



TAMPEREEN TEKNILLINEN YLIOPISTO
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INCREASING COMMERCIAL SERVICE DEMAND BY OFFERING
TECHNOLOGY SUPPORT FOR CUSTOMERS

Master of Science Thesis

Prof. Miia Martinsuo has been appointed as the examiner the Council Meeting of the Faculty of Engineering Sciences on 4 March, 2015.

ABSTRACT

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As the price competition in the aviation market between airlines and airport operators has increased, airport operators have focused their actions on the non-aviation side to attract profits. The commercial services of the airports provide opportunities for airport operators to increase their profitability. This research focuses on the non-aviation part of the airport business activity. Transfer passengers are chosen to be the target group due to their potential quantitative growth in the future.

The literature review of this thesis represents the main occurrence of service demand, previous ways to increase the service demand and, further alternative ways to increase service demand. The service demand literature review also clarifies different ways to increase service demand at the airport environment. An airport creates a unique retail environment having a multicultural environment with its passengers who have different preferences and consumer habits. In the empirical section, a field test is performed in an actual operational environment. A portable mobile phone pilot examines a flight passenger's alternative way to increase personal time and movement within the terminal by liberating them from the power socket.

According to the research results, increased personal time, a versatile mixture of services, good perceived value and low stress levels at the airport have an influence on increased spending. Additionally, passenger characteristics and flight destinations have an effect on service demand and revenue. If the airport can be seen as a shopping destination, the share of pre-planned purchases increases.

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Lentoyhtiöiden ja lentokenttäoperaattoreiden hintakilpailun kasvun myötä lentokenttäoperaattorit ovat keskittäneet merkittävästi toimintaansa kaupalliseen liiketoimintaan. Lentokenttien kaupalliset palvelut mahdollistavat lentokenttäoperaattoreiden parantaa heidän taloudellista kannattavuuttaan. Tutkimus keskittyy lentokentän kaupalliseen liiketoimintaan. Vaihtomatrustajat ovat valittu kohderyhmäksi heidän tulevaisuuden kasvupotentiaalin vuoksi.

Kirjallisuuskatsaus tuo esille palvelukysynnän ilmiötä, aiempia keinoja kasvattaa palvelukysyntää ja lisäksi vaihtoehtoisia tapoja kasvattaa palvelukysyntää. Palvelukysynnän kirjallisuuskatsaus myös selventää tapoja, joilla kasvattaa palvelukysyntää lentokenttäympäristössä. Lentokenttä monikulttuurisena ympäristönä, useine mieltymyksineen ja erilaisine kuluttajakäyttäytymisineen luovat ainutlaatuiset olosuhteet vähittäismyyntiin. Työn toinen osuus, käytännön kenttäkoe suoritetaan oikeassa toimintaympäristössä. Kannettavien kännykkälatureiden palvelupilotointi tutkii matrustajien tapoja kasvattaa omaa aikaa ja liikkumista terminaalissa. Matrustajalla ei mene aikaa vapaan pistorasian etsimiseen, eikä eletronisen laitteen lataus ole paikkaan sidottu.

Tutkimustulosten perusteella lisääntynyt vapaa-aika, monipuolinen palvelutarjonta, korkea asiakastytyväisyys, palveluiden hyvä löydettävyys ja matalat stressitasot ovat yhdistetty korkeampaan kulutukseen. Lisäksi matrustajaprofiileilla ja matrustakohteilla on todettu olevan vaikutusta palvelukysyntään ja tuottoihin. Pitkän matrustan lentomatrustaja käyttävät keskimäärin enemmän lentokentän palveluita. Ennalta suunniteltujen ostosten osuus kasvaa, jos lentokenttä pystytään näkemään ostosten teko paikkana.

PREFACE

This study has been carried out for the Finnish airport operator, Finavia, and for the department of the commercial services of Helsinki Airport.

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ABBREVIATIONS

Aeronautical Revenue	Revenue of services directly related to the processing of aircraft and their passengers and cargo in connection with facilitating travel
Airside	Security-checked area of an airport
B2C	Business-to-consumer
C2C	Customer-to-customer
Dwell time	Free time at an airport or at the shopping mall
F&B	Food and Beverage
FSA	Full Service Airline
KPI	Key Performance Indicator
Landside	Non-security-checked area of an airport
LCC	Low Cost Carrier
Non-Aviation Revenue	Revenue accumulated from ancillary commercial services, facilities and amenities at an airport
Non-Schengen area	Area that requires external border controls while entering and leaving the district
PR	Public Relations
Process time	Time required to perform check-in, security check and passport control
Schengen area	Area that allow free movement between 26 European countries that have signed the Schengen agreement

1 INTRODUCTION

In the first chapter, a case company is introduced, a background of the study, a purpose and scope of the study is expressed. The main goal of the research is presented in Subchapter 1.3 and the object is defined by three research question. Moreover, the structure of the study is stated.

1.1 Introduction of the case company

This research is conducted as a commission for the Finnish airport operator, Finavia, and more precisely, for the department of commercial services. Finavia operates its 24 airports and an air navigation system. Commercial services, passenger services and customer experience are the focus areas of the commercial services department. Helsinki Airport stands for the main airport of Finavia with its almost 16 million passengers in the year of 2014. The number of flight passengers has been growing and the company has accumulated 19.7 million passengers in total. The growth of 3.6 percent has been registered in the year of 2014 when comparing with the statistics of the year of 2013 (Finavia 2014). Finavia's customers consist of airport service operators, airline operators and flight passengers.

1.2 The background of the study

A primary task for an airport operator used to be providing infrastructure and other facilities for airlines (Zenglein & Müller 2007). The aviation market has been under a transformation during the past decades. Airlines are constantly competing to establish new routes rather than contest with existing ones. A market growth of more routes between the years 2002 and 2011 has increased 54 percent and 41 percent more capacity was offered during the same time period (Bush & Storey 2013, p. 20-21). Primarily, airlines are interested in ensuring that the processes and systems of an airport meet their requirements for fast plane turnaround times which may mean lower cost infrastructure. Assets of an airport operator are geographically fixed and generally create value only in airport use. Airlines have different situation in which it is typical to lease or sell assets. In order to satisfy the owner or investors and creditors, airport operators require consistent and reasonable returns to remain sustainable and to ensure capabilities to maintain business expansion.(Bush & Storey 2013, p. 23; Zenglein & Müller 2007)

At the present model, airport operators have broadened their business actions and create experiences. The price competition between the airlines and the airport operators has

increased challenging the airport operators to improve profits from the aviation segment. Therefore, to reduce economic risks, the airport operators want to expand their non-aeronautical activities in order to have a better resistance to absorb economic shocks comparing reliance purely on an aeronautical sector. New store concepts and service techniques must be developed in order to attract passenger demand in the global environment where individuals have a wide range of retail choices online.

The non-aviation section mainly consists of retail stores, food and beverages (F&B), money exchange, parking and car rental services. The largest airports benefit from the economics of scale in terms of a variety of special retailing. The large international airport operators may offer services from cinemas, museums, art galleries, mini golf to wellness centers, saunas, banks, health clinics, chapels and praying areas. An every third transfer passenger is told to choose their connecting flight based on their transit airport (Finavia 2015). Thus the role of the non-aviation business is significant for the airport operators not only a financially but also on behalf of the overall image.

The airport operators take commercial revenue into account when planning charges for the airlines. Both parties, a passenger and an airline, can benefit from the value added revenue generated from the commercial services. Lower operational charges for the airlines can be provided by the airport operator if the net profit from the non-aviation section reaches high levels. Additionally, cheaper flight tickets can be offered and a better airport experience for passengers can be produced (Bush & Storey 2013, p.19). Further, lower airline ticket prices can draw more consumers to use the airports' commercial services.

The average share of the non-aeronautical revenue at European airports was 46 percent between the years of 2008 and 2011 (Bush & Storey 2013, p.13), whereas Volkova & Müller (2012) indicates the share of the non-aviation revenue being 57 percent at U.K airports. When examine more accurately, the retail revenue of European airports forms 15 percent of the total non-aeronautical and aeronautical revenue. Between the time period of four years from 2008 till 2011, the increment was EUR 1 billion from EUR 3.1 billion to EUR 4.1 billion. In comparison, the equivalent share of the retail revenue accounted for 9 percent (Bush & Storey 2013, p. 11). Another example of the power of an airport non-aviation service cluster is that large airport retail sales per meter can be up to six times higher than shopping malls and downtown stores (Kasarda 2008). This is partly explained by the high passenger flows through the hub terminals.

An airport operator usually outsources its commercial services to special retails and service providers. The airport operator's role of selecting and negotiating the suitable service operators and to the right location within the airport evidently has a significant factor for the service demand and commercial success of the airport. Nevertheless, the efficiency and the ease of compulsory procedures such as security check and passport control also have affect the use of the commercial services. If passengers' process time

takes all of their free time at the airport, they will not have the required time for consume. Further, the airport operator's commercial revenue related responsibility continues to provide the terminal facilities which either heartens to spend and use services or on the contrary, to discourage passengers to consume.(Bush & Storey 2013, p.17)

Kasarda (2008) and Zenglein & Müller (2007) describe a future airport to remind of an airport city and to which Kasarda (2008) uses a term aetropolis. The concept of aetropolis originates from the increased links between the airport operators and cluster of shopping centers, business parks, information and communications technology complexes, hotel and entertainment centers and wholesale merchandise marts. Moreover, the accessibleness of aetropolises consists of extensive transportation modes of air, railway and motorway connections.

In wealthy societies, shopping itself can be a significant leisure activity and thus, there is clearly a good potential shopping to be a greater part of the whole passenger journey. The retail concept of duty free has branched out to strengthen the passenger experience. Almost half of the passengers have mentioned shopping to be the favorite airport activity and 60 percent of the European passengers are regularly making purchases at airports. The equivalent share is significantly lower in the US (Bush & Storey 2013, p. 5, 20). Service demand and its variation can easily be observed at the airports. Rush hours and holiday seasons have a considerable effect on to the service demand. Consumers, as well as transfer passengers, have become more demanding as customers due to the increased standard of living and educational level of the workforce (Grönroos 1994).

The use of the technology has increased rapidly among the consumers as well as the service operators. Technology applications enable multiple possibilities for service providers to affect their relationship with the customers. Price-consciousness and cross-border competition are the consequences of technology revolution and increased people and information mobility.

Larger airports tend to have more international and intercontinental passengers who are willing to consume more at the airports (Volkova & Müller 2012). Helsinki Airport attracted almost 13.5 million international passengers in the year of 2014 and the international passenger volume has grown 4.6 percent since the previous year (Finavia 2014). However, the cultural values have an important role as regards spending habits. International airport terminal creates a unique space as a retail environment with its own challenges and opportunities in regard to service demand. Service demand can be affected for instance by managing stress levels, retail mix, amount of dwell time and designing passenger volumes in order to avoid crowd in terminals. Easy way-finding, information regards of gate distances, service accessibility and knowledge of available time before boarding for instance have effect on decreasing stress levels.

1.3 The purpose and the scope of the study

The goal for this study is to recognize procedures and techniques to increase the service demand among passengers to enhance business activity. Transfer passengers are chosen to be the target group due to the positive growth expectations in the future. In this study, the chosen segment of transfer passengers comprehends mainly travelers moving from the non-Schengen area to the Schengen area and vice versa.

The segment of arriving passengers is considered having a low or insignificant commercial value for an airport operator and due to that reason, arriving flight passengers are delimited from this study. Additionally, the landside area of an airport, including car parking lots, for instance, is excluded from the study. The angle of an approach in terms of increment of service demand encompasses the airport operator, service operators and passengers' point of view. Even though, airline operators are a significant segment of customers for an airport operator, the role of airlines is minor in this study. However, legal restrictions of duty free spending and airline operators' policy in terms of carry-on baggage are taken into account because they have an immediate influence on non-aviation spending.

Lack of information in terms of increasing service demand in this context is the research problem in this study. Study focuses on improving consumer markets. The main research object is to increase commercial service demand by offering technology support for customers. As the main research is extensive, it is supported by the research questions. The research questions are answered with the help of the literature review and the field experiment. Further, interviews are part of this study to assist to gather primary data.

1. How can the service demand be increased at the airport environment?
2. What are the experienced consequences of using the technological application on the people flow?
3. How can the service demand be affected for a transfer passenger by intrinsic and extrinsic factors?

The chosen method for supporting research questions is conducted by a field experiment. The actual operational environment acts as a context instead of a laboratory environment. Finavia provides a good starting point and resources for performing field experiment. Every day, nearly 44 000 flight passengers travel through Helsinki Airport (Finavia 2014). Transfer passengers are playing the key role of the whole test. Another reason why the field experiment is the chosen method is that a laboratory test would have been challenging to implement into the real environment. The test is focused on area of service demand and consumer behavior that has not performed before.

At the airport environment, lack of time while changing planes can be seen as a barrier to use commercial services. Portable mobile phone chargers are distributed to passengers in the field experiment. A pocket charger makes possible to charge a small electronic device regardless of the place. The goal of the mobile phone charger pilot is not only to increase dwell time but also active transfer passengers and other passengers to move around the terminal enabling to use more commercial services.

In terms of service demand, this research predominantly focuses on the relationship between transfer passengers and airport's service providers. Flight passengers that form the service demand are often end users at the same time. As the customer base being very heterogeneous with demand, the possibility to customize services is limited. Especially in the airport operational environment, the demand is very versatile than other retail environment like in shopping centers, for instance. The level of customer participation of flight passengers at the airport during the service delivery is considerably low when comparing fast food restaurant services to high customer involvement required the services of personal training. Now that B2C service demand context is dominant in this research, a number of single purchases is high, monetary purchase being relatively small and service time relatively short. To lengthen the customer retention in a shorter time span is somewhat challenging or impossible because the main goal for passengers is to proceed from a location A to B. However, in the long-term retention of customers is doable but the cluster for passengers who visit the airport for instance twice a week is small.

1.4 The structure of the study

The research consists of six parts. First part of the work introduces the work and its background. The literature review studies the service demand that supports the field experiment and its results. Discussion covers the fifth section and last section summaries the whole study together. The structure of the work as a whole is represented in Figure 1.

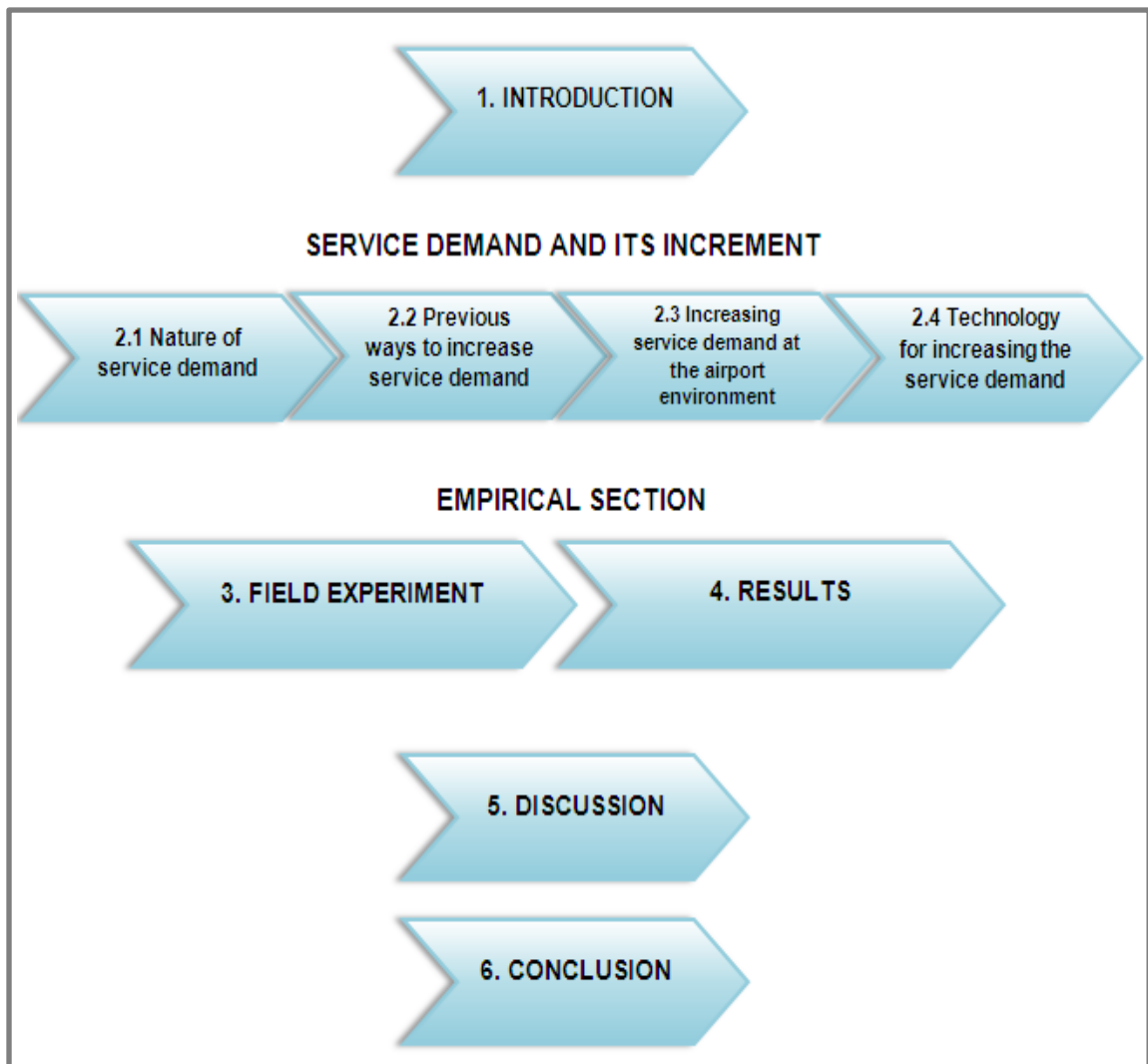


Figure 1. *The structure of the research*

In the first chapter, the reader is led to the background information on the study and the reasons why this study is performed. The chapter retains research questions and additionally, the structuring of the research.

The second chapter is the literature review based chapter of the work. The literature review of the research is conducted in order to find answers to the research questions from previously conducted researches. In this way, the repetition of already executed studies can be avoided. Moreover, the empirical research can be focused on areas in which the research has not been done before. The service demand as a phenomenon and previously executed ways for increasing service demand are examined in this chapter. As a part of the service demand chapter, increasing the service demand at the airport environment and the use of the technology for increasing the service demand are treated.

The chapters three and four consist of the field experiment research. In the third chapter, the research method and experiment are presented. The field experiment method is the used test method in the empirical part of the research. The value that the service pilot

creates and where in the service path the value is produced are described in the third chapter. Furthermore, passenger profiles to which the field experiment is directed are represented.

The results of the experiment research are examined at the end of chapter four. The fourth chapter of the research focuses on the experienced consequences and cost-benefit analysis of the field experiment. Moreover, suggestions for the future service concepts are examined. The fifth chapter covers discussion. The achieved results from the literature review and the field experiment are being discussed in the fifth chapter.

The last chapter of the work is the conclusion. The research results are inspected in this chapter. In the conclusion, it is analyzed what kind of limitations the airport environment required and how the research succeed from different points of view. In addition, the answers to the given research questions are presented. For the future, research theme suggestions are presented at the end of the chapter.

2 SERVICE DEMAND AND ITS INCREMENT

In the second chapter, service demand and previous ways to increase service demand are studied. Subchapter 2.1 clarifies the definitions of service and demand. Further, the factors that are required to generate service demand are explained. Subchapter 2.4 focuses on the airport environment, what kind features affect commercial revenue among flight passengers and how service demand can be increased at the airport environment. The use of technology for increasing service demand is brought up in Subchapter 2.5.

2.1 The concept of service demand

The desire, affordability and willingness to purchase are three characteristics in a society that are needed to generate the demand for services (Rao 2009, p. 105). According to Moon (2012, p. 2), service demand can be explained by two independent variables of price and service time, whereas Cai et al. (2012) describe service demand being a sum of all service times during visits to a given resource. The law of a service demand is presented in the equation (1).

$$D_i = \frac{U_i}{X_o} \quad (1)$$

The equation (1) clarifies the required factors of service demand law and their interdependence. U_i denotes the resource utilization of i and X_o indicates the overall throughput of a system. The variable U_i can be obtained by using a performance monitoring facilities that are supported by operating systems. Throughput, X_o , can be directly calculated by counting the total number of completed request in a fixed time period. Service demand law can be taken advantage of estimating service demand for different resource.(Cai et al. 2012)

Definition of services can be divided into three totalities of deeds, processes and performances (Zeithaml & Bitner 1996, p. 5). According to Fitzsimmons & Fitzsimmons (2004, p. 4), Mudie & Pirrie (2006, p. 3) and Rao's (2009, p. 8), the service can be seen as a time-perishable and intangible experience that is executed for a customer. In this configuration, the customer's role can be a co-producer. A service cannot be shifted from one person to another and further, the service is produced and consumed concurrently. Services are not directly commensurate to products for several reasons. Hoffman & Bateson (2006, p. 28) clarify the difference by characteristics of

inseparability and heterogeneity in addition to the perishability and intangibility by Fitzsimmons & Fitzsimmons (2004, p. 4), Mudie & Pirrie (2006, p. 3) and Rao (2009, p. 10).

The service quality and productivity cannot be distinguished from each other. When comparing a service business with the industry field, the customer influence on productivity differs significantly. This is due to the fact that a customer is physically present (Mudie & Pirrie 2006, p. 6) and participates in the service process, the progress of it and the outcome of the service. They can also affect how other customers involve the process and how they experience the service quality. The input of a service provider and the input of a customer come across in the service process. Technology, personnel, systems, information and the use of time are the inputs that service provider brings into the service process in directly. The customer's input is participation and the participation of fellow customers (Grönroos 2001, p. 214-215, Bitner et al. 1997).

Demand plays an important role for the service productivity. As the service cannot be stored, contrary than in the industry, the impacts of the fluctuating demand are greater (Rao 2009, p. 108). If the demand is low, the resources of a service provider are underutilized and thus, it weakens the internal productivity. Once the demand meets the resources of a service provider, the internal efficiency and productivity increase. The profitability decreases if the demand exceeds the service provider's resources while lowering the experienced service level and the use of external resources.(Grönroos 2009, p. 284-285)

Demand can be measured with the assistance of data market research. Nevertheless, at the point of and time of service production and consumption, the needs, wants and preferences of customers is constantly changing and thus challenging to forecast (Grönroos 2001, p. 378). Koshiba, Takenaka & Motomura, (2013, p. 281) bring out two main problems when forecasting service demand. Identified challenges are that there is no absolute right solution existing because the correct solution is depending on the situation and further, it is impossible to list these probable situations. Mudie & Pirrie (2006, p. 3) emphasize the role of uncertainty before, during and after the service. It is often considered that customer involvement increases and committees loyal consumers simultaneously (Bitner et al. 1997; Seiders et al. 2005). In the case of Ikea, the company plays a role of an interactive service provider where the customer participation has a considerable part of the entire service process. In other words, Ikea indirectly supports the service process by offering instructions, tools and activating the customer. The customer is anticipated to continue to finish the service process by assembling the furniture at home.(Grönroos 2001, p. 211)

2.2 Nature of service demand

Service demand is commonly derived from a heterogeneous source. According to Fitzsimmons & Fitzsimmons (2004, p. 246), the extensive variation in demand for services do not necessary need to be acceptable. There are different strategies how to manage demand. The impact of the cyclical variation system can be diminished by means of smooth demand. The average rate of customer volume becomes steadier in the course of time, even though the service users continue to arrive at random intervals. Rao (2009, p. 114) suggests adding communication and inform customers about peak hours or the peak business days. Some customers may prefer to use services during the non-peak hours and days. Other tools in addition to control service demand are partition demand, price offer incentives, promote off-peak demand, development of complementary services and the use of reservation systems.

Partitioning demand origin from the idea of service demand being consisted from the scattered crowd of consumers. The partitioning demand can be perceived in the airline business, in which service demand is grouped into two parts, planned arrivals and random arrivals (Fitzsimmons & Fitzsimmons 2004, p. 247-248). The differentiation process is conducted between business passengers and weekend holiday passengers. In addition to the partitioning demand, the price differentiation is an alternative way to smooth service demand. Price differentiation comprehends discriminatory pricing that are easily distinguished at the movie theaters, as the price of service varies depending on the showing time of the movie. By offering price incentives during the off-peak seasons, it can also attract new customers to use services. A wider customer base has good potential to create longer relationships between a customer and a service provider. However, it is noteworthy that private firms want to prevent their high-paid customers from shifting to the low-rate paid user category.

The demand between the low and a high season is separated by multiple variations and features. Traveling as well as sightseeing, sports and dining, for instance, can be seen as congestion-prone services (Moon 2012, p. 1). The creative and alternative use of resources can steady the consumer traffic volumes. One way to increase the off-peak demand is to seek different sources of demand (Fitzsimmons & Fitzsimmons 2004, p. 249). This strategy is used for example in department stores and skiing areas. Mountain ski resorts promote and develop alternative activities like trekking and biking for attracting more tourists to the summer season. The Austrian ski destination, Bad Gastein, has succeed in generating higher travel volumes for summer season up to that level that summer season has become more popular than the winter season. Department stores can promote low seasons by attracting customers to do their shopping before Christmas rush or giving special offers that are valid only on Tuesdays (Fitzsimmons & Fitzsimmons 2004, p. 249). Rao (2009, p. 105) summaries that the desired level of demand can be achieved ones it is set to be one of the primary responsibilities of a

marketing organization.

Bars in the restaurants and video games in the lobbies of the movie theaters are considered complementary services. Complementary services can have a notable financial benefit. In addition to the profitable advantage, there is possibility to shape a customer's experience and perception of the service unity. The connective factor behind the complementary services is to occupy customers during their waiting time (Fitzsimmons & Fitzsimmons 2004, p. 249) because consumers have a habit of overestimating significantly their time spend on waiting (Berry et al. 2002). Additionally, while they have something interesting and time consuming activities available, the anxious and frustration levels lower. In addition to anxiety, other psychological factors during dwell time such as stress, excitement and annoyance also have an impact on the perception of waiting times and further, the service quality (Berry et al. 2002). In consequence of soothing a customer, the far-reaching results can be obtained in terms of larger single purchases and substantial consumption.

There are more complementary service concepts that can be observed in practice. In North-America, for instance, the convenience stores have created a concept of holistic medicine which merges an original medical presence with a nutritional, psychological and overall well-being. Complementary service can lead up to be a notable source of revenue if the new demand for complementary service is being contracyclical. A result of this can be a consistent aggregated demand in which the demand for the original service is lower than the new service demand. This is why air-condition service providers often have heating contractors in their pay of.(Fitzsimmons & Fitzsimmons 2004, p. 249-250)

Variation in service demand can originate for very natural reasons. Service demand can be highly dependent on the time of the day, the day of the week, the season of the year. During the summer time, people usually have preferable prospects to travel due to their annual work rhythm. Significant variation in service demand can cause queues and periods of downtime for services. Queuing and waiting time can be seen as a determining factor whether to use a service or not. Waiting on the phone to get service was the most annoying aspect of doing business with call centers (Mudie & Pirrie 2006, p. 15). If the long waiting times are known beforehand, customers do not have so high hopes towards the service quality (Fodness & Murray 2007). On the other hand, downtime of service can send the negative signals of the service provider that why consumers are not interested. In some cases, like in most restaurants and in the transportation business, the hourly time of the day have a remarkable influence on fluctuating demand. Additionally, service demand is very committed to the nature of service (Fitzsimmons & Fitzsimmons 2004, p. 502). When predicting customer volumes for instance in hotels, it is important to understand the changing and day related forces in service demand. Demand during the weekdays is mainly generated by the business

customer, whereas vacationers prefer to use hotel accommodation during the weekends (Fitzsimmons & Fitzsimmons 2004, p. 501).

Negative demand, no demand and latent demand also represent demand situations. The evaluation of the offer may lead people to make a decision that is not favourable for the service operator when the negative demand occurs. People are aware of the service and the benefits offered when negative demand is present, whereas no demand can exist because of unawareness, insufficient information about the service or due to customers' indifference. Latent demand occurs when, for instance, a passenger is traveling in an ordinary bus but a passenger dream of traveling in a luxury bus. (Rao 2009, p. 106-107)

There is a specific guideline created for service demand in a competitive situation. According to Grönroos (2001, p. 376-377), the general guideline of managing service strategy and service management can be implemented in most service situations. In the guideline, the bottleneck of the service business is the customer itself. Furthermore, customers are seen as a critical resource not forgetting the importance of information technology, operational systems and physical resources. In a service process, the use of technology has not anywhere near reached its potential and thus, it can also be classified as a bottleneck of the service business. The service guideline of six rules is collected in order to emphasize the common features of a customer relationship in most service competition situations. The strategy of six stages for service competition is presented in Figure 2.

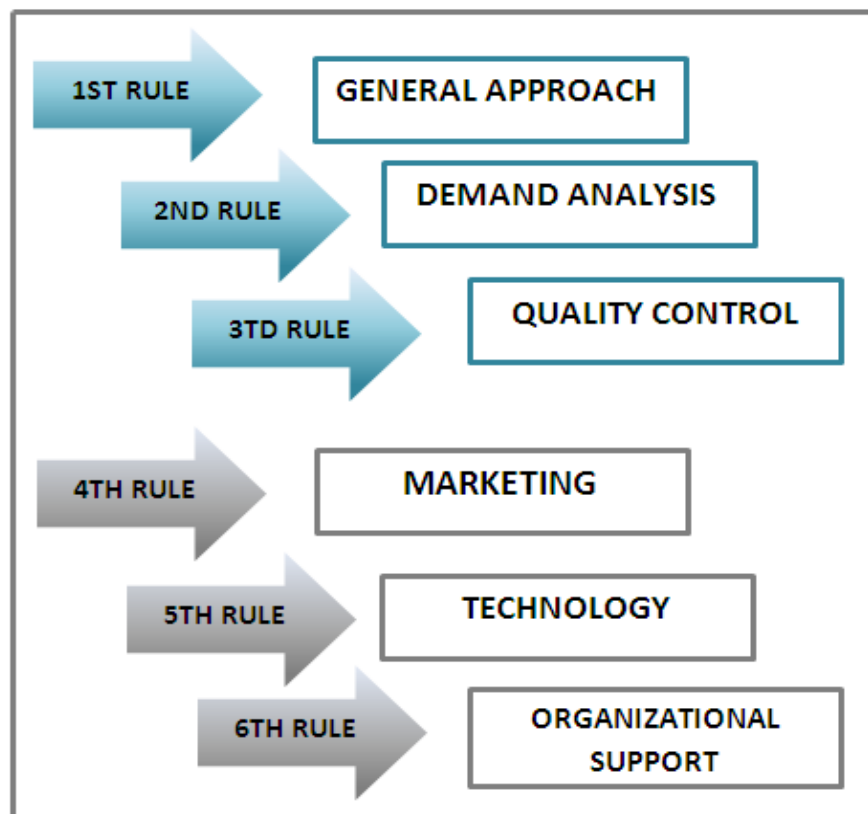


Figure 2. Six stage strategy for service competition (Grönroos 2001, p. 377)

The versatile and flexible demand of individuals and business customers challenge the service provider. According to the first rule of the service guideline, the firms who manage strengthen their customer relationship will achieve the best lucrative outcome. The customer engagement can be obtained if employees behave as consultants who are willing to do their work when the customer needs them in a way the customer wants. The motivation, creativity and skills of people represent the key successful factors of developing new services and implementation of new services. This occurs even though the increased use of automated service systems, internet and the development of information technology.(Grönroos 2001, p. 377-378)

The second rule of demand analysis indicates the importance of the personnel customer contact while producing the service. The realistic demand of customers can be achieved when the needs, values, expectations and wishes are carefully analyzed through at the time of service production and consumption. A standard market data provides a solid base for demand forecasting. However, the needs and wants of a customer are impossible to measure in advance. Fast reaction to continuously changing demand for consumers' wants and needs ought to be done in order to stay in the business. The best person to notice the possibly unpredictable shift in needs or wishes of the customer is the one who actually produce the service.(Grönroos 2001, p. 377)

The service quality is a distinctive feature when operators offer the same kind of service but have different qualities. Comfort, safety, cleanliness, beauty and service time including congestion delay can be categorized as a non-monetary service quality attributes (Moon 2012, p. 2). The quality control of the service is supervised by the person who produces service and is in contact with the customer. Quality control goes for the third rule of the service guideline. According to Grönroos (2001, p. 378), the responsibility of the quality of the service is shared for everyone. Since services being a combination of smaller results of the collaboration, the quality control is more challenging as a whole than comparing with manufacturing. From the customer point of view, the quality of the service has to be correct at the first time. The costs of repair can easily multiply and the damage to the customer has already happened.

The fourth rule of service guidance expresses the process of a customer contact person being a marketer of the service that he or she produces. Every kind of interaction between the service representative and a customer is considered consisting of the elements of marketing. In a competitive situation, maintaining current customers are even more important in the long time span than establish new customer relationships. This is despite the traditional purpose of competition of attract new customers. Good customer knowledge and a tight relationship to a customer provide good prospects for a profitable outcome. Above all marketing efforts and activities, the relevance of price of service has not diminished in any stages of the life cycle of a customer relationship.(Grönroos 2001, p. 379-380)

Information technology is present in the service business but in the future the importance of technology will be more outstanding. Grönroos's (2001, p. 379-380) fifth rule for service competition is to guarantee the attitudinal and technical preparedness to use technology, systems and physical resources. The same also goes for the employees. The importance of suitable use of resources of different kind is emphasized from the investment point of view and further so that, it does not cause negative effects among the consumers. If there is a resistance or lack of skills among the employees to use technology, the impact can affect both, internal relationships in the organization and external customer relationships. The use of technology enables to produce more personal service, improve working conditions not to mention the increased efficiency of the service operations. Along the technology development, more often machines represent a point of contact rather than employees (Mudie & Pirrie 2006, p. 18).

The last rule of the service competition covers the organizational support. The main task of organizational support is to encourage, motivate, guide, educate and provide required working conditions to perform duties. In service business, the geographical distinction between employees and departments who produce the service together can challenge the decision making process. Consequently, the flexibility due to too many restrictions and rules can harm not only able to serve a customer as an individual but also the employees in the long run. In addition to conjunctionally shared values, mission and vision, the trust and appreciation among all parties assist to produce a high quality service.(Grönroos 2001, p. 380-382)

2.3 Previous ways to increase service demand

At a product level, the fundamental way to gain business growth is by attracting new customers, creating new ways of using the product and achieving premium prices. One of the most used methods for increasing the demand is a brand extension by launching a new product under the existing brand (Vranešević et al. 2007). A brand provides a shortcut for the consumer and they are willing to pay more a branded product. A brand name conveys an increased value and quality of the product in customer's eyes. In addition, a consumer's risk and a cost of changing the brand strengthen the brand loyalty (Rugimbana & Nwankwo 2003, p. 96).

Fox et al. (2002) and Singh & Sahay (2012) emphasize the meaning of distance between home and the shopping center. Travel time is one of the predictors of shopping behavior among the retailer marketing policies and household characteristics. In grocery store revenue, the increased promotional intensity and decreased travel times of consumers have an explicit affect the revenue growth. However, the revenue of a mass merchandiser is more sensitive than grocers to increase with promotional efforts.

2.3.1 Used methods in different retail environments

This subchapter is divided into four main themes of used methods and techniques for increasing service demand different retail environments. The chosen themes are layout and visual, marketing and PR, additional and complementary services, and digital and technology based methods. The content in this subchapter is mainly founded on researcher's observations and experiences.

Similar methods for increasing the service demand and retention of customers can be used in very different spending environments. The usage of floor design as a tool for guiding customers connects the world of gambling and sports retail stores. Sports retail chain, like Stadium, has painted the main passages to look like real tracks. Casinos, on the other hand, provide a security and visual limits for keeping the underage visitors further away from the game tables. Moreover, the materials that are used in the floors of casinos are often fitted carpets. A soft floor material choice conveys a signal of to slow down on steps and, further, to stay longer in the wanted area.

Casinos like several other retail spaces such as restaurants and retail stores often do not place any clocks on the wall. Additionally, casinos' gaming halls tend to be windowless preventing the day light coming in and consequently, customers easily stay longer due to the loss track of time. More visual and layout related examples to increase service demand are collected in Table 1.

Table 1. Layout and visual based techniques for increase service demand

Method	Retail or Industry sector	Brand
Floor signs, floor design	Sports, Gambling	Stadium, Bellagio
Strong layout route	General retail, Furniture	Tiger, IKEA
Product category placing	Grocery stores	Carrefour, Walmart, Unilever
Vivid shopping windows	Chocolate, Department stores	Godiva, Harrods
Anchor stores, mixture of stores	Shopping centers, department stores	King of Prussia Mall, Nordstrom, Macy's
Similar stores locate next to each other	Shopping malls, outlet malls	Mall of Emirates, Woodbury
Iconic shop fronts	Shopping centers, Fast Fashion	Les 4 Temps, Marks&Spencer, Desigual

There are several other extrinsic factors applied to attract customers to spend more in order to stay longer in the store. A product placing, for instance, is easily observed in most grocery stores. Milk represents a product that customers often want to buy when

visiting a supermarket. Dairy products are often placed at the back of the grocery store and therefore, customers are exposed to all the in-store promotions while heading to milk shelves. Vivid shopping windows are one way to attract not only children but different age groups. A Belgian origin chocolate manufacturer, Godiva, have placed their employees in its New York shopping windows to make strawberries that are dipped into chocolate. A visual proof of “fresh” products and a tempting smell are conveyed to the customers to induce to do an unplanned store visit.

Table 2. Marketing and PR related ways to increase service demand

Method	Retail or industry sector	Brand
Celebrity endorsements, Campaigns	Cosmetics, Clothing, Cars	L’Oréal, H&M, Opel
Brand collaborations, Brand extensions	Aviation, Movies, Cosmetics	Finnair & Marimekko, Finnkino & Tupla, Nivea
Product testing, Giweaways	Cosmetics, Ceramics, Food	Lumene, Kahler, Vaasan
WOM, People-to-people	Hotels, Electronics, Bloggers	Tripadvisor, Mini in the Box, Strictly Style
Product placements in the movies, TV-Series, Music videos	Alcohol, Shoes, Eyewear, Cars, Soft drinks, Sports teams, Computer games	Heineken & James Bond, Manolo Blahnik & Sex and the City
Limited availability	Fashion, Cars, Alcohol	Chanel, Bugatti, LVMH
Price differentiation	Hotels, Restaurants	Sheraton, The Cheesecake Factory
Strategic pricing in terms of serving size	Fast food, Cafés	Taco Bell, Second Cup
Special edition production	Soft drinks	Coca Cola, Pepsi
Lead users	Outdoors	Patagonia
High temperature	Bars, Gambling	MGM Grand, Circus Circus
Guerilla marketing	Sports, Airlines	Nike, Norwegian

In Table 2, ways to increase service demand are presented in terms of marketing and PR. People tend to trust more other customer and acquaintances’ opinions than marketers. The role of word of mouth (WOM) marketing and people-to-people communication are emphasised when trying new services, new products or changing to a new brand. Bloggers and websites like TripAdvisor, eat.fi, Trivago uses WOM and people-to-people communication techniques. Despite all the positive effects of the

people-to-people communication, some of the users' comment on the internet can be bribed by the service provider.

There are numerous other ways to increase service demand. Price differentiation is widely used practice in terms of location, hourly time of the day, a day of the week and week of the year. After work, happy hours, lunch prices, late night movies, hotel and flight rates are dependent on the fluctuating demand. Intentional or unintentional spread rumours that a notable price level increment of a certain luxury product or product line is coming in the near future can have notable affects sales. Rumours of a price increment can speed up the purchase decision of cautious consumers. Furthermore, rumours that a certain product model will go out of company's production plan can activate potential investors to get good profits through a customer to customer (C2C) sales channel. The reselling price can get high due to stopped production. Distribution channels, retailers are careful though through. Location of the store in a famous shopping street may increase the brand's overall image and interest that affects demand other distribution channels like e-commerce and other stores as well.

Table 3. *Additional and complementary services for increasing service demand*

Method	Retail or Industry sector	Brand
Personal shopper	Department stores, Fashion, Non-aviation	Bergdorf Goodman, Heathrow Airport
Pre-order	Cosmetics, Interval refreshments	Kastrup Airport, NYC Ballet
Home delivery, Drive-in lane	Electronics, Fast food	Gigantti, McDonald'
Mass Customization	Toys, Accessories, Foot wear, Jeans	Build-A-Bear Workshop, LV, Nike, Levi's
Loyalty cards, bonus systems, company's own credit cards	Insurance, Aviation, Grocery	If, Finnair & Stockmann, Whole Foods
Free gift cards	Gambling	Casino de Montréal
First class, Business class	Airlines, Rail traffic	United Airlines, SNCF
Leasing	Electronics, Car	Lenovo, Audi
Hire contracts	Electronics, Furniture	Apple, Isku
Other services supporting the core business	Entertainment, Childcare, Catering, Car parking, Health tests	Disney & Caribbean Cruisers, IKEA, Walgreens

Table 3 represents some of the examples of additional and complementary service methods that are used to increase service demand. A customer's involvement and engagement during the purchasing process are assured when the company is offering mass customization services. Moreover, highly involved customers have a habit of allocating more time and effort to their product information searches before the actual purchase (Seiders et al. 2005).

An American based company, Build-A-Bear Workshop, that sells teddy bears and stuffed animals practices mass customization in a large scale. A customer and often in this case, a child has a possibility to decide the softness of the teddy bear and choose extra accessories. The possibility to take part of the customization can make customers feel like they are served as individuals and, further, customization creates an emotional connection to the product or service. A Swedish furniture company, IKEA, provides several product and services that support their main business of selling home furniture. Free car parking, restaurant services and free childcare increase the likelihood to add customer's dwell time at IKEA's stores.

In the world of gambling, casino operators have invented their own ways to encourage customers to continue playing despite previously lost games. Some Casinos like, Casino de Montréal, provides luxury vacations for the exotic destinations and expensive gift cards of the luxury stores for their regulars if they had lost a notable sum of money. In other context, if an expenditure of consumer goods segment for instance, exceeds over a certain level, customers can be dispensed gift cards to the same chain hotel or restaurant services.

Airlines introduced the business class the first time over two decades ago (Hoffmann & Bateson 2006, p. 468) and that can be categorized into the additional services. The same strategy is applied in other modes of logistics by rail tracks and by sea. It is possible to purchase more spacious cabins on the cruisers and larger hotel rooms for an additional fee. The United Airlines offers extra legroom for passengers and consequently, the seating capacity lowers 5 percent by implication. Despite a reduction of seating places in a plane, United Airlines succeed in accumulating profits because passengers are ready to pay 20 percent more from the additional space while traveling. Airline operators show the importance of business travelers by presenting the shares of different ticket categories. Even though, only 20 percent of the flight tickets are bought by business class customers, they bring 50 percent of the industry profits in total.(Hoffmann & Bateson 2006, p. 469).

Table 4. *Digital and technology based methods for increasing service demand*

Method	Retail or industry sector	Brand
RFID, NCF, Self-scanning cashiers, QR-Codes, Bluetooth, iBeacon	Grocery, TV-series, Warehouse management, Retail	Tesco, Robust North, Walkbase
E-commerce	Electronics, Accessories, Decoration	Best Buy, Neiman Marcus
3D Product design	Footwear, Accessories, Car, Furniture	Nike, Longchamp, Mini Cooper, IKEA
3D Fitting, Digital fitting room assistants	Textile, Shoes, Make-up	AR Door, Goertz Stockmann, L'Oréal
Mobile pay, Contact pay, Wristband payment, Chips	Kiosks, Restaurants, Grocery, Spas, Gambling	Wolt, Fafa's, Center Parks, Caesars Palace
Reservation systems: Overbooking, Not numbered seats	Movie theater, Aviation	IMAX, SAS
Easy Order, Orders while queuing	Fast food	McDonald's
Websites, Collective Intelligence	Fashion, Accessories	Burberry
Digital way finding, 3D Maps	Events, Shopping malls, Airports	Slush, Nokia, Changi

Digital and technology based methods in terms of increment in service demand are shown in Table 4. QR-codes, NFC, RFID radio wave based technique and Bluetooth are widely used in various circumstances. One example from the outdoor advertising of a television series is a tool called Arilyn. Arilyn combines in its use a QR-code related technology by scanning the code to a mobile device. A company named Robust North is behind the Arilyn that is promised to offer so called “augmented reality”. As a medium, Arilyn enables location related information that can be directed and varying content. The content can be preset and it can include any kind of electronic content such as videos and photos.(Robust North 2014)

One application based on sensors and Bluetooth technology is taking advantage in shopping carts. Cambridge Consultants (2015) invented a low-cost tool for avoiding queues and to accomplish a more personalized shopping experience. So called, smart trolleys, collect a real life data from the customer's movements within one meter accuracy. Trolleys assist to forecast upcoming congestions near the cashiers and further, the location of sales staff can be identified. Moreover, the smart trolley is able to guide a customer to a specific product offering. Sensors are embedded in the shopping trolleys and energy is developed from the rotation of the wheel of the trolley is harvest to uphold the location system. Cambridge Consultants explained that the high share of an

impulse buying and consumers' increased frustration of queuing was the starting points for the innovation.

The existence of e-commerce does not necessary mean that the customer flow in store would decrease dramatically. At its best, e-commerce and a physical store support each other. The product can be ordered and purchased online in advance but the delivery of the product is in the physical store. In this way, the customer flow is led to the physical store and the possibility for additional sales is provided. Moreover, the business hours of the physical stores are often longer than regular post offices.(Lehtoaro 2015)

2.3.2 Sensory influencers of service demand

Exterior appearance, interior design and other tangibles create unity that surrounds the service. Even though environmental cues may not directly affect customer's behavior but their emotional state is influenced. Emotional state, acts as an intermediate to the behavioral reaction of consumers (Bohl 2014). Hoffman & Bateson (2006, p. 225, 243) and Singh & Sahay (2012) emphasize the role of senses and physical environment for customer experience and hedonistic spending. Senses are strained through lighting, architecture, colors, shapes, scents, touch, music and taste. Lightning can set moods, tone, pace and guide consumers to act in a certain way without words. When the space is dimly lit, customers talk more softly, the pace of the service encounter is slower and the service environment is perceived more formal. On the contrary, customers tend to communicate louder, service more fast-tempo and overall environment is perceived more informal, exciting and cheerful when the lightning is bright. Bohl (2014) adds that bright lightning has been linked to a higher level of arousal which is shown to lead higher probability to interaction among people.

Sound as an effect on the retail environment has three main roles of a mood setter, attention grabber and informer. However, music can be perceived as distracting during the high involvement purchase. If the slow-tempo music is played at the restaurant, customers tend to stay longer and on the contrary, fast-tempo music makes people eat faster and cause a high turnover of customers (Hoffman & Bateson 2006, p. 243-244). In a retail environment, slow paced music makes customers move slower and they are more likely to notice a product they are looking for or notice the in-store promotion (Bohl 2014). Consequently, high tempo music can lead to higher total sales. A choice of music can have an indirect affect consumers' purchase decision. For example, an increased demand in Spanish wines was noticed when the Spanish music was played in the wine section of the grocery store.

All the physical evidences are due to set stimuli and at the same time playing a role for shaping a perception of a service quality (Fodness & Murray 2007). The environmental psychology model is called stimuli-organism-response (SOR). The organism component

describes the recipients of the set of stimuli within the employees and customers. Consumers' responses or outcomes are characterized as an approach or avoidance behaviors. Individual approach behavior is closely connected with shopping enjoyment, the favorable impressions of the store, amount of money spent and willingness to stay and explore the store longer. In addition to all physical evidences of the consuming environment, the air quality and the temperature have an effect of the mood and general comfort.(Hoffman & Bateson 2006, p. 229, 232, 237)

2.4 Increasing service demand at the airport environment

As a retail environment, the airport attracts consumers from various cultural backgrounds forming a heterogeneous customer base. In order to engage a maximum potential proportion of passengers, it is advisable to offer a wide range of brands and product categories. When it comes to food and other preferences, especially spices and smells are highly connected to the culture. One way of increasing the service demand at the airports is to eliminate barriers to use commercial services and Subchapter 2.4.5 clarifies more the subject.

One of the main justifications for airport operators to invest in non-aeronautical development and research is that airport users' covers the more diverse range of customer groups (Fuerst & Gross 2014). Consumers being out of their daily routines and familiar environment trigger strong emotions in some consumer segments. Airports, as well as amusement parks and sports stadiums can be graded to be high arousal environments and thus, emotions play a significant role on service demand.

Crawford & Melewar (2003) and Volkova (2009) indicate that airport environment makes customers react and act in unusual ways due to ambient unique retail environment and travelers' experience feelings of excitement, anxiety and stress. Particularly increased levels of stress, anticipation and excitement are strongly linked to the impulse buying behavior. Volkova (2009) also sums up the airport shopping being all about affecting the time period called "happy hour". The so called "happy hour" origins from the moment when the passenger receives the boarding pass and the levels of stress are low but excitement remains high. When considering transfer passengers, the "happy hour" could start when the passenger has arrived on time for the hub and has recently pass the security check.



Figure 3. *Four keys to increase service demand at the airport (DKMA 2013, modified)*

Nearly 30 000 passengers from fifteen different airports from Europe, Asia and North America took part of the DKMA's study in 2013. The study highlights four main objects to increase service demand at the airport environment that are represented in Figure 3. The methods are a promote airport as a shopping destination, a good develop mix of services, improve perceived value and increase passenger's dwell time.

The first highlighted characteristic is a promoting airport as a shopping destination that pursues passengers' mental image to plan their shopping before they even arrive at the airport. A passenger who had the intention to buy something at the airport had eight times more likely to buy duty free, six times higher likelihood to purchase retail and three times more likely to consume on F&B. Furthermore, they consume 40 percent more on duty free, 39 percent more on F&B and 24 percent more on retail than an average passenger. The challenge is that only a small share of passengers plans their buying at the airport in advance. For instance, only 16 percent of those passengers that pre-planned their spending had an intention to buy something from the retail section (DKMA 2013). The corresponding share of directed pre-planned spending in F&B and duty free is twice higher than retail.

In order to increase the share of passengers that pre-plan their spending, informing the passengers of retail opportunities before they reach the airport has a noteworthy role. Chung et al. (2013) emphasise friends and relatives' recommendations in addition to personal experiences to be the most preferred source of information in terms of pre-planning spending at the airport. A website also plays a significant role for conveying the wanted message of shopping possibilities and taking advantage of where the purchase decisions of will be made. Furthermore, the availability of the contact information of airport retail operators and ease of enquiring a specific product for

example increases the likelihood of making purchases at the airport.

A wide range of different kind of retail and F&B services stand for the second phase of the DKMA's guideline. In this way, the attention of as wide range group of passengers as possible is being attracted. A diverse selection of brands and product categories strengthen the overall satisfaction (Singh & Sahay 2012) and airport experience. Satisfaction levels are determined by expectations that are subtracted from the predominant perceptions (Mudie & Pirrie 2006, p. 8; Kumar & Thakur 2014). The third object for increasing service demand at the airports is improving the perceived value of retail and service offering. More than 45 percent of the passengers, who had the intention to buy non-duty free retail, ended up buying nothing (DKMA 2014). Providing better value does not automatically mean lower price and better product quality. Perceived value can be increased by adding personal service and experiment. Dwell time and its increment are listed as a fourth rule to follow. More about dwell time and its impact on service demand is examined in Subchapter 2.4.3. As the transfer passengers' time is limited at the airport, the consumption is commonly concentrated on either shopping or using the F&B services. Volkova & Müller (2012) expect transfer passengers to spend more on F&B due to longer travel time.

Despite the limiting factors in the context of the airport shopping, passengers prone to choose the store which the overall image fits the image they hold themselves. Passengers who identify themselves origin from various social backgrounds may select the stores of different fashion status from others (Rugimbana & Nwankwo 2003, p. 342). One of the notable competitive edges at the airports is the lower price level of certain product categories due to the legitimate statute of duty-free purchases. In the higher price category, the price advantage between buying a product from the airport than the store from the center of the city can be an outstanding amount of money. According to the researcher's observation, it is not unprecedented that people plan their trip and flight connections depending on in which terminal the desired store and product is located. In these deviant situations, the wanted product is typically an exclusive and limited edition kind of luxury product.

Airport service operators have competitive edge comparing with other service operators at the centers of the cities. Due to legal rights, they are able to offer products without taxes. The ability to provide exclusive products, product sizes and package designs, new products in store before other distribution channel bring advantage over competitors. Chung et al. (2013) have found out in their study that passengers prefer to use wandering as a source of information of services before taking an advantage of airport maps. A good service visibility and availability ease the barrier to passengers to enter the commercial space and use the service. Further, the strong presences of well-known brands give a shortcut to the content and the quality of the product for passengers. Additionally, a supply of services that are not available anywhere else in the country

besides the airport gives an additional attention and interest towards the service operator.

2.4.1 Determinants and measures of non-aviation revenue

Based on the research, made by Volkova & Müller (2012), there are three main determinants reflecting in the turnover of the non-aviation operations (Figure 4). A size of the airport, passenger types and a low cost carrier (LCC) terminal performance represent the characteristics of the revenue generation. The airport size alone does not give required information but a volume of passenger traffic is used as an indicator of the size of the airport. Passenger characteristics are divided into three subgroups of domestic and international passengers, LCC and Full Service Airline (FSA) passengers, business and leisure passengers. The favour of the LCC can be noticed from the increment of the seating capacity from 11 percent in the year of 2002 to 39 percent in 2013 (Bush & Storey 2013, p. 21).

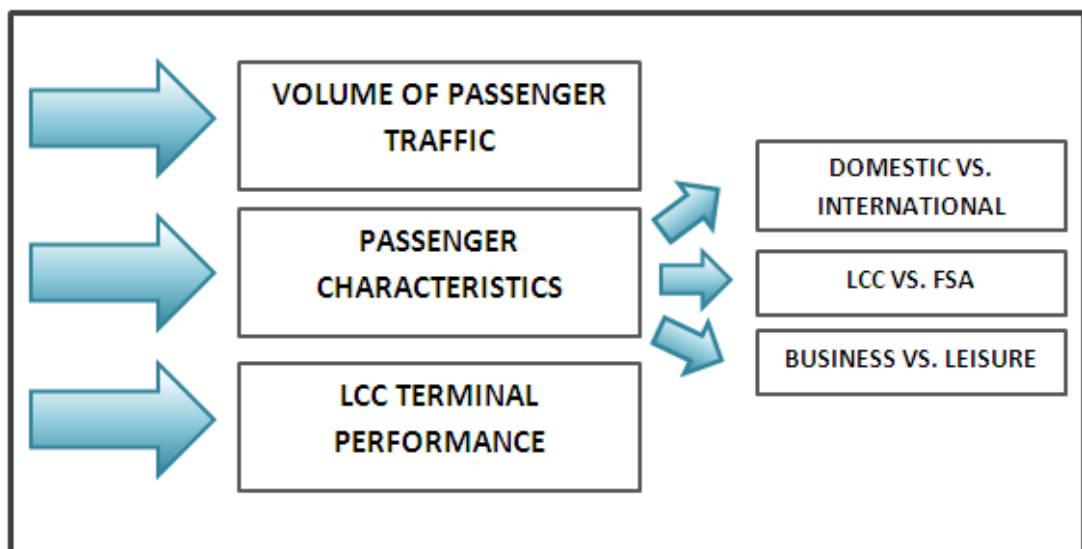


Figure 4. Illustration of three main determinants of non-aviation revenue (Volkova & Müller 2012)

There are several impacts of the volume of passenger traffic for the accumulation of the non-aviation revenue. One of them is that larger airports have a wider selection of different kinds of commercial services, including shops, kiosks and restaurants. A result of this, a relatively larger share of the non-aviation revenue is accumulated from the larger airports where more specialized shops are supported by the numerical superiority of flight passengers. On the contrary, smaller airports do not reach the required mass of passengers in order to sustain special stores and services. Studies show that international passengers tend to spend more money at the airports and particularly in a special retail and F&B shops. Larger airports do not only attract more flight passenger but more international and especially intercontinental passengers with their higher consumption

habits (Volkova & Müller 2012).

Additionally, airports with higher shares of international travelers usually have larger range of high-revenue generating commercial services such as high-end retail outlets selling international designer fashion, jewellery and watches (Fuerst & Gross 2014). At least in the shopping mall field, different levels of product assortments affect consumer purchasing behavior more than price level (Fox et al. 2002; Fuerst & Gross 2014). Thus, the part of the non-aviation revenue, including special shops and F&B stores, can be expected to increase more than proportionally in with line the growth of passenger volumes (Volkova & Müller 2012). Despite the volume of passenger traffic having the greatest impact on generating non-aviation revenue, the revenue per passenger may not be positively affected if the space for commercial operations stays unchanged but the passenger volume increases (Fuerst & Gross 2014).

In addition to the high volume of passenger traffic, Volkova & Müller (2012) emphasize three different classifications of flight passengers. The three groups of flight passengers are international and domestic, LCC and FSA, business and leisure travelers. Passengers' personal spending patterns have a direct impact on the generation of the non-aviation revenue. The distinction of consumption habits at the airport between the international and domestic passenger is evident (Freathy & O'Connell 2000). International passengers usually prefer to arrive early for the airport and thus, leaving more time for using commercial services. This case is shown at the Spanish airports, where the growth of the international passenger volume generates an increment to the non-aviation commercial revenue. Long dwell time at the airport affects positively for the service demand and especially for the F&B section. The basic physiological needs of liquids and food take place when free time spent at the airport increases significantly. One additional point of view for the consumption of international passengers is that they have paid more money for the flight ticket. Therefore, it can be assumed that they have better monetary resources to execute larger purchases.

The second classification group consists of the LCC and FSA passengers. There are no tremendous differences between the LCC and FSA passenger spending habits. However, a LCC passenger spends on average 7 percent less money at the terminal than a flight passenger that uses a traditional airline. The traditional airline indicates the FSA. Different spending patterns are also identified between the business and leisure travelers. Business travelers tend to consume less due to their more frequent visits at the airports and often later arrival before the flight (Freathy & O'Connell 2000). Moreover, business passengers usually have food on board in business class or in lounges at the airport. Nevertheless, the available time at the airport has an effect on spending in any case in both segments of business and leisure travelers. When dwell time is less than 45 minutes, the business passengers are more effective on spending higher sums (Volkova & Müller 2012).

The third main determinant of the non-aviation revenue is the LCC terminal performance. At larger airports with more than 3 million passengers, the contribution to the non-aviation revenue is smaller in the LCC passengers. Contrary to what would have been expected, the revenue per passenger from the F&B is smaller in the terminals of only LCC than in other terminals. In other terminals, in this case, the full service airline operators or the combination of the low cost airlines and FSA are represented. The result of lower per passenger consumption to F&B in the LCC passengers is valid even if the food is not provided on board during the flights of the low cost airlines. The revenue per square meter is higher in LCC terminals and one explanation for this is that, the F&B services have smaller operation space per thousand enplaning passengers in LCC terminals. However, the revenue from the special retail shops is more often accumulated from the terminals of fully FSA covered operators or in terminals in which the FSA is in a dominant operator's role. As the revenue from the specialty retail stores is lower in the LCC terminals, the shop entrepreneurs often pay lower rent per square meter for the airport operator. (Volkova & Müller 2012)

A better outcome is reached if an airport operator and service providers work closely together in terms of passenger profiles, passenger situations, the design of retail offering and marketing accordingly. Further, the space allocation policy of an airport operator is highly recommended to follow the revenue structure of the airport. The more the airport operator knows how their non-aviation revenue is generated, the better the determinants of the retail and F&B sales can be affected (Volkova & Müller 2012).

TFWA (Tax Free World Association) Global airport travel consumer survey was conducted in the first quarter 2011 to gain more information in terms of European airport shopping behavior. Among the European residents, travelers inform purchasing something from the Duty Free or Duty Paid stores every second time when they are traveling abroad. 60 percent of the travelers from Europe consume at Duty Free shops and the rest, 40 percent of the travelers hardly ever buy anything when visiting the airports. When the time spent on shopping at the airports is evaluated, the result denotes the period of 14 minutes. 14 minutes makes 16 percent of the total time spend at the airport before the flight departure (Bush & Storey 2013, p. 26). As the average time used for shopping being relatively short, the importance of perceived time of passengers emphasizes. When considering merely leaving passengers, 45 percent of the TFWA airport shopping behavior survey respondents would arrive at the airport earlier if the variety of services and retail stores were wider. 86 percent of the passengers visited Duty Free or Duty Paid shops when they were leaving for an international trip (Bush & Storey 2013, p. 27).

Retail activity has to be measured as all the other activities and processes. Otherwise, reference values cannot be set, the benefits of support investments and development of

procedures cannot be followed. There are several ways to measure retail activity at the airport and according to Bush & Storey (2013, p. 29) three of them are presented in terms of retail spending per passenger, a penetration rate and retail spend per customer. Retail spending per passenger measures the total till receipts for a given shop divided by the number of passengers using the airport. This calculating method includes also all the passengers who do not consume anything. The penetration rate is calculated by the number of a passenger who spends something divided by the total number of passengers. Retail spending per customer measures the total till receipt for a specific shop which is divided by the total number of customers. In this case, the group of customers refers to the passengers who actually purchase something. The relationship between three measures is: the penetration rate by spend per customer equals spend per passenger. All the three measures can be measured at the level of the retailer, the airport, by route types or by the airline using a given airport.

In addition, passengers' airport spending can also be measured by a number of items they normally buy and further the value of each shopping basket can be calculated. The typical number of items an individual purchase when flying short haul flights within the EU area, is just over 2 with the range of 1.7 to 2.3 (Bush & Storey 2013, p. 30).

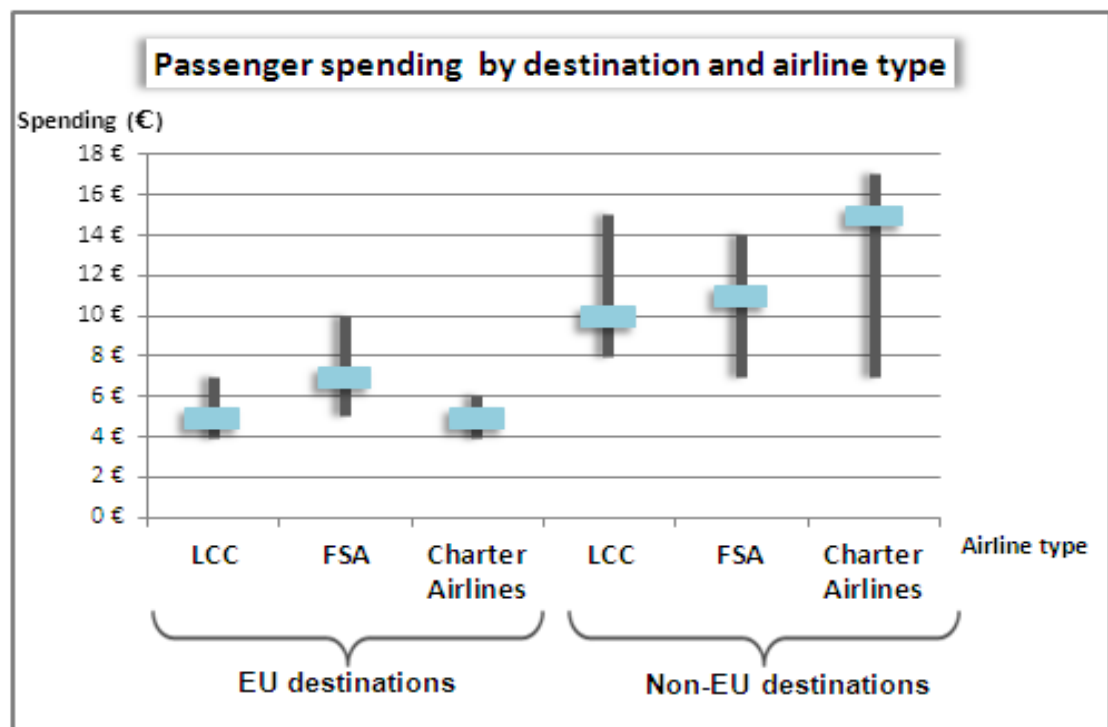


Figure 5. Passenger spending per head by destination and airline type (Bush & Storey 2013, p. 29, modified)

The data from Figure 5 is based on a leading airport retailer in 2010. Figure 5 uses a classification of three main groups of airline types that are low cost carriers (LCC), mainline carriers and package airlines. As the spending at the airport is polarized,

Figure 5 shows the bottom and the top quartile in addition to the medium spending of the passenger. Blue quadrilaterals denote the medium spending of each airline types and destinations. Different airline types and different routes tend to gather passengers with common journey purpose which can be observed by the patterns of spending by the airline operator and by the route. More passenger flow heading to long-haul flights to destinations outside of Europe increases the penetration rate of airport retail. Fuerst & Gross (2014) have also noticed that non-EU passengers have a positive impact on increasing the commercial revenue per square meter at hub airports in the EU. When these matters are added to the higher rates of spending per passenger causes notable differences in the overall consumption per passenger across different types of flights. Figure 5 shows that customers of full service carriers have a habit of spending more than passengers flying with low cost carriers and charter flight.

As seen in Figure 5, longer flight distances consistently mean higher spending per passenger (Freathy & O'Connell 2000). The same effect is shown within the LCC. Airline's operating practices may affect passengers' willingness and ability to engage in airport shopping. The flight passengers of the LCC company Ryanair, for example, their total spending was 10 percent below the median in the year of 2010 than the other LCC airlines (Bush & Storey 2013, p. 30).

2.4.2 Flight passenger's determinants of service demand

At the airports, flight passengers are influenced by internal and external factors in terms of service demand. Also, the situations that passengers are facing during traveling have a notable impact on consumer behavior. Some of the situations can be unexpected like a connecting flight being late, whereas traveling company is usually know beforehand.

The main determinants of flight passengers' shopping intentions at airports are investigated in the research made by Lu (2014). The passenger survey data was collected from two Taiwanese airports and the econometric model was used to evaluate the relationship between passenger's buying behavior and influencing factors. This is performed by controlling the correlation of residuals in the regression models. A passenger's shopping intentions are divided into two groups of planned and unplanned buying.

In terms of pre-planned shopping, enjoyment, values and environment are the top three influencers. Especially, the airport environment has the main attracting motivator for encourage passengers to do pre-planned purchases. Values, environment and famous are the main determinants to support for the impulse-buying behavior. Service also plays an important role for passenger's impulse-buying intentions. In summary, in order to raise passenger's shopping intentions, airport operators' idealistic combination would include valuable products, the wide range of items, low prices, comfortable and stress-free shopping environment (Lu 2014). Some examples of the share of the impulse buying

are between 30-50 percent by means of all spending across a range of airport retail categories. Only for in duty free product categories, the equivalent share for impulse purchases is 50 percent (Bush & Storey 2013, p. 36).

According to Fuerst & Gross' (2014) study that uses a sample of 75 airports in 30 countries, the demographic and social characteristic of a passenger notably influence on spending behavior. A flight passenger's spending situations is affected by many external and internal factors. External factors, such as dwell time and traveling company directly affect the spending pattern. Passengers traveling with a group spend more on F&B than what they would consume traveling by themselves. In terms of extra time in terminal, considerable change in spending can be seen and subject is more examined in Subchapter 2.4.3.

A passenger's intrinsic factors such as happiness and stress-free spirit are crucial traits for a service provider's financial performance. When comparing to the shopping mall field, Fox et al. (2002) accentuate the factors of security and safety. This is emphasized when children and families are involved in the shopping experience. At the airport, the feeling of security and safety can arise along with the increased information in terms of available time, gate distances and customs regulations. More internal and external factors are presented in Figure 6.



Figure 6. *Passenger's internal and external factors affecting service demand*

Once more detailed information about passenger types is involved some consuming related characteristics stand out more than the others. Passenger characteristics of gender, age and income level are taking into account in Lu's (2014) study. Male passengers, for example, prefer to make impulsive purchase decisions at the airport over the pre-planned shopping. Contrary to the male passenger segment in general, pre-planned purchases are done more often by the elder group of passengers. DKMA (2013) reports that most passengers who purchase something at the airport had planned to do so

in advance. The study revealed that 58 percent of the passengers who spent on F&B and 45 percent for retail was planned in advance at home. The corresponding figure of 72 percent represents the share of passengers who had pre-planned their purchased and bought duty free goods. When it comes to a passenger personal income level, a clear behavioral model can be pointed out. The better salary a passenger has, the more impulse buying behavior at the airports was noticed.

As the airport being a complex entity of multiple administrative units, none of them are able function in total independence. Here is one example of the close interdependence between the process unit and a commercial unit at the airports. J.D.Power's (2010) marketing information research claims that the customer happiness is the most important single factor in terms of commercial service utilization. The volume of respondents was more than 24 400 and the field section of the research was conduct in during the year of 2009. The study used six main attributes to determine overall customer satisfaction at the airports of North America. Airport accessibility, a baggage claim, a baggage check process, terminal facilities, security check and food and retail services were the evaluating targets.

According to the J.D. Power's study (2010), flight passengers valued most the ease of the check-in, the speed of baggage delivery, comfort in airport terminals and the required time for security check. However, the areas that did not meet the passenger's needs and expectations were overall seating comfort and smoothness of moving through the airport. Airports with high scores from overall customer satisfaction showed to have a strong positive influence on retail spending. Responded passengers who were "disappointed" with their airport experience consumed on average USD 14 per passenger, whereas USD 20 per passenger on average spent on airport retail if the passenger had a "delighted" with their airport experience. As the results indicate, there is almost 45 percent difference in average spending per passenger in airport retail. A small passenger percentage of 9 described their experience at the airport being "delighted".

When comparing the spending pattern of most satisfied passengers with the group of least satisfied flight passengers, results are notable. DKMA's (2013) research shows that most satisfied passengers are twice as likely to shop and they spend on average 7 percent more on retail and 20 percent more on duty free than to the least satisfied group of passengers. Further, an increment of 0.1 in overall satisfaction when using 5 point scales brings USD 0.8 more from non-aeronautical revenue per enplaned passenger. The study was conduct at fifteen different airports around the world involving almost 30 000 passenger.

International passengers are categorized as good spenders at the airports and especially in duty free purchases. One simple explanation is supported by the regulation of continental passengers not allowed to buy tax free products. Foreigners with high duties

in their home country tend to take more advantage of tax free shopping opportunities while traveling by air. In addition, it is shown that the existence of bars and restaurants attract more retail revenue and generate externalities. On the contrary, elderly passengers have a habit of consuming less at the airports and this apply to the F&B and retail consumption. When taking larger entities into account that may have a moderate impact on non-aviation revenue, is the county's or state's national income (expressed in GDP and GDP per capita).(Fuerst & Gross 2014)

2.4.3 Dwell time and its impact on spending

Time that passenger can decide how to use it at the airports is considered to be a passenger's dwell time. Dwell time spent in airport retail area is an important factor for the commercial revenue of airport operators. In Figure 7, the position of dwell time is presented in relation to airport environment, emotions and non-aviation spending. Dwell time as a factor seem to act in two ways, directly to the non-aviation consumption and as a mediator with the help of created emotions. McAdams & Biggar (2007) have showed that the longer the customer stays at the shopping center or the longer the flight passenger spends time at the airport DKMA (2014), the higher the average spending is.

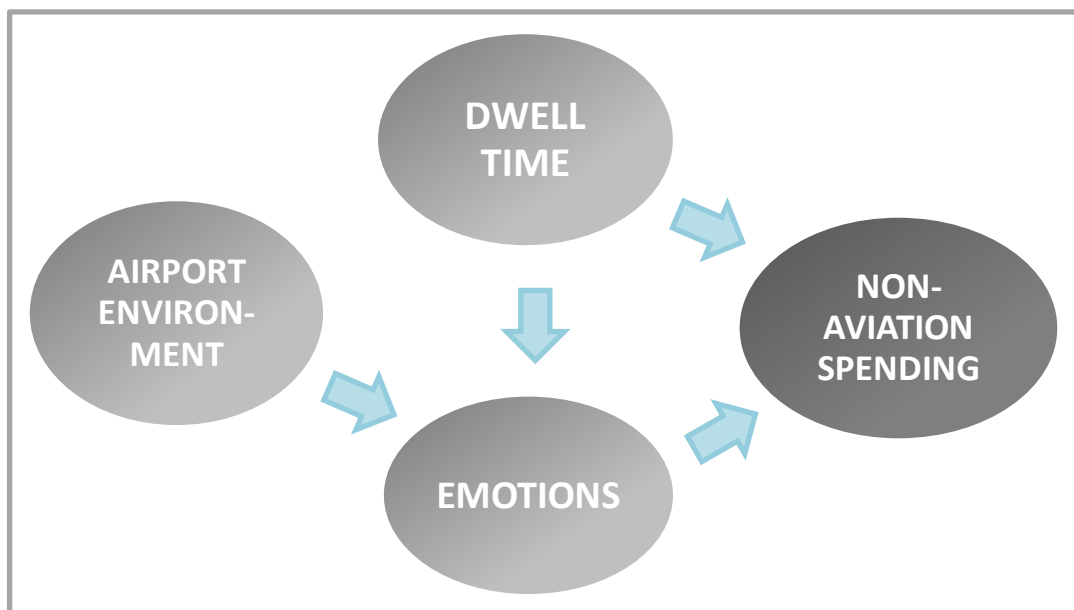


Figure 7. The position of dwell time in terms of airport spending (Bohl 2014, modified)

The airport research (DKMA 2014) shows a clear distinction of passenger's spending pattern in terms of spent time at the airport. Passengers who spend over 60 minutes at the airport are 33 percent more likely consume for F&B, 27 percent for retail and furthermore, 13 percent more duty free. Percentage values are compared with passengers who spend less than 60 minutes at the airport. Another study by Fuerst & Gross' (2014) remark that when the dwell time exceeds over 3 hours, the likelihood of

buying food increase by 31 percent and 19 percent for beverages. Further, the spending amount increases in general by almost 41 percent. Dwell time is also linked to the satisfaction levels and the same research indicates that the group of most satisfied passengers tend to spend 10 percent more time at the airport.

In the shopping mall field, the positive impact of increased dwell time for higher sales has been noticed in practice (Lehtoaro 2015) and there is also scientific support for the matter. The research of Path Intelligence Ltd (McAdams & Biggar 2007) discovered that daily sales of the mall increased by 1.3 percent when the average daily dwell time increased by 1 percent. The study was conducted with a collaboration of Massachusetts Institute of Technology (MIT) in the British shopping mall during nine months from March till November 2007. The FootPath technology was used to collect continuous data from an anonymous shopper's mobile phone transmissions during the test period. The test showed that the dwell time was increased during the days when special events at the mall took place. The connection between decreased dwell time and the busy shopping mall was observed. Customers spent less time at the shopping mall when they felt it was "crowded". Another feature that reduced dwell time was empty retail units at the mall. Empty retail spaces make space less attractive and decrease the shopping possibilities. Relationships between the reduced dwell time, empty retail spaces and in mall events were not significant but still appeared in the results.

One notable thing in terms of dwell time is that there can be a significant difference between real dwell time and passenger's subjective perceived dwell time. Often, passengers feel the perceived dwell time to be shorter than the actual available free time. As the Japanese passengers' being monochronic at the airport environment (Rugimbana & Nwankwo 2003, p. 19), they have preference on rigid time planning in which activity is subordinated to time and they are often a task oriented. Moreover, they also tend to practice low context communication when visiting the airports (Rugimbana & Nwankwo 2003, p. 18). How the available free time is perceived by a passenger has an effect on spending patterns when changing planes at the hub.

2.4.4 Space allocation in international passenger terminal

Space allocation policy on international passenger terminals does not follow a simple guideline due to two main influencers. Driving forces behind the space planning are a process and lucrative points of view, a passenger's processing efficiency and hedonistic passenger experience. If the utilized area for commercial services is relatively small, the attractiveness of those commercial activities can lower. Combination of bad reputation and decreased level of commercial service activities have a direct impact on the commercial revenue.

Even though, larger space utilization for commercial activities may attract more flight passengers during the rush hours, there are other important features for an airport

operator to taking into notice. One of them is airline operators who represent one customer segment for an airport operator. In addition to commercial services and airline operators, public facilities require significant space in international passenger terminals. Larger areas for public facilities enable a flight passenger to move efficiently through compulsory process points such as check-in counters, security checks, passport controls and boarding gates. Consequently, high service level of necessary controlling points release extra time for passengers to use commercial services.

A number of customers at peak hour and average space per customer can be useful tools for estimating and calculating required space for a store. Maintenance and operation costs are also worthwhile factors to pay attention when estimating optional store size (Hsu & Chao 2004). For instance, in some restaurants, the opening hours of 24/7 can become more profitable than long service hours with opening and closing stages. Opening and closing stages can increase the operational costs notably. In order to maximize commercial revenue and at the same time maintain the good passenger service levels, an airport operator has to be well-informed about the source of cash-flow while making decisions of distributing different types of stores in different areas of the terminal (Hsu & Chao 2004). Therefore, there are several mathematical models developed to produce guidance for space allocating commercial service. One of them is Hsu & Chao's model that is presented below.

According to Hsu & Chao's (2004) case study, passengers' spending amounts can be distinguished and the external reasons for commercial revenue variations in different terminals can be identified. The case study was conducted at Chiang Kai-shek International Airport (CKS) in Taiwan with its 36 operating airlines and 18,7 million passengers (2000). The CKS's case is aimed to demonstrate the determination of allocating space for commercial services and its consequence. Only larger and a notable result producing commercial services in the terminals 1 and 2 are taking into account in this case due to the data limitations. Commercial services that are included in this particular case are restaurants, general stores, duty free shops, banks and insurance services.

There are seven estimated and the calculated segments of the model that advice allocating spaces commercial service in international passenger terminal. The main 7 categories that are: an extra walking distance for undertaking commercial service, the shortest time required for undertaking the commercial activity, a time required for undertaking commercial activity, the ratio of passengers who use commercial services, an average space required per consumer for undertaking activity, an average consumption per customer undertaking commercial activity, a concession charging ratio per store revenue.

The model used in the case emphasizes the meaning of an extra-walking distance to the

services. The daily maximum money based value can be calculated accurately if the instructions are obeyed. According to the case study, the stores and other commercial services are located in a specific order within an average of 10 meter extra-walking distance in control area or in the non-control area. Banks, insurance services, duty-free shops are located in the first round to the immediate proximity of the meeting points. In the second round, restaurants and general shops are placed in the remaining space.

At Chiang Kai-shek International Airport (CKS) in where the case study was performed, 30 percent of the total space is used for commercial activities in the departure areas, whereas the equivalent share in arrival areas is 13 percent. All the used spaces for commercial services are achievable of an average of 10 meter walking distance. The designed passenger volume and its service demand is one directional feature in terms of service space allocation. Used time for commercial service activities naturally reduces the total time budget of a passenger. If a passenger is arriving late at the airport, he or she may not have time sufficiently for consuming due to additional walking distances in slightly more remote locations of the terminals.

However, the commercial service level can suffer if the capacity of commercial services is inadequate in certain terminals to serve passengers during the peak hours. Terminal 1 at CKS's Airport has this problem of too small commercial space for the rush hours. Therefore, in this case example, the average consumption rate of a passenger is USD 7 less in terminal 1 comparing with terminal 2. It is suggested that airline operators could move more of their activity from the terminal 1 to the terminal 2. By smoothing the passenger volumes between the two terminals, the service level and commercial revenue can improve. If the passenger volume in terminal 1 is reduced from current 78 percent to approximately 42-49 percent, the non-aviation revenue reaches its highest potential increasing over USD 100 per day.

The case results indicate that stores with high revenue per square meter per unit time should be located more accessible spots by the airport operator. More accessible position means higher volumes of passenger traffic bringing an increased number of potential consumers to smaller surface area (Hsu & Chao 2004). Moreover, the positive spillover effect can be present if there are a lot of retail outlets and other commercial activities located in the immediate proximity (Fuerst & Gross 2014). Even if the required space for the commercial services increases proportionally along with passenger volume, the revenue from the commercial activities does not increase by the same proportion (Hsu & Chao 2004).

2.4.5 Eliminating barriers to use commercial services

Time optimization and with the low feelings of stress and anxiety of passengers are the key components behind the service availability ideology. Additionally, lack of

information of available services can be classified as a barrier to use commercial services. According to Kumar & Thakur's (2014) explorative research at the shopping mall, there is a significant reliance on ease to find the product and customer stimulation towards shopping and shopping malls. Further, the same research showed what triggers an attraction for going shopping malls is that customers are very interested in purchasing new products from the new product categories.

The locations, distances and further time span impacts of the free services in relation to the commercial ones ought to be carefully considered through. A relaxing free of charge lounge area is not necessary desirable to locate immediate vicinity of commercial lounge services. However, if the free lounge is situated next to a kiosk kind of retail service, the situation can be a beneficial layout solution for all parties. Passengers have a temptation to stay longer near the shops, cafes and kiosks and in consequence, to consume more. Nonetheless, subject to a charge lounge areas offer versatile supplementary services its clientele, and hence the services are not equally comparable.

According to 30 000 passengers from fifteen airports around the world who answered DKMA's study (2013), finding information of airport services was regarded as challenging. Passengers have to hunt to find the information related to airport services and often the available information is limited to the list of locations and list of the name of the shops and brands. In terms of preplanning consumption, all communication channels should provide real time information about the service locations, product categories, newcomers, be interactive and generate conversations among the readers. Most effective websites and online channels are engaging, active, emotional and produce non-commercial contents.

Barriers to consume are emerged in the research of investigating factors that influence on passengers' shopping intentions at airports made by Lu (2014). 500 questionnaires were distributed to flight passengers at two Taiwanese airports and 176 of the respondents did not purchase anything. Among these 176 respondents, the high price level (45 percent) seemed to the cause reluctance to consume and 40 percent explained them not simply needing anything. Only 20 percent of the group of not spending, told the lack of time, too few items to buy or not interested in shopping in general affected the zero consumption. A low current budget was the situation for 7 percent of the passengers.

One of the barriers to use commercial services is queuing time at the service operators. This especially accents at the airport environment. Volkova (2009) states, apart from high stress level of the passenger, the increased level of crowding has a straight negative impact on retail sales. According to Sheu et al. (2003), the service operator can potentially lose a customer if they have to wait in line to the service. In the service industry, it is suggested that no feature of customer service is more override than

waiting in line to be served. Even if a queue would move rapidly, a passenger can be a lost customer due to the visual sight and prejudices of long waiting times. The risk of losing the potential customer in line can be higher if the intended purchase has not been planned beforehand. When a customer is doing an impulse buying, even a small negative external stimulus can easily invalidate the purchase process. Queuing, and particularly avoiding it, offers concrete challenge for developing more advanced technological reservation systems, alternative payment methods, accurate demand forecast and service design processes. Some fast food restaurants, like McDonalds, smooth their high service demand peaks by taking orders in before a customer gets to the cashier.

According to the TWFA (Tax Free World Association) Global airport travel consumer survey, which was conducted at European airports in the year of 2011, 14 percent of the European travelers did not make a visit to the Duty Free or Duty Paid shop and the main reason (24 percent) was that passengers did not want to carry any more items. 23 percent of the respondents who did not enter the Duty Free or Duty Paid shop told the problem was directed to the lack of time and 22 percent appealed to the perception of the price level being too high in comparison with the domestic market.(Bush & Storey 2013, p. 27)

Depending on the airline type and the destination of the flight, the selection of on-board sales of the airlines can have an effect on the consumption at the airport. Within the EU region, for instance, flight passengers are not able to purchase from product categories of foodstuff, alcohol and tobacco (Bush & Storey 2013, p. 30, 36). Still, the selection of items and services are substantially wider at the airports, even though many airlines desire is to increase their revenue per flight passenger in terms of on-board sales.

As the non-aviation spending at the airport is beneficial for all parties, the equilibrium is sustained by airlines' preparedness and willingness to take airport purchases on board and the commercial drive of the airport. Most airline operators approve to bring on board purchased shopping items at the airport in addition to their other cabin belongings but recently, there have been signs that these operational principles are going to change. The beneficial equilibrium can be harmed if the strict policy of one cabin bag regulation came into use for all airline types (Bush & Storey 2013, p. 55). The strict cabin bag policy can be regarded as a commercial issue between airports and airline operators (Bush & Storey 2013, p. 35).

Nowadays, more and more airline operators charge for a check-in baggage. Consequently this creates a financial incentive for passengers to increase their carry-on baggage (Bush & Storey 2013, p. 33). The size of the cabin bag is standard regardless the airline but lack of the consistent policies of allowed luggage weight within the airline operators in terms of a cabin bag may cause confusion among the passengers.

The item can be left on the shelf of the duty free store before the first departure because the passenger cannot pack the good to the check-in bag in a return trip. It is shown that there are direct financial impacts of the “one bag rule” for airport retail. At the time, the restriction came in to a practice the sales drop 12 percent during the year 2009 of one airport retailer.(Bush & storey 2013, p. 37)

According to the passenger survey made by Bush & Storey (2013) for the worldwide professional association of airport operators (Airport Council International EUROPE), the “one bag rule” has affected up to 25 percent of the flight passengers but most affected around 15-25 percent of the travelers who had been dissuaded from buying retail purchases. The estimated annual lost per a departing passenger is EUR 1.12 in retail revenue in consequence bag policy restrictions. The impact of the cabin bag varies between the airports depends on their traffic proportions subject to cabin baggage policies. Airports with a very low proportion of such traffic have the equivalent figure of EUR 0.89 departing passenger. The survey was conduct at eight European airports which collectively accounted for almost 95 million passengers in the year of 2011 (Bush & Storey 2013, p. 44). Other barriers to use commercial services at the airside of the airport are presented in Table 5. Part of the contents in Table 5 is based on researcher’s own observations, experiences and reasoning.

Table 5. *Barriers to use commercial services at the airport*

Barrier	Impact	Mitigation
Lack of time (Lu 2014), Lack of information available (DKMA 2013)	Low service utilization, increased stress levels	Change perception of available time, Easy way finding
Increased stress levels (Volkova 2009)	Not interested service utilization	Compulsory processes to be as smooth as possible, Increased dwell time
Boredom, Lack of service (Volkova & Müller 2012)	Passenger becomes passive and stays in one place, lower satisfaction	Events, Unexpected experiences, Wending machines (Best Buy, Ben & Jerry’s, Sephora), Flying simulations
Inadequate service capacity during rush hours (Sheu et al. 2003)	Long queue times, passengers dwell time decreases, less services are used, risk of losing customers, crowd	Ability to order the food in advance when the preparation time is saved, Passenger volume design between terminals
Hierarchy of guidance:	Commercial services	Visible brand logos, reserve

Barrier	Impact	Mitigation
Process over commercial	have a little guidance and services utilization can be low	separate spaces for commercial guidance (not competing the process related guidance)
Free services locate immediately proximately to commercial ones	Passengers prefer to use free of charge services, sales revenue decreases	Effective layout design, Emphasize of commercial services, Relocation of free services
Language challenges	Slow down the purchase process or the product remains unpurchased	Digital compiler, Translations in most used languages, Staff member's good language skills
Unawareness of currency rates	Passengers are less likely to do impulse purchases, make their purchase decisions more cautiously	Converted prices on displayed in most used currencies, Promotion of mobile app for currency rates
Legislation of duty free products (Bush & Storey 2013)	Passengers are less likely to do impulse purchases	Enhance information transparency
Policies in terms of carry-on baggage of different airlines (Bush & Storey 2013)	Passengers do not purchase items, uncertainty in terms of buying decision	Clear information channel to passengers
Information gap for consumers (Bush & Storey 2013)	Information rely on previous visits and family members' experiences	Information of up-to-date services via digital platforms, Separate channel for product queries

Individual's primary focus is on the travel details include the time, a date and a ticket price. A passenger may have to consider other features of the journey in advance like for instance preferential boarding options. The access to the wanted service provider seems somewhat to be complicated. At the time of booking the flight tickets, the link to the airport service opportunities is likely to be under-processed. At present, this gap of information is fulfilled with the previous experiences or opinions of friends and relatives. However, one notably is that if flight tickets are purchased several months before the flight, the desires toward a certain product or brands can be changed. The availability of service selection is reliant to the chosen airline operator and the destination of the trip. If passengers have substantially faulty and imperfect knowledge

of the product they are buying at the time they can act on that upon information, then the market may not work as well and efficient as it should.(Bush & Storey 2013, p. 51)

There are development suggestions in terms of determinants of commercial service utilization and spending at the airport. One improvement option is to enhance information transparency for passengers to reduce passenger uncertainty to some degree (Freathy & O'Connell 2000). In some cases, airlines obey different baggage policies at different airports. Airline operators could outline their information flow to their passenger only to the needed information prior to those required two or three airports that a passenger visits during the trip. However, all this ought to be presented and organized in a way to avoiding passengers' feelings of information overload. The same information would be required to display to passengers when they are doing the online check in and print their boarding cards. This is often much closer to the moment of flight itself and the airport experience. With the help of this rule suggestion, passengers would fully aware of the shopping opportunities at the airport via the ticket purchase. The next step is that whether passengers are motivated or otherwise able to act on upon information given at that point of time.(Bush & Storey 2013, p. 58)

Another development option is for enchanting rights for air passengers. This option would restore flight passengers' expectations and wishes related to the carriage conditions of all European airports. Clarification would consist of notice that passengers would be allowed to bring one carrier bag of goods purchased at the airport in addition to any cabin baggage by the airline. The proposition also comprises that airline operators would keep carry-on baggage included in the flight ticket price without extra charges in the future. This should add the collaboration between the airport, airport service operators and the airline operator to further develop the available range of services provided at airports. One reason of restoring passengers' choice and confidence is that it helps to generate revenue and value-adding activity at airports.(Bush & Storey 2013, p. 59)

2.5 The use of the technology for increasing the demand

The significance of information technology is only gaining more and more ground in the service industry. This can be seen in a remarkable shift in favour to an e-commerce. Often, the customer gets a first mental image of the brand its services through internet. Therefore, the websites and other technologic platforms of the service operators play an important role for inducing potential new customers and at the same time retain current customers. Besides the internet, the information technology makes possible to fast reaction to constantly changing demand by providing real time information and feedback of the service that an employee has served. If there is a weak interaction between a customer and an employee due to technical difficulties or other reasons, the service process can receive a reputation of a low quality.(Grönroos 2001, p. 381)

When creating service processes by means of information technology, fewer resources are needed from the service provider. Furthermore, the wider range of services and better service quality can be obtained at the same time. The usage of the different input configuration can produce significant cost savings (Grönroos 2001, p. 220-221). Tovar & Martín-Cejas (2009) showed in their study, among the Spanish airports, that higher commercial revenue is in a line with the use of above average technical efficiency. Further, the same research indicated an outsourcing of the non-aviation activities enables airport operators to focus on their core services and further, improve their competence. Figure 8 collects advantages that are gained through technology based solutions.



Figure 8. *Advantages of technology based solutions*

In the near future, more and more increment of service demand is believed to gain through the use of digital solutions. The best combination to increase service demand is to operate with the combination of a good product, service, digital and experiences. Competing purely with prices rarely ends up a successful outcome in the long run. The possibility to copy is notable lower when the good service and uniqueness are present in consumption. Moreover, experiences and especially unexpected experiences implemented via digital surfaces are one way to separate oneself from the competitor.(Östring 2015)

If there is a direct channel between a passenger and a service operator or an airport operator, there would be a better apt supply for the demand and better knowledge and

understanding about cultural preferences. Real time feedback with the help of tablets for instance, would provide reliable and substantial number of responses. Later on, if the same pattern of satisfaction levels of responds repeats, then the challenging situation can be predicted. Forecasting a possible forthcoming problematic situation provides time to act even before the challenging event has occurred to passengers. With the help of a predictive management system, passengers' feelings of nervousness and disappointment can be avoided and instead remain satisfaction level high.

Table 6. *Technology applications to increase service demand*

Advantage of free Wifi connection
Increased level of information of available services
Emphasis of popular product or service of the week
Ability to modify the supply of services depending on the traveling seasons
Brand logos more visible
3D Printing technology
Possibility to reserve products and services
Online service for product queries
Mobile cashiers, alternative payment methods at rush hours

Table 6 represent technology applications to increase service demand. Technology as a service channel enables an individually directed service and electronic service path would pass on information to passengers while their stay at the hub. The system would inform the available services that are located along the path from the arrival gate to the departure gate or immediate proximity. A service path would not necessary provide product related information due to the risk of information overload but would give more time passengers to plan their spending. Moreover, the visibility of brand logos eases a finding of services and attracts the attention of potential target group. Familiar brands can give passengers a sense of security or remind their home country.

Digital screens would emphasize one service or popular product of the week. This would be helpful for passengers who are buying gifts for their circle of acquaintances or for their business partners. Method of the best seller product is used for example in cosmetics, books and clothes. A Dutch clothing retail company, C&A, uses special hangers that display the “likes” a particular product has received on Facebook. This would be more continuous service or product emphasis that unifies tenants' action. Furthermore, the same screens could allow passengers to add product pictures, score services and products of the airport so that airport service operators would be able to follow their performance in real time.

Digital solutions not only improve the demand for existing services but they also create needs by providing new services. An automated cupcake making vending machine and a manicure vending machine are examples of newer services that are not dependent on to specific business hours. Especially at the airport environment, the services available around the clock are emphasized due to layover passengers and passengers with long transfer times. A supply of unusual services offers stimulus and interactive act for passengers who lack of interesting activities at the airport. The service utilization can be seen as a social event at the same time.

Besides the will to increase service demand with the help of technology, motivation towards create added value, provide sense of get one's money's worth and personalized shopping experience is strongly present. By using 3D printers for food and retail product categories, customization features are able to carry out through smaller time and monetary resources. The amount of tied equity on finished products is smaller when using 3D printing technology. The risk of lost sales is smaller when the tied equity is on smaller components.

Good satisfaction level of passengers has produce results that satisfied flight passengers are connected with higher average spending. At the sixth time best voted airport in the world, Changi in Singapore, has used an instant feedback system (IFS) as a part of an extensive program of SWIFT (Service Workforce Instant Feedback Transformation). SWIFT is used in the bathrooms alone saves EUR 1.3 million a year (CAG 2010) by reducing paper consumption, employee needed time for maintenance and housekeeping. IFS used touch screen devices for receiving passenger's feedback and it has generated 54 times more feedback than before the trial. Touch screen devices were placed at the key touch points of Changi's airport like check-in, immigration, information counters and retail satisfaction. Changi Airport Group (CAG 2010) explains that improved Customer Service Satisfaction Index results are a consequence of tight collaboration with tenants, contractors, government agencies, partners that also account stakeholders involvement.

Resistance to change and ability to adopt new at the airport environment can be considered relatively low. Passengers are often out of their daily routine and they face representatives of different nationalities and a different course of action in the international atmosphere of an airport. However, there can be individuals who may think that some applications collect too much personal information for instance following the movement in the terminal can cause negative feelings related to privacy issues. Other drawback in terms of technology based solutions is large investments at the beginning, the relatively fast decay of electronics and a risk of information overload.

3 FIELD EXPERIMENT

A field experiment is performed in order to achieve the main research object of increasing commercial service demand by offering technology support for customers. At the same time, the goal is to understand what are experienced consequences of using the technological application on the people flow and can the service demand be increased at the airport environment?

As the usage of the mobile phones is constantly increasing and the cell phone gains a more important role as a control device for multiple smaller remote devices, the demand for charging is present. Consequently, charging frequency has increased becoming a part of a daily routine rather than several years ago once a week kind of a task. At the airport environment, lack of time while changing planes can be seen as a barrier to use commercial services. Combining these two challenges, a need for charging batteries and scarce of time provide a starting point for the field experiment. The main goals are to activate passengers to move within terminal, increase their dwell time, decrease stress levels by fulfilling one basic need for charging phone while using services. Additionally, the field experiment determines the overall interest towards the possibility to charge a phone on the move and not being obligated to stay in one place next to the power socket.

3.1 Background information of the experiment

Before making the decision of starting the portable mobile phone charger pilot, the researcher studied the starting point and evaluation of the present state of passengers' behavior in terms of charging of electronic devices. The evaluation was conducted by observation and interviewing F&B operators and few passengers in the Schengen and in the non-Schengen areas.

The following matters came out from the evaluation. Every F&B operator told that charging possibilities have been asked which tells the relevance need for charging electronic devices. Furthermore, the observation of high utilization rate of the fixed power stations was made. It seemed that the average time for charging the mobile phone is 30 minutes next to the power socket but the determining factor for charging was the transfer time. Most of the time passengers who charge mobile phones were alone travelers and the common place for charging was close to the departure gate. Also the observations about types and models of electronic devices that passengers were seen to use. There are portable chargers on sale at Helsinki Airport but the problem is that

recently purchased portable charger does not create immediate value if the charger has to charge about four hours before the first use.

Despite the cultural diversity of the hub, the classification of basic needs unifies the segment of transfer passengers. Often the most visible differences are the superficial ones. Maslow's hierarchy of needs is a psychology based theory that clarifies the human motivation and explains what kind of factors guide the behavior (Maslow 1987, p. 15). The theory of needs is often represented in the shape of a pyramid that consists of five levels and each level denotes the needs of an individual. The importance of needs follows the line from the bottom to the top of the pyramid, the lowest level being the most powerful need.

The levels from the bottom to the top are physiological, safety, belongingness and love, esteem and self-actualization. Fundamental needs are placed at the lowest level of the motivation theory and the section can also be referred to physiological drives. Breathing, food, water and sleep are examples of physiological needs. The second layer of safety needs encompasses security in terms of body, family, health, employment, property and resources. At the third level, family, friendship and partnership fulfill the needs of love and belonging. Confidence, achievement, self-esteem, the respect of others and respect by others are part of the fourth level of needs of esteem. Top of Maslow's hierarchy of needs pyramid concerns the theme of self-actualization. Self-actualization occurs in individual creativity, spontaneity, morality, problem solving and lack of prejudice. (Maslow 1987, p. 15-22)

The hierarchy of needs follows the ideology that before moving to one level to another, the lower level of need has to be fulfilled. A person who is lacking safety, esteem, love and food may not be primarily interested in satisfying the need for confidence. The dominating goal is probably to fulfill the craving for food. However, there are exceptions that have an effect on the hierarchy of needs. The most common reversal in the hierarchy is that for some people, self-esteem seems to be more important than love. (Maslow 1987, p. 18, 26)



Figure 9. Hierarchy of needs of a transfer passenger

As the original Maslow's hierarchy of needs being classified into five stages but in this case, the pyramid is cut down to three main categories of needs of a transfer passenger. Transfer passengers with different transfer times have various needs, wishes and expectations in terms of the service supply at the hub airport. Even though there are fluctuations between the steps, Figure 9 outlines the needs into categories of basic needs, secondary needs and spare needs.

The ground level of the hierarchy of needs represents the basic needs that a transfer passenger primarily wants to conduct and expect to be taken care of. Basic needs concern every transfer passenger regardless the age, gender, nationality or purpose of the trip. The Wi-Fi connection will not create value if the battery of the phone is dead. That is why the basic need in the first stage ought to be fulfilled before to the sequential level of needs.

More leeway is expected between the primary needs and the spare needs. A gift buying and the use of Wi-Fi belong to the stages of secondary needs. A passenger might have children for example waiting at home whose are expecting to receive some gifts when their parent arrives. The passenger may feel obligated to inform to his or her next of kin that he or she has arrived at the hub. Communication is performed at its best by means of Wi-Fi connection if the costs of the telecom operator want to be avoided.

Not for all transfer passengers the take-away food is a secondary need due to the served meals on the plane. However, the assumption is that the longer the flights are the greater

the spendings on F&B is. Fuerst & Gross (2014) set the time frame of three hours that the likelihood for spending on food increased by third and for the beverage on one fifth if the dwell time exceeds the three-hour time frame.

A transfer passenger with a substantial amount of dwell time before the next flight may have higher expectations in terms of shopping possibilities, selection of restaurants, comfort and relaxation. In order a transfer passenger to fulfill the secondary needs, there has to be more dwell time in addition to the time spent on basic needs. A traveler with low stress levels has better prerequisites towards not pre-planned purchases and usually the stress personal free time at the airport.

In addition, the lengths of the flights and time differences of a transfer passenger have an effect on the needs and their priorities. If a passenger's internal clock is at night time, his or hers basic need in terms of a hub can be relaxation and sleeping if the enables such activities. Further, the needs and expectations are dependent on the travel company and the purpose of the trip. A single traveler business man or woman supposedly wants to read work emails or prepare for upcoming meetings. Due to scarce internet connections in planes, these actions are usually directed to the airports. In contrast, holiday travelers' needs and expectations in terms of nutrition at the hub airport are more likely to include a peaceful meal and new experiences.

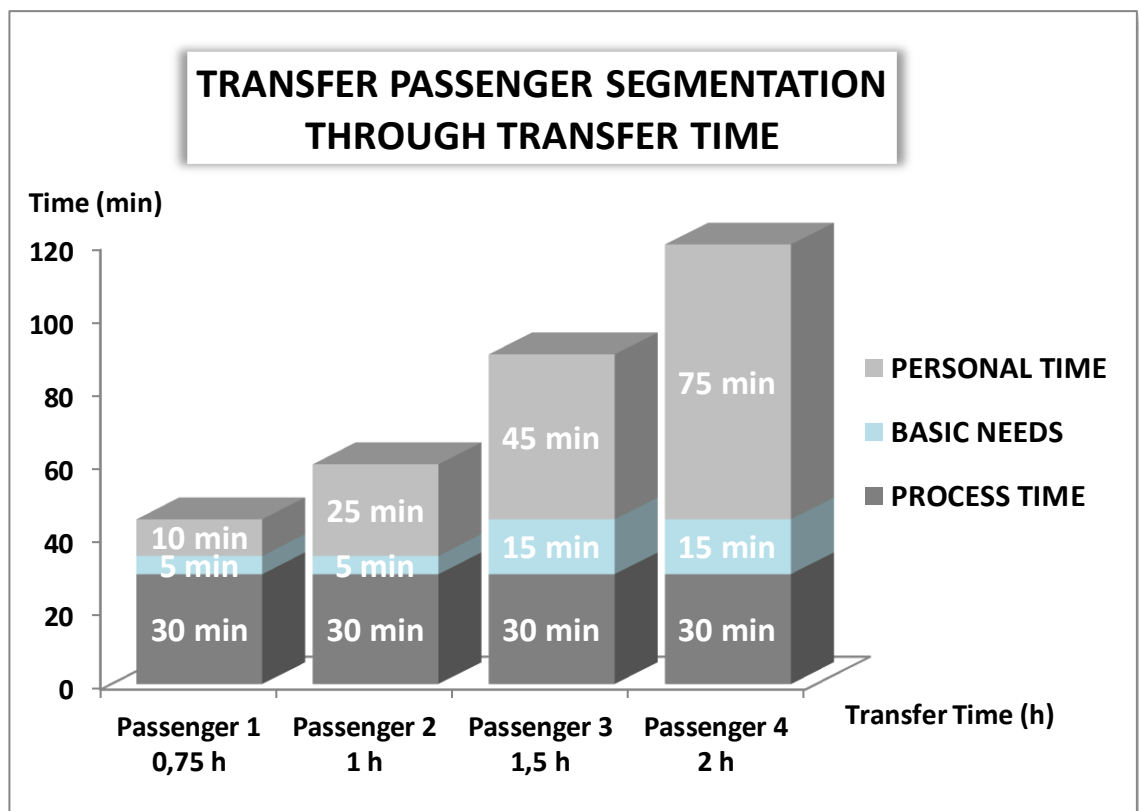


Figure 10. Segmentation of transfer passengers through transfer time (Knuutila 2015, modified)

Figure 10 shows four categories of a passenger types in terms of transfer time. The total transfer time of a transfer passenger is measured from the moment the plane lands and until the boarding of the connecting flight will be conduct. Time periods used for transition from the plane to the security check, waiting time at the security check and passport control are included in the process time. Process time remains stable despite the total transfer time. However, the process time is dependent on the passenger volume that differs strongly on the time of the day at the airport. Helsinki Airport is known for its short transfer times and the minimum connecting time between flights from the non-Schengen area to the Schengen area is 35 minutes. Nevertheless, the most common transfer time at Helsinki Airport is two hours. Personal time includes the walking time through the commercial space.

When observing a service point of view, different passenger segments, traveling company, airline type, a destination of the trip and purpose of the trip have an influence on what kind of services are appreciated and utilized at the Airport. A passenger type 1 or 2 does not necessary give value for slow food restaurant concepts if he or she does not have possibilities use services due to time constrains. Passengers with more personal time at the airport have more freedom to choose among the service providers. Personal time decreases the stress levels, which increases the likelihood of impulse purchasing further. Transfer passenger types 3 and 4 are expected to have higher commercial value for the airport operators. For these reasons, the field experiment is focused on serving the passenger types of 3 and 4.

As the dwell time and its impact on sales in the shopping mall environment are presented in Subchapter 2.4.3, the theory can be applied to transfer passengers' consumer behavior at the hub. McAdams & Biggar's (2007) theory obey the formula of daily sales increasing by 1.3 percent when the average daily dwell time increases by 1 percent. In the case examples of passengers A and B, EUR 20 is the imaginary average consumption at the hub.

Passenger A

- 1) Old dwell time 30 min
- 2) Dwell time increment of 15 min, total dwell time 45 min
- 3) Dwell time increment 50.0 %
- 4) Placement of the variables to the expression

$$20.00 \text{ EUR} \times 1,013 + 0.500 = 30.26 \text{ EUR}$$

$$30.26 \text{ EUR} - 20.00 \text{ EUR} = 10.26 \text{ EUR}$$

- 5) Consumption increases 10.26 EUR

Passenger B

- 1) Old dwell time 45 min
- 2) Dwell time increment of 15 min, total dwell time 60 min
- 3) Dwell time increment 33.3 %
- 4) Placement of the variables to the expression

$$20.00 \text{ EUR} \times 1,013 + 0.333 = 26.92 \text{ EUR}$$

$$26.92 \text{ EUR} - 20.00 \text{ EUR} = 6.92 \text{ EUR}$$

- 5) Consumption increases 6.92 EUR

In Figure 11, a 15 minutes dwell time is added to the free times of 15 minutes, 30 minutes, 45 minutes, 45 minutes, 60 minutes, 75 minutes, 90 minutes and 120 minutes. The imaginary average consumption per passenger is EUR 20.

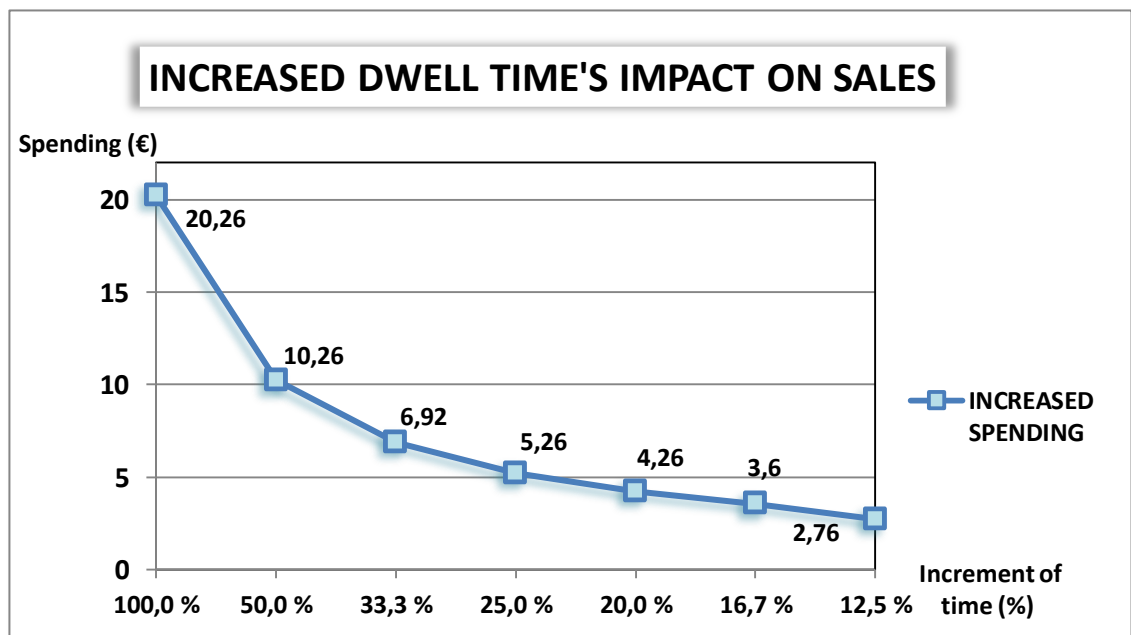


Figure 11. Increased dwell time and its impact on sales

However, the theory by McAdams & Biggar's (2007) is recommended to have limit values when the mathematical method can be implemented in actual spending environment and when not. A value curve is not necessary valid in real life circumstances in very short dwell times and at the same time for very long dwell times. If the dwell time increment is 50 percent from 4 minutes to 6 minutes, the impact on consumption will not supposedly be the same than in the case of a passenger A when the increased spending is EUR 10.26. The same hypothesis goes the most likely in longer dwell times, for instance a dwell time increment being 33.3 percent from 3 hours

to 4 hours. An hour increment to already long dwell time may not have a notable change in a passenger's consumer behavior.

3.2 Research method

The experiment is chosen to conduct in a real environment instead of laboratory circumstances for several reasons. Firstly, the daily passenger flow of almost 44 000 people offers good initial situation for field experiment. Secondly, the case company, Finavia, has good preparedness and other resources to implement development ideas and pilots into practice. Thirdly, the laboratory test environment would have been difficult to carry out not forgetting high arrangement costs.

The field experiment is a combination of qualitative and quantitative research methods because the combination supports best the set goals for the experiment. Observations, feedbacks, comments and the field experiment itself represent the qualitative methods, whereas a business point of view and the share of return of portable chargers are included in the quantitative research methods. Yin (2013, p. 11) recommends using a field experiment as a research method if questions like "why" or "how" a prototype experiment either work or not need to be answered. Rugg & Petre (2007, p. 35) and Shadish et al. (1979, p. 5) states the field experiment being a try out in a natural environment and see what happens. In the case study, the setting would be conduct once but in the field experiment, several samples are carried out. As for the feature that distinguishes a field experiment from a field study, something is changed in the experimental setting (Rugg & Petre 2007, p. 71).

Field experiments test real actions rather than relying on answers through case studies and surveys (Rugg & Petre 2007, p. 65). There can be differences between what people answer in interviews and surveys than how they would act in a real situation. However, field experiences do not provide answers to all questions, like for instance what motivates people to behave better in the area of health care (Rugg & Petre 2007, p. 66). One of the challenges doing a field experiment is that the possibilities to control what kinds of people are taking a part of an experiment are either very limited or impossible. However, a controlled field experiment, that is also conduct in this research, enables to constrain disruptive variables so that the wanted experimental subject is more exact directed (Campbell & Stanley 1963 p. 51; Rugg & Petre 2007, p. 66). Another notable feature in field studies is that it can be time consuming to set up an experiment in a real environment and be in contact with all the interest groups and other parties (Rugg & Petre 2007, p. 72).

Shadish et al. (1979, p. 498) advice three points to taking into account in conditions in which the field experiment is expected to conduct. Firstly, a large sample is desirable to have in order to detect effects. Secondly, efforts to reduce the influence of extrinsic and undesirable variation are worth to use time for and the usable techniques are through

experiment design, measurement and statistical manipulation. The studying of implementation quality represents the third recommendation.

Different kinds of observation techniques, feedback and user experience are gathered directly by the promoters from authentic situations and from actual flight passengers. The only systematic data that promoters collect on certain distribution sessions is participant passengers' flight numbers. Promoters also have their primary goals to achieve in addition to distribution of chargers. That is why observations are conducted. Part of the primary data collection is conducted through primary observations, a complete observation, structured observation and participant as observer techniques. According to Saunders et al. (2009, p. 296) the primary observations can be described as a working method where an observer notes what happened, was seen or said at the time. The researcher performs the complete observer's role in the last two distribution sessions.

As the field experiment involves several individuals from different parties at the airport, they are also being taken into account as a resource of information in terms of passengers and portable mobile phone charger users. After each distribution session, promoters are interviewed by semi-structured interviews because they have the customer contact and they are able to witness and sense the reactions of the counterparts. Semi-structured interviews enable the researcher and participant to engage in a critical reflection of the data and further, semi-structure interviews allow room for exploring junctures of perceived experiences (Galletta 2013, p. 94). As the researcher collects the used chargers from the departure gates, those gate officers who are available are heard for fact-finding. The gate officers who receive chargers from the passengers are asked by open interview whether they have heard comments, feedbacks or proposals for improvements related to the concept testing or the usage of portable chargers.

The chosen features in this particular field test are human-centered, user-centered and process-centered (Koshiba et al. 2013, p. 281). Flight passengers and more specifically, transfer passengers are playing the key role of that human-centered and on the same time user-centered sides of the field experiment. One goal for the experiment is to understand more passengers' consumer behavior and their experiences in terms of having technological support at the airport. Passengers are the end users of the experiment. The technical side of the field experiment represents the process angle of approach. This contains the technical compatibility between the passengers' mobile phones and portable chargers. Further, the charging power of different mobile phones is considered a part of the process point of view of the field experiment not forgetting other sections such as the physical places of returning the used chargers.

In addition to three features of human-centered, user-centered and process-centered, a business point of view is also studied. The quantitative approach of the field test does not only stand for the follow-up of the number of delivered and returned portable

chargers but also the cost-benefit analysis of the field experiment. According to Creswell (2013, p. 64), quantitative approach to research is used as a broad reasoning for attitudes and behavior. In addition, a quantitative research method can support presumptions with constructs, variables and hypothesis. Newman & Benz (1998, p. 10) describe quantitative research including the control of variable, randomization, reliable and valid measures. The goal is to generalizability from the sample to the larger population. It can be seen that, the more numerous and independent the course of actions in which the experimental influence is demonstrated, the less numerous and less plausible any singular or separate rival invalidating hypothesis becomes (Campbell & Stanley 1963, p. 36).

Newman & Benz (1998, p. 10) compact the data in quantitative research being coded according to operational and standardized definitions. Connections between participant passengers' destinations, locations of the departure gates and boarding times for returned and unreturned chargers are studied. Airport operator does not have any information in terms of passengers whereas airlines are aware of passengers' nationalities, destinations and contact information.

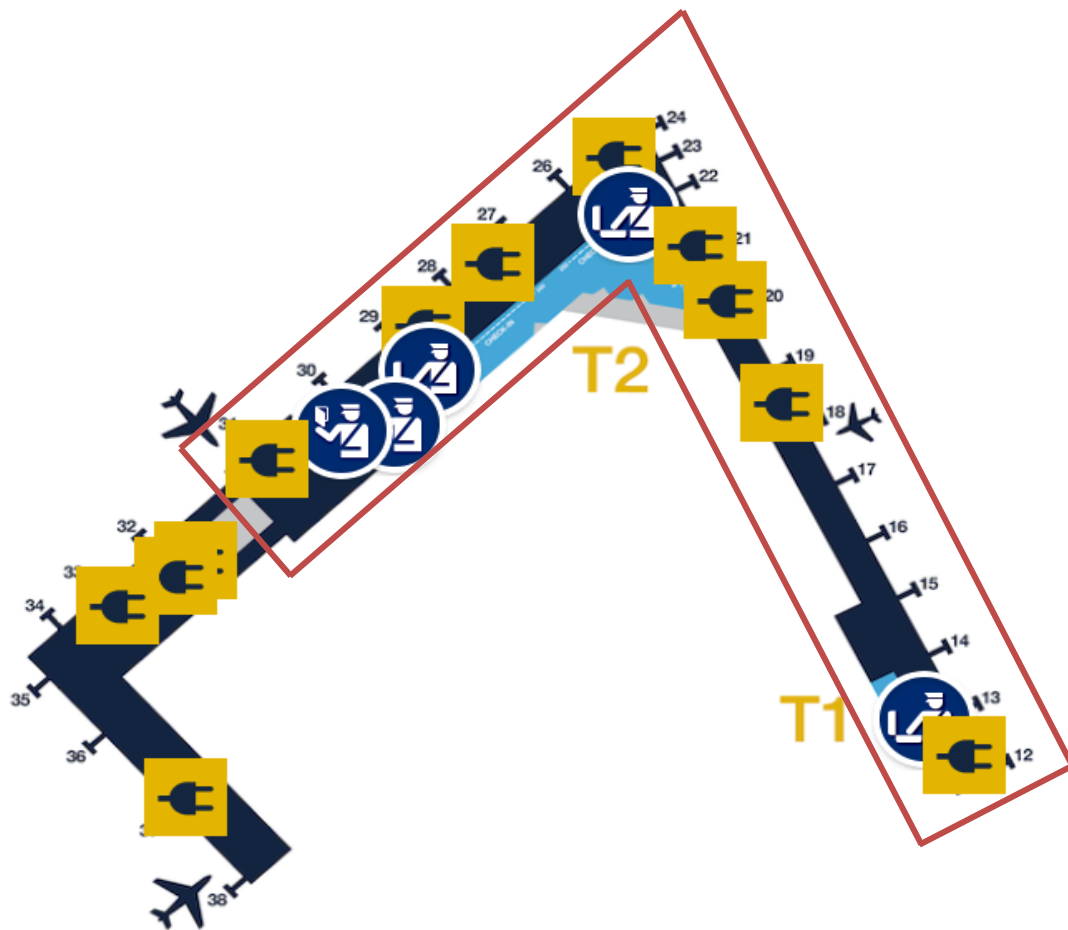
3.3 Experiment presentation

A portable pocket sized charger is the distributed gadget that enables the charging of small electronic devices regardless of the place. The goal of the mobile phone charger pilot is not only to increase the dwell time but also active transfer passengers and other passengers to move around the terminal enabling to use more commercial services. Further, it is everyone's advantage that passengers arrive on time for the departure gate and the portable charger liberates passengers from power sockets. The charger service experiment is a part of Finavia's customer experience development work.

The target users of the pilot are flying long-haul and they are traveling alone with having around one hour free time before boarding. Travelers alone tend to use mobile phones and other electronic devices more than other passengers when visiting the airport. Transfer passengers that fly outside of EU represent the consumer group that has the highest average spending at the hub. In addition, they often have several hour flights behind before arriving Helsinki Airport and the likelihood of empty mobile phones is higher than comparing solely with outbound passengers. Additionally, transit passengers are more active using the free wireless internet connection at the airport.

In order to reach the critical segment of passengers and transfer passengers, portable chargers are primary distributed at the selected Fortum recharge units or in their immediate proximity. There are 12 different Fortum recharge units at the airport in total but eight of them are located in the Schengen area. This pilot project covers eight Fortum power socket stations in the Schengen area. The Schengen area, Fortum

recharge units and departure gates and their locations are shown in Picture 1. The Schengen area is marked off with red lines.



Picture 1. Map of Helsinki Airport (Finavia 2015)

In addition to Fortum recharge units, there are work and rest locations called Suvanto. Suvanto does not only provide charging service but also more private working area with countertops and light partition walls to improve privacy. There are six Power Kiss charging locations that require a spare Power Kiss ring for wireless charging. Despite all the charging possibilities at the airport, most of the charging locations are occupied during the rush hours. Power Kiss charging spots have limited models of charging rings and all the charging options require staying at the charging spot.

On each distribution session of portable mobile chargers, there are two promoters that are conducting the actual delivery of chargers to passengers. Promoters are easily recognized by their Sun Days campaign uniforms. Sun Days campaign is a commercial campaign at Helsinki Airport that runs from at the beginning of June till the end of August.

White portable pocket chargers which have Finavia's logos on them are for ensuring which party is organizing the experiment but also for increasing the brand recognition

and emphasize differentiation in comparison to other airports. Portable mobile phone chargers can be seen in Picture 2.



Picture 2. Pocket chargers for mobile phones (Finavia 2015)

The return policy of the portable chargers aims to increase the mobility within the terminal and to get as many as pocket chargers returned for the next use. So that passengers would not have any extra stress for returning empty pocket chargers before moving to transfer flights, gate officers receive the used mobile phone chargers. On the desk of every gate in the Schengen area, there are announcements of policy in terms of the pilot project and paper bags. Gate officers collect used portable chargers in the paper bags when passengers hand them over to staff before boarding. Paper bags and announcement are visible only for gate officers and other staff members working at the gates. Possible gates to returning empty pocket chargers encompass the gates within the Schengen area from the gate 11 till 31 creating the total of 33 departure gates. There are gates for instance 20, 20a and 20b that create three different departure gates despite the mutual numerical sign.

Even though, a time spent at the airport between flights is determined beforehand unlike in shopping malls, but increasing the dwell time in the commercial areas of the airport is what matters and effect on sales. At the end of each day of distribution of pocket chargers, each paper bag behind the desks of a departure gate in the Schengen area is cleaned by the used pocket chargers and number of returned chargers and their locations are recorded. Returned portable chargers are charge again for another round of use.

3.4 Required resources and arrangements

The operational environment of the field test brings its own challenges with various nationalities of passengers. Due to very heterogeneous target group, the process point of the field experiment has to be as simple as possible not excluding the user-friendly approach. Figure 12 illustrates the phases of preparation, implementation, the collection and analysis of results of the experiment.

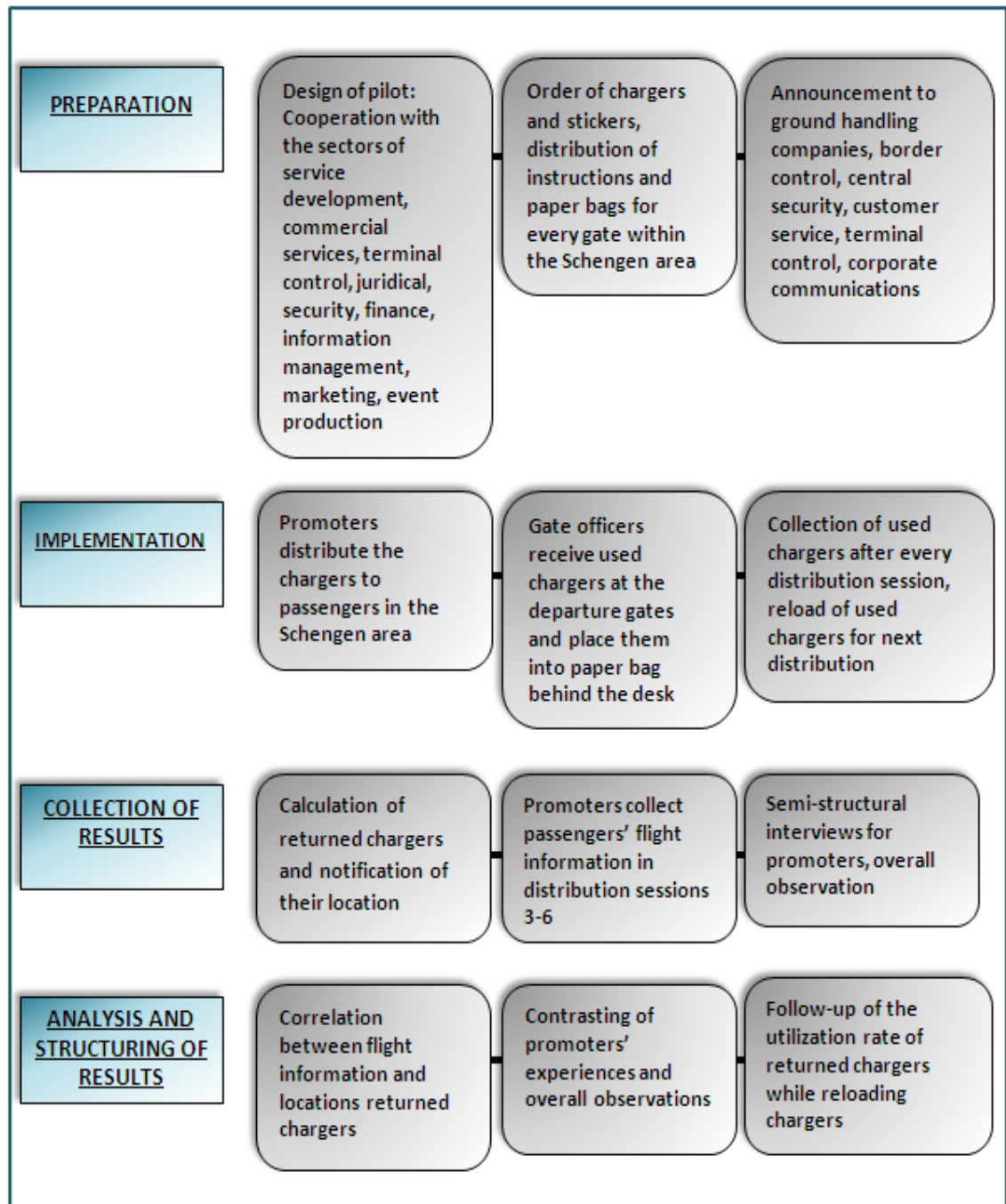


Figure 12. Used resources and arrangements of the field experiment

In the phase of planning, consider practicalities and realizing the field experiment several different sectors of Finavia and other parties have been involved. For instance, when outlining the field experiment more accurately, the rush hour of transfer passengers has been queried from the terminal control unit. Acting in the aviation field, it requires taking the security aspect into account. Communication and schedule planning between all the interest groups have an important role because of a large number of airport workers who are applied by the charger service pilot during the three weeks of trialing. Sectors of service development and commercial services play the

main role in the designing and arrangements of the field experiment but there have also been supports for instance from the parties of legal counselling, financial administration, operations supervision, information management, the departments of marketing and communication.

Resources of external companies of Finavia have been used for instance when ordering the mobile phone chargers, Finavia labeled stickers, event and sponsorship agency for handling the actual distribution of chargers to passengers. Additionally, all the staff members at the gates are operated by ground handling service companies or by airlines' own employees. Furthermore, customer service, security services, border control the sectors have been informed about the pilot project.

Promoters' role in the implementation of the field experiment concentrates on the distribution of chargers, the collection of passengers' flight information and observations of passengers' behavior. When taking a collection of results into account, promoters provide valuable knowledge for the research because they have the actual contact with the service users and witness their reactions. The role of gate officers in this field experiment can be seen rather passive. Their main task is to receive the used chargers that passengers hand them at the departure gates. Gate officers do not monitor the number of chargers they receive or the time of transfer of the charger. They only place chargers in the paper bags behind the desks.

The role of the thesis writer is to coordinate the field experiment, produce announcements for the gates in the Schengen area and for electronic channels. Additionally, the researcher conducts the collection of used chargers from the gates and reloading chargers for the next distribution session. The researcher manages the analysis of the collected flight information that when a passenger has possibly returned the charger, where he or she is flying to and at which gate the charger should be returned. After every distribution session, the thesis writer interviews promoters orally with semi-structural of perceived experiences and observations. During the session 5 and 6, the researcher makes general observations of the progress of the distribution of services and how passengers are responsiveness passengers are for the charger service.

3.4.1 Test environment conditions and expected results

The test is directed to perform in the Schengen area. When considering transfer passengers who are arriving at the non-Schengen area, their stress levels reach the highest levels before the security check and the immigration process (Volkova 2009). After the immigration, a transfer passenger is allowed to proceed to the Schengen area where the feelings of excitement and Volkova's (2009) employed so called "happy hour" start. The usage of a mobile phone charger is aiming at reinforcing the impact on the "happy hour" that affect positively on sales and the overall travel experience.

Passengers are able to choose how to use their dwell time and which kind of service to use and not be forced to stay near the power socket to charge the phone.

In this experiment, the charging cables of the portable chargers are limited to one coupler of micro USB. Micro USB is suitable for the mobile phones of Android and Windows. However, a passenger with an iPhone for example can take an advantage of a portable charger. This requires that a passenger has their own charging cable where the other cord is a USB that is suitable for the portable pocket charger.

One challenge that promoters are facing when distributing chargers is a language barrier that the whole alternative charging concept stays unclear to a passenger. The returning policy and coherent, multiple possible spots for returning has to be as simple as possible because the majority of transfer passengers might be visiting Helsinki Airport for the first time. All the gates in the Schengen area are possible places for returning the empty mobile phone chargers before passengers board their planes.

From previously mentioned test environment conditions, the suggestions of expected results can be made. The goal is to allow passengers to move freely and at the same time get as many as returned chargers before moving to a connecting flight. The idealistic results of the field experiment would be that the share of return of the chargers would be close to 100 percent, passengers would have more dwell time and lower stress levels due to the possibility of fulfilling one basic need for charging phone while using services. According to the theory, lower stress levels and increased dwell time have a positive impact on sales numbers. In addition, passengers would arrive on time for their departure gates which assist the work of gate officers and airline operators.

Some passengers may want to return the charger voluntary if they do not want to carry any extra items while traveling especially if the portable charger is empty before moving to a transfer flight. Chargers can be unreturned by intentionally or unintentionally. According to observation and an informal verbal query of airport service operators who work closely with the passengers, it is likely that transfer passengers who are traveling alone would be more interested towards the alternative charging possibility. Passengers who travel without a company tend to use more electronic devices while visiting Helsinki Airport.

The share of return of portable chargers is expected to be somewhat the same in every running test day and in all areas of distribution of chargers. It is probable that passengers prefer to charge their electronic devices near to their departure gate and this stands out especially in the shorter transfer times. The passenger flow in the Schengen area is difficult to predict and narrow down because passengers disperse effectively to over 30 departure gates in the Schengen area depending on their destination. It can be assumed that passengers that are located at the Fortum recharge units closer to the commercial areas may have a lower emotional barrier to leave and roam in stores when

they receive the portable charger than those passengers who are primarily sitting in a little more distant Fortum recharge units.

3.4.2 Instructions for distribution sessions

The charger service pilot is underway during three weeks in July and each week has two distribution days accumulating a total of six distribution sessions. The week days of distribution of chargers are Tuesdays and Wednesdays. The distribution is carried out during the afternoon peak hour of transfer passengers from 2 pm till 6 pm.

Promoters did not only distribute chargers during the peak hours but they also their other tasks of handing out Sun Days campaign materials to passengers. Each distribution session has a different working pair in a shift and thus, versatile feedback, the points of view and observations are received. Different days of distribution have slightly different techniques and emphasis that are presented in Table 7.

Table 7. Instructions for distribution of portable pocket chargers

<p>Session 1</p> <ul style="list-style-type: none"> • 50 pcs reserved • Fortum recharge units • Schengen region passenger • Windows or Android phone user 	<p>Session 2</p> <ul style="list-style-type: none"> • 50 pcs reserved • primarily by the Fortum recharge units • Schengen region passenger
<p>Session 3</p> <ul style="list-style-type: none"> • 40 pcs reserved • flight number • a remind text added to chargers • Fortum recharge units • Schengen region passenger 	<p>Session 4</p> <ul style="list-style-type: none"> • 40 pcs reserved • flight number • a remind text added to chargers • Fortum recharge units • Schengen region passenger
<p>Session 5</p> <ul style="list-style-type: none"> • 50 pcs reserved • a remind text added to chargers • flight number • Fortum recharge units • Schengen region passenger 	<p>Session 6</p> <ul style="list-style-type: none"> • 50 pcs reserved • avoidance of groups • a remind text added to chargers • flight number • Fortum recharge units • Schengen region passenger

A number of reserved chargers for each session vary depending on the previous rate of return of chargers. Moreover, in the session 3 and 4, an equivalent starting point for distributing chargers is set to be in order to enable comparability between the two consecutive sessions. There is only insignificance or any differences in the surrounding conditions or passenger profiles whether the chargers are distributed on Tuesday or on Wednesday. However, the factor that can generate differentiate results are the changing promoters and working teams of two.

Returned chargers are collected from departure gates after each distribution session. The collecting of chargers takes place in the evenings and a more specific time depends on the schedule of departure flight connections are being distributed departure flight. A number of chargers that drifts to the non-Schengen area are tried keep as low as possible by asking a flight number before giving the charger to a passenger. Regardless of flight information, all the gates in the non-Schengen area and border crossing points are checked after every distribution session from the used chargers.

There is no distribution of chargers in the non-Schengen area for the passenger flow from the non-Schengen to the Schengen area since the high share of inbound passengers. The risk of handing out a portable charger to an inbound passenger is high as a result of having a low rate of return of chargers. Furthermore, inbound passengers are perceived to have a low commercial value. If the place of distributing chargers were right after the border control and in the Schengen area, the sample of would be much less accurate. The challenge is to separate those passengers from the passenger flow whose battery of the mobile phone is low and moreover, who are traveling alone and whose optimal dwell time would be less than a one hour.

As observed in the early phases of planning experiment, many of the fixed recharging points are highly occupied during the peak hours. That is why it is probable that there are passengers who need for charging their electronic devices and they waste their time for finding the available power socket. By distributing chargers at the Fortum recharge units, the sample is more carefully allocated than distributing them only for the general passenger flow. Optimal users for portable chargers are especially those passengers who are about to start charging their mobile phones at the fixed recharge points.

3.5 Measurement objects

There are few key performance indicators (KPI) that measures the effects of the field experiment. Firstly, a rate of utilization and a rate of return of pocket chargers are being calculated. Secondly, the charger trialing aims to broad knowledge about the passengers' attitudinal, overall interest and responsiveness of the optional charger service. Therefore, the overall experience and feedback have a distinct emphasis when

analyzing the results of the field experiment. After distribution sessions, a commercial value of the field experiment is estimated. Also, it is important to take into account the sentiments and development ideas from the airport.

Depending on the distribution session and instructions for the promoters, flight numbers are asked from passengers when they receive a charger. This way it can be followed that which flight connections return the chargers and which do not. Furthermore, the flight information provides knowledge about how much dwell time a passenger has, in roughly, before boarding. Some passengers might think that they are under surveillance when giving a flight number which can affect positively for the rate of return of chargers.

A number of flight connections, the count of departure gates and the share of chargers that are returned in other gates than they are using for boarding are compared together between different distribution sessions. By means of passengers' flight numbers, it can be seen that if the waste of chargers is higher when a passenger flights long-haul from the non-Schengen departure gate. Chargers are, however, primarily distributed to passengers who are traveling within the EU region.

In Table 8, the variables in terms of fact-finding are brought together and further, the level of knowledge is achievable for each variable is showed. Table 8 evaluates how the occasion of the experiment reflects on participants and it presents variables' possible effect on service demand.

Table 8. Arrangement and variations of the experiment

Variables in the phase of fact-finding	Knowledge	Influence on service demand
Number of participant passengers	Resources for 280 passengers	
Difference between distribution sessions	Tuesdays and Wednesdays do not have difference on passenger segments or passenger behavior	No difference on passenger segment or passenger behavior
Time of the year for experiment	July as a traveling month attract notable large share of holiday travelers, significantly less/none of business travelers	Holiday travelers often have lower stress levels that can reflect on higher average spending

Knowledge of participant passengers	<p>Known: Destination and time of departure in the sessions 3-6, nationality and their feedback in individual cases</p> <p>Unknown: Age group, free time, nationality, location where passenger receives the charger, what service they use, how much money they spend, the reason why charger leaves unreturned (unintentionally or intentionally)</p>	Long haul travelers tend to spend more at the airport (Bush & Storey 2013, p. 29)
Turnover of promoters who distribute chargers	Different points of views are gained, experiences are perceived differently	Promoters also distribute lollipops and fliers that increase service demand by activating passengers and creating good spirit

Other features that are perceived consist of whether there are significant variations between the distribution sessions, how the different instructions show at the rate of return of chargers. Moreover, the passenger profile is being observed whether a passenger is traveling alone or in a larger group, is there explicit gender or age preference that is using the charger service.

In the last week of trialing, particular observations are being made whether passengers leave their seats after receiving portable chargers or not. General inspections are carried out during the third week of service piloting of whether passengers are recognized to be using the portable charger while moving in the terminal. However, due to lack of a systematic or detailed surveillance about what passenger types are dominantly participating, the size of traveling company or whether passengers take advantage of the mobility of charging in the experiment, the observations are based on individual cases.

4 RESULTS OF THE FIELD EXPERIMENT

In Chapter 4, results of the field case are presented. Firstly, the numbers of distributed chargers, returned chargers for each session are disclosed and the percentages of returned portable chargers are illustrated. Secondly, the reasoning for given results and the deviations in results are argued by background factors. Overall feedback and observations from the promoters are brought up in Chapter 4. Promoters have been working closely with the passengers that are at the same the end-users of the charger service.

4.1 The distribution of chargers

There are several different instructions for each week or session of mobile charger distribution that have an impact on the loss of chargers and instructions can be seen in Table 7 in Subchapter 3.4.2. Figure 13 expresses the number of distributed chargers and number of returned chargers for each distribution session. The reason why distributed and returned chargers are presented in units is that the level of structured behavior of passengers can be observed. At the same time, the total participant of 218 passengers can be discovered and how they are divided for each distribution session.

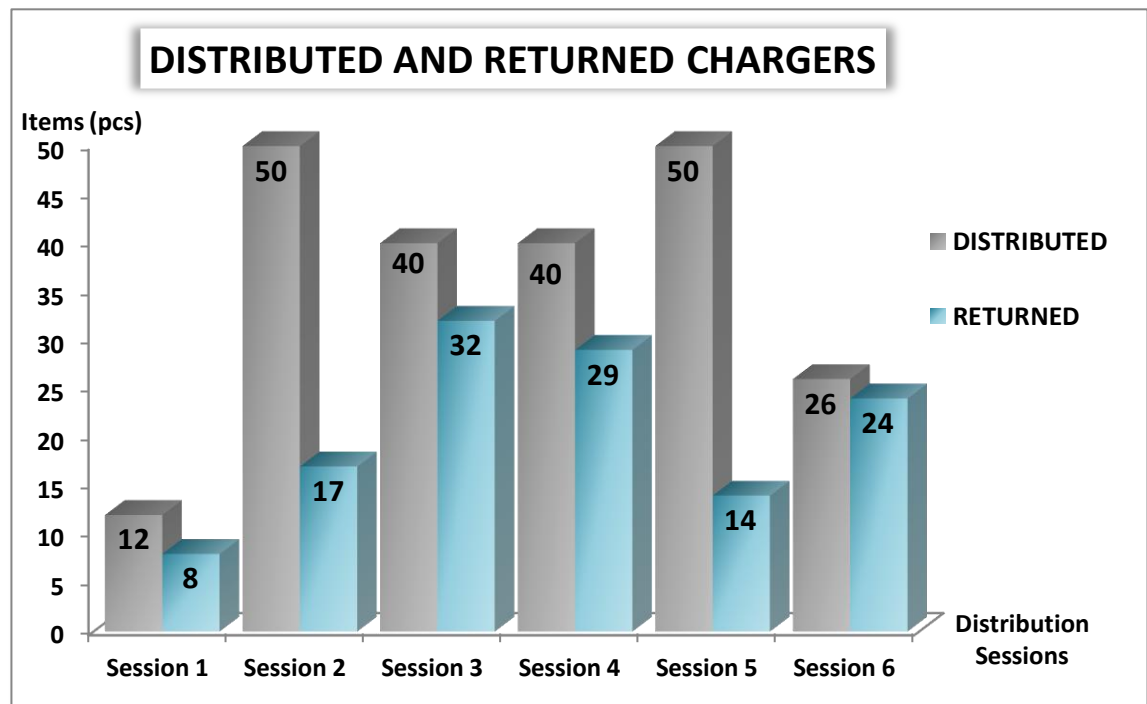


Figure 13. Distributed and returned pieces of portable pocket chargers

In the phase of distribution of chargers, the categories of passengers and staff members' reactions towards the service pilot, the used time for distribution in relation to the consumption of chargers and how the selected target group reflects on the consumption of chargers are studied by promoters' interviews. In addition, how distribution location's within the Schengen area and the query of flight numbers influence on the consumption of chargers is enquired by promoters' experiences.

At the beginning of the experiment, there might have been a higher temptation for gate officers for instance to take chargers to their own use if they have thought that no one is keeping a track of returned chargers. At least this kind of behavior was seen in the case of black paper bags. Gate workers' duty was to place the used chargers in a black paper bag behind the desk when passengers are handing chargers to gate officers. The black paper bags at each gate were decorated by a Lapland landscape. Between the first and the second week of charger service trial, four paper bags were missing whereas between the second and the third week, all the paper bags were stayed in their place.

The main reason for the low consumption of pocket chargers in the first session is that the actual running time for distributing portable chargers was relatively short that it was originally planned in advance. In the next distribution sessions, the communication within the company that actually operates the distribution of the gadgets was managed more efficiently. In the first session, promoters were advised to distribute chargers merely to Windows and Android phone users and this narrows the target group making the actual distribution event slower. Additionally, the service pilot was new to the campaign workers that required a new way of acting. According to the promoters' semi-structured interviews, the approaching technique developed over time. In addition, there were distinctive experiences as per the interviews on how challenging or easy it was to approach passengers and distribute chargers.

Especially during the first distribution session, promoters were asked from several staff members that "where they get the free portable chargers". Even though, the charger pilot was aimed at passengers, this shows that there is interest towards the chargers. Additionally, promoters told many passengers approached them solely for asking the closer principle on how does a portable charger works even though the batteries of their mobile phones were full. Promoters told that there were passengers who were reserved and were willing to receive a charger fearing of that involve them to do or to pay something. Some passengers informed promoters that they simply do not have the need for a charger, their batteries of the mobile phones being full. In general, promoters experienced that chargers were easier to distribute to younger passengers because often they already knew what the gadget is and how it works.

During the second distribution session, some passengers did not want to use the portable charger because it was not meant for keeps. However, this kind of thinking did not prevent for many passengers to receive the charger and eventually not returning it.

Promoters did not see influence on the fluctuation of passenger volumes to the consumption of chargers which can signify that there is sufficiently potential clientele. There were also families with children who were using chargers for ensuring the continuation the playing of mobile games. Another question is that did these kind of passenger profiles bring any commercial value to the airport operators.

At the third distribution session, promoters were asked several times on why they are handing free portable chargers. Promoters distributed cahrgers to the group Spanish passengers who were heading to Frankfurt and they would have been willing to buy the chargers for their own use. Because of this event, the working pair that distributed chargers in the session 3 suggested that in future, portable chargers would have labels that indicates from where they have been purchased from. This way, chargers could be at the same time as souvenirs from Finland or from Helsinki Airport for some passengers. Despite the curiosity and interest towards chargers by Spanish passengers, all the nine chargers were returned to their departure gate before the group head to Frankfurt.

During the distribution session 3, 4, 5 and 6, the range of flight connections whose passengers chargers were distributed and were able to identified varied from 14 flight connections to 21. As for the number of departure gates, the scale follows roughly the same curve, excluding larger groups, that the same flights. Some flights used the same departure gate which forced flight connections to have different flight times. This made the linkage between returned chargers, non returned chargers and flight connections more challenging. All the promoters who worked during the second and third week of charger service trialing reported that passengers shared easily their flight information and it was not a barrier for the consumption of chargers.

At the terminal, there was a behavior of slight mass hysteria and imitating perceived among the passengers meaning that if one passenger likes to try the charger, then the other, third and fourth passengers are as well to use the charger. The corresponding behavior was observed by the researcher as the promoters distributed Sun Days campaign lollipops. There were many passengers who in a way followed how previous passengers have acted. At times, surprisingly many passengers refused to receive a free lollipop.

The researcher was due to conduct a structured observation during the third week of charger service trialing but because of the vivid conditions of test environment, given results are neither reliable nor comparable. A complete observer, as the Saunders et al. (2009, p. 294) describes a person who does not participate in the activities or reveal observer's role for the target group, took part of the field experiment during the third week of trialing. At the distribution session 5 and 6, the researcher paid attention on the passenger profiles of portable charger users and moreover, whether passengers leave their seats and start moving after receiving the charger.

On both distribution days, the researcher observed passengers wondering around in stores or in their immediate proximity while charging their mobile phones were spotted. In all of these cases, passengers were charging their iPhones which helped recognizing them because cords for iPhones are often notably longer than the cords for micro-USB. The knowledge remains unknown whether passengers were on the move because of the portable charger or they would have wonder around in the terminal in any case. The consumption of chargers was somewhat higher for passengers who were traveling with somebody than comparing with alone travelers. Gender of passengers did not seem to have any difference in the responsiveness of chargers. Despite these being individual cases, they might indicative the demand for a larger scale.

Promoters' interviews revealed that neither the distribution location in the Schengen area nor the query of flight numbers have effect on the consumption of chargers. However, the allocated target group of Windows and Android phone users were considered to delay the consumption of chargers.

4.2 The return of chargers

This subchapter focuses on the phase of return of chargers and studies the reasons behind the occurred actions. Figure 14 represents the rate of return of chargers for each distribution session. It is probable that some of the pocket chargers are not returned to the departure gates either unintentionally or intentionally. It is likely that the longer the passenger has the portable charger, the higher the likelihood is to forget to return the charger.

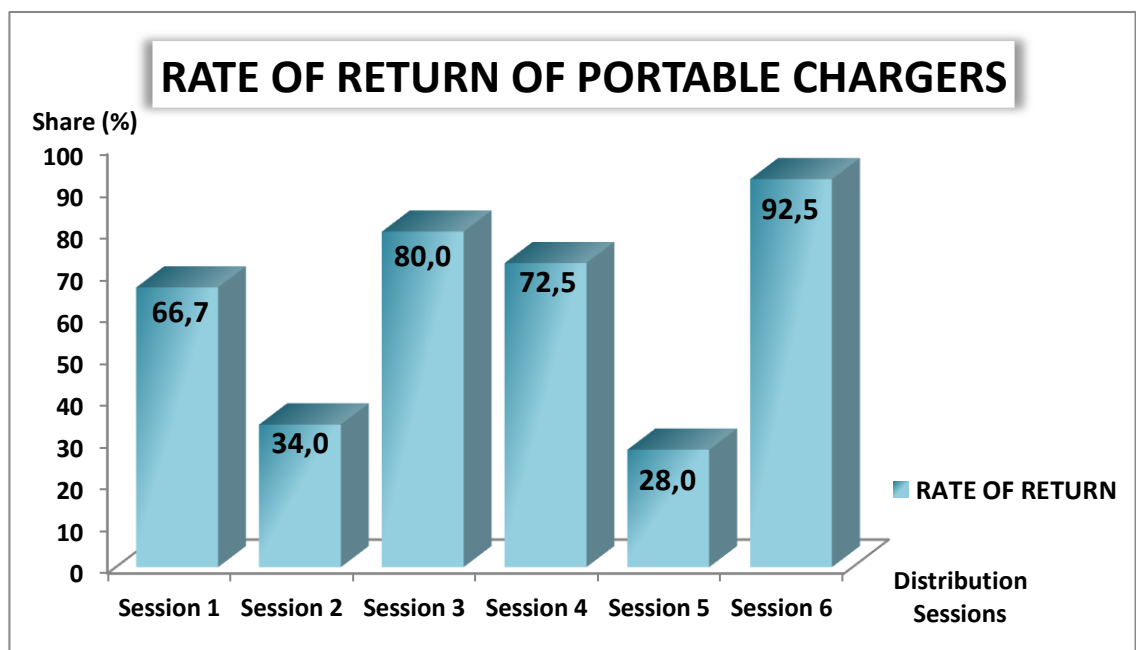


Figure 14. Rate of return of portable mobile phone chargers

In the phase of the returning of chargers, the effect on the rate of return of asking passengers' flight numbers is studied. Moreover, the impact of the focused target group and the early time for collecting the used chargers from the gates are discovered. The variability of the destination of the trip, the locations of gates where chargers are returned and where they should have been returned is tracked.

There is distinct fluctuation among the different distribution sessions during the three weeks of charger trial and the reasons for variations are not necessary unambiguous and therefore, challenging to forecast. However, some points and reasons for explaining and supporting the divergent percentage values can be brought up. In the first distribution session of chargers, the number of departure gates to where passengers have returned chargers concentrated on five gates whereas the corresponding number of returning points in the session 2 was double. This can be simply explained by the consumption of chargers which were 12 chargers in the session 1 and 50 chargers in the distribution session 2.

In the distribution sessions 1 and 2, flight numbers were not collected from the passengers. Additionally, the Finavia logos in the chargers are stickers which can be easily removed. This provides an explanation for the systematic and relative high loss of chargers in the second distribution session. When comparing the rate of return in the distribution session 1 and 2, the target group was more accurately instructed in the first distribution session. This defining of target group was also seen the higher rate of return on the results.

The gates to where chargers were returned varied all the way from the Schengen area terminal 1 gate 12/12a to the non-Schengen area terminal 2 to the gate 37B. Even though, the charger service trial was aimed to perform in the Schengen area, the non-Schengen area did not manage to be avoided by the field experiment. The loss of chargers in the non-Schengen area seemed to be somewhat the same than in the Schengen area when excluding one particular homogenous group that otherwise distorts numbers.

The returned chargers from the session 2 were collected from the departure gates later in the evening than in other distribution sessions. Because of the moment of collection being relatively late, from 11 pm to midnight, this can be one supporting action for the low rate of return. The high loss of chargers seems like being systematic due to the high volume of distributed chargers but the next distribution session proves the claim being incorrect.

The concept for the session 3 and 4 was to create the exact the same conditions in order to get results that were completely comparable. The only difference was the changing promoters who were distributing the chargers. Apparently, the query of flight information had the biggest role and the repeated influence on gaining the relatively

high rate of return. In the distribution sessions 3 and 4 the rates of return are 80 percent and 72.5 percent. Presumably, the added text to chargers that reminds passengers to return chargers to departure gates before boarding had influence on high the rate of return.

Given flight details did not provide any remarkable interdependence that passengers heading for a specific destination would have behaved in a certain way. Usually, there were one or two chargers missing chargers for one flight connection. In other words, the flight numbers did not help to predict passengers' behavior. However, flight numbers assisted on scheduling the time for collecting chargers at departure gates, the minimize the loss and further, helping to understand what kind of dwell times passengers were spending at the airport. For instance, one passenger was heading to Oulu not until midnight and he or she received the charger before 5 p.m. having at least six hours of free time at Helsinki Airport. Obviously, this particular passenger did not represent the target passenger profile of the field test because of having plenty of free time and thus, being able to use the desired services without a portable mobile phone charger.

The rate of return of chargers in the session 5 is low of being only 28 percent. Passenger characteristics or their similarity that took part of the charger pilot clarifies the reason for the low rate of return in the session 5. There was one larger group of young scouts traveling to Tokyo to whom 21 pieces of chargers were given. This one homogenous group of teenage passengers showed substantial amount of interest towards the portable charger but also in a way they slightly distort the statistical results. The loss of chargers solely in the case of scouts was 19 pieces and meaning the loss rate over 90 percent.

In the session 6, the exceptionally high rate of return of 92.5 percent can be a party explained by the margin of error. The margin of error is three chargers signifying that the real rate of return is closer to 80 percent for the session 6. There are several features and actions referring to the margin of errors have been actualized and actions that provide reason for the low loss of chargers. Deviating from previous times, 5 chargers were returned to gates that did not match with the departure gates of identified flights. This alone gives a signal of margin of error being actualized. There were two flight connections in the session 5 that were not able to identify when conducting the distribution session 6 and three chargers in total were distributed to those two flights. The returned chargers were collected from each departure gate relatively early, around 6 pm. This can increase the probability that those two unidentified flights departed later in the evening, after 6 pm. On the other hand, the early moment of collection the used chargers from the departure gates can minimize the loss of the chargers from other surrounding factors for instance staff members.

Furthermore, the promoters who distributed chargers chose quite carefully to whom they are giving the gadgets. For instance, there were some enthusiastic passengers who would have been willing to use portable mobile phone chargers but their boarding to the

flight to Copenhagen was due to start in 15 minutes. Promoters evaluated that because of their remaining short dwell time, their commercial value would have been low. Moreover, they would not have been able to benefit from the chargers that much and further, the probability to not having chargers returned was considered as high. Due to these reasons, chargers were not delivered to passengers to the flight to Copenhagen. On each distribution session, the actual rate of utilization of chargers was high. This became clear from returned chargers because at least none of them were full or close to full charging capacity. As for summary, according to the presented results, the average rate of return for distributed chargers without a deposit system can be considered around 75 percent.

4.3 Cost-benefit analysis of the experiment

The business point of view of the experiment is calculated. In terms of the cost-benefit calculations of the field experiment, there are variables that are either assumptions or based on the collected data. The main presumption is based on the theory that when the dwell time increases by 1 percent, the daily average sales increase by 1.3 percent (McAdams & Biggar 2007). The share of used passenger profiles for cost-benefit calculations is 5 percent for passenger type A and 95 percent for passenger type B. Passenger profiles and their expected spending behaviors are presented in Subchapter 3.1. The imaginary average consumption per passenger is EUR 20. Further, it is assumed that a passenger who receives a portable mobile phone charger does not move next to the power socket.

Other variables are determined by gathered data from the field experiment. The total of 218 passengers took part of the field experiment and the cost per one charger is EUR 4.3. The cost of the portable charger includes the charger itself and the attached logo. The allocated human labour for delivering the portable chargers is 33 labour hours and the labour cost per hour is EUR 35. Calculations regarding to the field experiment are presented in Table 9.

Table 9. Cost-benefit calculations of the field experiment

Definition	Value (€)
Profit expectation	1545
Expenses of distribution	1155
Expenses of damaged chargers	234
Result	156

Despite the way of conducting the distribution of chargers by human labour, the commercial value of the field experiment is positive. However, the costs of reloading of chargers, the total cost of ordering the chargers and other working hours spent on organizing the pilot are not being taking into account.

4.3.1 Operational suggestions for charger service in the future

The demand for alternative charging possibilities is existed but the operational way of conduct can be seen as a crucial factor. The chosen method firstly for distribution and secondly, the return of chargers plays a key role for succeeding the service concept. The charging service would create value for departure passengers in addition to transfer passengers. Departure passengers might have an entire day before catching the flight in the evening.

When considering a suggestion course of action for the future, there are two charger service concepts without a deposit and with a deposit. In both concepts, a distribution and the return of chargers would be organized by machines. At the same time, the distribution and returning stations would take care of the reloading of chargers. The machines would only offer for use those chargers that are fully loaded. When a passenger returns an empty charger, the reloading of the charger starts immediately.

In the first concept without the deposit, the receiving of the chargers requires identification by a boarding pass. This way the loss of chargers can be minimized by limiting one charger per passenger. In the second concept with the deposit, the distribution and possible return of a charger would be conducted by a credit card. In order to perform the repayment for the possible return of the deposit, the system requires the same credit card that was used in the phase of distribution.

Depending on a passenger, some individuals are more comfortable to do business with machines over a human contact. Of course, there are passengers who prefer human contact and a contact with the salesperson can increase the consumer commitment. There are several variation possibilities for passengers to encourage returning a charger. Reduction coupons, for instance, could be tested as an incentive for returning the charger. Depending on the visual design of the portable chargers, some passengers would prefer to buy the charger as a souvenir, as it was seen from the Spanish group of passengers in the field experiment. However, the use of portable chargers would mean more passengers on the move especially during the peak hours. Service operators might have to take that into a consideration when directing resources.

4.3.2 Cost-benefit analysis for future charger service

At Helsinki Airport the daily passenger flow is 44 000 (Finavia 2014) and the hypothesis is that almost every passenger has a mobile phone with them. Some

passenger can have two mobile phones for different countries or continents whereas younger passengers can have other electronic devices instead of mobile phones. In other words, the potential target group is all passengers at the airport. However, it is probable that if a passenger has for instance a three hour transfer time, a passenger has time to do all the things he or she wants to do at the hub. Furthermore, not everyone has the need for charging batteries.

There are cost-benefit calculations for without and with the deposit charger service concepts presented in Table 10. Investment cost for the same concepts are calculated in the same chart. All the calculations are based for evaluation during one day when the daily passenger flow is 44 000 (Finavia 2014). An abbreviation of pax in Table 10 denotes a passenger.

Table 10. Cost-benefit calculations for charger service without deposit and with deposit

Without Deposit	Value	With Deposit	Value
The rate of utilization	10 %	The rate of utilization	5 %
Number of users	4 400 pax/day	Number of users	2 200 pax/day
The rate of loss chargers	25 %	The rate of loss chargers	0 %
Without deposit	0 €/pcs	With deposit	7 €/pcs
Direct profit expectations	<u>-4 730 €/day</u>	Direct profit expectations	<u>15 400 €/day</u>
Indirect profit expectations	31 200 €/day	Indirect profit expectations	15 600 €/day
Investment costs	Value	Investment costs	Value
Unit price of a charger	4.3 €/pcs	Unit price of a charger	4.3 €/pcs
Cost of 4 400 units	18 920 €	Cost of 2 200 units	9 460 €

In Table 10, direct profit expectations are estimated only from chargers, the deposit of chargers and possible loss of chargers. Indirect profit expectation numbers are based on the increased dwell time. The mathematical method for evaluating the indirect profit expectations obeys the same formula as the profit expectation calculation of the field experiment in the in Subchapter 4.3. Dwell time and its impact on consumption is origin from the theory by McAdams & Biggar's (2007). The default to the average spending per passenger is EUR 20. According to McAdams & Biggar's (2007) theory, when the average daily dwell time increases by 1 percent the daily sales increase by 1.3 percent.

In calculation, 5 percent of each concept users represents passenger a segment whose consumption increases by EUR 10.26 as the relative increment of dwell time is 50 percent. 95 percent of both charger service users belong to the passenger segment whose relative increment of dwell time is 33.3 percent increasing the consumption by EUR 6.92.

In addition to investment estimations stated in Table 10, the cost of machines for distribution and return of chargers are not included the calculations. Furthermore, in the calculations it is assumed that all the passengers using the charger service with the deposit are expected to keep the charger. According to the promises by some charger manufacturers', portable chargers can be recharged about 500 times.

4.4 Perceived experiences and consequences of the experiment

The idealistic object was to find out how much an increased dwell time affects a passenger's consumer behavior and spending pattern. At Helsinki Airport, airport service operators are independent entrepreneurs meaning at the same time that Finavia does not own any stores or cafes. Therefore, the accurate follow-up of each passenger spent while using the portable mobile phone charger was not realistic to perform. Nevertheless, the charger service trial gained new information about passengers' behavior, their responsiveness and attitudes towards portable chargers. Other purpose of the service pilot was to find out is there truly demand for portable chargers among passengers. These are valuable observations if there is a plan for broad the service concept in the future.

There have been several different parties planning, developing and implementing the service pilot. A flight attendant, for instance, gave recommendation ideas for how to accelerate the rate of return of chargers. All advises from the people who have been working at the airport environment and have experiences with passengers were valuable and tried to be utilized as much as possible. The ordered chargers for the field experiment were evaluated in terms of price, appearance, charging capacity, usability and time of delivery. Brand visibility was taken care of adding Finavia-logo stickers to white portable chargers. Chargers were considered suitable for this purpose of use but however, ordered chargers not being of uniform quality and security of supply caused challenges when planning the distribution sessions for passengers.

The main feature that considered having influence on the loss of chargers was the distribution to all passengers who were willing to receive the charger and not solely for those, who actually needed the charger facility. Moreover, passenger traveling with a group experienced to be risky due to the imitation behavior among the group members. The likelihood of not receiving the used chargers back was high if one member did not return the charger, then the rest of the group members behaved the same way. The

enquiry of passengers' flight numbers, early time for collecting at the departure gates and selected target group increased the rate of return of chargers. The focused target group means that the charger was not distributed for passengers whose boarding was about to start. Further, the added text reminder of returning the gadget to the departure gate perceived to lower the loss of chargers.

The collection of data of how many passengers actually left their seats after receiving the charger belongs to the areas of improvement in order to gain reliable and comparable results. Other targets for development are to ensure the functionality of communication channels and how a certain way of acting would come true in real situations. There has been negative feedback regarding the charger connectivity limits not being suitable for iPhones as it is. The choice of providing solely a micro-USB charging cable has been conscious and mainly based on financial reasons. Many iPhone users have attached their own iPhone charging cable for the portable charger and, thus benefit the charger service.

The charger service pilot attracted media attention in domestically and internationally. The airport as an environment can lower the newsworthy events. The subject was covered in radio, social media and other references on the internet including Airport Business, Passenger Terminal Today, Future Travel Experience and Travel and Tour World.

5 DISCUSSION

Research questions that are represented in Subchapter 1.3 are discussed based on the literature review and field experiment. First research question addresses the subject on how the service demand can be affected at the airport environment. Increased dwell time, good perceive value and low stress levels at the airports have an effect on increased service demand and further, higher spending. Features of diverse mix of services and events impacts positively on dwell time. Congestion and empty retail spaces have negative influence on the spent dwell time in the commercial areas of an airport. Empty retail spaces make the environment look less attractive and reduce shopping possibilities while cutting back the service supply.

The field experiment especially aimed at enabling more dwell time for transfer passengers and passengers in general. The charger service pilot assists to reduce one barrier to use services which is lack of free time. With the help of portable mobile phone chargers, passengers are liberated next to the power socket and thus, make possible passengers to choose how and where they spend their free time. At the same time as the calculations of commercial value of the field experiment shows, the average spending per passenger increases in relation to the increment of free time. When there is no need for finding a free power socket, the stress levels decrease. The need for carrying personal gadgets and charging cables in the carry-ons can be decreased if alternative charging possibilities become more and more available at the airports. The service demand can be increased by offering new services and is a potential candidate when taking the importance of mobile phones as a control device in to a notice.

The experienced consequences of using the technological application on the people flow are discussed in the second research question. At the airport, security check, passport control and departure gate can be seen as the anchor points as certain popular brands can be anchor stores for shopping centers. The role for anchor stores is not only to attract customers to a shopping mall but also the physical placement of anchor stores directs the people flow. Even though, the main passenger path is ruled by external authorities and compulsory procedures, the field experiment showed that passengers' movement can be affected. There were observations where passengers left their seats by their departure gate after receiving the charger and begin to move around the terminal. That is one supporting argument that passenger flow at the airport can be influenced by technological solution. Further, better accessibility and findability of stores and services with the help of technology can have leverage on passenger movement, even the service or a specific store would not be situated along the passenger's service path when transferring.

The actual free time and perceived time often differ from each other. It is more common that the perceived time is evaluated to be a notable shorter than the actual available time in reality is. According to Bush et al (2013, p. 26) 14 minutes is the average time spent on shopping before boarding. By enforcing the information about the actual free time, passengers would be easier to activate and use services at the airport.

The third research question subject of how the service demand can be affected for transfer passengers by means of intrinsic and extrinsic factors. Stress levels, perceived time, jet lag, financial situation, age, an income level and intentions to shop are ruled in for intrinsic factors for a transfer passenger. Time, distances, architecture, congestion, the reputation of an airport, purpose and destination of the trip are on the other hand counted for extrinsic factors.

When considering intrinsic factors in service demand, the feelings of security and safety are the most important ones. Information of gate distances, easy way-finding, accessibility of services and knowledge of available time prior to boarding support the low stress levels. Pre-planning the purchases at the airport increases the likelihood of the intentions of buying by 72 percent (DKMA 2013). Sensory based influencers are especially supporting on hedonistic shopping behavior. With the help of sensory influencers like sound, light and even smell design, passenger behavior and an emotional state can be affected. Fast tempo music can for instance inducing passengers eat faster producing the turnover of customers can be higher. It is noticed that when the background music has been Spanish style, the increased demand for Spanish origin wines has shown in the sales numbers.

Passengers' experiences and the perception of waiting times can be shaped by providing complementary services while waiting. Moreover, complementary services can lead up to a significant source of revenue. If the rush hours are informed beforehand, then passengers' expectations towards service levels are lower. Extrinsic factors like the overall conditions and surroundings of an airport have influence on mental images, perceptions and further on satisfaction levels. It is noticed that the most satisfied passengers are likely to spend 10 percent more time at the airport (Fuerst & Gross 2014). According to McAdams & Biggar (2007) dwell time being increased by 1 percent, the sales increased by 1.3 percent.

In the future, the demand for charging personal electric devices is expected to grow until significant advances are made in battery technology. At the airport environment, mobile phones are gaining a bigger role for holding compulsory travel documents because more and more passengers use solely electronic flight tickets. Nowadays, wireless options are gaining popularity and furniture manufacturers have started to embed wireless charging points in their products. Later on, infrared or WLAN might be options for charging small electronic devices in longer distances in public spaces.

Further phase would be modifying the movable charging service according to passenger's comments, needs, and wishes taking the process points of view into account. There can be seen a two-way opportunity to commercial advantage in terms of portable chargers. Firstly, through the rent or buying of portable chargers and secondly from the increased dwell time that effect on increasing sales. Moreover, the alternative charger service can help an airport for standing out from other airports by providing innovative services and experiences.

6 CONCLUSION

In the last chapter of the work, a summary of the research and analysis and success of the research is presented. Limitations when operating and conducting the service pilot at the airport environment are indicated in Subchapter 6.2. In addition, subjects and areas for future research are discussed.

6.1 Analysis and success of the research

Due to the novelty of the examined charger service, new information about travelers' habits, reactions, attitudes and behavior was gathered in the field experiment. The pilot work also showed an effective flow of information among gate officers who represent several different companies. As a traveling month, July gathers a different passenger segment due to holiday season. The field experiment was possible to conduct at any time of the year because the service had a wide range of potential users and the summer holidays did not effect on the charger trial itself.

The literature review focused on the service demand in general, how the service demand can be affected, how it can be increased and it also helped to avoid conducting something in the field experiment that was already done. The first half of this thesis provide a supporting theoretical background and reasoning for choosing a portable charging service for the field experiment. Possible future risks regarding service demand and passengers consumer behavior at the airport environment are also brought up. According to several different researchers, passengers who are satisfied with an airport processes and service supply are more likely to spend more. Higher non-aviation revenue lead to lower operating costs for airlines and, eventually, they enable better resources for airports to develop their processes and invest in construction projects.

The pilot work would have been more effective if there had been precise techniques on how to direct the service merely on those passengers that actually were in need of a mobile charger. An idealistic passenger would be traveling alone with about one hour of free time at the airport and additionally would have a commercial value for the service operators of the airport. Furthermore, if there had been a possibility to gather exact data about how many of portable charger users actually used the commercial services of the airport, for how long they used the charger, what kind of services were used the most and how much money they spent.

However, the juridical reasons regarding the passengers' privacy set boundaries on how much information it was possible to have. The airport operator does not have any data

about the single passengers or passenger groups, their connecting flights or movement within the terminals in the first place. Nevertheless, the positive commercial value of the field experiment shows the potential business opportunity that also suits the service concept of the airport. The field experiment part of the thesis attracted a rather great deal of media attention, both in domestically and internationally. The spread of information about the pilot project depicts the amount of interest in the common topic of consumer technology, the aviation industry and projects related to it.

6.2 Limitations at the airport environment

Multicultural environment with heterogeneous demand and language barriers brings its own challenges. In the phase of experiment implementation, the research had to be as simple as possible due to different language backgrounds. When conducting the field experiment, passengers could not be disturbed too much in order to avoid causing extra stress on them. The field experiment could not yet have been time consuming from the passenger's point of view because it is beneficial for all parties that passengers catch their flight on time. Moreover, all the parties that were involved in the pilot project involve a large number of staff members and thus, the policies used had to be simple and they could not draw attention from the employees original tasks.

An airport as an environment can be a stressful environment for first time visitors and for those who flight very seldom. Passengers may not be willing to receive any extra gadgets or have to remember something like returning the pocket charger to the departure gate before boarding. Safety regulations are strict in the aviation industry and they were taken into account while conducting the field experiment.

6.3 Further research

For further research, there are several fields that would be worthwhile to investigate. For the basis of most of the studies, the economic perspective and travel experience are the driving forces behind the exploration. When developing the supply of services at the airport, it would be useful to know how much the tenancy mix of retailers actually affect dwell time in the commercial areas. Another theme for further research would consist of for instance how much crowd affects sales and dwell time and whether there are significant differences among different cultures and nationalities.

As Helsinki Airport has distinctive rush hours, the capacity of services requires flexibility in order to adapt to the accentuated service demand. Queuing, and particularly avoiding it, offers concrete challenge for developing more advanced technological reservation systems, alternative payment methods, accurate demand forecast and service design processes. More efficient forecast methods are, nevertheless, always necessary when making notable investments decisions. Moreover, in terms of forecasting the consumer behavior, it would be beneficial to know how much the given

information reflects in passenger's spending patterns at the airport in advance. Do passengers pre-plan their purchases more and how this can be seen in the sales data? Would the pre-planning centre function mainly in higher price range retail products? Are passengers willing to reserve and pay services before arriving at the airport? Parking spaces, at least, are possible to reserve and pay by mobile in advance at Helsinki Airport.

Knowledge of how much destination and the purpose of the trip determine consumer behavior at the airport would have an effect on product group planning and product placement. Once the passengers who travel with a company tend to spend more on F&B (Fuerst & Gross' 2014), it would be beneficial to know how much the travel company size or group size have an effect on the sales of F&B. More directed guiding and additional value could be delivered if there was knowledge of how much the lack of guidance and service in a passenger's native language affects sales and general satisfaction. Also, one interesting field to get more data would be how aware transfer passengers are of the exchange rate of euro and how it might reflect on service demand.

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