (Should be smooth even there is small problem)
 3 (Very smooth)
 I don't need it

<https://docs.google.com/forms/d/1cYwAqWgKwWfBpYtLkRhyvNjTt2ZyQKk3hE1cd> 4/10

19. What is the experience at luggage checkin desk? *

Check all that apply.

- 1 (Not smooth at all)
- 2 (Smooth but there is small problem)
- 3 (Very smooth)

20. What is your impression of this experience? *

In general how do you feel when you at the luggage checkin desk?

Check all that apply.

- Frustrate about it
- Confused about it
- Happy with it

21. Additional opinions

Please drop any recommendations if you are not happy with luggage checkin desk.

Security check area

Experience at security check area

22. Have you ever noticed there are instructions at security check? *

Instructions include security check processes and instruction.

Check all that apply.

- Never
- Yes

23. Have you ever spent time reading these instructions? *

Check all that apply.

- Never
- Sometimes
- Always

24. If "Yes", Are the instructions at security area easily understood? *

There are many instruction signs in security area, can you understand them easily?

Check all that apply.

- 1 (Not easy)
- 2 (Easy)
- 3 (Very easy)

25. What is your expectation about going through security check smoothly? *

Your expectation of security check related to time, privacy and communication with staff.

Check all that apply.

- 1 (Not smooth at all)
- 2 (Should be smooth even there is small problem)
- 3 (Very smooth)

26. What is the experience of going through security check? *

Check all that apply.

- 1 (Not smooth at all)
- 2 (Smooth but there is small problem)
- 3 (Very smooth)

27. What is your impression of this experience? *

In general how do you feel when you are at the security check?

Check all that apply.

- Frustrate about it
- Embarrassed about it
- Happy with it

28. Additional opinions

Please drop any recommendations if you are not happy with it.

29. Have you ever use the service of boarder control? *

Boarder control in this case is for customers of non-european flights to Helsinki.

Check all that apply.

- No
- Yes

30. If "Yes", What is your impression about the experience? *

Check all that apply.

- Frustrate about it
- Happy about it

31. Additional opinions

Please drop any recommendations if you are not happy with it.

Luggage claim

The area where customers get back checkin luggages.

32. How easy is it to find the luggage claim sign when you get out of the gate? *

Can you see the sign of luggage claim sign easily?

Check all that apply.

- 1 (Not easy at all)
- 2 (Easy, but I need search for it)
- 3 (Very easy)

33. Where do you see luggage claim signs? (Multi choices) *

Check all that apply.

- Near the elevators
- Displaying on the screens
- In the sign board above my head
- I don't remember

34. Are those luggage claim signs helpful to guide you? *

Have you followed the signs to find your luggages successfully?

Check all that apply.

- 1 (Not at all)
- 2 (Helpful, but I got lost a bit during the way)
- 3 (Very helpful)

35. What is your expectation about the experience of luggage claim? *

The experience of luggage claim include time, privacy and communication with staff.

Check all that apply.

- 1 (Not smooth at all)
- 2 (Should be smooth even there is small problem)
- 3 (Very smooth)

36. What is the experience of luggage claim? *

Check all that apply.

- 1 (Not smooth at all)
- 2 (Smooth but there is small problem)
- 3 (Very smooth)

37. What is your impression of this experience? *

In general how do you feel when you are at luggage checkin desk?

Check all that apply.

- Frustrate about it
- Embarrassed about it
- Happy with it

38. Additional opinions

Please drop any recommendations if you are not happy with it.

Additional

39. Can you find help timely if there is any problem happened when you are using airport services? *

Check all that apply.

- I can't
- Not sure
- I can

40. **What is the most important information resources for you at the airport? ***
 Please give a mark according to their importance.
 Mark only one oval per row.

	1 (not important)	2 (sometime important)	3 (Always important)
Guidance signs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Airport broadcast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information display screens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information desk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ask from airport staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41. **The comprehension of following contents ***
 Is it easy for you to understand the content?
 Mark only one oval per row.

	1 (Not easy at all)	2 (easy)	3 (Very easy)
Guidance signs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interface of self-checkin machine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Airport broadcast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information from the staff (luggage checkin desk/security check)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please give a mark by your satisfaction of service experience.

42. *
 Mark only one oval per row.

	1 (Not satisfied at all)	2 (Partially satisfied)	3 (Satisfied)	4 (Very satisfied)	5 (Perfect)
Visual guidance signs and instruction information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internal airport broadcast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-checkin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Luggage checkin desk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Security check	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

