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**BEEP! YOU'VE CHECKED IN
Technological Development and its Impact on the Air
Transportation Industry**

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ABSTRACT

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<p>This thesis focused on the development of technology and its impact on the air transportation industry mainly from the customer point of view. The aim of this report was to study how important the technology and its development is for air travel in tourism industry.</p> <p>The author of the thesis has analysed the value of air travel globally, the impacts of technology on air travel in general terms, as well as in historical terms showing how much the World Wide Web and Global Distribution Systems have improved the industry, and also introduced the new technologies which are or will be available for customers on the air travel market.</p> <p>Future trends in the field of air travel regarding the technological development such as the growing importance of self-service facilities at airports, mobile self-service and mobile commerce, social media and traveller experience have been identified and discussed.</p> <p>A quantitative customer satisfaction research has been done for Helsinki Vantaa Airport operator Finavia. The questionnaire was delivered to the passengers of the Helsinki Vantaa Airport and the respondents were interviewed about the technological innovations and also asked to evaluate the airport. The main findings of the research were that the majority of the passengers are interested in the development of technology in air travel, but they still do not know much about the available innovations thus there should be more promotion of them, especially within the leisure travellers as they tend to be less informed than the business travellers.</p>		
Key words Air transportation, Helsinki Vantaa Airport, impacts, quantitative research, technology		

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1 INTRODUCTION

Air transportation is a very valuable means of transport globally. It is hard to imagine how people would manage without the access to air travel which is the fastest and most convenient way to transport around the globe. With the development of technology it has become more affordable and accessible for travellers to fly. Searching flights online and booking via internet is very commonly used nowadays and it is the simplest proof to anyone that technology has a tremendous impact on air travel in the tourism industry. In this report it will be analysed whether technology can accompany travellers throughout the whole travelling experience and if it will be so in the future. Technology that is taken into account in this thesis is what includes electronic mobile devices, programs and applications and equipment at the airport.

The aim of this thesis is to analyse the importance of technology on air travel and how it can help to develop the industry for customers. The objective of the report is firstly to examine the importance of air transportation on a global scale and the technology in air travel and tourism. The second objective is to identify the main visible impacts of technology on air transportation. Another one is to give an overall idea about some examples of modern technology used or to be used in the near future, and to identify and discuss the main future trends in the air travel and technological development field. The final objective is to conduct and analyse a customer satisfaction research at Helsinki Vantaa Airport which will involve the assessment of the technological development at this facility.

The commissioner for this thesis is Helsinki Airport Operator Finavia, a service company maintaining a network of 25 airports in Finland and the air navigation system which covers the entire country. The company's cornerstones are safety, customer-orientation and cost efficiency. The basis of the operations of Finavia is

the geographical advantage over the competitors as Finland is located in favour for the traffic between Europe and Asia, which is the reason for Helsinki Vantaa Airport to be the leading North European airport for many Asian routes. A development of Helsinki Vantaa Airport to a top-class North European transit airport through outstanding new passenger's services and customer experience is the company's main aim. (Finavia 2013)

As one of the objectives of this thesis is to assess the technological development of the facilities at Helsinki Vantaa Airport, a customer satisfaction survey will be introduced and analysed showing the main findings of this quantitative research. The target group of the research are the passengers at Helsinki Vantaa Airport and they were the ones to be interviewed. The research method that was used for this thesis report was a quantitative survey and the method of conduct was interviewer-completion, as the author of the thesis has interviewed the respondents personally.

The content of the survey is based on the air travel innovations which are or will be available for the travellers. The aim is to find out how much they know about the technological advances, to what extent do they use them and to what extent are they interested to use them in future. Moreover, a development plan for the airport in Helsinki is to be introduced based on the suggestions and evaluation given by the passengers.

2 THE VALUE OF THE AIR TRANSPORTATION INDUSTRY GLOBALLY

Air transport is a significant part of the global economy. According to the Air Transportation Action Group, it occupies approximately 5, 5 million people in the world directly, meaning manufacturers, airports, airlines and other associated activities on the ground, and additionally 6, 3 million people employed indirectly (suppliers and subcontractors). The corresponding GDP that is contributed reaches approximately 408 billion dollars. (Air and Space Academy 2011.)

Generally speaking, air travel has brought a great number of simplifications in our lives. It can be seen for instance that since air transport has become more affordable due to its increasing popularity and competitiveness, it is not anymore a luxury product but also a commonly used means of transportation. Many young people use it to travel to different countries on international exchange programs or to study their degree abroad. (Association of European Airlines 2007.)

What is more, air transportation also provides access to remote areas for instance when facing a natural disaster, famine or war, they will not be isolated from receiving help from cargo deliveries, transport of medical teams to name a few. Additionally, it is the only mode of transport which is entirely accessible to passengers with limited mobility and unaccompanied children. It cannot be ignored that air transport is very important for those regions that rely on tourism as their main source of income and living, in particular remote and/or island destinations. For these places air transport is the viability keeper, because tourism creates significant revenues for the retailing, catering and hotel businesses, it attracts investment, boosts the economic growth and improves the living standards of the population. Nevertheless, air transport is also crucial to provide efficient communication between important political centres, which is significant

for the international integration and cooperation. (Association of European Airlines 2007.)

In conclusion, air transportation is proven to be an important means of transportation regarding its growing competitiveness which makes it increasingly available for people of different incomes and expenditures. It is not a very high luxury to go on a holiday abroad for instance if someone is aware of the low cost routes. Nowadays it has become very easy to fly and it is something that the young generation of travellers will be used to. What is more, aviation connects the world making it a smaller place and easier to get to know. People can travel all around the globe for various purposes which mainly include leisure, business or studying.

3 THE IMPORTANCE OF TECHNOLOGICAL DEVELOPMENT IN THE TOURISM AND AIR TRANSPORTATION INDUSTRY

The tourism industry has evolved and is becoming more and more efficient due to the development of technology, specifically information technology (IT). According to Buhalis (1998), the role of ITs in the marketing, distribution, promotion and coordination of tourism is critical due to the fast progress of supply and demand. Already in the 90's the development of ITs has contributed to many areas of tourism infrastructure in general, such as management, communication between departments as well as communication with branches. All the internal improvements have made it easier within a tourism organisation to develop better consumer communication with the tourism industry. As can be seen in the Table 1 on the next page, the whole infrastructure of tourism relies very much on IT. It would not be possible for instance to develop a good reservation system without the progress of technology.

TABLE 1. Tourism industry communication patterns and functions facilitated by IT (adapted from Buhalis 1998, 418)

Intra-organizational communications and functions	Inter-organizational communications and functions
<p>Within a tourism organization</p> <p>Management strategic planning competition analysis financial planning and control marketing research marketing strategy and implementation pricing decision and tactics middle term planning and feedback management statistics/reports operational control management functions</p> <p>Communication between departments networking and information exchange co-ordination of staff operational planning accounting/billing payroll supplies management</p> <p>Communication and function with branches co-ordination of operations availability/prices/information orders from headquarters/administration share of common resource databases for customer and operational information</p> <p>Consumer communication with tourism industry Electronic commerce Travel advice Request availability/prices/information Reservation and confirmation Amendments for a reservation Deposits and full settlements Specific requests/enquiries Feedback/complaints</p>	<p>Tourist product suppliers and intermediaries</p> <p>Pre-travel arrangements general information availability/prices inquiries negotiations and bargaining reservations and confirmations ancillary services Travel related documentation lists of groups/visitors receipts/documents vouchers and tickets production</p> <p>Post-travel arrangements payments and commissions feedback and suggestions complaint handling</p> <p>Tourism enterprise communication with non-tourism enterprises Other suppliers and ancillary services vaccinations travel formalities and visa Insurance companies Weather forecasting Entertainment and communications Banking/financial services Credit cards Other business services</p>

3.1 The World Wide Web

It is generally known that the World Wide Web's prosperous growth has affected people's lives significantly. As Buhalis has predicted in his paper from 1998 "eventually consumers will live in 'electronic houses' or 'intelligent homes' and

will be served by 'virtual enterprises' through a very interactive communication framework" (Buhalis 1998).

Nowadays, meaning 14 years after his publication, it is so obvious to consumers to arrange almost everything via Internet sources. There are websites for shopping online, booking travel tickets and packages, viewing pictures, reviews, reading books, finding information, marketing, actually it is hard to imagine how many possibilities the Internet gives.

While it is a major improvement for the consumers who are able to find almost any product online, it is an even bigger advantage for the suppliers, also in the tourism industry, because they can create a wider market for their services. The convenience of the Internet services is the biggest factor for online consumers. They are enabled to access information about tourism products and organisations straight from their home. What is more, they can make and modify their bookings and buy tourism products via electronic shopping and banking.

3.2 Global Distribution Systems

The history of GDSs (Global Distribution Systems) dates back to the year 1962 when the American Airlines introduced its Sabre Computer Reservation System (CRS). This new at that time system had become a significant technological success and later on in the 70s it had been a foundation for further development of wider control systems including, for instance, generation of flight plans for aircrafts, tracking spare parts, scheduling crew and developing a range of decision support systems for management. This has changed the airline industry significantly because since the release of Sabre and its success, every single airline has decided to develop, buy or lease a similar system. (Buhalis 2004, 807.)

After the USA air transportation deregulation permitted airlines to change their routes and fares as often as they wished to, the need for a central planning

administration for airlines appeared, due to the growth of air traffic. This led to the development of CRS which from then on allowed airlines to improve their international organization, manage their inventory, communicate with travel agencies and distributors, update routes as well as availability and prices on a regular basis. As a result, the competition between airlines grew and they became able to adapt their schedules and fares to the demand. Although it was already much easier to manage the sales arrangements between airlines and travel agencies, it was still not enough for the travel agencies that wanted to have access to numerous airlines from a single terminal and also to get information on extra products at destinations, such as for instance hotel, car rental etc. (Buhalis 2004, 807.)

That is why CRSs have developed to much broader Global Distribution Systems (GDSs). From that time they were able to offer a great deal of tourism products. The CRSs developed their databases to include other airlines with their inventory and itineraries, which was the case for Sabre for instance. In Europe two major systems have developed: Galileo and Amadeus GDSs. Nowadays there are 4 major GDSs, namely: Sabre, Galileo, Amadeus and Worldspan. They all compete for recruiting travel agencies and penetrating the market. (Buhalis 2004, 808.)

To sum up, technology and the air transportation industry were developing together and aviation has benefited a lot from the efficient IT systems which helped to organise and customise the service of airlines and travel agencies. IT has improved the inner as well as the outer management because companies were able to organise their back offices and front offices for customers at the same time mainly due to the development of CRSs.

4 THE IMPACTS OF TECHNOLOGY ON AIR TRAVEL

“Airlines were early adopters of ICTs and have a long history of technological innovation, in comparison to many other travel and tourism businesses” (Buhalis 2004, 805). Generally speaking, airlines have benefited from technological advances on a high level. The new technologies have made it easier, faster and better accessible, thus more customer friendly, to use air transport. The next chapter introduces the biggest technological advances and innovations for travellers.

Additionally, the air transport industry has become more efficient due to the distribution systems (GDSs). These systems enabled them to start code sharing on routes and create alliances, which caused the creation of frequent flyer and hotel programs making it even more attractive to the customers. (Duval 2007, 287.)

Air travel is also one of the safest modes of transportation and it is so mainly due to the pilot training and very qualified maintenance service, but also because of technology. According to Federal Aviation Administration there are various new technologies such as inflatable restraints, ballistic parachutes, weather in the cockpit, angle of attack indicators, and terrain avoidance equipment. All of which could provide “a significant reduction in general aviation fatalities and have the greatest likelihood improving safety” (Federal Aviation Administration 2012). Moreover, one has to realise that the possibility of any attack or anything in this character is not bound to happen in air travel as all passengers need to go through the security check and scanning monitors.

What is more, technology has contributed to making air travel more sustainable. Over the last 30 years there has been a 70% reduction of aircraft emissions mainly due to the fuel efficiency, direct routings and new technology. (Association of

European Airlines 2007, 2.) Fuel efficiency improvements have been achieved through more advanced jet engines, high-lift wing designs and lighter airframe materials. However, these improvements have slowed down since the 1970s because of the slower pace of technological advancement in engine and aerodynamic designs and airframe materials. In order to achieve the sustainable technological advancement the development of biofuels needs to mature. (Lee & Mo 2011, 3778, 3791.)

At the moment, only a few airlines are trying to implement the biofuel engines in their aircrafts. The first commercial flight in Europe using sustainable biofuels was Thomson Airways and it happened on the 6th of October 2011 with Boeing 757-200 which carried 232 passengers from Birmingham Airport to Arrecife. (European Biofuels Technology Platform 2012.)

To sum up, the air transport industry is depending on the technological development in many aspects. The GDS systems have made it more efficient to buy air travel products and services. Then the various technological advances at the airports connected with the cockpit design and radar systems have enhanced the safety of flying. Moreover, there is a significant decrease in air pollution which means that aviation is aiming at developing its industry with the concern of the environmental effects, and technology is the biggest solution for these issues.

5 NEW TECHNOLOGIES FOR TRAVELLERS

There are various new technologies for air travel customers but also for travellers in general. Some of them are already in common use and some of them are yet to be introduced to the market. The technology is developing very quickly nowadays so it is very important for suppliers to keep up to date and offer as advanced services as possible. In this chapter it will be presented what the technology market has to offer for travellers at this moment and what is planned to be developed in the nearest future.

5.1 Mobile devices: Tablets and smartphones

It is predicted that the developing mobile technologies will continue to grow and have a large impact on the tourism industry as well as air travel, which is a big part of it (Buhalis 2004; SITA 2012a). Already at this moment it can be noticed that mobile devices such as smartphones and tablets are changing our lives significantly. Devices such as iPhone, Blackberry or other smartphones are being continuously decreasing the border between phones and computers. That is why it is a major basis point of access to online services. It is being steadily revealed in various surveys that more than 90 per cent of airline passengers carry a mobile device during their travel (SITA 2009). The new technologies which are already available for mobile device users will be presented next.

5.1.1 3G and 4G

Users of smartphones and tablets are able to take advantage of Wi-Fi, which allows them to connect to the Internet, but nowadays it has become even more popular to use 3G and 4G technologies for wireless communication. This means

that a user can access the Internet regardless of the Wi-Fi location or the user's location, the Internet is provided by the mobile phone operator which is now still a bit costly for everyday use although many people already have this possibility in their devices. It is very useful especially in business life, as it enables easy access to many applications for instance email, video conferencing and GPS. The successor of 3G is 4G and the main difference is that it offers much higher speed enabling the user even to stream movies online. (Viswanathan 2012.)

5.1.2 QR codes

QR stands for Quick Response. QR codes can be seen in various locations, they are used for instance on boards and posters of advertised products and can be scanned in order to enter a website of that specific product. That is where the name Quick Response comes from – they are designed to be read and used quickly, on the spot. Basically, QR codes are two-dimensional barcodes which can be read by smartphones. In order to scan a QR code a user needs to download a special application which enables to do so. These codes have become quite popular and it is possible for everyone to create one. All that is needed to be done is to use a special website, such as <http://goqr.me/> and type the text. (Cassavoy 2012.)

5.1.3 Near Field Communication (NFC)

Near field communication, abbreviated NFC, is a form of contactless communication between devices like smartphones or tablets. Contactless communication allows a user to wave the smartphone over a NFC compatible device to send information without needing to touch the devices together or go through multiple steps setting up a connection. (Near Field Communication 2012).

NFC will become very useful in aviation, particularly at the airports. The passengers who possess smartphones or tablets will be able to use their devices to scan during the whole travelling process, starting from the check in of the passenger, luggage, security, through lounge access, boarding and on post-flight ending. (NFC World 2012b.)

Opposite to the currently used scanned itineraries, NFC will make it a bit easier to use due to the fact that the traveller will not have to look for the right itinerary or email confirmation in the phone, the traveller will not even need to take the device out of the pocket. A single “beep” on the phone will confirm that it was correctly verified by the airport sensor as the passenger has passed through the gate. (SITA 2010.)

For now, NFC’s biggest usage is mobile payment with applications such as Google Wallet or PayPal. Some airlines and airports are already trying to adopt the NFC technology in their service, for instance Japan Airlines is planning to launch NFC boarding pass this year. (NFC World 2012a; Future Travel Experience 2012.)

5.1.4 Augmented Reality

Augmented Reality (AR) is a new technology enabling the users to get instant information about their surrounding at any location. The way it works is very simple and easy for the users. One has to turn on the smartphone camera and point at the object/building/location of interest, for instance a restaurant, and the AR system will automatically search data about that restaurant online, showing the user directly if it is for instance an elegant restaurant or a simple fast food. It will also give information about the available services in the neighbourhood. (Common Craft 2012.) An organization which is working on the research and development of Augmented Reality is for instance Contactum, a group of Swiss companies. Their goal is to provide new solutions to companies by using the

digital technologies. They have become one of the leaders on the market of Augmented Reality and they are able to teach other companies with their know-how and experience in that field. (Contactum Augmented Reality 2012.)

When it comes to the implementation of AR in air travel, it is already in use and available for travellers. The world's first indoor augmented reality application was launched at Copenhagen Airport in the year 2011 and can be downloaded by the iPhone users. The app helps the passengers find information on where they are in the airport and displays services which are in the neighbourhood. The application also shows how the passengers can find their gate with the help of the phone's camera which scans the surrounding. (SITA 2011.)

5.1.5 Travel applications for mobile devices

There are also special applications designed especially for people who are travelling and have a modern mobile device such as smartphone or a tablet. For instance, one of the most popular travel related applications is called TripIt, the number one traveller application according to Forbes (2011), helps the user to keep track of all itineraries and puts them all including flights, hotel booking, and car rental in one list. It is free of charge to use and it can be easily downloaded from the official website of that application. (Forbes 2011.) "TripIt automatically collects and stores details of your trips from airline and ticket booking sites. If a gate changes, it lets you know. It can also forward your itinerary to other people" (SITA 2010.)

One of the new items is the Skyscanner application for iPad, iPhone and Android which allows users to browse flights all around the world on a fully interactive globe. The prices are shown to any country and within any country. (Breaking Travel News 2012.)

What is more, the German airline Lufthansa has just introduced a new in-flight entertainment system called Board Connect. This system is enabled for mobile devices which means that it is accessible via laptops, tablet computers or smartphones which can connect to the on-board server via an application. Board Connect is a wireless system and it is working on a regular WLAN connection which allows carriers to offer a wide range of information and entertainment that can be updated quickly and easily. The system allows passengers in both business and economy class to watch movies, read digital newspapers, look up a moving map and information about the destinations and also buy products from online in-flight sales offers. Passengers can also use Board Connect to access the Internet. (Business Traveller 2013.)

5.2 Internet possibilities

As most of the consumers nowadays do own a personal computer at their households it is a great channel for marketing. The possibilities which can be found on the Internet for the consumers of air travel will be described in this chapter.

5.2.1 Social media panels

Social media is playing a significant role in marketing and branding nowadays as users are able to follow the brands online and get information on all new products or offers (Mashable 2011). Thus it is very useful for travellers and also for service providers as they can now reach their customers more easily. Lonely Planet and Trip Advisor are the two most popular travel portals where one can find a wide range of information and reviews about local restaurants, attractions, accommodation etc. Lonely Planet which publishes guidebooks, ebooks as well as

mobile applications for various destinations all around the world has recently been voted as the Favourite Travel Guide in the countries: the United States, the United Kingdom, Italy and Spain. (eGlobal Travel Media 2012.) Apart from the travel specific portals, also “regular” social media panels are very important for the marketing of the companies because the users can follow the brands as for instance on Facebook and be updated by the companies’ offers on a daily basis. (Mashable 2011.)

5.2.2 Online booking and e-ticketing

It is generally known how easy it is to book a flight ticket online via the Internet webpages of an airline. The sector which took a full advantage of that tool is the Low Cost Carriers (No-Frills). As these carriers are not using the GDS systems their customers are in a way obliged to go online and purchase the tickets there. Online booking is not new to the users at this point, but it has revolutionized the tourism industry significantly, now it is possible to book almost any product via the Internet. Many travellers do not even carry a physical ticket anymore, it is e-ticketing that is used in modern travelling, not only by home users who can book a flight online and have the itinerary on their phone, but also travel agencies which do not print tickets to their customers but are using e-ticketing instead. (Buhalis 2004.)

5.3 Airport facilities

There are various modern facilities being introduced at the airports now which make the travelling experience more pleasant and less stressful. What is one of the most developing tools now is self-check-in and self-baggage-drop which is available by filling in the information at the airport kiosk. It is also available to

check in online or with a smartphone and soon it will also be possible to do with NFC boarding passes which are even more comfortable to use. Although now only about 15% of smartphones contain the NFC chip system, it will be more common in the near future. (BBC 2012.)

When it comes to baggage drop, it is a simple process of scanning the boarding pass through a touch screen monitor and placing the bag on the weigh scale conveyor. If the luggage is too heavy the passenger can opt to pay the fee or to repack the bag. Next, the tag is printed, activated, the passenger puts it on the bag and later on it is sent to the baggage handling system. (ICM Airports Technic Delivers 2010.)

Another airport innovation is facial scans which have been recently introduced at London Heathrow Airport. The faces of passengers at Heathrow's terminals one and five will be scanned for identification upon entering and leaving the departure area. The reason for this solution is the need for security at the airport's departure area where passengers leaving on domestic and international flights both wait before being called to the gates. The concern was that the international passengers might swap boarding passes with someone in the lounge and sneak to domestic flight avoiding the immigration check. The scan will take about five seconds to flash an infrared light across each flier's face. The machine will match the images of the passenger's face with the images in the database, recorded when the passenger passed through an earlier set of automated gates to enter the departure area. If the identity match is successful, the automated doors will open. But facial scanning can also be used for other purposes, for instance to increase other methods of verifying a passenger's identity, such as to detect who has permission to enter a first class lounge. (BBC 2012.)

Travellers are getting more and more expectations on the airports as many services are becoming very popular and what is even more important – free of

charge. A good example here would be Wi-Fi which is offered for free in a great number of airports all around the world. Customers while waiting for their check-in or boarding can benefit from Internet kiosks or Wi-Fi areas. Moreover, airlines nowadays aim to offer wireless internet access for on-board passengers so that they can stay connected at all times even in the air. The number of airlines that have Wi-Fi on-board is 27 for the moment, the data comes from September 2012 and the list is presented below in Table 2.

TABLE 2. Airlines offering Wi-Fi on-board (adapted from Business Traveller 2012)

Air Canada	Air Tran	Alaska Airlines
American Airlines	British Airways	Delta Air Lines
Egypt Air	Emirates	Etihad
Frontier Airlines	Gulf Air	Lufthansa
Norwegian	Oman Air	Qantas
Qatar Airways	SAS	Saudia
Singapore Airlines	Southwest Airlines	TAM
TAP Portugal	Thai Airways	Turkish Airlines
United	US Airways	Virgin America

Technological development can be visible on the air travel market by looking at the wide range of devices, applications and software which are available for the passengers throughout the journey. Self-service at the airports is a growing trend nowadays and customers are getting used to it. More expectations on the airport facilities will force the managers to continuously improve the equipment and services to offer for the passengers.

The new technologies which have been presented in this chapter are continuously being developed and the ones which have not entered the travel market yet will do so in the near future (probably within the next few years, as for instance NFC boarding passes are expected to). All these devices and software are an example of what the passengers are able to use pre, during and post-travel. Of course not

everyone is doing so, but a vast majority as has been mentioned in this chapter before already does.

6 FUTURE PROSPECTS

The future of air travel is focused mainly on improving the customer experience and facilitating it. Apart from sustainability, technological development in customer services is the most important issue for airports and airlines nowadays. According to Yeoman (2008), the progress of technology will simply enable tourists to have a wider choice of products, be better informed and purchase holidays on demand. It will become more and more convenient for the consumers of the tourism industry to find, buy and use the products and packages as the technological advances will keep on spreading around the globe and developing. Also with the help of new technologies the customers will have a better travelling experience, with more attractions, amenities and helpful devices to use on the way. It is all about the simplification of travel and especially air travel which is developing very quickly and vastly. (Yeoman 2008, 30,37.)

What is increasing significantly and is going to have an important impact on the future use of airports is the self service. It is being developed and the customer's interest in it is continuously growing. Passengers mostly welcome the unassisted bag drop, automated boarding gates and transfer kiosks. What is more, passengers want that the self-service channels (mobile, phone, kiosk, website) would be unified to ease the usage. In the past 2 years there has been a visible growth in the usage of self-check in. The most frequently used platform for self-check in continue to be the websites (79% of passengers), further on there are airport kiosks with a number of 77% of passengers, and last but not least the mobile check-in which increased with eight percentage points compared to the year 2011. Mobile check in is not the most common channel yet but it is being proved that the interest in it is growing and that it could overtake the other channels in just a few years' time. (SITA 2012b.)

When it comes to mobile self-service in particular, the travellers value the most mobile boarding passes and flight status updates. At the moment, there are 40% of airlines or airports that have implemented these functions in their mobile applications and over 80% are planning to do it by year 2015, which shows a significant future oriented development. (SITA 2012b.)

Focusing on mobile commerce is also one of the future predictions of SITA's Passenger Survey (2012). It is proven that booking tickets via mobile phones is rising and will continue to do so – in the year 2015 it is expected to reach 7%. It is not a very high number although it is justified by the surveyed passengers who for now use only website bookings need to have a clear benefit from booking via mobile applications. (SITA 2012b.)

Mobile technology is predicted to change the commercial strategy of airlines and to make the offers more tailor-made for the customers. This means that the promotions will be transformed into more specific, personalised and relevant to the context and location of the passengers. The SITA survey showed that many passengers would be interested in that, but at the same time some of the respondents had a different attitude mainly because of the data privacy. Nevertheless, personalisation of commercial messaging is one of the future trends which companies are trying to aim at, and by 2015, 78% of airlines plan to personalize the content of what they are distributing. (SITA 2012b.)

While a mobile phone is now a standard accessory for all the passengers, 70% of them already use a smartphone. The number of users is continuously and significantly growing which is reflected in the statistics, there has been a 54% growth from the year 2011. Passengers value these devices for their multiple usage possibilities, which means that in the future airlines are going to focus on introducing mobile applications in order to improve the interaction with passengers. Mobile applications (also called simply apps), are going to be one of

the two dominant channels for passenger interaction by 2015, together with websites. Already now, 50% of airlines have introduced a mobile check in service which is possible with a smartphone device and 90% of airlines are expected to provide it by 2015. (SITA 2012b.)

Another major future trend is connected with social media. Social media is now not only a socializing tool for friends, it is also a business platform which has many opportunities for companies and brands. By promoting their products/services through social media they can get a better interaction with the consumers. The social media usage differs significantly among travellers of different ages. The users are mostly youngsters between 18-24 years old, and only 39% of travellers over 55 years old are active on social media. Nevertheless, the airports and airlines have big future plans regarding the social media. The main issue is to engage the passengers through the social media during the whole journey. Airlines are planning to use social media mainly as a marketing tool in order to promote and sell their services to passengers, while airports are aiming on giving more information to the passengers such as flight status updates. (SITA 2012b.)

To sum up, in general, the main objective for the future of air travel is to make the whole travelling experience less stressful and more smooth and convenient. Some passengers still do not feel confident while on the journey, the parts which are found most unpleasant and stressful are security, transfer and check-in. Travellers consider them so, due to the possibility of unexpected changes, lack of information or control and long waiting times and queues. Technology will change the air travel in order to improve the travel experience, reduce related stress and make it smoother to go through the different points of the journey at the airport.

7 HELSINKI VANTAA AIRPORT – DESCRIPTION OF THE FACILITY

As the research project of this thesis is the evaluation of the airport in Helsinki, this chapter will present the facility in a nutshell. To start with, Helsinki Vantaa Airport is the leading long-haul airport in Northern Europe and a popular transfer point. The airport's strength is its location along the most direct and quickest route between Europe and Asia. It offers 130 non-stop destinations around the world and 350 departures a day, connecting Europe with the rest of the world.

What is more, about 90% of Finland's international air traffic passes through Helsinki Vantaa Airport. It is the principal airport in the network of 25 airports operated by Finavia, the Finnish Airport Operator. Basic facts and figures of the company can be seen in the Table 3 below.

TABLE 3. Basic facts about Helsinki Vantaa Airport (adapted from Helsinki Airport 2012a)

Passengers: 14.9 million (2011)

Landings: 95,312 (2011)

Runways: 3

Terminals: 2

Airlines: 33

Employees: 20,000

Companies: 1,500

Travellers at Helsinki Vantaa Airport can benefit from quite many different technological facilities. First of all, there is a free wireless Internet connection available to all passengers at the speed of 100Mbps. After connecting with the mobile device, information about the connection will be shown automatically on

the screen. Second of all, there is an SMS service. It is available after texting the number "16124" with the flight number and date of travelling. Then the traveller will receive all the flight information regarding, for example, gate changes, flight landings etc. via text and/or voice message. This service costs 1.04 euros (plus international charges) and it is for one flight. (Helsinki Airport 2012b.)

Moreover, Helsinki Vantaa Airport is the first one in the world to provide wireless mobile charging service called "Powerkiss". The way it works is that the passengers can ask for a charging plug for their device at the restaurants, bars or cafes at the airport and put their phone in a special place marked with a red sticker where the device has to be put in order to charge. The service is available free of charge. (Helsinki Airport 2012c.)

Business travellers who spend many hours at airports waiting for their flights can benefit from quiet business working areas to make phone calls for instance, but those are accessible only within three Suvanto lounges located near gates 16-17, 26 and 36. These lounges are equipped with visual protection, a tranquil sound space and power sources for electronic devices as well as a small table. When it comes to charging the electronic devices it is also possible throughout the terminal and check-in areas. (Helsinki Airport 2012c.)

Finally, the transportation from Helsinki city centre to the airport is organised by bus connections with the city bus 615 (620 at night) or Finnair City Bus, both running approximately every 20 minutes from Terminal 1 and 2, the journey takes around 30 minutes. From Tikkurila train station the passengers can take bus 61. (Helsinki Airport 2013.)

8 RESEARCH METHODS

This chapter will discuss the research methods used for this thesis report. According to Veal (2006) there are three main types of research: descriptive, explanatory and evaluative. As the aim of this research is to find out the customer satisfaction level, the type of the research is the evaluative one. However, it also combines some characteristics of the explanatory research, meaning that there are questions which aim at explaining the patterns and trends in the usage of new technologies.

The author has chosen to conduct a questionnaire survey which is a form of quantitative research. There are six various types of a questionnaire survey which include household survey, street survey, telephone survey, mail survey, e-survey, user/on-site/visitor survey and captive group survey. Each of those types has different characteristics and differs from the form of collecting data as well as from what kind of information the researcher needs to find out. (Veal 2006, 235-248.)

Because this research was done at the airport the type of the questionnaire is user/on-site/visitor survey, more particularly visitor survey, and people who were interviewed were the passengers of this transport facility. According to Veal (2006), a visitor survey is used when the day-trippers are involved or when there are types of facilities where visitors are relatively infrequent, which fits the character of the airport although it could be as well called a user survey as passengers at the airports are not really visitors but users of the facility. This kind of survey also includes elements of a street survey type due to the fact that the respondents are being interviewed on the spot and are stopped by the interviewer. However, at the airport it is possible to interview people without stopping them if they are in a rush because many passengers are waiting in the check-in areas. This

is what enabled the author to conduct this research in a calm manner without interrupting the passengers. (Veal 2006, 235-248.)

There is also a distinguished type of completion of the survey as it can be interviewer-completion or respondent-completion. As respondent-completion can result in low response rates the author has chosen to do an interviewer-completion survey and has interviewed the passengers herself. (Veal 2007, 233-235.)

9 RESULTS

The results of the survey will be presented in this chapter. In order to analyse the data IBM SPSS Statistics Data Editor and Microsoft Office Excel were used. The survey was conducted at Helsinki Vantaa Airport on the 8th of January 2013 within the check-in area and the passengers were interviewed about the technological development facilities and were asked to evaluate the airport in Helsinki.

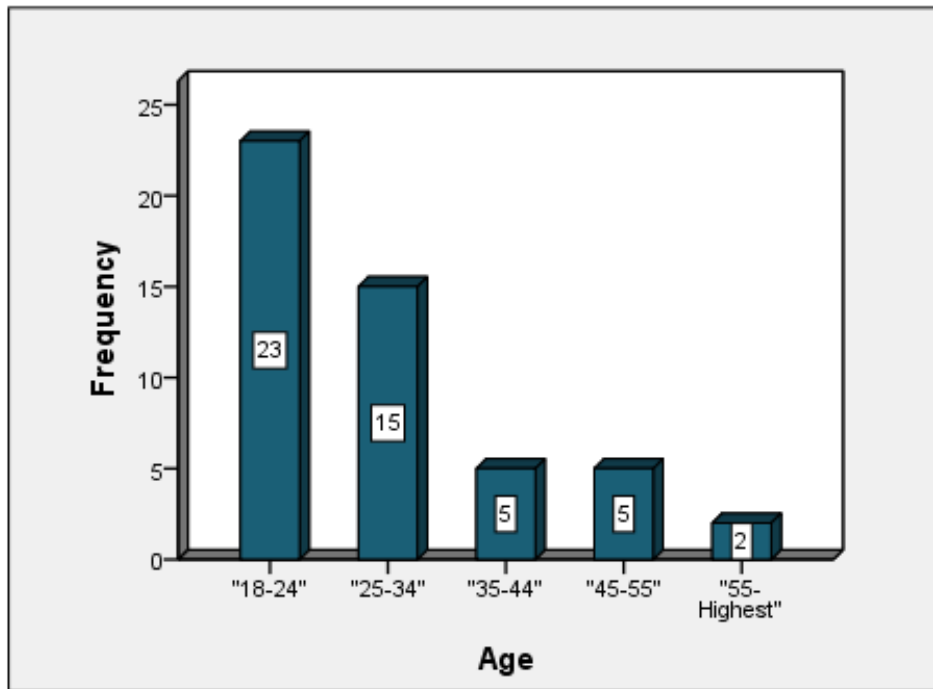
9.1 Information about the respondents

The survey was conducted with the passengers of Helsinki Vantaa airport with a total of 50 respondents, 28 of which were male (56%) and 22 female (44%). The data is shown in Table 4 below.

TABLE 4. Gender of the respondents

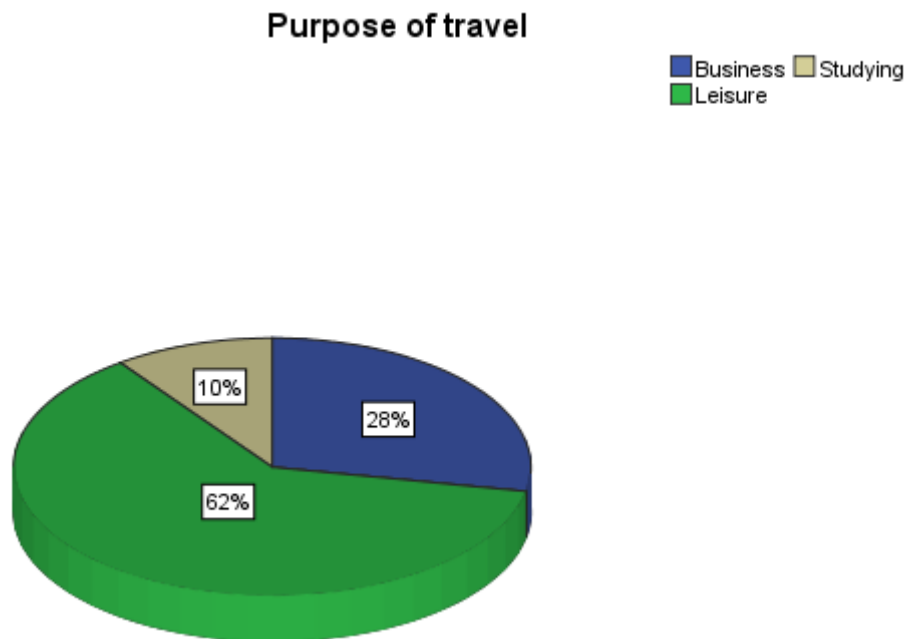
		Gender	
		Frequency	Percent
Valid	Male	28	56.0
	Female	22	44.0
	Total	50	100.0

Graph 1 below shows the respondent's age which was measured in corresponding age groups starting from the age of 18 until 24, 25 to 34, 35 to 44, 45 to 55 and 55 and higher. The reasons for selecting this method of age measurement is that the respondents would not feel forced to indicate their exact age but only the group in which they apply. The large difference in the amount of responses from young passengers and elderly ones can be explained by the fact that there are not so many old people travelling or at least not during that time of the year.



GRAPH 1. Age of the respondents

There were 31 respondents qualified as leisure travellers, 14 business travellers and 5 students travelling for their studies abroad. The same results are presented in Graph 2 in percentage.



GRAPH 2. Purpose of travel

Table 5 below shows how many business travellers, leisure travellers and students have been in which age groups. It is significant for the results that all the respondents from the highest age group are business travellers because they are generally more familiar with the services available on the travel market since they travel a lot for their jobs.

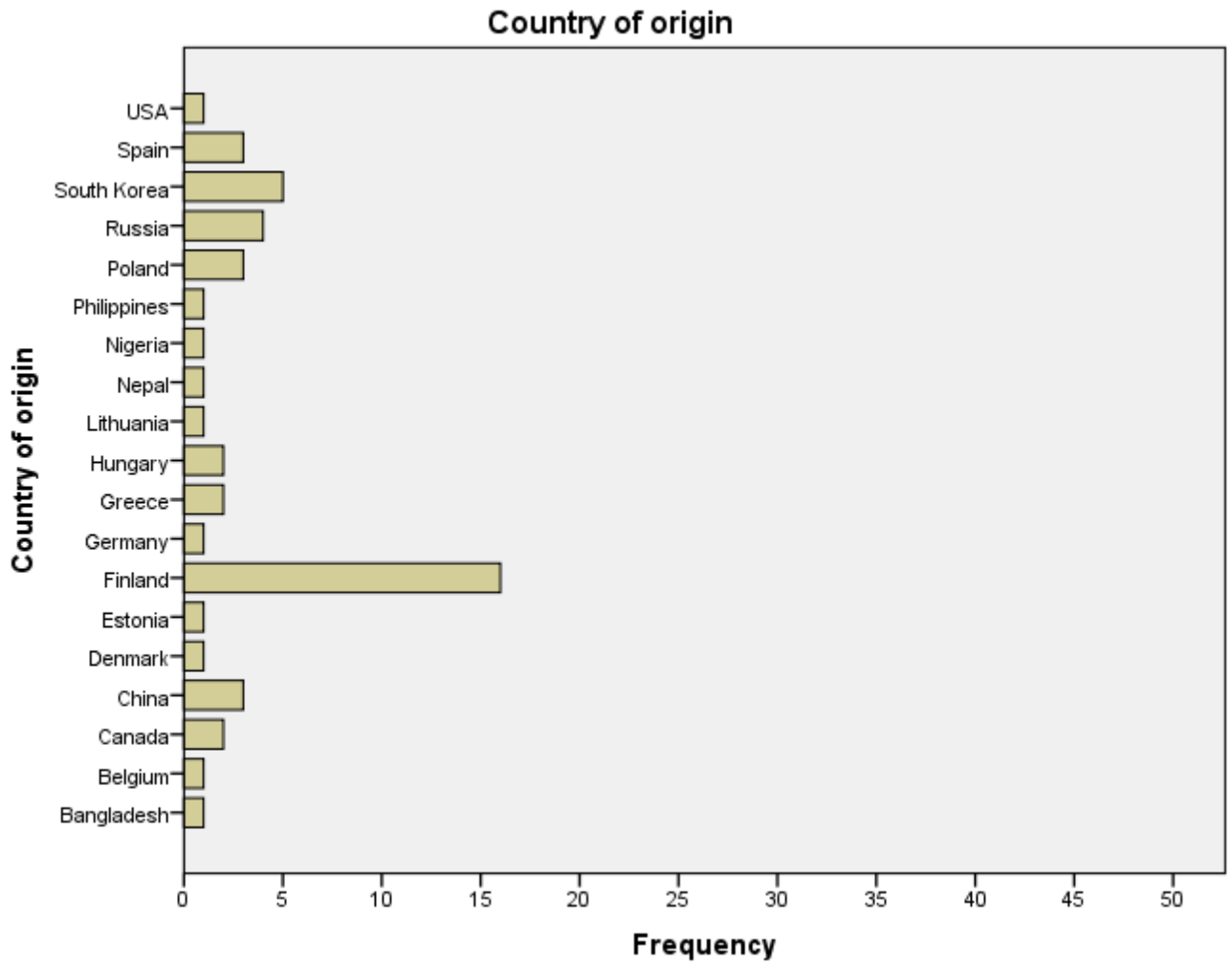
TABLE 5. Age of the travellers and their purpose of travel

Age * Purpose of travel Crosstabulation

Count

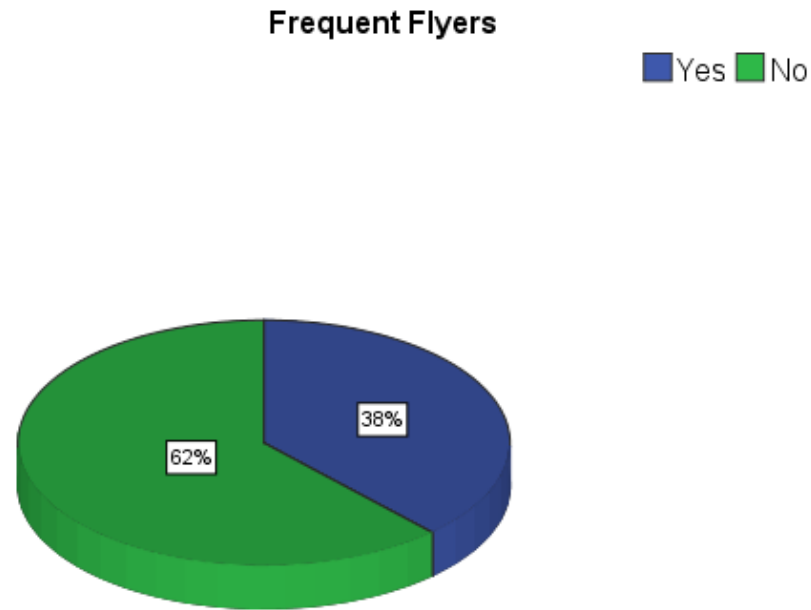
		Purpose of travel			Total
		Business	Leisure	Studying	
Age	"18-24"	2	16	5	23
	"25-34"	6	9	0	15
	"35-44"	3	2	0	5
	"45-55"	1	4	0	5
	"55-Highest"	2	0	0	2
Total		14	31	5	50

As can be seen from Graph 3 below, the majority of the respondents were domestic travellers from Finland (16 respondents). The second biggest amount of respondents was from South Korea and then Russia. The sample of the answers is quite varied as there are European, Asian, African and American citizens that took part in the survey.



GRAPH 3. Respondents' country of origin

There were 19 frequent flyers that took part in the survey, which makes 38% of the respondents. Frequent flyers were defined as those travellers who fly more than 10 times during the year (Graph 4).

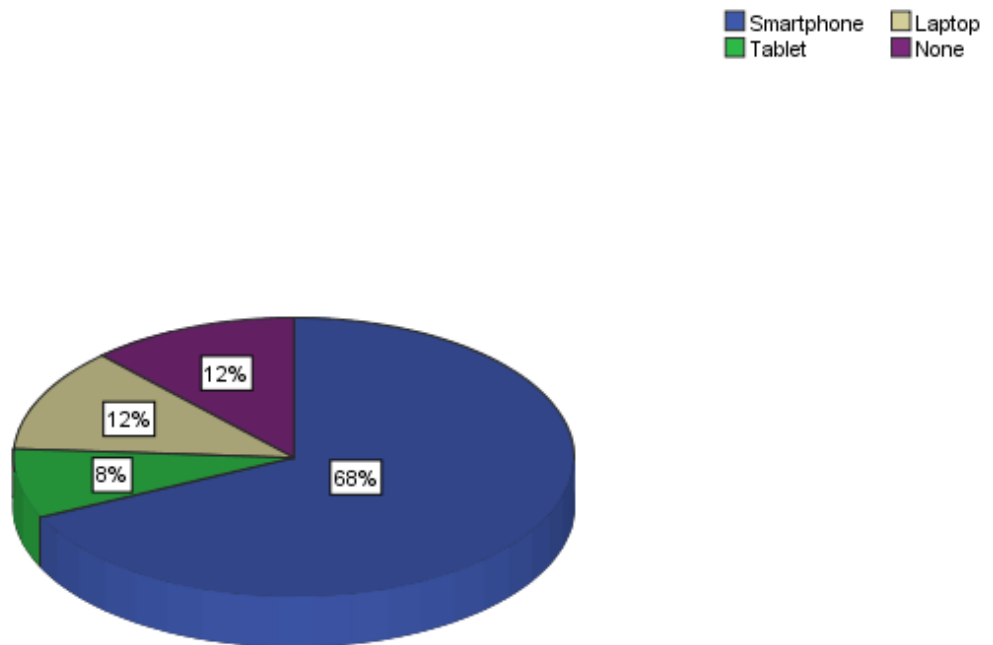


GRAPH 4. Frequent Flyers

9.2 Usage and awareness of modern technologies

The first part of the survey focused on the usage and awareness of mobile devices and new technologies. As can be seen from Graph 5, the vast majority of the passengers who answered the survey are already actively using smartphones during their travel. Still, only 8% of them have tablets and 12% is using laptops and 12% are not using any mobile devices. Mobile phones were not taken into account in this survey due to the fact that they are not the newest devices on the market and are not suitable for the research on the newest applications and services.

Mobile devices used during travel



GRAPH 5. Mobile devices used during the travel

Table 6 presents the reasons which passengers who do not use any mobile devices during their travel gave. The majority of the respondents said that they cannot afford a modern mobile device.

TABLE 6. Reasons for not using mobile devices during the travel

Reasons for no usage of mobile devices					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No need	1	2.0	16.7	16.7
	Not interested	1	2.0	16.7	33.3
	Can't afford	2	4.0	33.3	66.7
	Other	2	4.0	33.3	100.0
	Total	6	12.0	100.0	
Missing	System	44	88.0		
Total		50	100.0		

Table 7 presents the results of cross tabulation regarding the users of mobile devices and their travel purpose. The main finding is that there is a higher percentage of business travellers who use mobile devices looking at the fact that there is only 1 respondent who did not use any of the mobile devices while there are 5 within the leisure travellers. It can also be seen that there is no one from the students group who answered negatively to this question.

TABLE 7. Usage of mobile devices during travel according to the purpose of travel

Mobile devices used during travel * Purpose of travel Crosstabulation

Count

		Purpose of travel			Total
		Business	Leisure	Studying	
Mobile devices used during travel	Smartphone	12	19	3	34
	Tablet	0	3	1	4
	Laptop	1	4	1	6
	None	1	5	0	6
Total		14	31	5	50

Another cross tabulation below indicates that the frequent flyers are more likely to use mobile devices than non-frequent travellers.

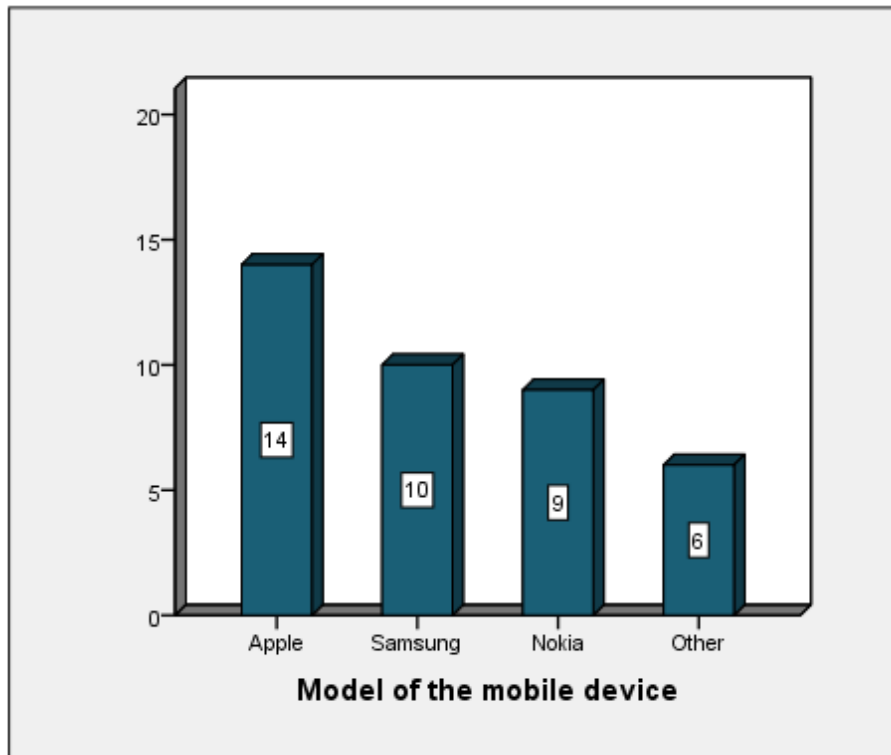
TABLE 8. Usage of mobile devices during travel according to the frequency of flying

Mobile devices used during travel * Frequent Flyers Crosstabulation

Count

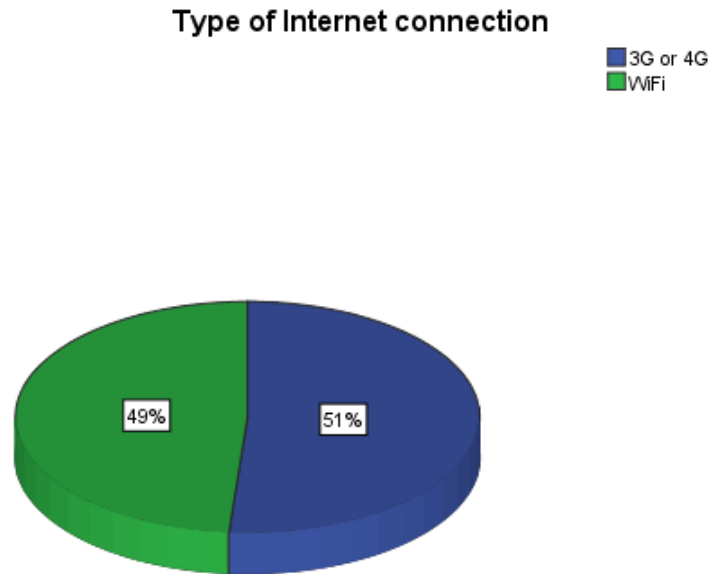
		Frequent Flyers		Total
		Yes	No	
Mobile devices used during travel	Smartphone	14	20	34
	Tablet	2	2	4
	Laptop	2	4	6
	None	1	5	6
Total		19	31	50

When it comes to the model of the mobile devices used by travellers, the most common one is iPhone from Apple according to Graph 6 below. Second is Samsung with only 4 less users and afterwards there is Nokia. Apple and Samsung are at the moment the worldwide leaders of smartphone and mobile device production, although Nokia is also not far behind.



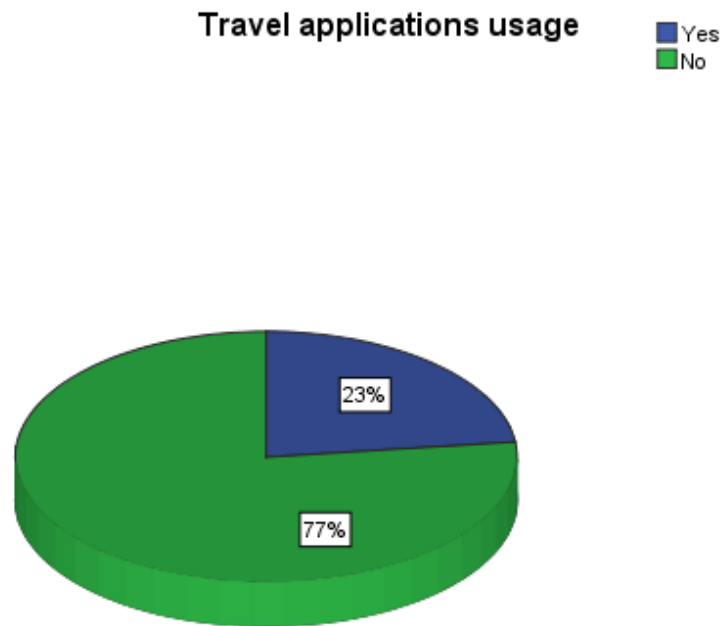
GRAPH 6. Model of the mobile device

Graph 7 shows that there is not much difference between the amount of users of 3G/4G Internet connection and Wi-Fi. Mostly the devices that have 3G or 4G connection are also able to connect to Wi-Fi if needed, so the number of respondents for Wi-Fi is those who do not use the other connection at all.



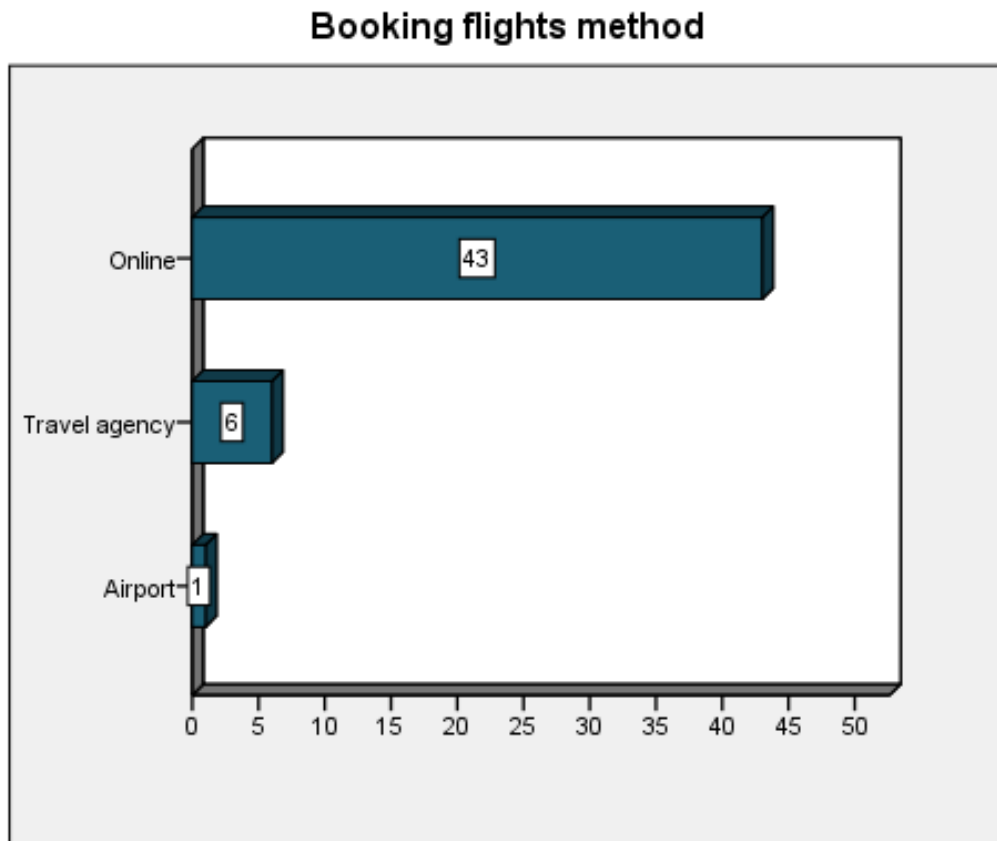
GRAPH 7. Type of Internet connection on the mobile device

A great deal of respondents has answered negatively to the question regarding whether they use any kind of travel applications on their mobile devices or not. As the number of mobile device users was high (88%) this means that travellers still are not that familiar with the variety of applications available for their devices during their travel (Graph8). Those who have answered positively which is 23% of the sample have listed the following kinds of travel applications: ticket sales, Booking.com, Google maps, train/subway maps, Trip advisor app, Lufthansa & other airline applications, Airport Zoom, Public Transportation app.



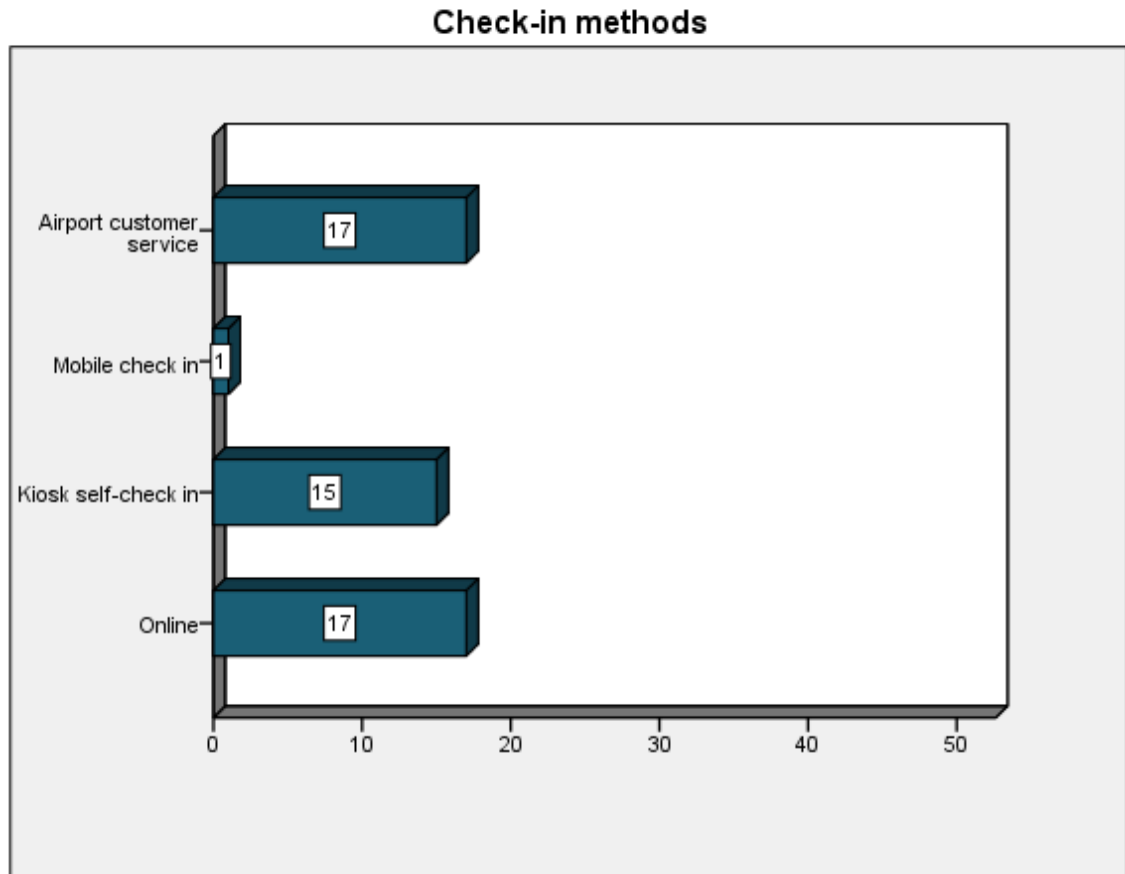
GRAPH 8. Usage of travel applications

Another matter taken into the analysis of the survey was to identify the most common booking method. As can be seen from Graph 9 below, a vast majority of the respondents purchase their flights online. Only 6 persons use a travel agency and only 1 uses the airport desk, which proves that with the development of the modern technology it has become more common to buy products through the Internet.



GRAPH 9. Method of booking the flights

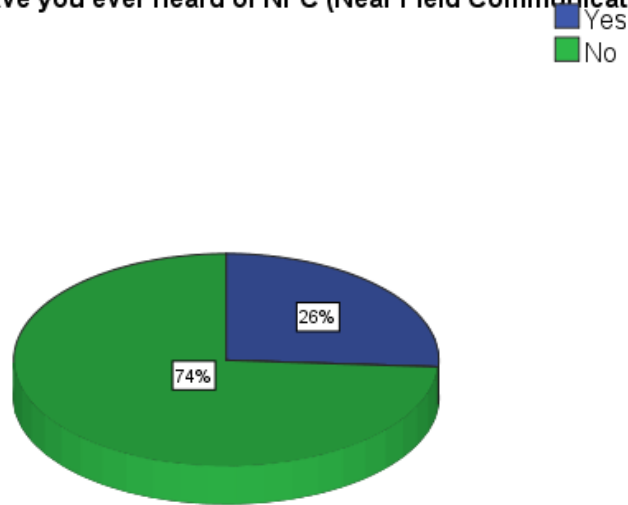
The check-in methods as can be seen from Graph 10, are still not so differentiated with the exception for the mobile check-in which got the lowest score. Only one person admitted to using the mobile check-in method which is the newest method from all the options. Considering the fact that the majority of the passengers surveyed already uses a smartphone, the number of those using mobile check-in could be higher. 34% use online check-in and the same result accounts for the airport customer service desk, which is the traditional method of checking in. Kiosk self-check in is still quite new but passengers are getting more interested in it as already 30% of them do use it.



GRAPH 10. Method of checking in for the flights

Graph 11 shows that a bigger part of the passengers have never heard of NFC and only 26% knows or is aware of its existence. From those 26% of respondents only 2 persons have used NFC before, and the purpose was not connected with any travel services, but business and navigation purposes.

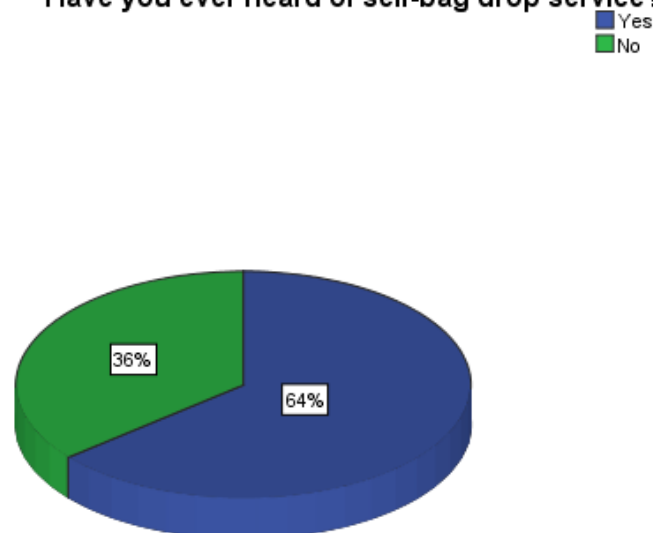
Have you ever heard of NFC (Near Field Communication)?



GRAPH 11. Awareness of Near Field Communication among the passengers

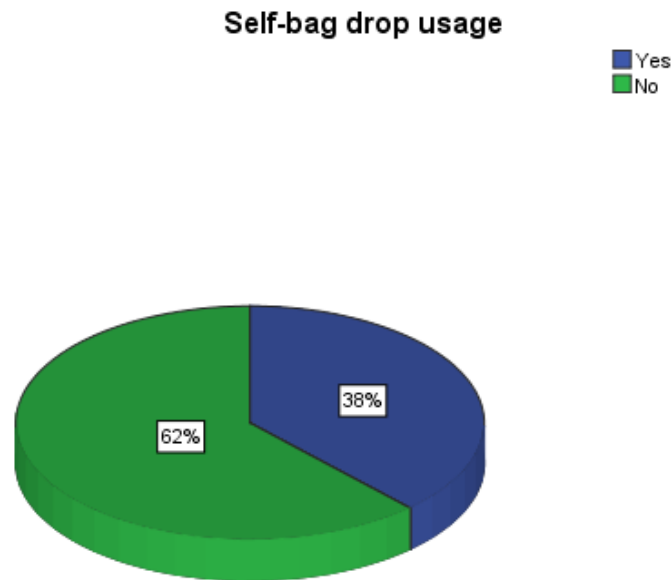
Another case is with the self-bag drop service because a vast majority of the respondents have answered positively to whether they have heard of this service before or not. The results are presented in Graph 12 below.

Have you ever heard of self-bag drop service?



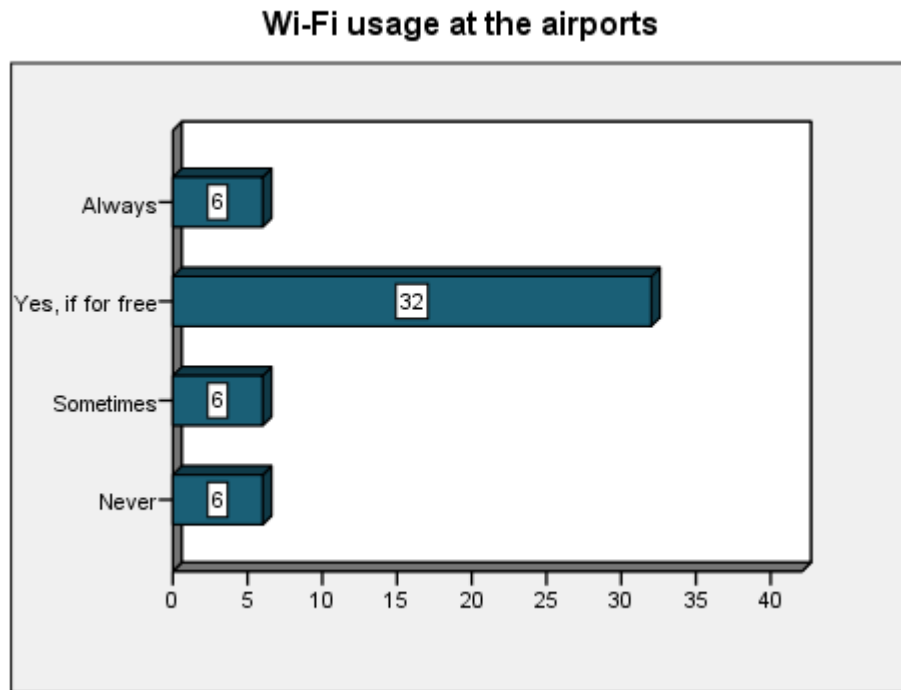
GRAPH 12. Awareness of the self-bag drop service among the passengers

Although 64% of the passengers have heard of the self-bag drop, not as many of them have already used it, as can be seen from the next graph.



GRAPH 13. Usage of the self-bag drop service among the passengers

The next graph shows that many passengers already use Wi-Fi at the airports. The total of 38 persons uses this service, 6 of which do it always and 32 who do it only if the service is offered free of charge. The main reasons for not using the Wi-Fi service at the airports were "No interest" and "Don't own a device".

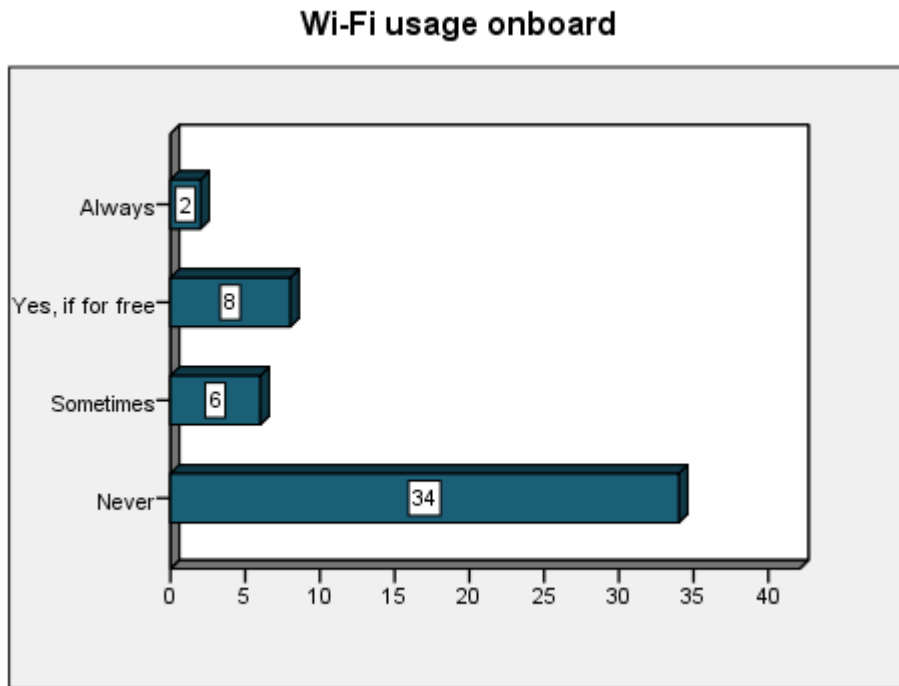


GRAPH 14. Usage of the Wi-Fi service at the airports

Even though many passengers do use the Wi-Fi at the airport area, much less of them take the benefit of Wi-Fi on-board during the flight (Graph 15). Of course not all the airlines do offer this service yet, but most of the passengers were not even interested in using it if it was available. The main reasons for not using the Wi-Fi on-board are presented in the table below.

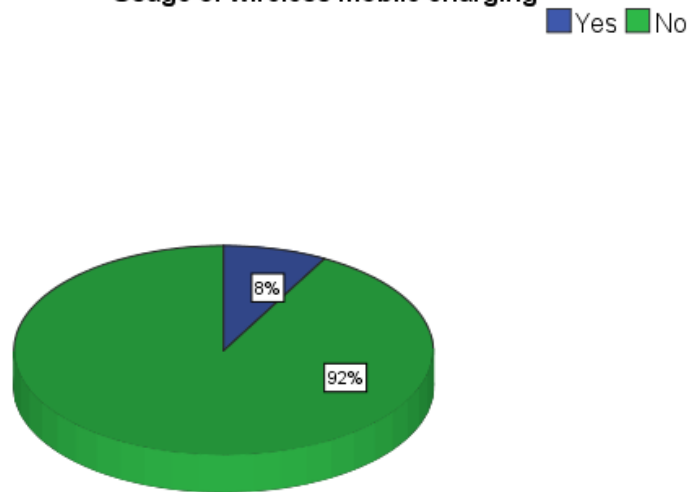
TABLE 9. Reasons for not using the Wi-Fi service on-board

No interest
Wasn't available
Didn't know it was available for free
Too expensive
Don't have a device
Prefer to relax during the flight
Never flies on long distances, thus no need
Haven't heard of it

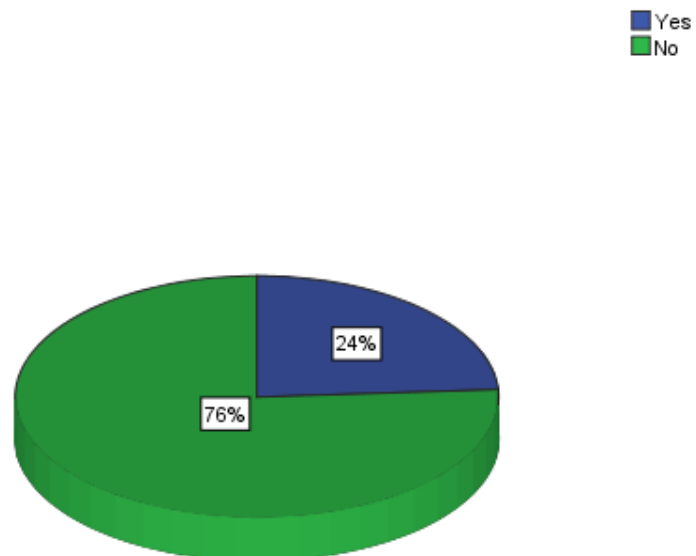


GRAPH 15. Usage of the Wi-Fi service on-board

The next graphs analyse the amount of users of wireless mobile charging facility and whether or not they have ever heard of the availability of this service at Helsinki Vantaa Airport. As can be seen from Graph 16, only a small amount of respondents have used wireless mobile charging in the past. And the numbers are not much higher regarding the Powerkiss wireless mobile charging service at Helsinki Vantaa Airport, as only 24% of the passengers knew about the availability of this service.

Usage of wireless mobile charging

GRAPH 16. Usage of wireless mobile charging

Knowledge about Powerkiss mobile charging

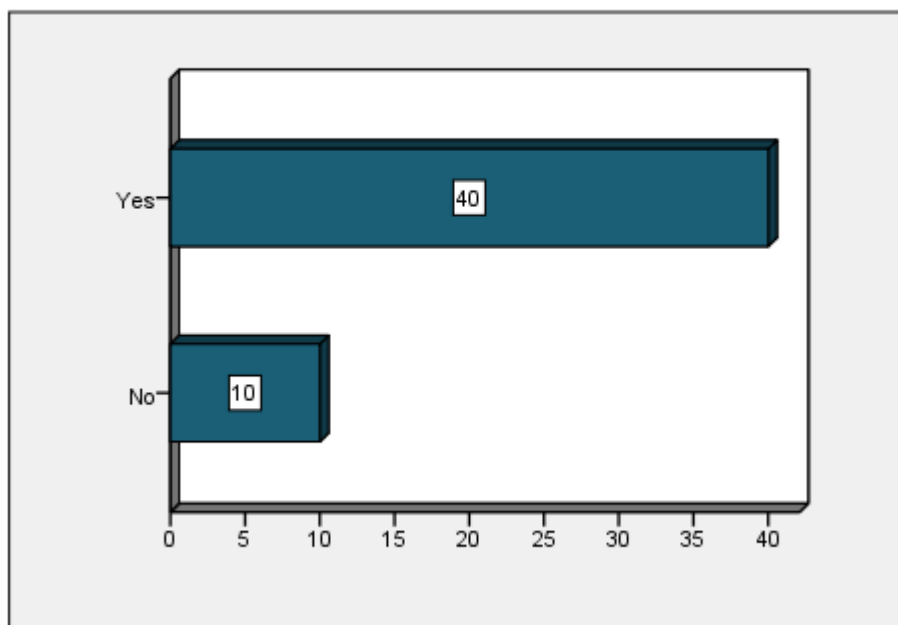
GRAPH 17. Knowledge about Powerkiss wireless mobile charging service at Helsinki Vantaa Airport

9.3 The future – customer interest in new technologies

This subchapter will analyze the interest of the passengers in the future development of the modern technologies and their willingness to use them.

As can be seen from Graph 18, a greater part of the respondents are willing to use the NFC boarding passes in the future and only 10 from 50 persons answered negatively. Most passengers were very positive when they heard the explanation of what the NFC boarding pass would be in the future and were excited about it.

Passengers' willingness to use NFC boarding passes in the future



GRAPH 18. Passengers' willingness to use NFC boarding passes in the future

Table 11 presents the passengers willingness to use NFC boarding passes in the future according to their age. It can be noticed that the highest ratio of those who are not willing to use NFC boarding passes is in the age group 45-55 with the amount of 2 on 3 answers which makes 67%. The two lowest age groups are

supporting the service on 79% and 64% respectively. The age groups 35-44 and 55-highest support the service in 100%.

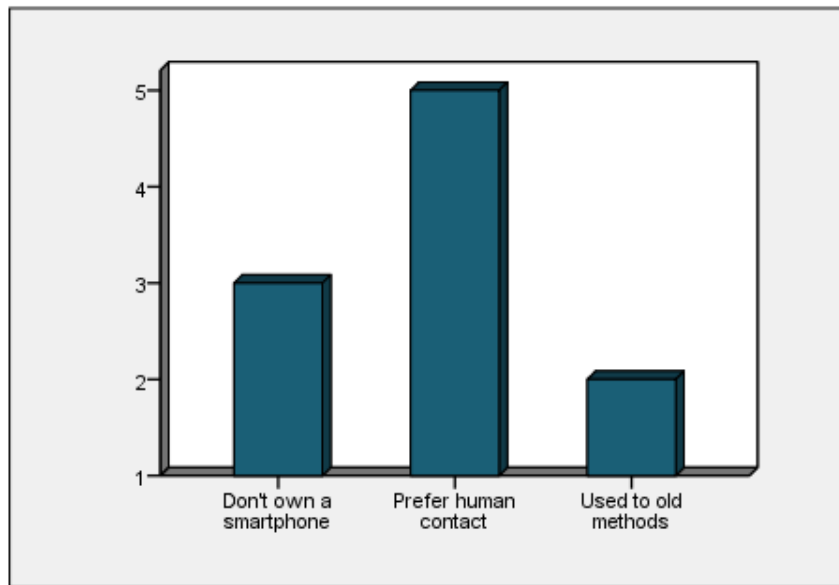
TABLE 10. Willingness to use NFC boarding passes according to the age of the respondents

Willingness to use NFC boarding passes * Age Crosstabulation

Count

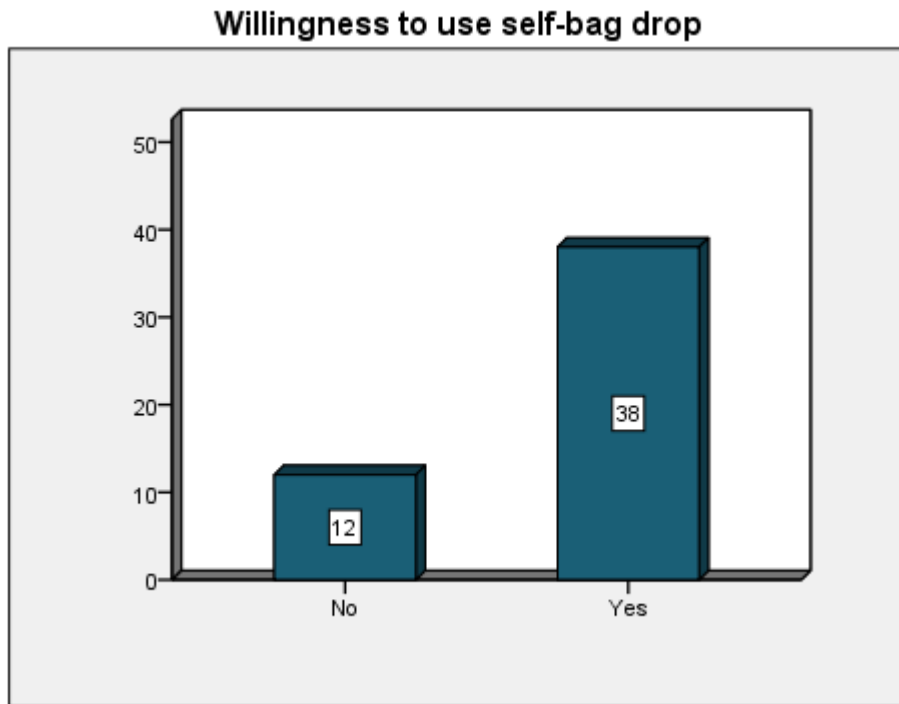
		Age					Total
		"18-24"	"25-34"	"35-44"	"45-55"	"55-Highest"	
Willingness to use NFC boarding passes	Yes	19	11	5	3	2	40
	No	4	4	0	2	0	10
Total		23	15	5	5	2	50

The next graph presents the reasons for which passengers did not want to use NFC boarding passes in the future. Mostly the case was that they prefer human contact rather than self-service facilities. Secondly, some passengers still do not own a suitable device such as a smartphone to be able to use the service. Some of the respondents said that they were used to the old methods and did not want to change to a new system.

Reasons for not willing to use NFC boarding passes

GRAPH 19. Reasons for not willing to use NFC boarding passes in the future

Another question regarding future preferences of the passengers was about the usage of self-bag drop service at the airports. Some of the passengers have already used it before, some have not. Some have not even heard of it before. Nevertheless, as can be seen from Graph 20, the majority of the respondents have answered positively to this question and only 12 of them were negative.



GRAPH 20. Willingness to use self-bag drop service

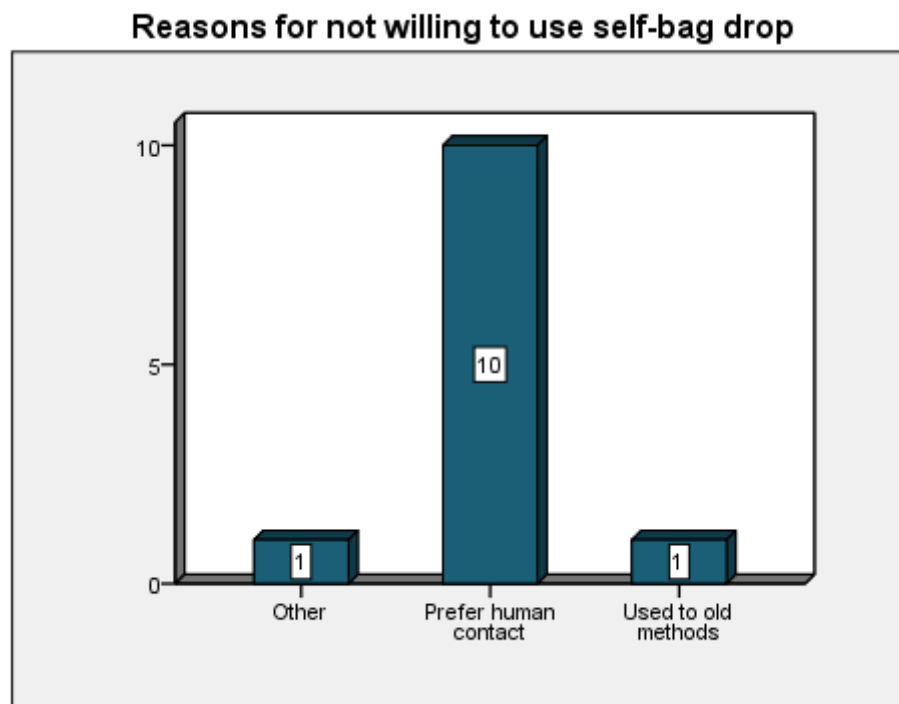
The next table presents how passengers with different mobile devices are willing to use the self-bag drop service. Those who own a tablet are supporting the service in 100%, those with a smartphone or laptop a bit less but still to a high extent, and those who do not use any mobile devices during their travel support self-bag drop only in 50%. This means that the passengers who are already using some of the modern technologies are more likely to use more technologically developed facilities than those who do not use any modern devices.

TABLE 11. Willingness to use self-bag drop service according to the usage of mobile devices during travel

Willingness to use self-bag drop * Mobile devices used during travel Crosstabulation

Count		Mobile devices used during travel				Total
		Smartphone	Tablet	Laptop	None	
Willingness to use self-bag drop	Yes	25	4	5	4	38
	No	9	0	1	2	12
Total		34	4	6	6	50

The main reasons for not willing to use the self-bag drop service are presented in Graph 21. Again it shows that the biggest fear of the passengers is the loss of the human contact.



GRAPH 21. Reasons for not willing to use self-bag drop service

This part of the survey analyses passengers' preferences regarding the possible future development of self-service facilities at the airports, thus the main question of this part is whether or not are they willing to have a fully automated service. A fully automated service meaning that there would be the self-service facilities only. Graph 22 shows that there is only 4% difference between the respondents who answered positively and negatively. Nevertheless, there is still over half of the passengers who do not agree on this matter and are not willing to have only self-service facilities at the airports. In fact, most of the respondents who answered positively also said that they are still willing to have someone who can help if needed and that there should always be the choice of both self and personal services.

Willingness of using a fully automated service at the airports

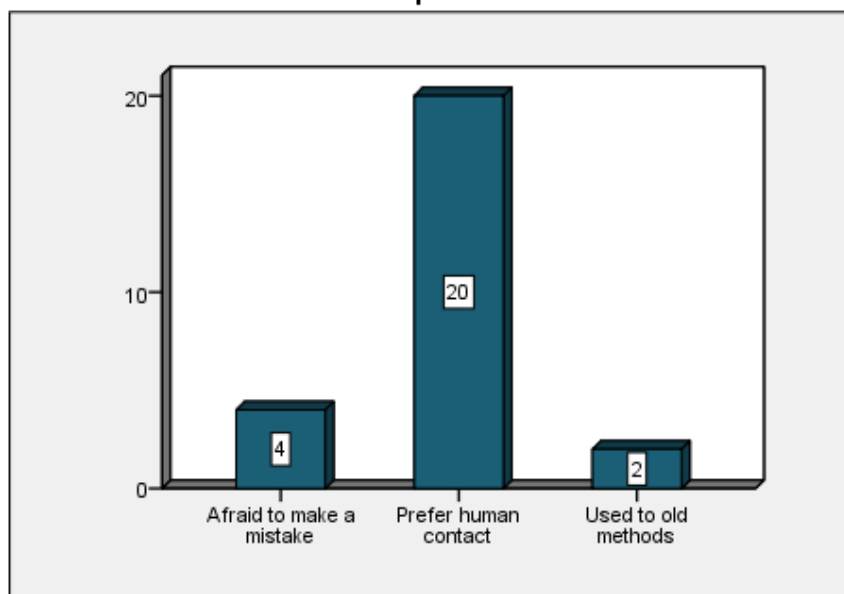
■ Yes ■ No



GRAPH 22. Willingness of using a fully automated service at the airports

The main reasons why passengers do not want to have fully automated airport service are again repeating and the highest amount of respondents said that they prefer the human contact rather than machines. A small number of the passengers (4 persons) answered that they are afraid to make a mistake while using the self-service. Some of the travellers are simply used to the old methods and like it the way it is. The results can be seen in the graph below.

Reasons for not supporting fully automated service at the airports

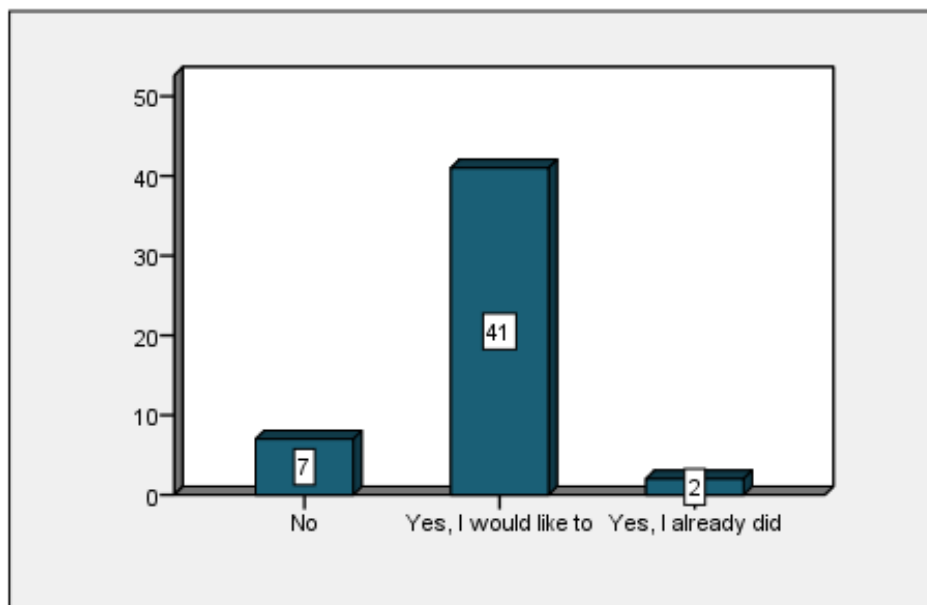


GRAPH 23. Reasons for not supporting fully automated service at the airports

9.4 Helsinki Vantaa Airport facilities

The next section of the survey was designated to focus on the facilities of the airport in Helsinki Vantaa. The passengers were asked to evaluate the airport and its services as well as give suggestions for its development. The first matter that was taken up was whether or not the passengers want to use the wireless mobile charging service called Powerkiss. The vast majority of the respondents said that they would like to use this service in the future. Only 2 persons have already used the service before and 7 persons were not willing to use it at all. The results can be seen from Graph 24.

**Willingness to use the wireless mobile charging service
Powerkiss at Helsinki Vantaa airport**

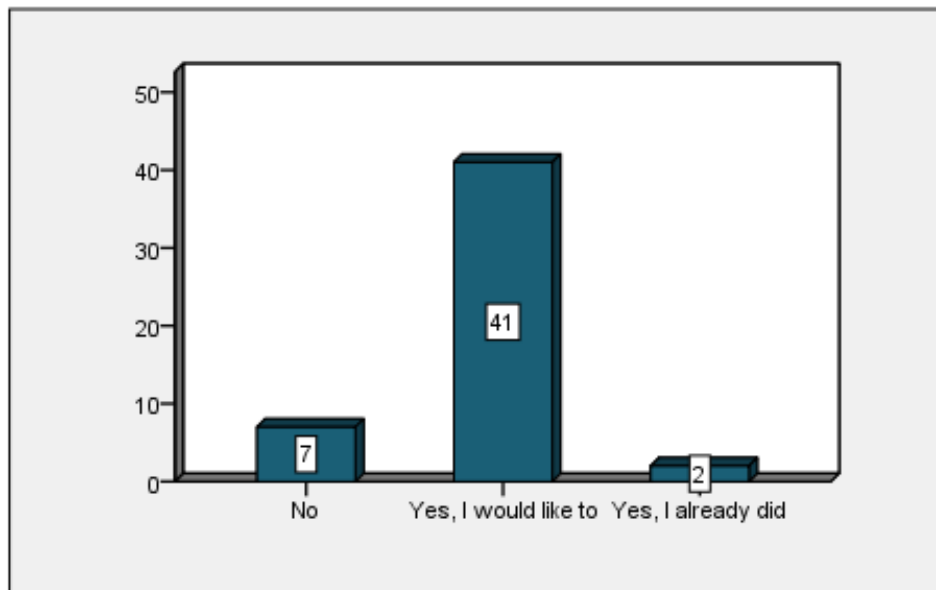


GRAPH 24. Willingness to use the wireless mobile charging service Powerkiss at Helsinki Vantaa airport

The passengers who have answered negatively have given a few reasons for their opinion and the main one was that they do not need this kind of service because they always carry extra batteries for their devices during their travel or they simply have a good battery and remember to charge the device before going on a trip. One respondent said that wireless mobile charging is not efficient and that it is better to use a normal plug charger.

Another service that was taken into the evaluation was the flight information service via text and voice message which is offered to all passengers at Helsinki Vantaa Airport. The results are actually the same as in the previous question. Most of the passengers are willing to use this service in the future and they were happy to hear about its availability. The results are presented in Graph 25.

Willingness to use the flight information service via text/voice message at Helsinki Vantaa airport



GRAPH 25. Willingness to use the flight information service via text and voice message at Helsinki Vantaa airport

The main reason of those passengers who did not want to use this service was that they can get the flight information on their own from the screens and they do not want to pay extra for the text message. 2 persons also said that the reason is because they do not own any phone. The last reason was that the person preferred the human contact and would rather ask someone from the airport service about their flight delays/changes etc. rather than getting it on the phone.

9.5 Conclusions

To sum up the analysis of the survey, the results show that the air travel industry is developing towards the self-service facilities and passengers are slowly getting used to the usage of new technologies available at the airports. Some services

should be marketed more efficiently though, because even if travelers would like to use them, they are not aware of them – as for instance the flight updates or Powerkiss. The only service that passengers were not very interested in was the on-board Wi-Fi service, although maybe if it was better promoted they would be more interested in it. It is visible that the business travelers and frequent flyers know more about the benefits of using modern innovations and travel solutions than leisure travelers, thus they are the ones that the innovations should be more marketed to. Moreover, a very small number of respondents are using travel applications which can be very helpful during the journey. 68% of the respondents do use smartphone so the development on this platform will continue but more encouragement is needed for the customers to take advantage of the available applications and services which smartphones enable them to use, especially that most of them do have the access to the Internet.

Another important finding of the survey is that online booking is continuously growing and the number was 43 on 50 persons. When it comes to the check-in methods, there is a large number of customers who still use the airport desk, but online and kiosk check-in are not far behind, thus the self-service check-in is developing and customers get more interested in it. Only the mobile check-in is still not common and only 1 passenger on 50 surveyed admitted to using it.

Important news is that 76% of passengers take benefit from the Wi-Fi at airports. Although, as mentioned before, more promotion is needed for the on-board Wi-Fi availability as most passengers are not aware of it.

Additionally, passengers are very interested in using the NFC boarding passes in the future (80% supports), although only 26% of them have heard of this before. The 20% that does not support the NFC boarding passes explains that they simply prefer the human contact at airports. Another self-service facility that passengers are supporting to a high extent (76%) is self-bag drop. When it comes to the

complete development of the self-service facilities at airports, passengers say that there should always be a choice for those who prefer human contact and those who do not mind to do it on their own at a machine.

10 HELSINKI VANTAA AIRPORT – DEVELOPMENT PLAN

This chapter is designated to present the suggestions that the passengers at Helsinki Vantaa airport had for the future development of the facility and to show how satisfied they are with the facilities that are already there. The passengers had generally a good experience of Helsinki Vantaa airport but they also had many things to say regarding the future development of the facilities and what could be improved upon. This development plan is based only on the suggestions from passengers and on the author's conclusions from the research.

First of all, it is important to take into consideration the fact that the whole air transportation industry is developing in a certain direction thus many of the self-service facilities can be already seen at the airports. Customers are getting more and more acquainted with it, but still many of them are not yet ready to switch from the old methods of for instance bag drop, to the modern ways such as self-service ones. Nevertheless, there are 76% of passengers who would like to use self-bag drop more in the future and during the survey it has been suggested a few times (14% of the respondents) that there should be more of those self-bag drop facilities than there are now as they are not available for all the airlines. What is more, customers were quite interested in the NFC check in which is not available at the moment yet, but they would be interested to use it in the future.

Second of all, what has come up in the survey is that there should be more promotion of the available services at the airport. A good example in this case is the Powerkiss wireless mobile charging service. Only 24% of the surveyed passengers knew about the availability of this service at the airport. This does not mean that they are not interested in using it, because 82% of the respondents said that they would like to use it in the future but they simply did not know about it before. A similar situation with the flight information offered via text or voice

message, because also 82% of the passengers have answered that they would like to use this service. A suggestion from the passengers have been made that all these additional services such as Powerkiss wireless mobile charging and the flight information service should come up on a webpage straight after connecting to the Wi-Fi at the airport.

Furthermore, there have been many suggestions regarding the technological advances and their development at the airport. Most of the respondents were suggesting the self-bag drop service. The second biggest number of respondents said that they were satisfied with the already available technology. The next suggestion with a big number of passengers who gave it was the NFC check in and that they would like to have it at the Helsinki Vantaa airport in the future. Another repeating request from the travellers was for a fast transportation inside the airport such as a flat escalator within the gates as some of them are far away from each other and that it is hard to move quickly when the gate changes.

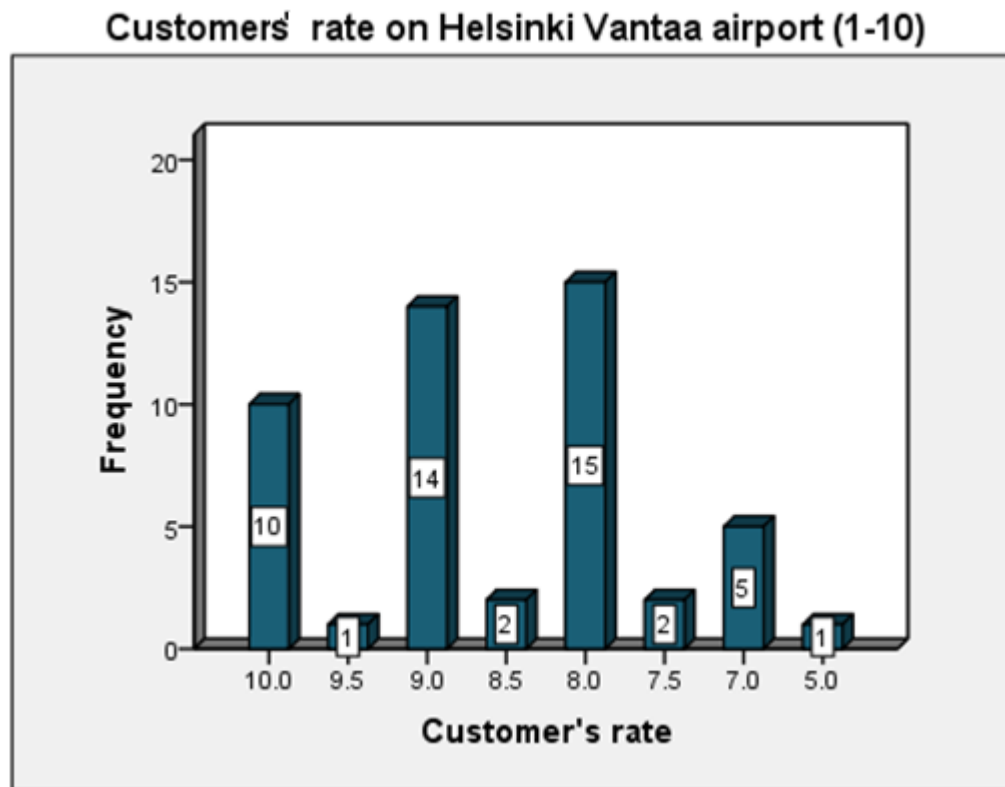
What was an interesting suggestion was that there should be a virtual map of the airport developed for the electronic mobile devices and generally more mobile applications developed. One idea was that it should be an integrated application for booking flights, getting updated information about the flight and the map of the airport as well as of the facilities in the neighborhood such as close hotels, taxis, buses etc. What is more, one respondent proposed a development of a queue numbering system as he was tired of waiting for a long time in a long queue for checking in the luggage. There was also a recommendation for bigger baggage lockers as they were not spacious enough for one passenger's suitcase. The last suggestion concerned the information screens about departing flights and gate numbers. The passenger said that there were not enough of them in some waiting areas as for instance in the passage between terminal one and two.

Many passengers when asked about the facilities and services available for them at the airport, said that when there is free Internet connection it is already enough for them because it enables them to do many things while waiting for their flight. There were a few answers though that the Internet connection should be a bit faster. Some passengers also complained that there were not enough plugs for charging their devices available and that some of them did not work. As the technological development continues, one person suggested that there could be tablets to borrow, a similar system as Internet/computer kiosks.

There were a few suggestions for some more entertainment at the airport such as movies, book rental, massage chairs, games and some facilities for children. Also, many respondents have complained that there are no comfortable seats when they have to wait for so long for their flights and that there should be a place for sleeping or napping at the airport. One person also suggested that if she could have anything she wanted while waiting for the flight, she would choose a room to relax with nice music in the background. What was a practical proposition from one businessman was that there should be a silent place for calling somewhere in the terminal in the check-in area as there is much noise at the airport. Moreover, someone recommended a phone service where passengers can go for advice when their device does not work.

When it comes to the connections with the city of Helsinki, some passengers said that it would be a good solution to have a train connection from the airport to the center or at least a free shuttle bus. There were complaints that the bus that goes to the airport at this moment is a city bus which stops at every stop and takes also every-day commuters, which is not convenient because then there is not much space for the ones who are travelling with heavy luggage.

In general, the passengers were satisfied with the airport and its facilities and the average grade was 8,75 in the scale of 10 (where 10 is the highest grade). The results of the rating are presented in the graph below.



GRAPH 26. Customers' rate on Helsinki Vantaa airport on the scale from 1 to 10

The table below also shows how different kinds of travellers have rated the airport. What can be noticed is that business travellers have been less likely to give the best grade than the leisure travellers as they are generally more demanding when it comes to the service given due to the fact that they are more familiar with different facilities and are used to travelling a lot.

TABLE 12. Customers' rate on Helsinki Vantaa airport according to their purpose of travel

Customer's rate on Helsinki Vantaa airport (1-10) * Purpose of travel

Crosstabulation

Count		Purpose of travel			Total
		Business	Leisure	Studying	
Customer's rate on Helsinki	5.0	1	0	0	1
Vantaa airport (1-10)	7.0	1	4	0	5
	7.5	0	1	1	2
	8.0	6	8	1	15
	8.5	0	2	0	2
	9.0	4	7	3	14
	9.5	1	0	0	1
	10.0	1	9	0	10
Total		14	31	5	50

To sum up, the passengers at Helsinki Vantaa airport were generally happy with the available service and there was no grade below 5, thus it can be said that the airport is serving its customers well. The suggestions that have been made are mainly directed towards the future development and improvements of the facility rather than complaints against what is already there. The main issues found from the research are that the passengers are open for the development of the self-service facilities, the promotion of the available services such as Powerkiss charging and flight information service should be done more effectively, applications for mobile devices could be more developed, some improvements could be done regarding the entertainment facilities for the passengers who need to wait long for their check in and flights, and the transportation from the city center to the airport could be improved.

11 CONCLUSIONS

In the report it has been shown that technology plays a significant role in the air transportation sector of tourism. Travellers as well as travel providers and suppliers are using technological advances in order to improve the efficiency and convenience during the travel experience and process. Airlines and travel agencies have benefitted a lot from the GDS systems that allowed easy searching for connections and booking, track of the reservations, inventory system, and have increased the competition between companies. Customers buying air travel have experienced that new technologies are more and more available on every step of their travel. Starting from online booking, self (online, mobile or automatized) check in, self-bag drop, Wi-Fi areas to use while waiting for boarding, Wi-Fi on-board while flying, on travel organizing applications and internet review portals ending.

New technologies and devices such as smartphones and tablets are becoming very popular among travellers and the possibilities connected to those are growing. Already now it can be noticed that there are a lot of things which customers are able to do with the help of their devices. For instance, using the Internet which already gives a variety of opportunities such as searching, buying and booking online, using social media and much more. Various applications are available for free download which can be travel-focused such as itinerary organisers for instance. There are so many on the market already and there are more still to come.

One can say that the future of air travel is very technology-oriented due to the development of new devices and passenger facilities at the airports. The future trends mainly consist of the development of self-service equipment which means that in a few years passengers will use only self-check in at a kiosk, mobile check

in or online check in. The same will happen with the other parts of the journey, such as self-bag drop, automated boarding gates and self-transfer kiosks. What is more, many companies will focus more on the mobile service improvement including mobile applications, personalised mobile commerce and flight status updates. Another major trend is that social media branding is going to play an even more important role for many companies. As can be seen, the air travel market is aiming at simplifying the travel experience so that the steps that the passenger has to go through at the airport will be less stressful.

What has been proven in this report is that technology has had a tremendous impact on air travel. From the beginning it has been improving, developing and changing the industry through its technical aircraft designs, computer systems, reservation systems, Internet progress, mobile devices and new efficient ideas for customers. It could be said that technology is actually a part of air travel as it affects it in many ways to a large extent.

Finally, the survey conducted at Helsinki Vantaa Airport (see Appendix 1) has resulted in various findings mainly implying that the new technologies and solutions for passengers still need to be more promoted. As much as the travellers would like to be aware of them and know how to use them, they do not take enough advantage of them yet. When it comes to the future preferences, the passengers are mostly interested in the development of self-service facilities at the airports as well as in other services such as the mobile applications and flight updates. The vast majority of the travellers already carry a modern mobile device such as a smartphone or tablet, and most of the users take the benefit of the free Wi-Fi service at the airport so it is a great opportunity for the suppliers to offer a wider choice of travel-connected applications such as airport maps, updates etc. The passengers of Helsinki Vantaa airport were generally satisfied with the given service and technology but some improvement suggestions were proposed and

revealed in the development plan which the author of the thesis hopes will be helpful for the future progress of the facility.

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Technology for air travel passengers – Customer satisfaction research

1. Information about the respondent

Age group: <i>18-24; 25-34; 35-44; 45-54; 55+</i>
Sex: <i>Male/ Female</i>
Country of origin:
Purpose of travel: <i>Business/ Leisure/ Studies</i>
Frequent Flyer (more than 10 trips per year): <i>Yes/ No</i>

2. Usage and awareness of modern technologies

Do you use any of the below mentioned mobile devices <u>during your travel</u> ? <i>Smartphone/ Tablet/ Laptop</i>
Model of the mobile device (brand):
Type of Internet connection usage: <i>3G,4G/ Wi-Fi/ None</i>
Do you use travel applications? <i>Yes/ No</i> If yes, which one are you using the most?
If none mobile device is used, please explain why: <i>No need/ Not interested/ Can't afford/ Other</i>
How do you book your flight tickets? <i>Online/ Travel agency/ Company/ Airport</i>
How do you generally check in and get your boarding pass? <i>Online/ Kiosk self-check in/ Mobile check in/ Airport customer service</i>
Have you ever heard of NFC (Near Field Communication)? <i>Yes/ No</i> Have you ever used it? <i>Yes/ No</i>
Have you ever heard of self-bag drop service? <i>Yes/ No</i> Have you ever used this service? <i>Yes/ No</i>
Do you use Wi-Fi areas at airports? <i>Always/ Yes if for free/ Sometimes/ Never</i> Reason for answer "never": <i>No interest/ Too expensive/ Other – specify:</i>
Do you use Wi-Fi onboard while flying? <i>Always/ Yes if for free/ Sometimes/ Never</i> Reason for answer "never": <i>No interest/ Too expensive/ Other – specify:</i>
Have you ever used wireless mobile charging? <i>Yes/ No</i> Did you know about the availability of wireless mobile charging ("Powerkiss") at Helsinki Vantaa airport? <i>Yes/ No</i>

3. Future – Customer interest in new technologies

Would you like to use NFC check in/boarding pass in the future? (NFC boarding pass will allow passengers to have an electronic ticket on their mobile devices which will be checked in automatically while crossing the gate) *Yes/No*

Reason for “no”: *Used to old methods, prefer human contact, don’t own a smartphone, afraid to make a mistake, other-specify:*

Would you like to use the self-bag drop system? (Self-service bag drop means that the passengers can check in the luggage on their own by scanning the boarding pass and printing the luggage tag) *Yes/No*

Reason for “no”: *Used to old methods, prefer human contact, don’t own a smartphone, afraid to make a mistake, other-specify:*

Would you like a fully automated self-service at the airports? *Yes/No*

Reason for “no”: *Used to old methods, prefer human contact, don’t own a smartphone, afraid to make a mistake, other-specify:*

4. Helsinki Vantaa facilities

Would you like to use the wireless mobile charging at Helsinki Vantaa airport? (This Finnish invention is called “Powerkiss”, you can rent a small plug to your phone and charge it wirelessly for free at cafes and restaurants)

Yes, I already did

Yes, I would like to

No, why not:

Would you like to use the flight information service via text/voice message at Helsinki Vantaa airport?

Yes, I already did

Yes, I would like to in the future

No, why not:

Helsinki Airport has free wireless Internet connection, power sources to charge your devices, computers to use, Internet kiosks, and wireless mobile charging service. What else would you like there to be for passengers?

How would you rate Helsinki Vantaa airport regarding the technological development and customer service? (lowest 1 – 10 highest)

What technological advance(s) would you like to have on airport to make travelling more convenient and less stressful?

Thank you for your time!