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Evolving user interface design in public areas as a consequence of demographic changes

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Evolving User Interface Design in Public Areas As a Consequence Of Demographic Changes

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Abstract

Airports are rapidly getting more complex. They are in general undergoing rapid development with new sections added and new technology and information systems put into operation. The security is also becoming more rigours in terms of restrictions and regulations. Moreover, it can be experienced that airports are becoming more like shopping malls, filled with stores, cafés and restaurants. It can be perceived as a "landscape" of experiences. Simultaneously, societies all over the world are experiencing an aging population ("WHO," 2012). The senior segment tend to have different needs than younger adults, and these needs can often be more complex (Alsnih & Hensher, 2003). This study focuses on seniors aged 55 and older. This is a generation born before the information revolution, and comparative studies have shown that people born before this period are more sensitive to the development of technology (Christopher Sze Chong, 2010). Similarly, the many effects of aging and environmental characteristics can also influence how the elderly interacts with technological devices, such as automated services, signs and boards and not at least, how they experience the more complex airports. The present thesis hence places its concern on the elderly segment and if they are experiencing any difficulties or obstacles in relation to the user interface design at Stavanger airport, Sola. The term user interface design has in this project been defined as the entire environment at the airport and reflects the security, personnel, cafés, seating area, information boards and signs. The present project follows a qualitative design, including methods such as participant observations and semi-structured interviews at Stavanger airport. One of the outcomes was that the subjects experienced difficulties with the use of automated services. However, there are no clear evidence that the elderly experiences any vital obstacles in relation to the security and interpreting signs and boards.

Keywords: Stavanger airport, Sola, User Interface Design, Universal Design, aging, elderly passengers, participant observation, qualitative.

Table of Content

List of Figures

List of Maps

List of Photos

List of Tables

Foreword

The author has worked for the Ground Service at Stavanger airport for 2 years and as an airhostess in SAS for 1 year. Throughout this period, it has been a personal experience that older people have more problems, and are less willing to take advantage of the automated services than younger adults. Difficulties when seniors are passing security have also been experienced as a common phenomenon, while many people are not aware of the regulations and restrictions regarding carryon luggage.

Based on previous experiences the author found this to be an interesting phenomenon and would therefore like to examine whether this was a situation that should be taken more seriously by designers and owners of public areas. The interest for the travelling industry was also an important factor for the choice of the specific topic.

There are many people who have supported me with my graduate paper. I was able to choose a dynamic and interesting subject, and not only have this given me motivation, but I have also been able to meet people who have inspired me and provided me with information of great value. First of all, I would like to express my gratitude to Professor PhD Reidar Mykletun for his great support over the last months. It has been a tough and challenging period, and I would not have been able to make it without his valuable insight and feedback. It is also important to acknowledge Espen Nicolaisen for his great support during this process. He has been my proof-reader and provided me with much feedback and advice that has been of great value. I would also like to express my gratefulness to Else Ravndal, Human Resource Director at Stavanger airport and Morten Sand, Manager of airport experiences at Stavanger airport. They have been very helpful during the process of data collection and given me support and invaluable knowledge when I have needed it.

Finally, I would like to express my gratefulness to family and friends who have supported me throughout this period.

Evolving User Interface Design in Public Areas As a Consequence Of Demographic Changes

Airports are becoming more complex and advanced. They are in general undergoing rapid development with new sections added and new technology and information systems put into operation. In Norway, Avinor has a responsibility for the airport network in terms of planning, development and operations ("Avinor," 2012a). Avinor has monopoly on a product that is meant to suit all travellers and people should be able to cope with the automated services that continue to expand on the different sections at the airports. For instance, check-in machines at the ticket frontier and often by the gate that are replacing staff are a common phenomenon. Moreover, signs and flight information boards that are to guide passengers to their final gate are also becoming more advanced, as well as more rigours airport security.

Experiencescape, Servicescape and User Interface Design

It can be recognized that airports are in general becoming more like shopping malls, filled with stores, cafés, restaurants and TV entertainment. It has become a designed and styled "landscape" of experiences, where the customers have the possibility to experience something more than phenomenon of travelling. It can be connected to the essence of "experiencescape" (O'Dell, 2005).

Similarly, the physical surroundings within the service context deal with more than just the specific service attributes. There is a constant development and planning of the physical settings where the service interaction occurs, and this have the ability to influence the users' behaviour and experience to a large extent. It regards the "servicescape" (Bitner, 1992).

User interface design, also called Human interface design, is an important component in this thesis, and can be seen in the light of "servicescape" and "experiencescape". User interface design is basically referred to as the "communication between a human user and a

computer system, referring in particular to the use of input/output devices with supporting software. Devices of increasing sophistication are becoming available to mediate the human-computer interaction. These include graphics devices, touch-sensitive devices, and voice-input devices" ("Human-computer Interface," 2008, para. 1).

The author will in this thesis expand the definition of user interface design and consider the entire airport environment as a part of the term; security, personnel, boards and signs and the offer of cafés, stores and seating areas. The reason for the expanded definition is because the original term only includes technology, which is too narrow for the present study.

The Aging Society With Older Travellers

Nations all over the world are experiencing an aging population, and WHO (2012) expects that the older population (aged 60 and older) will reach 1.2 billion people in 2025 and 2 billion by the end of 2050 ("WHO," 2012). A decrease in birth rates and increase in life expectancies have resulted in the larger percentage of elderly in the adult population (Grougiou & Pettigrew, 2011). Falnes-Dalheim and Slaastad (2007) states that in Norway;

> people aged 67 and above have increased with nearly 125 800 over the last 30 years. That accounts for almost 1/5 of the population growth since 1977. The largest share comes from people aged 80 years or older, which have more than doubled over the last 30 years. ("Færre unge – flere elder," 2007, para. 6 (own translation)).

As the population is aging, the senior citizens are also experiencing a financial increase and improved economic status (Epland, Lunde, & Mørk, 2005). They are becoming a vital part of the consumer market (Grougiou & Pettigrew, 2011). This especially applies" to couples with fewer expenses relating to children and with a main-income earner aged 65 or

older" (Epland et al., 2005, "Større inntektsforskjeller," para. 3 (own translation)). The median income for this segment has increased with 47 % since the year 1990 in Norway (Epland et al., 2005).

The seniors tend to be an important segment for the service industry (Grougiou & Pettigrew, 2011) and a vital force in the tourism around the world. The emergence of an aging population that are retiring, combined with improved health and economic status has been stated to have the most radical influence on the travel industry (Faranda & Schmidt, 2000).

In the later years it has become more popular for seniors to travel abroad, especially as the generation of the baby boomers retires (Schindler, 2005). This is also recognized by Moschis and Ûnal (2008) who state that; "….travel seems to be the most common and pleasant activity associated with retirement" (Moschis & Ûnal, 2008, p. 259). It has to be mentioned though, that this includes all kind of travelling, and not only by airplane.

Even if older people seem to have the time and money to travel, they are more exposed to the affects of travelling; stress, get easier overwhelmed and disoriented (Schindler, 2005). The needs of the elderly segment are often more complex in relation to the younger segment (Alsnih & Hensher, 2003) as they are more likely to have physical and psychical impairments (Daatland & Solem, 2011), such as deterioration of sight, touch and hearing. The result is often that they process and approach information differently than younger people (Mates, 2004).

Moreover, it has been noticed that many service industries fails to adapt to the aging population by tailoring service to the elderly segment (Grougiou & Pettigrew, 2011). This has also been supported by Biswas, Robinson and Langdon (2012) who states that several designers don't consider prospective needs for the elderly and people with disabilities during the phase of design (Biswas et al., 2012).

There are many reasons for the neglect of the senior segment. For instance, people have not been aware of the size of the segment and their growing economic status. There have also been stereotypes regarding the physical and psychical condition, and the segment has also been ignored because there is a perception that there is a high homogeneity among the elderly (Grougiou & Pettigrew, 2011). Chong (2010) state that it was not until very recently that designers started focusing on the need for inclusive design (defined as a better design of services and products that is easy to use by as many segments as possible, especially for the elderly segment and people with disabilities) (Christopher Sze Chong, 2010). As the population is aging and there is a lack of adaption from the service industries, the senior segment will provide challenges for the society and service providers (Alsnih & Hensher, 2003).

Definition of the Older Traveller. The definition of a person who is "old", "mature" or a "senior" citizen varies within different studies, and there seem to be no common agreement on the definition of when a person is "old" (Faranda & Schmidt, 2000). People aged 65 and above have generally been considered old in the consumer field, but recently, people over 60 and sometimes from the age of 50 have been defined as "old". Seen from another point of view, the elderly segment are also approached in age groups; "50 – 59 (youngest olds), 60 – 74 (younger old), 75 – 84 (older olds), and 85 and over (oldest old)" (Yoon, Cole, & Lee, 2009).

In this thesis the elderly segment will be referred to people aged 55 and above. Because the researcher will sample people based on their physical traits and the researchers own discretion, this "low" age cut off will make it easier to ensure that the chosen subjects are within the specific age group. Moreover, this is also a generation born before the information revolution, which started from year 1977 (Schewe & Meredith, 2004).

The Research Question

The question the present thesis wants to investigate is whether the elderly segment experiences any difficulties or obstacles in relation to the user interface design at Stavanger airport. If so, what difficulties are met and how are they coped with?

Based on comparative studies in related areas it can be expected that seniors do encounters some challenges at the more complex and advanced airports. However, Avinor might adapt to the changing population by tailoring their services and products, and the elderly may encounter none or few problems.

Method Overview

The issue will be approached by utilizing a qualitative design with sampling methods such as participant observation and semi-structured interviews at Stavanger airport, Sola. The author will observe approximately 20 passengers, or continue observing until there are no new patterns or themes during the conversations and observations. The participant observations will take place prior to charter and scheduled flights. Since check-in takes place by the counter when travelling with charter, and basically by the automated services when travelling with scheduled flight, this will hopefully secure a sample of diverse experiences and perceptions.

There will also be conducted semi-structured interviews with four employees working at the Ground Service and two employees working at the Securitas to see if they can contribute with any new and interesting factors concerning this issue. An interview with the Human Resource Director at Avinor, Sola, Else Ravndal and Manager of airport experiences at Avinor, Sola, Morten Sand will also be a part of the empirical work in order to enhance the insight of the phenomenon and see if they are adapting to the demographic changes.

As a final sequence, there will be carried out measurements of the light level (lux) and Decibel at the airport.

The researcher believes the findings will be of use for Avinor and public area design in general that are continuously developing into more advanced and complex spaces. As few studies have focused on senior consumers in an airport context, this study expects to add new insight to this field.

Stavanger Airport, Sola

The following section is to a large extent based on, and translated from the text by Hollund (2012) and Avinor`s homepage (2012b). Stavanger airport can celebrate its seventy-fifth year anniversary this year, 2012. It is the third largest airport in Norway, and can offer ten national - and forty-two international direct routes. The airport has over the last years had an enormous growth resulting in much construction activity. Since 2004, Avinor has spent over two billion NOK on new and improved technical equipment, developments of parking areas, check-in area, gate terminals and the runway. There is also a new airport hotel owned by Stavanger airport (Hollund, 2012).

Photo 1. Stavanger airport, Sola (private photo).

Photo 2. Overview of Stavanger airport. *Note.* From Ramboll, "Stavanger Lufthavn, Sola" by Nyhus, (n.d.). Copyright n.d.by Ramboll.

When the construction work is finish, Stavanger airport has the capacity to handle approximately five million people a year, and in 2011, over four million people travelled to

and from Stavanger airport (Hollund, 2012). The airport is an important transportation hub for the business community at Vestlandet. Stavanger is Norway's energy capital and a majority of the national - and international companies has established their headquarters in the region. Stavanger region is also the second largest city in Norway in relation to fund management. Business development will be one of the most important work areas for Stavanger airport. The goal is to create a positive synergy and to contribute to amplify the position of the airport as an important and international airport ("Avinor," 2012b).

Because the business community is an essential part of the Stavanger region, it can be expected that business travellers is a major part of the traffic at the airport. These people might be younger adults, more familiar with the process of travelling and technological devices compared to older people. It is therefore important to also focus on the leisure segment where it may be easier to sample older adults.

Litterateur Review

Airports have become “landscapes” of experiences that offers more to its customers than the necessary facilities. TV’s, cafés, restaurants and playgrounds are just some of the physical attributes that are to provide the customers with more exiting experiences. It deals with an environment adapted to satisfy its customers, but simultaneously, is it adapted to all segments in the society?

The following sections will therefore concern elements regarding the physical surroundings that can have an impact on the customers. Similarly, this section will also portray efforts that can be accomplished in order to provide facilities that are applicable for a larger proportion of the population.

Servicescape. The model of “servicescape” is developed by Bitner (1992) and regards the physical setting where the service interaction takes place (i.e. consumed, delivered and performed). There is a constant development, planning, building, control and change of the physical surroundings of organisations, but the impact these specific designs have on the ultimate consumers is not completely understood. The physical environment has the ability to create an image and influence the user’s behaviour. As the service interaction involves producing and consuming simultaneously, the users are “in the factory” (Bitner, 1992, p. 57) and able to experience the entire service within the organisations physical environment. The organisational space where the production of the service occurs is impossible to hide and may have a vital influence on the user’s service experience. Previous research has shown that the psychical setting may have an impact on the customer’s service satisfaction (Bitner, 1992).

It is vital for any organisations to realize that the physical setting is dependent on the kind of job that is performed and the consumption experience. Physical settings that can be managed are often looked as tangential in relation to other variables in the organisation, such

as “pay scale, promotions, benefits, and supervisory relationships” (Bitner, 1992, p. 58). Likewise, variables on the users side such as “pricing, advertising, added features, and special promotions” (Bitner, 1992, p. 58) receives more attention than the physical setting so that the consumers can be satisfied and/or just attracted to the organisation.

Because employees and customers most often have an experience in terms of the organisations facilities, the physical surroundings are in general important within the service interactions.

Bitner (1992) has developed a model that suggests that the physical environment of a firm have an influence on customer and employees in terms of cognitive, emotional and behavioural reactions. It is also referred to as servicescape and includes the physical facilities such as interior, symbols, signs and so forth. This model deals with a vertical and horizontal dimension. The *vertical dimension* concerns “*who* is performing actions within the servicescape – the customer, or the employee, or both” (Bitner, 1992, p. 58). One extreme situation regards the “self-service” firms where there are few or no employees present resulting in a high activity among customers. The other extreme concerns the “remote service” indicating that there are few if any users within the servicescape. In some cases there might even be little involvement from employees, such as “fully automated voicemessaging services” (Bitner, 1992, p. 58).

“Inter personal services” are located in the middle of the two extremes. In such firms, both employees and customers are present and active within the servicesecape. The degree of involvement from employees or customers will designate whose needs ought to be consulted in the environmental design. Within interpersonal servicescape, “special considerations must be given to the effects of the physical environment on the nature and quality of the social interaction *between and among* customers and employees” (Bitner, 1992, p. 58). Whether employees, customer or both are equally present in the servisescape will also determine the

kind of objectives an organisation might assume to accomplish with the use of these physical facilities. In settings where self-service are present, the use of a creative design can back up discrete positioning and strategies for segmentation and improve marketing objectives, such as attraction and customer satisfaction. Where remote services are present, employee satisfaction, operational efficiency and motivation could be considered within the physical setting due to the fact that customers rarely experience the organisations physical setting. In relation to interpersonal services, both marketing and organisational objectives could basically be aimed at careful physical design.

The complexities that can be present within a servicescape are captured at the *horizontal dimension*. Certain service environments can be very minimalistic including few attributes or elements, spaces and forms. It can be defined as "lean" environments. There is a straightforward design particularly in remote service or self-service situations where the interaction between employees and customers are absent. One example could be a "Federal Express dropoff kiosks" (Bitner, 1992, p. 59). The other extreme represent servicescapes that are severely complicated, with several elements and forms such as hospitals. They are defined as "elaborate" environments (Bitner, 1992).

Staffs' attributes are important elements within the servicescape, and can have a vital influence on the consumers' perception of the service industry. Because this thesis focuses on the elderly segment, elements such as ageism, stereotyping and heterogeneity will be presented and discussed in a later section.

Experiencescape. Experiences have become one of the most popular phenomenon's available on the market. People are constantly confronted with advertisements of products that guarantee to give different experiences of different kinds in terms of better, newer, bigger, more genuine, more thrilling and flexible. Likewise, users are also more willing to try out new experiences, take risks and consequently utilize more money in order to "experience

something new" (O'Dell, 2005, p. 12).

An experience is an ongoing process that is personal, intangible and subjectivity perceived. To re-present the constitutive of individuals experiences may be impossible, but focusing on the materially and the space of experiences can help to analyze the social, cultural and cognitive processes that frame and define them (O'Dell, 2005). Staged and consumed experiences can be compared to "landscapes" that are styled, strategically planed, designed and laid out. In this sense they are "landscapes of experiences – *experiencescapes*" (O'Dell, 2005 p. 16). As producers organize them, consumers also actively consult them. The "landscapes" of experiences are spaces of enjoyment, pleasure and entertainment at the same time as they are meeting grounds for diverse segments that interact and move about with each other (O'Dell, 2005).

It is important to understand the way spaces are conceived, perceived and lived. Space has physical facilities that are actively produced and can be quantified, measured, described and observed. These spaces can also be manipulated, planed and designed in order to have an impact on people in specific ways. In other words, spaces can "be thought about and created" (O'Dell, 2005 p. 18) – by urban planners, architects, artists, social scientists and so forth. In this manner it is a realm that is politically charged where powerful relations are expresses as designers claim their ideas and wills over space and thus influence people who consult "their" space (O'Dell, 2005).

The light level (lux) and Decibel will be measured at the airport. These elements can be seen as a part of the experiencesacpe, as it can have an impact on customers' experience. The light level (lux) and Decibel will be presented and discussed in a further section.

Inclusive Design. It has been recognized that the society are not actively adjusting and designing products and services to the needs of the elderly segment. Not only can the elderly find this frustrating, but it also increases the need for assistance and guidance (Roupa

et al., 2010).

As the population is rapidly aging and new technology continuously shows up on the market, the seniors segment are faced with the necessity to adapt to the demands from the society. However, the adjustment to new technology takes place in a much slower rate in relation to younger adult. This is an accepted phenomenon, and the reason is either because of unfamiliarity with technology or impairments due to aging. Other factors that might also play a part are education, geographical locations, lack of skills and incentives, and complex device and lack of training (Roupa et al., 2010).

Research regarding seniors and their use of technology is of major importance to this thesis, and several authors have addressed this issue (Roupa et al., 2010). For instance, researchers have focused on the interaction with daily-living appliance and outdoor activities (Yasuo & Takatsune, 1999), modern technology in relation to nurses and health care among the elderly (Matarese, Marfoli, Piredda, Tartaglini, & De Marinis, 2008) and the use of devices among frail elderly and how this influence their independence in everyday activities (Skymne, Dahlin-Ivanoff, Claesson, & Eklund, 2012).

A relevant research that is of interest to this thesis, is the investigation undertaken by Chong (2010); "*Designing Inclusive ICT products for older users: taking into account the technology generation effect*".

The author argues that the development of technological products has changed the way we interact with these products. From switches, push buttons and dials to virtual buttons and wireless controls. The operation procedures, how people interact with these devices, have also progressed "from single layered to multi-layered" (Christopher Sze Chong, 2010, p. 192).

Chong (2010) state that, regardless of capabilities, all people can benefit and increase their life quality from the use of technology. If the service and products are designed to increase independency, this is an important feature. However, several researches have shown

that many products are too complex for the users (Christopher Sze Chong, 2010).

Chong (2010) recognize that designers in general have been considering older adults and people with disabilities during the design phase, but in was not until recently perceived as a very important element within the mainstream design. It concerns "inclusive design", which has received much attention in order to meet the needs of disabled people and older adults. Inclusive design can be defined as:

> The design of products and services that should be easily usable by as many people as possible, in particular aiming to meet all the needs of people who have been unable to use mainstream products because of age and disability. (Ricability, 2001, as cited in Christopher Sze Chong, 2010, p. 190).

Thus, inclusive design concerns developing better design by creating a balance between the fast development of technology and being able to have a sensitive touch to the needs and capabilities of different users (Christopher Sze Chong, 2010).

However, the author state that many designers only focuses on the aging effect (decline in cognitive, sensory and physical functions) during the inclusive design approach. Even if this is an important element, the generation effect should be taken into account during the design phase. "The generation effect" is the way people behave and act with technology in their formative life. It can be expected that this behaviour will be similar in the future (Christopher Sze Chong, 2010).

To be able to accomplish the research and investigate why seniors might find it more difficult than the younger adults utilizing information and communication products, the author developed the "Generation Timeline Tool (GTT)" (Christopher Sze Chong, 2010, p. 194). The GTT were meant to make it easier studying experiences in the past and knowledge of products within the technological space. The GTT contained different technological products

used in the daily life through different generations (Christopher Sze Chong, 2010).

The findings reported that the generation effect were the reason for the difficulties experienced by the elderly segment when using present products. Particularly people born before 1950 found multi-layered interface as an obstacle. However, as new technology and new ways to operate products substitute for the multi-layered products on the current market, people of today will also experience obstacles coping with products in the future. The effect of the technology generation between different cohorts will therefore continue to exist (Christopher Sze Chong, 2010).

As a final part, the author recommends designers to recognize the generation effect, and take it into account when designing technological products. This can be of great help for elderly people who are experiencing difficulties when approaching information and communication products (Christopher Sze Chong, 2010).

In addition to inclusive design, there are resources that can eliminate or reduce performance degradation encountered by seniors, such as introduction sets. Instructions that seem to be promising are "semantic encoding, visual imagery, rehearsal, and organization" (John & Cole, 1986, p. 302). Findings have shown that elderly benefits even more from explicit instructions, for instance visual imagery. However, researchers have also found that this does not only benefit the elderly, but the younger adults as well (John & Cole, 1986). Another feature that can influence on any deficit experienced by the elderly segment is response format. Formats that don't contain cues are often experienced to be overwhelming by the elderly segment, because it requires active unassisted retrieval. Formats that include recognisable elements are rather preferred by the elderly (John & Cole, 1986).

Universal Design. The following section is based on, and translated from the report of Rogaland Fylkeskomune (2007). As a further recognition of the term inclusive design and the positive effect it can have, a similar trend in the Norwegian society has over the last years

developed; Universal Design. Universal Design addresses the design of products and environment and that it should be applicable for all segments in the society, without any special adoptions or assembling. The purpose of Universal Design is to enhance the possibility for people to participate in the society by developing products, services, communication and surroundings that is applicable and approachable for a larger part of the population (Rogaland Fylkeskommune, 2007, p. 5).

Throughout life, people will experience some type of impairments, either stable or temporary. The differences in impairments among people are an expression of the heterogeneity in the society. By implementing Universal Design as a main basis for development, one is trying to create solutions that are applicable for the larger proportion of the population, and simultaneously, avoid creating special solutions for different segments in the society (Rogaland Fylkeskommune, 2007, p. 5).

The meaning of the word is not limited to the architectural design, but also captures areas within education, information, design and so forth (Rogaland Fylkeskommune, 2007, p. 5).

The most important challenge within Universal Design is to try and change the mindset of those who every day makes decisions regarding accessibility within different areas. There are several challenges within this area, and some of them are:

- Increase the competence in the society of the needs for Universal Design.
- Regarding architecture and design, it will be a great challenge to meet the claims that the anti- discrimination law add up to/suggest: to meet the demands of Universal Design in architecture aimed for the population within 2009 and 2019.
- This claim also concerns the outside environment aimed for the entire population, which will require a great effort. Within outdoor life and travelling, many of the same challenges that are aimed towards architecture and transport are also required.

- The development of information must have a design understandable and available for all people.
- In the future it will be even more important to handle the information and communication technology, and it is therefore important that all people will receive an opportunity to master this technology.

(Rogaland Fylkeskommune, 2007, p. 7).

The main principles of Universal Design show what kind of functions and performances, product requirements, architectures and solutions must satisfy in order to be applicable for people with different impairments. The principles can also be used for evaluation and development within educational and informational work;

- Similar possibilities for use.
- Flexible in use.
- Simple and intuitive in use.
- Understandable information.
- Tolerance for error.
- Little mental effort.
- Size and room for access and use.

(Rogaland Fylkeskommune, 2007, p. 6).

Inclusive design and Universal Design are built on the same foundation; creating facilities that are more applicable for a larger proportion in the society. However, Inclusive design is more concerned about developing technological products for older and disabled people (Christopher Sze Chong, 2010), while Universal Design is a more general term. It more or less concerns about the entire heterogeneous population and the development of products,

information systems, education, outdoor life and travelling (Rogaland Fylkeskommune, 2007).

Even if this thesis is written when the implementation of Universal Design is just starting up, the demands might already be well planed or incorporated at Stavanger airport. As previously mentioned, Stavanger airport has since 2004 undergone enormous development and has increased in size and efficiency. It will therefore be of interest to see if they have considered the demands of Universal Design during the phase of development. This will be a subject brought up during the interviews with Ravndal and Sand.

At the moment, there has been performed little mapping of the accessibility within the travelling industry in Rogaland. Documentation is therefore limited. There are several examples of effort that has been implemented, but the general impression is that improvements are needed several places. There is a need for increased resources, knowledge and motivation for innovation within several areas (Rogaland Fylkeskommune, 2007, p. 29).

Information and Communication Technology (ICT). This section is to a large extent based on, and translated from the Government Document by Fornyings-og Administrasjonsdepartementet (2007).

Norway is one of the leading countries in digitalisation within the community, both in private and public sector. However, there seems to be a dilemma that the expected rewards in many areas are absent, such as improved service, universal adaptive solutions and improved electronic solutions for self-service and automaticity (Fornyings-og Administrasjonsdepartementet, 2007, p. 4).

There is a high agreement that common solutions and reuse, multipurpose and standardisation should be one of the facilities in order to increase the effect of ICT-investments. This expectation is the foundation for a great share of the plans developed over the last years, and entails the government white Paper number 17 (2006-2007); “An

information community for all people" (ICT-report). The purpose is to develop good suggestions on how to improve electronic self-services for the public society. The report is a direct starting-point for the establishment of the workgroup that have developed this suggestion of how the government can approach the establishment of a public ICT-architecture (Fornyings-og Administrasjonsdepartementet, 2007, p. 4).

The government's ambitions are divided in two. Both citizen and businesses should encounter an open, accessible and coherent public sector that offers holistic digital solutions with a priority of self-service. The government would also like to increase the efficiency and replace resources with help from ICT in order to increase welfare and reduce the administration. A 24-hour open government administration creates new demands for the government organisations handling of ICT, in relation to investments, developments of attendance and production of available services (Fornyings-og Administrasjonsdepartementet, 2007, p. 4).

This report highlights approaches to problems, opportunities, frameworks and recommendations concerning the principles for architecture, processes, components and models/mechanisms for directive (Fornyings-og Administrasjonsdepartementet, 2007, p. 4).

Plans and strategies for ICT in public sector are located at all levels within all sectors and organisations. The plans seem reasonable and concrete, but an essential problem is the lack of authority. A direct consequence of the general directive principles in public sector is that the implementation and compliance of these plans and strategies are only followed to the extent that the plans are a part of the formal directions for governing the specific organisation. The result is that a great proportion of plans and strategies are never implemented. It is not possible to implement a common ICT-architecture unless these measures are based on an authorization structure and a directive regime that is authorized to impose the actors to follow the principles, strategies and plans (Fornyings-og Administrasjonsdepartementet, 2007, p. 5).

The Agency of Public Management and Government sent out a letter the 25.06.08 regarding a submission of the report of a common ICT- architecture in the public sector. At the current time, Avinor did not want to get actively involved with this work. Likewise, they would not submit a detailed feedback regarding the ICT- report from The Agency of Public Management and Government. However, they presented a general comment on the report and the project. Avinor perceived the initiative with great interest. As they were already involved with their own ICT project, they experienced that the public report was in line with their own strategy. They also recognized that a common ICT- architecture in public sector is an ambitious project that will involve great challenges within technology, interactions between units and additionally how to solve the economical consequences within each single unit. Avinor recognized that it is important that the principles that are described in the rapport about the architecture are implemented and that public services and components are developed based on these. The use of external contractors, pervasive standards within developments of services and the exchange of information has to be an absolute requirement in a common ICT- architecture (Samferdselsdepartementet, 2008).

As a final summary, Avinor perceived the project as positive. It is comprehensive and will influence several organisations and agencies, but at the same time create many advantages if the project succeeds. They also recommend that the coordination of initiatives in the public sector has its intersection with this project. This will make it easier for companies, such as Avinor, to keep up with the development and at the same time have the possibility to relate to only one department in relation to ICT- initiatives that involves several units (Samferdselsdepartementet, 2008).

How do Older Travellers Fit Into the Modern Airport Experiencescape?

As aging progresses, people are likely to have changes within the physical and psychical spectrum (Daatland & Solem, 2011). Consequently, this can cause challenges as airports are becoming more complex and advances. In order to understand the many effects of aging and the respective consequences that can occur within the airport setting it is important to adapt a perspective regarding several components. Aging, sensing, cognitive functions, cohort and the generation effect are some of the components that will be highlighted and discussed in the following sections.

It must be mentioned, that some of the references of interest are dating back to the eighties and early nineties. The reason might be because the aging population was a phenomenon that started expanding during this period, and people recognised that it had to receive more attention. However, the author has tried to incorporate more recent references because it was found important and necessary to include material that can be linked to the contemporary society that is continuously evolving.

Previous Findings

There has previously been minimal research about difficulties experienced by the elderly segment within an airport context. However, there have been studies focusing on issues within this phenomenon such as elderly and travelling (Schindler, 2005), elderly and technology (Christopher Sze Chong, 2010) and elderly and consumer behaviour (Tongren, 1988).

A relevant study that is of interest to this thesis, is the research conducted by Wolfe and Suen (2007); *Evaluation of airport improvements for older adults*. The authors' focuses on the situation that all people, especially older adults with minor impairments, have the possibility to take advantage of the accessibility arrangement at airport that is basically set up for people with disabilities. Through "The Americans with Disabilities Act Guidelines", it is

statutory to arrange for people with disabilities at airport, but at the same time it is difficult getting support for prospective design adaptations that could be helpful for the elderly segment who have impairments. The authors' wants to address the values that arise when people have the possibility to benefit from the arrangements. They also suggest a calculation (benefit-cost and return-on-investment) of the benefits these arrangements provides, and state that it can, with further investigation, increase the activity of travelling for older adults. They recommend further research to calculate the exact revenue for the airports. As a further recognition the authors have also suggested some efforts and improvements so that the airport can be more "accessible", labelling the different suggestions mandatory, recommended and desirable (Wolfe & Suen, 2007).

The conclusion of the research is that all air travellers, especially older adults benefits from the arrangements set out for people with disabilities (Wolfe & Suen, 2007).

As mentioned, it will be essential to ask Ravndal and Sand if they are adapting to the changing population. However, there will also be questions concerning general adoptions to segments in the population. If Avinor has any statutory regulations or arrangements at the airports in Norway set up for people with impairments, it can be expected that older adults who have the need for it, can employ these arrangements.

Model

Grougiou and Pettigrew (2011) have in their research paper "*Senior Customers Service Encounter Preferences*" suggested a model that focuses on how the elderly segment "evaluate their service encounter interactions" (Grougiou & Pettigrew, 2011, p. 1). The study explores how the service encounter is experienced by Scottish seniors and what type of factors that has an influence on their evaluation. The authors interviewed 60 people aged 60 and older. They left out people with impairments who were dependent on help from others to do their purchases, as it was likely that they did not interact with the service provider

(Grougiou & Pettigrew, 2011).

Positive and negative memories regarding the service experience were fundamental for the study, but it was recognize that the negative experiences were most salient for the seniors. The findings showed that most of the seniors favoured the social aspect during the service experience, and cared less about the pragmatic elements, for instance price. Recent studies have shown that social interaction and the relationship with the service provider is very important for the elderly (Grougiou & Pettigrew, 2011). Patterson (2007) for instance, conducted a research regarding age and loyality in service contexts, and the findings showed that the the elderly consumer placed a higher importance on the social benefits within service encounter, than younger adults. He also recognized that a decreased network and lack of social interaction among the senior segment increased the needs and wishes for social interaction with service providers (Patterson, 2007).

The general service encounter is of great importance to the current thesis, which is "the mutual interaction between a service organization and its customers" (Hoffman & Bateson, 1997, as cited in Grougiou & Pettigrew, 2011, p. 2). Even if this thesis is not set out to investigate the overall satisfaction with the service encounter, the author believe it can have an influence on the seniors perception and what they experience to be an obstacle or difficulty within the user interface design at the airport. Firstly, the automated service itself might be difficult to handle and turn out as obstacles and secondly, the seniors might prefer the interaction with staff and therefore refuse to approach the automated services.

Grougiou and Pettigrew (2011) states that seniors may even seek service provider because of emotional and social advantages that take place during the interaction (Grougiou & Pettigrew, 2011). Even if this might not be the case at airports, since most of the people who are there are basically passangers or picking up aquainstances, it highlights the fact that the replacements of automated services over staff can be negatively percieved.

In order to provide a comprehenshive picture of elements that can influence the seniors perception about the user interface design at the airport, a model have been developed based on the model suggested by Grougiou and Pettigrew (2011). The author have left out some elements from the original model such as work and family status, gender, size, location, staffing policies and attitude. The researcher found these element to be nor relevant for the present issue, and have instead included elements that is of more interest to the phenomenon under investigation (Figure 1). These elements will be presented and discussed in the following sections.

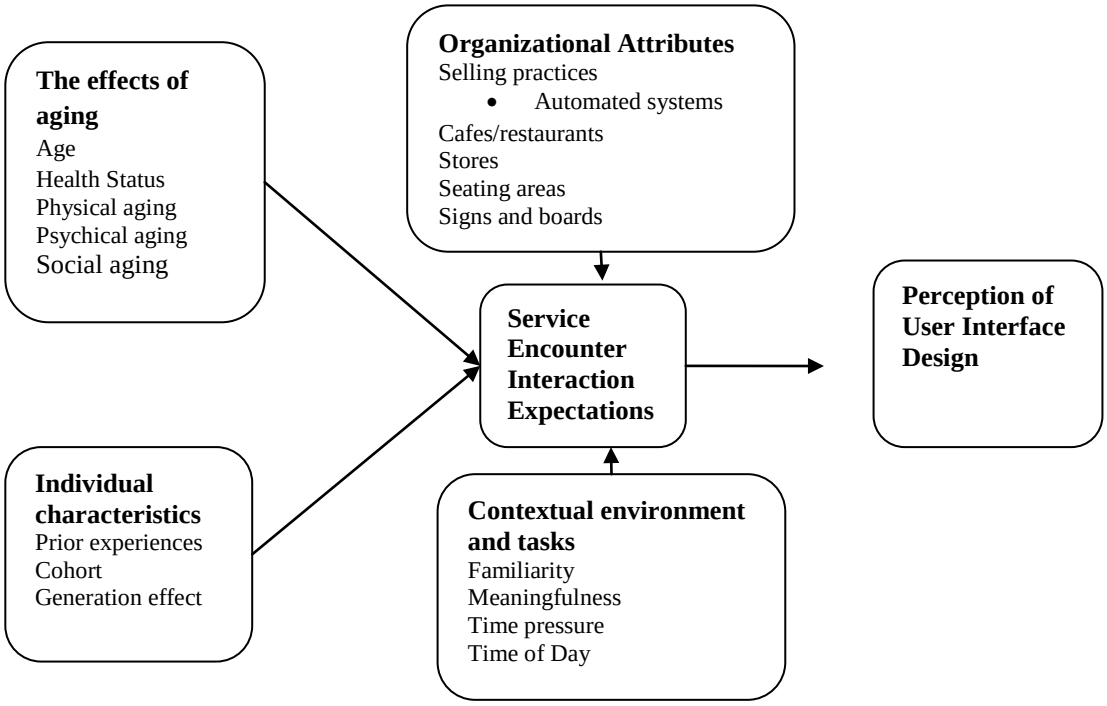


Figure 1. Elements influencing seniors` evaluation of the User Interface Design at the airport. *Note.* Adapted from "Senior Customers` Service Encounter Preferences" by Grougiou and Pettigrew (2011), *Journal of Service Research, 14 (4),* p. 4. Copyright 2011 by The Author (s).

Age and Aging

Concept such as “menopausal years” and “puberty age” shows that the nature of age is a multidimensional term. These terminologies defines the changes and “life course transitions that are not only biological and maturational but also psychological and social in nature” (Uotinen, 2005, p. 9). A person may be considered to have many distinctive, but also related ages. This is because the character somewhat differ; a biological age, chronological age, social age, personal age and a subjective age. These dimensions imply “different ontological approaches to age” (Uotinen, 2005, p. 9) and addresses that aging concerns the physically, social and personal intentions and goals. Likewise, it also deals with the subjective age, thus how old we feel (Uotinen, 2005).

A recent study conducted in Norway showed that most people in general feel younger than their actual age. The gap between the subjective age and the chronological age actually increases as age progresses. Moreover, people were asked to define when they consider a person to become older and old. The mean results revealed that when a person is aged 65 the individual is considered to become older, while a person aged 80 is more considered to “be old” (Daatland, 2005, p. 4 – 5 (own tanslation)).

During the last decades, the threshold for being “old” has decreased. This may be grounded in a lower retirement age, but due to increased health, people do actually get older even later than before. It may be too easy to explain the contrast of subjective and chronological age as an antagonism for being “labelled” as old. Two hypotheses can explain why there is a gap between how old an individual feels and the actual age; a biological and psychological explanation. The biological explanation may be the instinctive defence against time, and that aging is something we have to defend ourselves against. The later explanation concerns about the “gravity” against the identity and self-image people created during the early adulthood, and the fact that people long to this core (Daatland, 2005, p. 5 - 7).

Chronological and Functional age. The chronological age of a person can be misleading because it only indicates to a slight degree how the person acts. This is because the biological and psychological artefacts develop as time progresses. However, these artefacts vary within different processes and between people. These differences increase during people's lifetime due to the fact that people are exposed to different experiences and environments. It can therefore be expected that the variety is greatest within the elderly segment because it takes time to build ones character (Daatland & Solem, 2011, p. 23).

The functional age expresses that the lifespan is socially constructed and vary within time and place. "It regards an institutionalization of the phases in life such as childhood, youth, adult and seniors and the normative expectations of what should be conducted in each period" (Daatland & Solem, 2011, p. 23 (own translation)). However, the division that usually has characterized the industrial society are blurring, and a stronger individualisation is coming forth with looser collective norms. The new structure that is looser gives people a greater space, but also a greater responsibility (Daatland & Solem, 2011, p. 24).

Social Aging. In general the social dimension addresses a person's life phase and the social status the person occupies within the society. During a person's lifetime, an individual can have multiple social ages, usually based on the person's social role. For instance, a person can coincident be a young researcher and a middle-aged father (Uotinen, 2005).

The theory of social aging explains the changes that happen with the social spectre during aging. It also places it concern on why older people participate less in social interaction than younger adults (Daatland & Solem, 2011, p. 143). Social aging refers to how people are treated and organized by the community and the social rolls that are expected from them. The life path are socially organized and constructed, indicating "whom and what people should be in relation to appearance and age" (Daatland & Solem, 2011, p. 26 (own translation).

During a lifetime, people are lead through different rolls with different expectations, rights and duties. The transition to retirement has in recent years been viewed as an entry into "senior citizenship". The role of "senior citizen" has become the modern role of older people, a role that is transforming the lifestyles of older people and making them less institutionalized in postmodern society (Daatland & Solem, 2011, p. 26). .

Social Age Identity. Social identity involves how you perceive yourself in relation to your actual age. Grougiou and Pettigrew (2011) found that older people who suffered from frailty within the mental or physical aspect often "adopted the social identity of an older person" (, p. 5). For them, assistance offered by the staff was important factors during the service process. The lack of social network and loneliness was also connected to the adoption of an older identity. Interaction with the service providers was valued (Grougiou & Pettigrew, 2011).

A contrast to these characters, are those who don't attach themselves to their actual age or any physical/physiological deteriorations. People who don't attach themselves to their actual age, do neither desire nor long for interactions during the service process. They were more concerned about speed and efficiency. However, most of these subjects tended to be one of the youngest of the sample, still working and had therefore less need and time for the social interaction during service encounter (Grougiou & Pettigrew, 2011).

The Effects of Aging

The following section is based on, and translated from the text by Daatland and Solem (2011).

In a further recognition of the multidimensional term age and the process of aging, it is important to realize and clarify on a deeper level what happens as age progresses. This will also contribute to understand any special need the elderly consumer may have.

Gerontology is the study of aging and elderly people and is derived from the Greek words “geron”; old man, and “logy”; study of. The discipline focuses on the changes that happen as age progresses, such as the physical, biological, social and the cultural. Gerontology includes researchers from several fields, such as medicine, biology and psychology (Daatland & Solem, 2011, p. 31).

Age is connected to biology and deals with organisms and processes that have a measurable time, thus a life span from beginning to end. The foundation of age is time, and the chronological age is the time that has passed from the start of the lifeline to the current moment. Aging defines the strangest changing processes in the human body and will at the end, lead to death (Daatland & Solem, 2011, p. 20).

The aging process is influenced by multiple dimensions and is a complex interaction between several processes. It can be observed on different levels within an organism, from the interaction between the organs to the molecules and cells in the tissue. Even if all the functions in the human body will sooner or later start to decline, there are great differences within an individual and among people in general. These variations are basically caused by differences in lifestyles, environments and in the genetic material (Daatland & Solem, 2011, p. 54).

Traits that are easy to spot are the thinning and greying of hair and wrinkles. Psychological changes are however not directly observable with the human eye, and deals with memory and intelligence, personality and self-awareness and additionally, the onset of diseases (Daatland & Solem, 2011, p. 21 - 26).

Some changes that appear during aging are descended in the genetic material. These are all natural changes, they are unavoidable and are basically referred to as the primary aging. Changes that are caused by external factors such as environmental influences are often referred to as the secondary aging. However, one factor cannot easily be isolated from the

other as humans are products of genetics and the environment (Daatland & Solem, 2011, p. 21).

Aging does not only concern changes, but also variety, differences and inequalities. People experiences the effects of aging differently, and it spans from people who don't recognise the changes to people who refuse to acknowledge the changes and impairments that follows (Mates, 2004).

Biological Aging. Aging is a phenomenon that we all experience to some extent, either by growing old or experiencing relatives getting older. As mentioned, "the aging process is basically a biological phenomenon, thus the processes that happens to the human body as people are getting older" (Daatland & Solem, 2011, p. 24 (own translation))

Psychological aging cannot directly be deduced from the biological aging. The biological signs of aging can basically be experienced in the human organs, functions and death of cells. Some psychological characteristics can be directly influenced by biology, such as changes in the senses and brain. However, in this thesis it will be discussed within the psychological changes (Daatland & Solem, 2011, p. 24 - 25).

Psychological Aging. Psychological aging can be experienced by changes in the mental abilities and characteristics. It deals with a great spectre of activities within the organism such as storage of "experiences, emotions, feelings and dreams until it eventually is expressed in actions, behaviour, language and meanings" (Daatland & Solem, 2011, p. 59 (own translation)). Psychological aging do not only concern the direct effects, but also the indirect effect, thus how the individual is able to adapt to the biological changes (Daatland & Solem, 2011, p. 25).

Research has shown that the psychological abilities and traits in the adult and mature years is considerable stabile, especially if the individual is healthy. However, this does not

free people from experiencing memory loss and changes in psychological needs and motives (Daatland & Solem, 2011, p. 25).

The loss of relatives and relations, and a weaker health can drain people of recourses resulting in depression and loneliness, which is a mental health problem primarily at a higher age. People are also more likely to have Alzheimer and other types of dementia, but basically at a high age. However, studies conducted among people aged 100 and above have reported that "at least every third person has no signs of metal deteriorations" (Daatland & Solem, 2011, p. 25 (own translation)).

Psychological aging influences the cognitive functions. The cognitive functions concerns processes of capturing and remembering ideas, objects and situations. Moreover, important elements within cognitive psychology are learning, perception, thinking, memory, problem solving and intelligence (Daatland & Solem, 2011, p. 61). It would require much more investigation in order to explain how these phenomenon's changes during aging, but they are closely connected (Daatland & Solem, 2011, p. 61).

Capabilities

Airports are filled with sources and features that shall provide passengers with information regarding their luggage, flight, gate and so forth. There are many impressions, and you have to be able to encode information from several sources such as the ticket, automated services and staff, boards, signs, boarding pass and security. It is therefore important to clarify on a deeper level what happens with the abilities for sensing, and the cognitive functions that are responsible for encoding, remembering and understanding information as people age.

Perception and Sensing. Perception is the process that connects the senses to experiences. The experience depends on how the senses operate and how signals are transmitted and registered in the brain. These are all features that can cause challenges

approaching products and services. As age progresses, the threshold value generally increase, thus an older person needs higher stimulation to achieve the same effect as a younger adult (Daatland & Solem, 2011, p. 61). Compared to a person aged 20, there has to be three times lighter for an individual aged 60 to see. Older people are also more sensitive to glare and abrupt light conditions (Wolfe & Suen, 2007).

The researcher was not able to locate any light table (lux) for public spaces, but in order to create a perspective of the findings at the airport; a light table of recommended lux in workspaces have been utilized (Table 1). The luminance or light level is "the total luminous flux incident in a surface, per unit area" ("The Engineering Toolbox," n.d, para. 1). The light level outdoor on a clear day is approximately 10 000 lux. Inside a building closest to the window, the light level can be approximately 1000 lux ("The Engineering Toolbox," n.d

Table 1

Recommended lux at workplaces. From "The Engineering Toolbox," n.d. Copyright n.d. by "The Engeneering Toolbox".

Activity	Illumination (lux, lumen/m^2)
Public areas with dark surroundings	20 - 50
simple orientation for short visits	50 - 100
Working areas where visual tasks are only occasionally performed	100 - 150
Warehouse, Homes, Theaters, Archives	150
Easy Office Work, Classes	250
Normal Office Work, Pc Work, Study Library, Groceries, Show Rooms, Laboratories	500
Supermarkets, Mechanical Workshops, Office Landscape	750
Normal Drawing Work, Detailed Mechanical Workshops, Operation Theatres	1,000
Detailed Drawing Work, Very Detailed Mechanical Works	1500 - 2000
Performance of visual tasks of low contrasts and very small size for prolonged periods of time	2000 - 5000
Performance of very prolonged and exacting visual tasks	5000-10000

It is expected that approximately 30 percent of all people aged 70 and older have severe loss of hearing (Wolfe & Suen, 2007). This makes it difficult to hear frequencies at

different levels and interpret certain vowels (Moschis & Ûnal, 2008). The loss of hearing can also be experienced as isolating, and can in some cases falsely indicate that the person with a decreased hearing has a mental deficit. It is common for a person to become suspicious if the person is not able to hear all that is being said. Similarly, it can be difficult to keep up with the conversation when the speech is not directly addressed to that person or when many people talk at the same time. It can also be difficult to hear what is being said if a person talks fast, while sounds in speech blur into each other. There are different tone levels within the different sounds, and it can be difficult to tell apart sounds that are similar and close. Older people can therefore have problems understanding what is being said. Poor acoustic can also influence the sounds and speeches making it difficult to hear (Daatland & Solem, 2011, p. 63 - 64).

Table 2

Sound level for nonlinear (decibel) and linear (Intensity) scales. From "Sound," 2012. Copyright 2012 by Encyclopædia Britannica Inc.

Decibel	Intensity*	Type of sound
130	10	Artillery fire at close proximity (threshold of pain)
120	1	Amplified rock music; near jet engine
110	10^-1	Loud orchestral music; in audience
100	10^-2	Electric saw
90	10^-3	Bus or truck interior
80	10^-4	Automobile interior
70	10^-5	Average stress noise; loud telephone bell
60	10^-6	Normal conversation; business office
50	10^-7	Restaurant; private office
40	10^-8	Quite room in home
30	10^-9	Quite lecture hall; bedroom
20	10^-10	Radio, television or recording studio
10	10^-11	Soundproof room
0	10^-12	Absolute silence, (threshold of hearing)

* In watts per square meter

In order to provide the readers with a perspective of different sound levels, the researcher have utilized a table over different types of sounds and respective decibel and intensity (Table 2). Decibel is a logarithmic scale and each level in the scale "corresponds to

an increase in absolute intensity by a constant multiplicative factor" ("Sound," 2012, para. 15). The level of sound intensity or decibel describes the pressure waves the ear are capable of responding to. "…….0 decibel, is approximately the intensity of a wave of 1,000 hertz frequency at the threshold of hearing – about 10^-12 watt per square meter" ("Sound," 2012, para. 16).

Memory. The loss of memory is often the first element people connect with psychological aging, but there are several factors that lie behind the phenomenon of memory loss, even among the elderly segment (Daatland & Solem, 2011, p. 64 - 65).

Memory can be interrupted by aging and unfavourable situations. It is a sensitive mechanism, but it can be improved with flexible conditions, teaching, mental activity and a variety of impressions (Daatland & Solem, 2011, p. 64 - 65).

Several researchers have tried to investigate memory deficits among the elderly segment. Issues that have been of interest is efficient memory strategy, and the use of it (processing deficiencies) and whether they are able to use and benefit from strategies that are efficient (production deficiencies) (John & Cole, 1986).

Some studies have shown that the primary memory among the elderly segment is unimpaired and other research has shown that there is a slight loss in the short-term memory during aging (John & Cole, 1986). Short-time memory "has in general limited capacity and corresponds to the material people may keep within the awareness at a single time" (Daatland & Solem, 2011, p. 67 (own translation)). The reason for the diverse findings is most likely because the capacity of the short-term memory have been approached differently. Aside from the measurements, the result seems clear and the elderly segment do experience a slight decline in "short-term memory capacity" (John & Cole, 1986, p. 299). In addition to these studies, some researchers have stated that the elderly don't experiences a decline in memory capacity; it is rather reduction in central nervous activity. To date, these findings have gained

some support and contribute as an elucidation for several difficulties among the elderly population (John & Cole, 1986).

Working memory is shown to be very sensitive to aging and can be described as "a system of mental resources that must work together to hold and manipulate information" (Baddeley, 1998, as cited in Drolet, Schwarz, & Yoon, 2010, p. 256). The elderly therefore seems to have greater problems overlooking factors that are interrupting their concentration. It will be tougher to focus on working memory and the possibility to accommodate the relevant information so it can be stored in the long term memory (Daatland & Solem, 2011, p. 68). Tasks that are strongly connected to working memory creates difficulties for older people, for instance processing "small amounts of information for short periods of time when engaging in ongoing cognitive activities such as reading, listening, problem solving, or thinking" (Moscovitch and Winocur, 1995, as cited in Yoon et al., 2009, p. 6).

Long-term memory is also affected gradually over the life span, and can be defined as the information people have stored and want to recall for current use (Drolet et al., 2010). It is however predicted that information stored in the long-term memory doesn't disappear, but are rather rearranged and can create problems for the individual. New material can be connected to stored material and become mixed up (Daatland & Solem, 2011, p. 68). When no cues are presented the deficit is greater. Even if the elderly do recognize the information, the detailed picture is vague and they are prone to errors in the memory (Drolet et al., 2010).

Furthermore, impairments in functions may also be experienced, such as the ability to shift "between different task goals, updating the contents of working memory, and inhibiting inappropriate responses" (Hedden and Yoon, 2006, as cited in Yoon et al., 2009, p. 6).

For instance, the past experience will influence on the abilities of using a product, such as electronic devices (Christopher Sze Chong, 2010). Information of this sort is located "in the long-term memory" (Christopher Sze Chong, 2010, p. 191) and consist of the following

components: *episodic memory* that stores information of events you have participated in and are connected to place and time, *procedural memory* that deals with the accomplishments of tasks and how you have learned to do things, and *semantic memory,* that deals with the process of maintaining general knowledge and information about our surroundings (Christopher Sze Chong, 2010). Even if people experiences variabilities, the semantic knowledge seem to increase as people age. The episodic knowledge and the procedural knowledge will decrease during aging. However, if the innvolved knowledge (procedural and episodic knowledge) means a lot to the person or are highly learnt/practiced, this will not be the case. It is difficult to change or unlearn a skill once it is learned (Christopher Sze Chong, 2010).

Non-declarative- (procedural memory) and declarative- (semantic and episodic memory) knowledge facilitate the use of devices. For instance, to understand how a task was performed, one requires cognitive skills (non-declarative) and usually reasoning abilities such as fluid intelligence to construe instructions (Christopher Sze Chong, 2010).

Working memory plays a vital part when using the short-time memory and long-time memory. Working memory is "needed to store, coordinate and update the information" (Christopher Sze Chong, 2010, p. 191) that are transferred from the environment into the short-term memory (declarative knowledge), and from the long-term memory while carrying out and finishing chores (Christopher Sze Chong, 2010). In general the memory among the elderly segment seems to work quite optimal if it takes minimal of resources to remember the information when ques are given (Daatland & Solem, 2011, p. 68).

When does the memory decline? The clearest sign of memory loss comes when brain deceased causes dementia. By normal aging "the memory will decline stepwise and in limited progress, often not discernible before aged 75-80" (Daatland & Solem, 2011, p. 69 (own translation)). However, there have been examples of people aged 90 who have better

memory than people that are 20-30 years younger. There are individual differences, and one reason might be that the people who live the longest are individuals that function well in most areas, including within the cognitive dimension (Daatland & Solem, 2011, p. 69).

A longitudinal research conducted in Umeå reported that the episodic memory declines from the age of 40, and the semantic memory weakens from the age of 60. A similar study by Molander and Bâckman (1996) also reported that there is a decline in the episodic memory from the age of 40 (Daatland & Solem, 2011, p. 69 - 70).

Mental Processing Deficit. The ability of processing information among the older consumer has increased in interest among researchers, marketing practitioners and regulators (John & Cole, 1986). The main focus has been aimed at their ability to "understand, evaluate, and use product-related information to make informed product choices" (John & Cole, 1986, p. 297). Researchers have also placed their concern on old peoples processing abilities, and whether they possess what it takes to "understand, critically evaluate, and use product information" (John & Cole, 1986, p. 297).

The process of understanding, remembering and evaluating information varies between different age groups and has been documented in several studies (John & Cole, 1986). A research conducted by John and Cole (1986) investigated the information processing between the young and elderly consumer; "*Age differences in Information Processing: Understanding Deficits in Young and Elderly Consumer*". The article tries to increase the understanding of the fundamental processing deficits encountered by young and older people and at the same time specifies task factors that cause these deficits. The authors investigate processing deficits during performance on children under the age of 12 compared to children aged 12 and above. They also performed the same research on the elderly segment, aged 65 and above compared with "young and middle-aged adults" (John & Cole, 1986, p. 298). The findings documented that the elderly segment scored worse than the adult

population in a range of situations such as problem- solving and learning. Due to impairments in areas such as "processing speed, use of memory strategies, and knowledge bases" (John & Cole, 1986, p. 305) the elderly segment and young children as well, are specially exposed to elements such as "information quantity, information formats, instructions sets and response format" (John & Cole, 1986, p. 305). Seniors seems to experience deficit in the performance when (1) the information flow is high, (2) the transmitting of information is in formats making it difficult to encode, (3) there are few guidance or cues to support the processing, (4) the response format are difficult and require recall in order to do the performance (John & Cole, 1986).

Intelligence. Intelligence concerns the process of thinking and problem solving, thus the ability to cope with situations that demands cognitive skills. Most situations that are not based on routines or habits, demands the process of thinking and problem solving. There are several abilities and skills that lay within intelligence, but in general it concerns "the ability to learn and be able to utilize what has been learned" (Daatland & Solem, 2011, p. 76 (own translation)).

Intelligence can be divided into two types; crystallized and fluid. Crystallized intelligence can be defined as "vocabulary, general information, comprehension, arithmetic, and reasoning with familiar material" (John & Cole, 1986, p. 301). It is basically the intelligence of learned skills and knowledge from experience and the ability to utilize them (Daatland & Solem, 2011, p. 76). A person's base of knowledge is represented by the crystallized intelligence. Previous research has shown that the elders` knowledge base remains stable, and difficulties rather lie in the process of acquiring and utilizing their existing information and knowledge (John & Cole, 1986). Chong (2010) further argue that the greater the base of knowledge is, the simpler it is for a person to "understand, encode, integrate and remember new and relevant information" (Christopher Sze Chong, 2010, p. 191).

Fluid intelligence "is used during the solution of new problems and includes the ability to rapidly accommodate information and to be able to detect new connections" (Daatland & Solem, 2011, p. 76 (own translation)). These abilities can be compared to the hardware in a computer (Daatland & Solem, 2011, p. 76). As age progresses, the fluid intelligence will decrease and it becomes more difficult to acquire and utilize new information (John & Cole, 1986).

Individual Characteristics

"Individual characteristics interact with the decision making context and task to affect the person-context fit" (Yoon et al., 2009, p. 4). In the following section the following characteristics will be considered; prior experiences, cohort and the generation effect.

Prior Experience. If the subjects have been exposed to similar service practise previously; as customers or employees, they may either prefer or have a negative attitude towards changes in service practice (Grougiou & Pettigrew, 2011). Grougiou and Pettigrew (2011) documented that several of the elderly were sensitive to behaviour they considered to be a deviation from the "proper", such as utilizing informal clothes and calling one by the first name (Grougiou & Pettigrew, 2011). Yankelovich (1987) also conducted a research where he recognized that "while there are many changes in our needs due to aging, many of our preferences for products, activities, and lifestyle behaviour remain unchanged from earlier adult years" (as cited in Faranda & Schmidt, 2000, p. 15 - 16).

In relation to the original definition of user interface design and prior experiences, Chong (2010) state that "memory and prior experiences affect learning about – and operation of – a product or a technological interface" (, p. 191).

Cohort. Examining cohorts can be useful in order to create a perspective of the changing and diverse senior market. To start by focusing on cohorts can therefore help to reveal a market consisting of many diverse consumer cohorts (Faranda & Schmidt, 2000).

Cohort refers to a segment of people that are born within the same generation and are influenced by similar views and experiences from the world during their late youth and early twenties. Cohort also affects health, attitudes and lifestyles (Yoon et al., 2009).

The cohort effect will follow you throughout your life, and each cohort has a commonality that can be seen as one market segment (Schewe & Meredith, 2004). The mindset seems to be affected by these cohort moments and these cohort consumers will therefore have specific needs (Moschis & Ûnal, 2008). Faranda and Schmidt (2000) also addresses the phenomenon of cohort, and state that the historical events and experiences will influences the attitude of different generations and most likely have an impact on the consumer behaviour (Faranda & Schmidt, 2000).

There are many cohort moments, such as war and depression. Another unique cohort moment is the development of technology and the spread of it within the society. For instance, the cohort for Internet is called the N-generation and is born within the information revolution, from the year 1977 (Schewe & Meredith, 2004). An additional example is the baby boomers, who experienced the conflict in Vietnam, the “rock invasion” from England, a consumer pattern of free-spending and much TV watching (Faranda & Schmidt, 2000). Baby boomer is referred to the high birth rate (approximately 75 million) from 1946 to 1966 (“baby boom,” 2012).

Based on the research by Schewe and Meredith (2004) it can be predicted that people who are born in 1977 and later find it easier and more common dealing with technological devices than the generation before. Since the sample in the current project will concern people born in 1957 and earlier they all have in common that they were born within a period

not introduced to information technology. Even if there are several reasons for prospective obstacles the elderly segment may encounter in relation to automated services, it can be assumed that the cohort effect will have an influence on the use of automated services.

The Generation Effect. As previously mentioned, Chong (2010) discusses the phenomenon of the generation effect. It deals with the norms, values, attitudes, skills and behaviour that people acquire in their formative period (10-25 years old). If not changed, these factors will usually influence the behaviour in the future. Consequently, if not exposed and taught how to interact with certain technology during the formative period, it can be expected that this will influence the behaviour in the future (Christopher Sze Chong, 2010). Furthermore, Chong (2010) state that as the information and communication technology rapidly evolves, the seniors do adapt slower to technological products in relation to younger people, which further affect the behaviour and attitude of a person towards these products (Christopher Sze Chong, 2010).

The "technology generation" is based on how people behaved with technology in their formative period. Different generations will therefore approach and interact with technology differently than the last generation. Moreover, this "generation effect" can be connected to different cohorts, such as the attitude and behaviour towards technology and what individuals were exposed to in their formative years (Christopher Sze Chong, 2010). As previously argued, Chong (2010) state that one reason for the difficulties encountered by many seniors when approaching information and communication technology, is because they have not been accustomed to similar technology during their youth and early adult. The seniors' knowledge in terms of technology may therefore not stand up to the requirements that are needed to encounter modern technology (Christopher Sze Chong, 2010).

Organizational Attributes

Organizational attributes refers to the number of staff, automated systems, organizational culture, selling methods etc. The findings by Grougiou and Pettigrew (2011) revealed that the seniors experienced many "industries difficult to deal with" (, p. 6). For instance, they experienced that employee at larger service industries were less able or willing to have a meaningful interaction with customers than staff at smaller service industries. Consequently, many rather appreciated small and local businesses, as it was easier to have a social interaction that was genuine and not arranged by service scripts. These interactions also lead to commercial and social exchange (Grougiou & Pettigrew, 2011).

The findings also revealed that some subjects found service industries less approachable when there was a reduction in staff at the frontline. It was neither found favourably with standardized processes that replaced staff. The subjects also revealed those qualities such as the emphatic and personal service that were valued during service encounters were lost when oneself had to weigh and price groceries for purchase. The subjects also noticed that the service quality reflected the lack of loyalty that the organisations had to the employees, which highlights the image of social responsibility that are currently pursued by many service organizations (Grougiou & Pettigrew, 2011).

It must be argued that the interviews and findings by Grougiou and Pettigrew (2011) takes place in an everyday – situation, whereas travelling is usually a less frequent phenomenon. It is therefore difficult to predict the subjects` perception about the automated services and standardized processes in this setting. They might consider it just as a part of the travelling process, or the findings may be consistent with the findings by Grougiou and Pettigrew (2011). Either way, it is a critical stage since several researchers have reported the negative attitude seniors have towards automated systems and the preference for personal interaction during service encounter.

Contextual Enviroment and Tasks

In the following section there will be a consideration about the contextual enviroment and specific tasks that can play a signifficant part in relation to individual characteristics, age and theire performance. If the contextual environment and tasks have a greater demand than the available resources and abilities of the performer, the pressure on the elderly may be too high. The result might be poorer outcomes in terms of decision making (Yoon et al., 2009).

Familiarity. In everyday life there are some tasks that are performed continiously. As a result these chores are executed without much effort and thoughts. The processes that are performed "automatically" will stay relatively solid during the adulthoud (Yoon et al., 2009).

Script and schemas are developed to organize knowledge of products, such as the ability to comprehend, generalize and categorize (Yoon et al., 2009). These schemas may also play an important part in relation to recall of information when it occurs in a "schema consistent manner" (Yoon et al., 2009, p. 8). These schemas may benefit seniors during decission making and it can help to remember information if it is presented in a similar way. However, the use of scripts and schemas might sometimes cause confusion, while people have forgotten important details and only remember sematic features from the past. This is more commen among the elderly segment. Learning how to utilize a digital product require processes that are controlled, such as intentional reflection and a clear effort. In situations like this, people can not utilize prior knowledge, and the older a person gets the more difficult it becomes to adapt (Yoon et al., 2009).

Questions will be asked to the participants wether they have utilized similar machines in the past. If the the answer is yes, it can be possible to detect if there is a signifficant connection between theire actuall performance and familiarisation and previous use. Similarly, it can also be seen during the process of interpreting relevante information in terms

of signs, boards, ticket and so forth.

Meaningfulness. If the information is meaningful to the person it can boost the personal relevance, the realism and make the information more value-laden. These elements will ease the connection of information into the memory and other conceptual links. Studies have shown that when the information is meaningsful to the subject, the differences within memory performance among age groups are minimized. This can also lead to better decision making and memory among seniors (Yoon et al., 2009).

The essence of meaningfulness can in this case be connected to the use of the automated services. For instance, if a subject is unfamiliar with the automated services, but at the same time are eager to learn how to interact with them, it can be assumed that this subject will, if learned, have a better decision making and memory performance in relation to a person who are "forced" to interact with the automated services. As previously mentioned, people are basically required to utilize the automated services when traveling with scheduled flights.

Time Pressure. Decission making can have a negative outcome if consumers are under time preasure. Even if all consumers are affected in a negative manner under time pressure, it especialy influences the elderly segment (Yoon et al., 2009).

The airport is a place where people may feel stressed due to of time pressure. It is affected by long queues and the fact that people have an airplane to catch. In the present project it can be difficult to connect lack of decision making to time pressure as it can be expected that people who are stressed under a time pressure may not want to participate in the study.

Time of Day. Studies have shown that the time of day influences on decision making and memory during performance. The more cognitive resources that are available, the circadian arousal have a tendency to peak at a higher performance, on a particular time during the day. There are individual differences in circadian arousal that may change througout the day (Yoon et al., 2009). The pattern of performance seems to variate between younger adults and seniors during the day. The performance for yonger adult seems to improve throughout the day, while the performance for the seniors tends to be at the top in the morning. As the day progresses their performance tend to detoriate so their ability to make decisions that is difficult, or tackle information that is more complex will be better during the morning (Yoon et al., 2009).

The first departure at Stavanger airport is aproximatley at 6:00 a.m. The researcher will sample participants throughout the day. However, because the sample will be quite smal and specific it can be difficult to detect any significant differences between time of day and the subjects actual performance.

Staffs Attributes

As previously mentioned, staffs attributes can have a vital impact on the customers perception of the service industry. It is connected to the servicescape and in this case, it concerns how the employees interact and perceive the elderly segment.

Heterogeneity. It appears to be a trend segmenting the senior market by age, but that might turn out to be very inefficient (Moschis & Ûnal, 2008). A article in the *Wall Street Journal* stated once that "….the mature market is full of contradictions" (A Muddled Market, 1987, p. 23, as cited in Faranda & Schmidt, 2000, p. 7). It has often been recognized by service industries that the heterogeneity among the elderly segment is high, and it is important to realize that "one size does not fit all" (Moschis & Ûnal, 2008, p. 261).

Until recent scrutiny, marketers have held assumptions against the elderly consumer that are wrong. One basic assumption is that the market of senior consumer is homogeneous, assuming that needs, attitudes and tastes etc., blends, as people are getting older. This is not the case, while as people are aging they become more distinct. It is therefore a mistake by any marketers to treat the senior consumers as one group, and several researchers have given warnings about doing that (Faranda & Schmidt, 2000). There is in fact a great diversity among the elderly consumer, regarding "demographics, lifestyle, or health, psychological and social criteria-notable differences" (Faranda & Schmidt, 2000, p. 8).

Stereotypes. The following section is to a large extent based on and transelated from the text by Daatland and Solem (2011).

There have been different perceptions against aging and the elderly over the last centuries. Classical philosophy, connected to names such as Platon, Artistoteles and Cicero are for inctance people who had discussed this phenomenon. Platon and Cicero thought that the phenomenon of aging was as a phase in life characterized by wisdom and freedom from work and stress. Artstoteles however, expressed the phenomenon of aging as a phase with fragilness and weaknesses. This is a picure that has continued to grow into the contemporary society (Daatland & Solem, 2011, p. 119).

Empirical studies from modern time has shown that older people are percieved as more fragil than they really are. People have a tendency to exagerate the possibility of needing care when people get old, and believe that maybe halv of the older generation lives in retirement homes. The actual numbers are, 15% of people aged 80 and older, and 25% when livin nursing is included (Daatland & Solem, 2011, p. 119).

Many young people have a negative perception against the old age, but older people as well have a tendency to exaggerate the "misery" of aging. This is an example "of people who created stereotypes early in life, and brought it with them into the old age" (Daatland &

Solem, 2011, p. 119 (own translation)).

People have a tendency of considering the elderly segment as a stereotype mass, even if the individual differences can be extremely high. The perception of older people varies with regard to abilities and coherence, and is not only negative. Age can for instance be perceived as a handicap from the age of 40 within the work life. In other situations, such as the local history club, high age can be considered positive (Daatland & Solem, 2011, p. 120).

Studies have shown that people do not favour the phenomenon of ageing, but cares for older people. Many people fear the thought of getting old. These thoughts are especially emphasised in cultures that appreciate the youth, such as in the contemporary society. The negative attitudes held against the aging process are basically connected to the dependency of others, and the frailness that people experiences as age progresses. The antipathy against the elderly can be rooted in a concern or agony for death; while the sympathy is usually connected to their knowledge, friendliness (Daatland & Solem, 2011, p. 120 - 121).

Yoon et al. (2009) also discusses the phenomenon of stereotyping. During service encounter, it has been noticed that the service provider can automaticall start to speak "elderlyspeak" to seniors. "Elderlyspeak" often innvolves speaking slower, uses a simpler vocabulary and syntax. This type of "elderlyspeak" which is a result of stereotyping also have a negative effect on the communicative competence for the elderly. It also influences their ability when sorting information. Several studies have shown that negative or positive stereotyping will influence the elderly segment during memory performance in a negative or positive matter, depending on the stereotyping (Yoon et al., 2009).

Ageism. Approximately 40 years ago Robert Butler launched the term "ageism", a word that is utilized for prejudice and discrimination against older people. The core of ageism is that "they" are different from "us", and that older people do not have the same interests, needs and values as "everybody else". Ageism is built on the idea that people stop

acting like “ordinary people “and become an inferior type of individual because of age. It can be compared to racism, which is associated with skin colour, and sexism that is linked to sex. Ageism however, is slightly diverse than the other “isms” while sooner or later it will affect everybody (if people don’t die young) (Daatland & Solem, 2011, p. 122).

Attitude can basically be described as the tendency people have of evaluating certain units in favour or disfavour. Many researchers have tried to develop models that describe the represented attitudes within ageism, but in this thesis the traditional tripativ model by Eagly and Chaiken (1993) that consist of three components have been considered (Kite & Wagner, 2002):

- An effective component, represented by the feelings that one has towards older individuals.
- A cognitive component, represented by the beliefs or stereotypes about older people.
- A behavioural component, represented by behavioural or behavioural intentions towards older adult.

(Kite & Wagner, 2002, p. 131)

Summary

As previously discussed, airports have become a styled and designed “landscape” which offers more than the necessary in order to provide the customers with experiences out of the traditional. Even if Stavanger airport has been, and still are undergoing construction work that is to be for the better, it can create challenges if not probably adapted to the users.

The elements discussed in the previous chapter shows that the aging process involves several changes that may influence an individual’s performance in relation to the user interface design at the airport. Even if there are individual differences during the ageing

process, people will eventually experience problems within the physical and psychical dimensions, such as sight and hearing and senses (Daatland & Solem, 2011). Consequently, this may cause challenges for people when they are at the airport, especially if they are not used to the more complex airports and the process of travelling. However, Avinor might adapt to the changing population by tailoring services based on their needs. As mentioned, there are several demands within Universal Design that has to be implemented by the year 2019 (Rogaland Fylkeskommune, 2007).

The researcher adverts to Figure 1 in order to distinguish the connection between the discussed elements and why the elderly segment may experience challenges at the airport. As previously mentioned, comparative studies have shown that the elderly segment do experiences problems when interacting with automated services (Grougiou & Pettigrew, 2011) and it can be expected that the present findings will indicate similar result. Nevertheless, since none of these studies have been conducted in Norway and because of a high education level, standard of living and economical stability it is a possibility that the findings may indicate the opposite. However, it has to be argued that the many effects of aging are unavoidable and it can therefore be expected that the findings may indicate impairments within the psychical dimension during the subject performance at the airport.

As a further recognition of the present findings it is also important to state that the result hopefully will give an insight to the market situation of-to-day and how it might be changed tomorrow. Today's market is continuously changing and information regarding the elderly consumer cannot be restricted only to the present market (Faranda and Schmidt, 2008. p. 9). Leventhal (1990) also expressed that "the aging consumer of tomorrow is going to be much different from the aging consumer market of today" (Leventhal, 1990, p. 39, as cited in Faranda & Schmidt, 2000, p. 9).

Method

Overview

The present chapter describes the methods and procedure that was undertaken to investigate the present issue. Moreover, it tries to portray why the chosen approaches was the most applicable for the present study. The researcher also presents an insight to the data collection and the process of analyzing. Finally, the last section portrays the phenomenon of validity, reliability and reflexivity of this study.

The Purpose of This Study

Neuman (2006) argue that the purpose of a study can be divided between three main categories; *Exploratory* research: the research of a brand new topic and there is usually no clear outcome, *descriptive* research: conducted when there is a formative understanding of the phenomenon and basically describes an issue in a real context and *explanatory* research: conducted if the description of the phenomenon is clear, but you don't know how and why the phenomenon operates (Neuman, 2006).

Veal (2006) suggests a more flexible approach to the study; the *interpretive* model. The *interpretive* model "places more reliance on the people being studied to provide their own explanations of their situation and behaviour" (Veal, 2006, p. 23). A researcher that follows an *interpretive* style wants to "get inside" the subjects minds in order to experience their viewpoints of the world (Veal, 2006).

This study can be perceived in a two way dimension; a *descriptive* and *exploratory* approach and concurrently in an *interpretive* style.

The present research was conducted to explore, describe and present a picture of the elderly segment and investigate whether they are experiencing any problems or obstacles in relation to the user interface design at Stavanger airport. Even if there has been research

focusing on the elderly segment in relation to technology and airport experiences, the concrete phenomenon under investigation was new. The first sequence in this study was therefore to increase the understanding of the issue by exploring it closer.

The research was also qualified as a descriptive study as the formative understanding of the senior segment and the user interface design at the airport itself was known for the researcher, but a detailed picture of the present topic did not exist.

Simultaneously, it was vital to observe the subjects under investigation and try to "get insight" their minds that could portray their viewpoint of the situation, thus an *interpretative* approach.

The researcher have therefore taken advantage of survey methods, such as field research and interviews, in order to describe the social setting by focusing on variables such as the automated services, security, personnel and airport facilities.

Research Design

It is important to choose a good design for the study. Depending on the topic, there are different research designs that can be employed. The consequences of selecting a wrong design can influence the validity of the project (Jacobsen, 2000). A research design can be defined as the overall plan for solving the research problem and includes style, data collection, sample and analysis (Scott & Marshall, 2009).

Non-experimental Research. A non-experimental research focuses on a qualitative discussion of interdependent variables. In social science there are many variables that cannot be modified or manipulated, and it is therefore of interest to conduct non-experimental research. A researcher that goes with a non-experimental research has to be open for alternative explanations, prospectively analyze several variables and make a conclusion without any clear causal statement (Lapan & Quartaroli, 2009).

There was no treatment or assigning of participants involved in the present project. The researcher was only concerned about the true existence of variables, in this case; does the elderly segment encounter any difficulties seen in relation to the user interface design at the airport.

A disadvantage by utilizing this approach is that it can be difficult to isolate the actual reason of the findings, as there are no pre or post-test groups or manipulation. However, since the research was of small scale it was possible to evaluate a real life situation that could otherwise have been impossible to investigate.

Qualitative Design. A qualitative research presents the findings in words, objects, pictures, symbols and so forth (Neuman, 2006). The researcher investigates human behaviour in cultural, social and political settings (Salkind, 2009) and tries to connect on a deeper level with the case under investigation in order to increase the understanding of the social life (Neuman, 2006).

A researcher that goes with a qualitative style emphasize creating precise examinations of natural settings of social life and try to look at it from multiple perspectives (Neuman, 2006). They are therefore able to experience developments of issues, the emergence of conflicts and the development of social relationship (Neuman, 2009). Exploratory techniques such as interviews, case studies, surveys, documentation, physical artefacts, archival records, observations and focus groups are utilized in qualitative research (Salkind, 2009). They rarely focus on the relationship among variables or hypothesis as they rather concentrate on the many aspects of life and try to develop new concepts or theoretical interpretations. Finally, they are more concerned about the real social context and retaining the ideas and images found in these settings (Neuman, 2009).

While a quantitative investigation often goes with a deductive approach, qualitative investigation is usually conducted with an inductive approach. Utilizing a deductive approach

means that the researcher beginning with ideas or "educated guesses" regarding the social world and theoretical relationship, which further will be tested against evidence from empirical research (Neuman, 2009). An inductive approach is less straightforward. The researcher starts with observations or hard facts about the empirical world and then creates a general topic, moving from the specific to the general. Their reflection and vague ideas then moves towards theoretical aspects and patterns. Most researchers who utilizes a qualitative approach tend to "collect, analyze, and interpret data simultaneously" (Neuman, 2006, p. 15) and rotate between these steps (Neuman, 2006).

Design in this study. The setting were the empirical work was executed is a part of the researchers "home culture", and she observed and interacted with older adults in a social setting that was relatively small. Based on these characteristics, this study was a field research, also called participant observation research. The style is qualitative, and the essence regard observing and interacting in a social setting of small-scale and most often in the home culture of the researcher (Neuman, 2006). Moreover, interviews were also conducted which is a common research technique within a qualitative approach (Neuman, 2006).

There are both advantages and disadvantages utilizing a qualitative approach. By utilizing a qualitative style the researcher has the opportunity to get a unique insight in the participant's situation and create a relationship that can enable the researcher to capture the subject's feelings (Neuman, 2006). Because the questions during participant observation was going to be asked when people found themselves in a stressful situation at the airport, the researcher believed that the use of observations and personal interaction with the participants could create a more detailed picture of the issue than for instance using a quantitative questionnaire.

Disadvantages with the use of a qualitative approach lie in the limited and specific

function if the total spectrum during data collection. It is therefore essential that the information received is reported correctly. Moreover, due to the fact that the qualitative sample is quite small and specific, it can be difficult to generalize the findings to the entire population (Bartos, 1986).

It was important to sample a high variety of participants in order to get a greater perspective of the findings that could hopefully be representative. Similarly, the findings were correctly reported and are presented under the section *Findings*.

Even if the chosen method, participate observation was found most applicable for this study, there are limitations to it. People often change their behaviour when they know they are being observed, for instance by avoiding doing something that can be perceived as negative (Jacobsen, 2000). Therefore, the researcher was aware that the participants under observations might change their behaviour leading to bias in the findings. Consequently, it was important to highlight that no actions were right or wrong.

Moreover, people who are travelling are often stressed, and it could therefore be difficult getting subjects to participate. The researcher was aware that people might refuse to be observed during their time at the airport, and that this method could therefore be time consuming.

This study was a mixture between an inductive - and a deductive approach. The idea of older people experiencing difficulties within an airport context started when she worked as a handling agent for Norport handling (Ground Service). It began with observations and then processing towards a theoretical relationship and ideas (inductive). It was then necessary to investigate theoretical relationships and conduct additional empirical research in order to get a deeper understanding of the issue, thus a deductive approach. This is a common phenomenon among researchers; utilizing both inductive and deductive approaches during the study (Neuman, 2006).

Sample and Structure in This Study

Sampling can be defined as "a smaller set of cases a researcher selects from a larger pool and generalize to the population" (Neuman, 2006, p. 219). The sample for this study was the elderly passengers at Stavanger airport (aged 55 and older), four random employees working at the Ground Service, two employees at Securitas and Else Ravndal, Human Resource Director and Morten Sand, Manager of airport experiences.

The present study relied on a probability sampling technique in order to gather the information needed. A sample that is based on a probability selection usually utilizes mathematically processes to sample the elements. They target their population and specify the sampling units. Researchers utilizing a probability sampling do also have a greater chance of producing results that are representative for the population (Neuman, 2006).

The present sample technique might have been called a stratified sampling which is a method where the entire population is divided into strata or subgroups and finally selected randomly from the different strata (Lapan & Quartaroli, 2009). The sampling was random in the sense that everyone passing the sampling point had the same likelihood of being selected during the data collection period.

The subjects in the present thesis was not chosen by a mathematical method as it would have required insight to the passenger lists, where name and aged is registered. This was not possible due to the personal information privacy act, which insures that all passenger lists are confidential ("Lovdata," 2012). Similarly, because age and being old might be a sensitive subject for some people, the author chooses subjects based on discretion. The selection of people was therefore based on the psychical traits of a person. The participants were neither told this is a project concerning the elderly segment. First of all, most people might not like being defined as old and second, it could have influenced their behaviour during observations or will to participate in the project.

Because there were no questions regarding the age of the subject, the findings present no overview of what type of age group participated in the study. Even if the researcher did her best to sample people aged 55 or older, she is aware the findings might contain information from people aged bellow 55 which further can create a bias in the findings. Employees working at the Ground Service and Securitas were also selected based on probability sampling.

Interview

The aim of an interview is to capture descriptions of the subjects` point of view, particularly with regard to interpreting the meanings that are argued and stated of the phenomenon under investigation. The positive dimension with a qualitative interview is the openness between the researcher and the subject (Kvale, 1997, p. 17).

An important element in any interview is to be aware of the phenomenon under investigation before the specific interview. This will allow the researcher to be prepared for the interview by mapping *what* will be investigated, *why* it is important and *how* will the researcher be able to receive the wanted information Kvale (1997, p. 52). The interview itself is an interaction between the interviewer and the subject and argues that the success of an interview depends on;

- The level of spontaneity, comprehensiveness and the relevance of the subjects answer.
- The shorter the questions are and the longer the answers are the better.
- The researcher should follow-up with clarification of the subject's relevant answer.
- The ideal interview is interpreted during the sequence.
- The interviewer will throughout the interview verify his or hers interpretations of the subjects answer.
- The interview is "self-communicating", thus it is a narrative that don't demand much

comments or explanations.

(Kvale, 1997, p. 90 (own translation)).

The interviews in this project were based on semi-structured interviews, thus following an open design interview. Questions was prepared in advance, but it allowed for new questions to emerge during the interview process (Whiting, 2008). This made it easier for the participants to identify and reflect on a deeper level and allowed the interviewer to add additional questions regarding the respondent's viewpoint and statements.

The questions asked to the employees at the Ground Service was similar to the questions asked during the participant observation, thus focusing on vital checkpoints at the airport that can turn out to be an obstacle. The aim was to hear their side of the story and at the same time make them visualize the passengers' situation. This would hopefully make the employees imagine and discuss any obstacles they believe the elderly experience during their time at the airport. The interviews with Securitas were based on how they perceived the elderly segment during the security process. Finally, the interviews with Else Ravndal and Morten Sand concerned the construction and any adaption for this segment at the airport, and at the same time what they believed could be experienced as a difficulty or obstacle for the elderly segment (see Appendix for full interview guide in Norwegian and English).

Data Collection

The author developed an interview guide with eight questions that were utilized during the participant observations. As mentioned, the question was linked to vital checkpoints at the airport and concerned the subjects' perception about these checkpoints. These questions were memorized and a tape recorder was utilized to tape the conversations and personal notes of the observations. The communication was in Norwegian as this is the mother tongue in

Norway, but the researcher was prepared to communicate in English if subjects were international.

The researcher approached the senior segment within the check-in area. If the subjects allowed it, the author followed them during their time of check-in and throughout security while actively communicating and discussing relevant checkpoints at the airport. If assistance was needed, the author did her best to provide it.

The first sequence of the empirical work was field-testing of the interview guides. This was conducted in order to detect any bias in the overall strategy and the selected items. It was also possible for the subjects to make comments in relation to unclear questions (Lapan & Quartaroli, 2009). Three subjects and two employees were asked to participate in the field-testing. There were no problems during the conversations, and there seemed to be a correct balance between the selected items and the strategy of the observations.

The day after the field-testing, the researcher started with the participant observations. The process lasted one week; Tuesday from 10:00 a.m. to 1:00 p.m.; eight subjects were sampled. Wednesday 9:00 a.m. to 11:00 a.m.; six subjects were sampled. Friday 3:00 p.m. to 5:30 p.m.; three subjects were sampled and Saturday 6:00 a.m. to 9:00 a.m.; five subjects were sampled. The three first days went without any problems in terms of sampling subjects. Saturday, when a high share of the traffic was charter the researcher had problems finding participant and of the 12 people being asked, half of them refused to participate.

In order to get a greater perspective of the situation the researcher sampled nine participants interacting with the automated services and the remaining 13 either within the check-in area or at the gate terminal.

The researcher did experience a problem during the observations. Even if the participant observation was going to take place from the check-in area and throughout security, the researcher only managed to observe four participants throughout security. It was

experienced that there were no more to discuss when leaving the check-in area and 10 of the subjects did indicate that they were not interested in being observed longer then the check-in process.

During each day of observation, the researcher also interviewed one employee at the Ground Service. The interviews with Else Ravndal, Human Resource Director, and Morten Sand, Manager of airport experiences, was arranged in the beginning of the process and was carried out some days after the observations. The interviews with employees at Securitas were conducted two weeks after the participant observations. The interviews took place at a quiet office and were accomplished without any problems.

Sand helped the researcher to get in contact with Magne Olsen who helped to measure the light intensity (lux) at the check-in and security area. This was conducted because elderly often experience a decrease in eyesight (Daatland & Solem, 2011) and at airports people need to read flight information on tickets, signs and boards in order to locate right check-in machine, counter and gate. The lux-device that was utilized was a *Digital Lux Tester, Beha 93-1065L*.

The researcher was going to measure the Decibel in relation to the Personal announcement–system. This was going to be conducted because elderly often experiences a loss of hearing (Daatland & Solem, 2011). This however, turned out to be unmanageable as the researcher was not able to get hold of any equipment. However, Sand did send some valuable information concerning the announcement-system that is at the current time utilized at the airport.

The Process of Analyzing

To analyze interviews can be a challenging process, but there are tools that can provide the researcher with support during this process (Kvale, 1997). Kvale (1997) describes five methods that can be utilized to analyze a qualitative interview which in this

case were of valuable use;

- *Meaning condensation* involves an abbreviation of the subject's answers and statements to a more consistent formulation.
- *Meaning categorization* involves a categorisation of the interview, indicating non-occurrence or occurrence of a subject's point of view, negative or positive of the phenomenon under investigation. The categorisation makes it possible to reduce and structure long texts into a few tables or figures.
- *Narrative structuring* involves a temporal and social structuring of the interview by highlighting the meaning in it. The focus is on the narratives told during the interviews that are being structured and organized. Are there no stories told, the researcher can try to create a coherence narrative based on single statements by the subject.
- *Content interpretation* goes further than structuring the immediate meaning of the text as it is more concerned about a deeper understanding and less speculative interpretation of the text.
- *Content generalization* through ad hoc – methods is based on several methods focusing on common sense and advanced textual methods to find the meaning in the data. The results may be expressed in numbers, words, figures or diagrams or a combination of these.

(Kvale, 1997, p. 125 (own translation)).

The process of analyzing data in the present study was done in a three steps, following Strauss (1987) qualitative data coding method*; open coding, axial coding and selective coding* (Neuman, 2006, p. 460 - 464). After tape-recording the participant observation and interviews, the data was analysed together.

The first sequence of coding was done right after the data was collected and involved assigning initial codes and locating themes. The aim was to make the amount of data manageable and sort them into categories (Neuman, 2006). The next phase, *axial coding,* involved *meaning consideration* and *meaning categorisation*. The data was organized, categorized and linked together, reduced and "grouped under higher order headings" (Elo & Kyngäs, 2008, p. 111). In the last sequence, selective coding, the researcher identified the codes more thoroughly and identified data and organized them in terms of "belonging" to specific groups. The aim was to enhance the understanding of the issue and generate more knowledge of the phenomenon (Elo & Kyngäs, 2008).

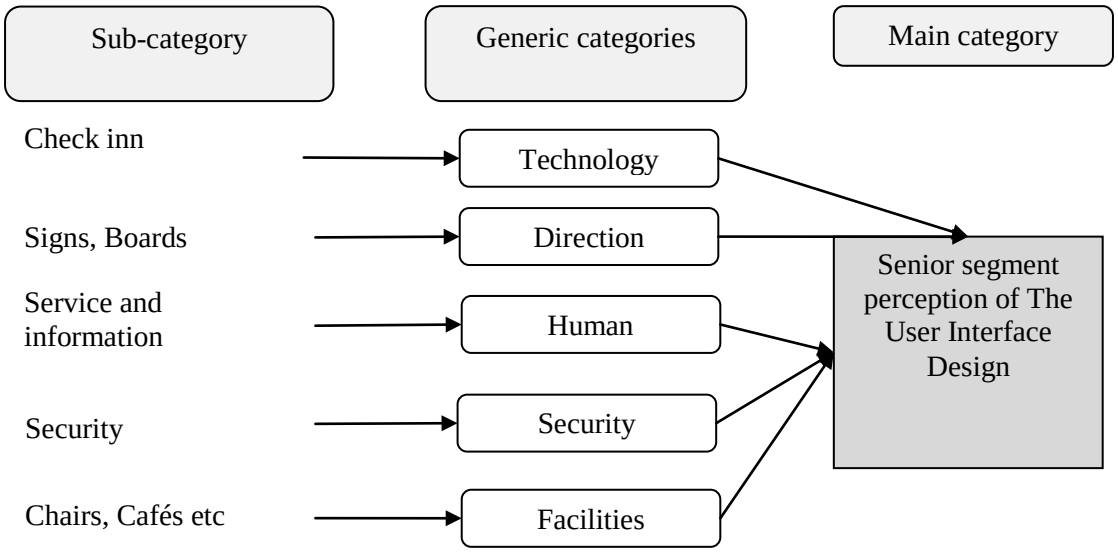


Figure 2. Abstraction of the findings to categories. *Note.* From "The qualitative content analysis process" by Elo and Kyngäs (2008), *Journal of Advanced Nursing, 62(1),* p. 111. Copyright 2007 by The authors, Journal complication and Blackwell Publishing Ltd.

Validity and Reliability

Validity refers to what degree a method investigates what the researcher was set out to measure. It concerns the construct, how well it fits with the measurement and how well the phenomenon of interest matches with real life. Depending on the research style, qualitative or quantitative, the exact meaning of validity varies (Pereira, 2007).

Researchers that go with a qualitative approach often addresses authenticity rather than validity, referring to "…. A fair, honest, and balanced account of social life from the viewpoint of someone who lives it every day…candid portray of social life that is true to the experience of people being studied…a detailed account of how those being studied understand events " (Neuman, 2003, p. 185, as cited in Pereira, 2007, p. 115). In field research, such as participant observation the validity may be conceived through the analysis and data and that the representation is as accurate as experienced in the social world. On the other hand, "Replicability is not a criterion because field research is virtually impossible to replicate" (Neuman, 2006, p. 405). Neuman (2006) offers four types of validity within a field research:

- Ecological validity demonstrates a true reflection between the study and the social world, its authenticity and that the event was undisturbed by the presence of the researchers.
- Natural history demonstrates the trustworthiness and authenticity of the project with a detailed description of procedures and actions occurring in the study.
- Member validation is present if the members under investigation recognize the findings as true and reflecting of their social world.
- Competent insider information refers to the ability of a researcher to present trustworthiness and authenticity due to the fact that the researcher has been able to interact as a member. (Neuman, 2006, p. 405).

The “natural history” validation is described and argued under the section method and findings and therefore strengthens the validity of this investigation (Pereira, 2007). Because it may be difficult to replicate participate observation, the “ecological validity” and “member validation” are presented with detailed descriptions in terms of procedures and measurement, and therefore increasing the possibility to be replicable (Pereira, 2007). Even if the researcher did not take any actions to interact as a member (passenger), competent insider information is an element that is tried to be achieved by conducting multiple interviews with several parties. The researcher has therefore increased the possibility of getting an insight to the passenger’s events and situation. In terms of sampling subjects under the age of 55, leading to a biased insight to the situation, the researcher believes that all of the participants were within the right age group. This justification is based on their physical traits, acts and what they said.

A crucial element concerning the validity of the findings is that the researcher was only able to observe four participants throughout the security. Even if all the participants argued about the security process, the phase of observation is absent and can therefore have an influence on the validity of this specific finding.

A critical element with any research is the process of operationalisation of theories into items and statements utilized in the participant observations and interviews (Neuman, 2009). Even if a pre-test was conducted to minimize the risk of bias within this process there is a change that questions and statements were employed for situations they were not designed for. In that case, it influences the validity of the findings. One example is the process of pre check in, where the researcher did not ask what type of airline company the subjects were travelling with. Because this was not clearly addressed, there is a lack of validity within this situation.

Plausible findings addresses that there might be alternative explanations, but that the presented result is a mighty description of social life, especially when derived from multiple

sources (Pereira, 2007). By approaching the issue with a triangulation, in this case taking advantage of participant observation and interviews, the researcher have been able to experience the viewpoints of the current situation from several parties that might contain plausible findings (Jacobsen, 2000). This has also resulted in the possibility to create connections and dynamics between the different sources of data that can develop into a coherent ensemble (Pereira, 2007).

Valid analysis addresses the unbiased assessment. It is therefore important to document information and keep optimal records in order to present transparency because the researcher are also the analyst, which can pose questions regarding the studies reliability (Pereira, 2007).

The validity of the interview transcription is an element that should be addressed. The transcription of an interview deals with "translating from an oral language that has its own rules into a written language with other rules" (Kvale, 1997, p. 104 (own translation)). It is not a copy of the reality as it is rather abstractions. There is no such thing as a true, objective translation from oral to a written form and it is therefore important with a literal transcription in order to perform a linguistic analysis of the interview. To include repeats, brakes and accent can revile anxiety and denies, and it is therefore relevant in relation to the psychological interpretation. Thus, "by transferring the interaction to a literary stile makes it possible to convey the subject's perceptions to the readers" (Kvale, 1997, p. 105 (own translation)).

The interviews and observations were transcribed as accurate as possible during the whole process of data collection. The transcription was done the same day as the data collection in order to make them as accurate as possible. As mentioned, the researcher tape-recorded the interviews and observations, and simultaneously, a personal diary was kept in order to perform a linguistic analysis of the data. It can therefore be argued that the validity

of the findings is improved.

In research where interpretation is necessary, it is important that an effort is done to make it truthful. Accounts that are false or distorted should therefore be avoided in order to have a close match between the subjects understanding, statements and ideas about their social world and what is occurring. The findings and conclusion should be believable, intersubjectively understandable and acceptable. They should also be powerful and cover the true experience in the field seen from the researcher's perspective. Likewise, with additional details included, it can be claimed that validity is demonstrated in a collective matter. The validity of the data also increases as the elements of the data are connected in a web (Pereira, 2007).

Reliability means consistency and dependability of measurement and there are several methods that can be utilized to record the observations consistently. Since many researchers that goes with a qualitative approach investigates situations that can be unstable over time, it can be difficult to achieve the consistency of observations. However, this is what the researchers often emphasize; the value of the developing or changing interaction between the phenomenon and the researcher (Neuman, 2006; Pereira, 2007). Neuman (2006) addresses two types of reliability, internal consistency and external consistency of data. Internal consistency addresses the consistency of the findings achieved from measurement. It is achieved when there is a correlation between the measured items and measured content and construct. Thus, the pieces should fit together and form a coherent picture. External consistency is a way of crosschecking and verifying the findings with divergent sources of information (Neuman, 2006, p. 404).

Reliability can be difficult to achieve, and Neuman (2006) addresses four obstacles that can hinder high reliability: 1) Misinformation, falsehood due to complexity and uncertainty; 2) Evasions, purposely holding back information; 3) Lies, untruths intentionally

stated to mislead or give a biased view; 4) Fronts, deceptions and lies that are shared and learned (Neuman, 2006, p. 404 - 405).

For the current study, where a single instrument was administrated on a single group, it can be argued that the selected items did reflect the measured content and construct. Moreover, as the researcher was able to crosscheck the information from divergent sources of information there seem to be reliability within the measurement instrument.

Since an interview is based on a person's perception it can be difficult to judge the information received as untrue or true. The reason is that the subject can provide an insight to a situation or event that may vary from material that previously has been published. Thus, to them their perception is true and what they state are their experience and daily life (Pereira, 2007).

The researcher had no formal training from previous research, but had practised interview techniques in order to appear serious and focused. In order to eliminate bias in the data, the interviews undertaken in this thesis was conducted based on the nine recommendations provided by Neuman (2006). The researcher stayed gentle and warm with no negative attitude, was focused to the questions and made the respondent feel like they were an important part for the project (Neuman, 2006, p. 305 - 306).

Questions concerning reliability of the interview transcription are rarely discussed. Technically it is a simple assignment to write down what has been said, but it is important to listen to the interview records several times in order to eliminate any error. There can for instance be a lack of quality in the recorded speech resulting in hearing something else that was originally said, special breaks connected to emotional feeling and laughs and sigh. These are all elements that should be written down during the transcription in order to enhance reliability of the interview (Kvale, 1997, p. 102 - 103).

The researcher listened three times to the tape recorder in order to make sure that all

information was captured, such as brakes, laughs and sigh that can have an impact on the analysis. The interviews provided the researcher with beneficial information of good quality. The participants seem to have an interest and trust in the interviewer allowing the information to flow about the question asked. The subjects were cooperative and eager to discuss the phenomenon, and there was a relaxing atmosphere and chemistry between the researcher and participants. Even if the researcher had no training from formal interviews, it was experienced that the participant perceived the researcher as formal and serious.

The concept of reliability in qualitative research also means consistency and is a dynamic issue rather than a mechanical issue. In order to increase consistency multi-method approaches can be utilized. By focusing on contrasts in the findings, similarities can add support to the reliability of the data at the same time as diverging data can form the foundation for further investigation. However, it cannot be expected that a repeated investigation will present similar findings as the first research due to the fact that the process under investigation are continuously developing (Pereira, 2007).

The data collection can be seen as an interactive process with the researcher located in a continuously developing situation, where also strategies and outcomes are influenced by the contexts. It can therefore not be expected or even desirable that a repeated investigation will produce similar result (Pereira, 2007).

Pre-understanding and Reflexivity

Studies that are utilizing qualitative approaches for data collection and analysis may be concerned that the researcher and subjects are co-creators of the real life described in the thesis (Pereira, 2007). Reflexivity tends to trustworthiness of qualitative research and is the process and relationship between researcher and the subject, and the ability of the researcher to reflect and inspect critically the research process (LaBanca, 2011). A reflexive methodology can be seen as …"making personal experiences, belief systems, motivations and

tensions, as well as political agendas, explicit and continually assessing the impact these factors may be having on the researchers endeavours" (Brannick & Coghlan, 2006, p. 145). In order to determine impacts of earlier knowledge and experiences, reflexivity can be used as a self-critical method. The researcher will have the possibility to recognize the influences of different styles and genres of information. Challenges that may occur is to avoid prejudice in perceptions, limits or personal interests of the researcher (LaBanca, 2011).

Within the term reflexivity, subjectivity is a central issue and it is therefore important to elaborate some of the researcher's background and relationship with the case under investigation in order to increase the understanding of the study (Pereira, 2007).

The pre-understanding of the travelling industry has had a great influence on the researcher and the choice for selecting the current issue. Likewise, it has also had an impact on the chosen design and method, and similarly on the elaboration of the results and conclusion. The researcher's knowledge and interest is closely tied to the event under investigation.

The researcher interest in this field research originated from 2006 when she was accepted into the Norwegian School of hotel Management in Stavanger. The interest for the travelling industry continued to expand and when she got employed in Norport Handling (Ground Service) in 2009. She then started pondering whether the senior segment is exposed to any barriers in terms of the user interface design at the airport. As previously mentioned, she had experienced situations where older people had difficulties with the automated services and the security process.

After contact with the researcher's supervisor and a thorough review of previous research it was clear that this was a topic that had not been studies yet, and this was therefore a phenomenon that could be interesting to investigate.

Ravndal and Sand showed interest in the project. They recognized my needs during

the data collection and offered help if needed, such as uniforms, measurement of light intensity and prospective food coupons that could be handed in return for the subject's participation. The help and interest from several parties had a great influence on the researcher's ability to perform and present an adequate project. It gave motivation and support during a tough and stressful period.

The great interest to the phenomenon created a higher energy for the researcher being able to stay more focused and collect data more thorough. It was also experienced as an advantage that the researcher had great knowledge about the airport area such as security restrictions and how the automate systems operates. This knowledge made it possible to appear knowledgeable and confident during the observations and interviews. The researcher was also available to answer questions and assist when help were needed regarding the automated services, directions, security and so forth. Not only did this make the process more efficient, but also became easier to detect any mistakes or difficulties the participants did experience.

The researcher tried to stay objective during the observations, but at the same time it must be admitted that the pre-understanding and knowledge about the phenomenon could have had an influence on the data collection as the researchers might already have held opinions and perceptions regarding the issue. Likewise, it could also have had an influence on how the questions were asked, for instance asking leading questions. In that case, it could have had an influence on the validity of the data, as the researcher might have influenced the subject's perceptions. An additional disadvantage that was recognized with having knowledge about the airport area was that several of the subjects tried to hand the check-in process to the researcher making it difficult to observe their actions. It was also experienced that some of the subjects perceived the researcher as an employee that was there to help, rather than a researcher.

The researcher experienced that the pre-understanding of the phenomenon included several advantages, but it must be admitted that the researcher was not as prepared and that this could create challenges as well. Still, the researcher has tried to stay neutral and consistent during the data collection in order to avoid bias in the findings. This is also recognized by Pereira (2007) who state that pre-understanding can create both advantages and challenges. However, if there is a right balance, it can be conceived as increasing the reliability and validity of the findings and the conclusions accuracy (Pereira, 2007).

From a personal point of view the researcher finds the automated services applicable. They are custom friendly with guidelines that are easy to follow. Nevertheless, it is understandable that people in general might find them difficult to use, especially if they are not custom to similar devices with touch screens.

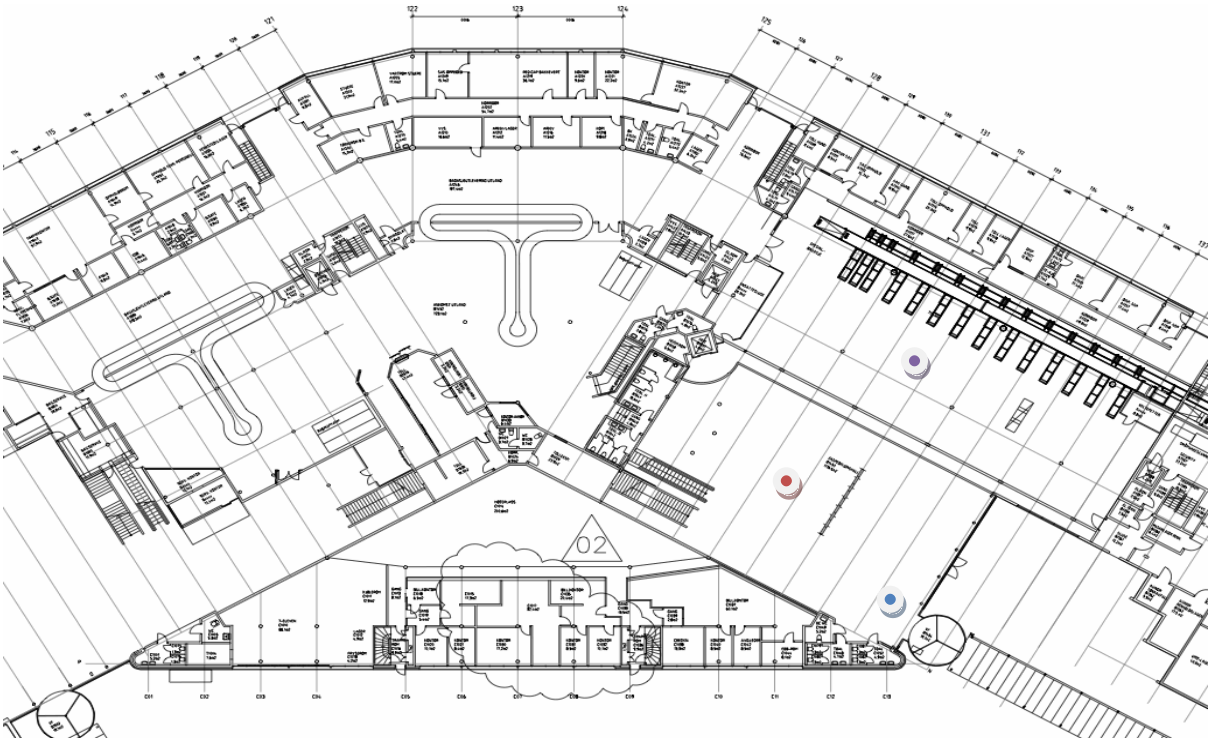
Findings

Overview

Two maps over the airport area have been included in order to present the vital checkpoints that have been considered during the investigation. Map 1 illustrates the first floor at the airport. This is the check-in area. Map 2 illustrates the second floor where the security is located.

The participant observations, interviews with Ground Service, Securitas and management in Avinor will be presented, discussed and linked with these checkpoints.

The layout of the findings will be based on the generic categories developed in the method section. In the present reporting, employees from the Ground Service will be addressed as *"E"* and subjects from participant observation as *"P"*.



Map 1. Check-in area, first floor. Received from Morten Sand, Manager of airport experiences at Stavanger airport.

Entrance

Check-in counters

Check-in area where the automated services are located

Check-inn; Technology. The first checkpoint that was considered was the check-in process. The researcher will shortly repeat where and when the participants were sampled in order to provide a more holistic picture of the setting. The researcher sampled nine participants interacting with the automated services, and the remaining 13 either within this area or at the gate terminals. Participants one to eight were observed Tuesday from 10:00 a.m. to 1:00 p.m., participants nine to 14 were observed Wednesday 9:00 a.m. to 11:00 a.m., participants 15 to 17 were observed Friday 3:00 p.m. to 5:30 p.m. and participants 18 to 22 were observed Saturday 6:00 a.m. to 9:00 a.m. Table 3 gives a comprehensive picture of the participants and their actions and statements in relation to the check-in processes.

Table 3

Participants` actions and statements concerning check-in

Participant	Pre check-in	Automat	Self Bag-drop	Counter	Charter	Prefer to use counter	Prefer to use Automated S.
1							
2							
3							
4	Tried						
5							
6						Does not matter	Does not matter
7							
8							
9							
10							
11							
12							
13	Tried						
14							
15							
16							
17							
18							
19							
20							
21							
22							

All of the participants stated that they previously had utilized computerized devices, either at home, in stores or at the airport. However, many of the subjects seemed to not favour the standardized check-in processes and/or experienced problems during the interaction with the automated services.

The first element that was discussed was pre check-in. Pre check-in can be accomplished either on the mobile phone or at the computer. Among the Norwegian airline companies SAS, Norwegian and Widerøe, Norwegian do not offer pre check-in to its customers. It is neither possible to pre check-in when travelling with charter. It must be mentioned that if passengers decides to check-in at home, one must also utilize the automated services at the airport if bringing any luggage.

Six people had pre check-in and experienced no problems (see Table 3). Out of the remaining 16, two people had tried but did not succeed. P#4; “I think it is too confusing to check-in at home”. As 13 subjects were observed within the check-in area or at the gate terminal, it was not possible to indicate what type of airline company they were travelling with, if it was not mentioned by the subjects. Five subjects indicated that they were travelling with charter. However, nine subjects did not indicate the airline company they were travelling with. It is therefore impossible to say if they have had the possibility to pre check-in or not.

The first act people do when entering the check-in area is generally to locate the right automated service or counter, either by utilizing signs and boards or printed flight information. It is therefore important with optimal light conditions, especially for older people who may have weakened eyesight. Lux was measured at the centre of the check-in area, placing the device on the floor, indicating a lux at 395.

People are basically restricted to utilize the automated services (check-in machines), except on charter. In terms of any special arrangement of the automated services, Sand stated

that they are only adapted in height for people in wheelchairs. Among the 22 participants, 13 subjects had utilized the automated services (see Table 3). Five subjects travelled with charter and the remaining four did not want to approach them. The reason they did not want to utilize the automated services was either because they had never tried them before or they perceived them as too complicated (P#19), deteriorated eyesight (P#17) or as P#5 stated; "the process of having to use the automated services is such a new phenomenon that it totally slipped my mind".

P#8 were a woman who stated she were 55 years. The researcher could hear her and her children having a discussion regarding where to check-in. As the researcher approached her and started interacting with her, she argued that the technical systems changed between each time she travelled. She had experienced difficulties several times when interacting with the automated services, such as problems with registration of passports, printing bag-tags and "out of order" notifications. Consequently, she would not approach the automated services anymore. It just resulted in her feeling like an idiot and not a worthy person who had spent thousands of NOK on a ticket.

E#3 implied that she found it very strange that the elderly did not find the automated services more applicable because many of the seniors who did not utilize the machines had bought their airline ticket over the Internet, which she believed was an even more difficult process.

In relation to the employees' perception, the elderly was seen as a segment that was less willing than others to approach the automated services. E#2 stated;" I often experience that the elderly don't dare to approach the automated services…. I believe they are scared to push the wrong buttons…. that their luggage might be sent to the wrong destination". E#1; "I basically think it is the technology and that they are not able to keep up with the development of it. On the other hand, if we assist them, I often experience that they have no problems

doing it and they appreciate learning something new". E#3; "I believe they in general find the automated services confusing and would preferably check-in at the counter. Another reason might be because the text on the screens is quite small".

The nine participants who were observed by the automated services interacted differently during the process. While some experienced no problems, other handled the process slowly, hesitated and was unsure in different situations. From the researcher's point of view, a critical point seemed to be when reading the text on the screens in term of what to do. If this was because the text was not understandable, not readable or just overlooked, this seems like a reason many of the subjects got stuck and needed help from the researcher. It was also experienced that several of the participants had problems in terms of locating the right buttons and where to insert cards (visa, Eurobonus, etc).

Only four out of the nine subjects interacted "perfectly" with the automated services (P#1, 2, 3, and 4) as the remaining needed some form of help from the researcher. Of the 13 subjects that had utilized the automated services, nine subjects indicated that the machines were somewhat manageable and efficient. Two subjects found it somewhat confusing and the remaining two indicated that the automated services only caused more queues; one by the machines and one at the bag-drop. P#2; "I find it very efficient utilizing the machines…but I travel a lot so it is essential that I chose the best option in relation to time and queues". Four out of these participants also stated that it is appeasing if employees are present to help.

Most of the subjects indicated that they did not favour queues. P"18; "It is okay to use the automated services, but if there is a long queue behind me I get easily stressed". This was also recognized by P#15 who stated that she got easily stressed at the airport due to all the people and many queues.

E#2 recognized that the airport often caused a lot of stress and confusion among people in general….."The confusion and stress causes people to go in wrong lines…it is like

they don't know where to go…this goes for all people in general, but is especially common for the older generation".

Nine out of the 13 subjects who had checked-in at the automated services utilized the self-bag-drop (see Table 3). Self bag-drop means that the passenger personally sends their luggage by scanning the bag-tag with none assistance from staff.

None of the participants seemed to have any problems sending their luggage. Only two of the subjects needed to get conformation from the researcher that what they were doing was right. They all stated that the system was manageable. The four last subjects indicated that they found it more efficient sending their luggage when employees were present to assist.

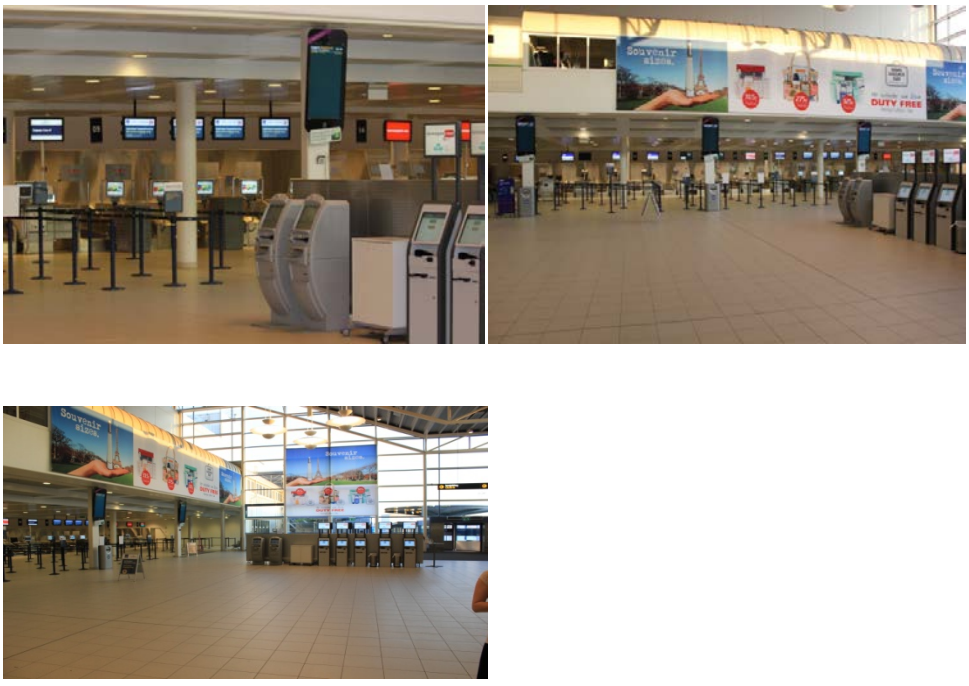


Photo 3. Check-in area (private photo).

The employees recognized that sending luggage was not that great off a problem among the senior segment. E#1" I sometimes get the feeling that self bag-drop is too easy for the elderly…. That they expect that they need to do more than just scanning the bag-tag". E#3 also experience that the elderly did not find it especially complicating sending their

luggage, but as she state “the counter off self bag-drop has been moved, and I experience that people in general now have problems locating it… there should be more signs above the counters”.

Ravndal and Sand recognized that the changes within technology could be a barrier for the elderly segment at the airport. On the other hand, as Sand stated; “Since we do not get as much feedback, especially from the elderly segment, of what is perceived as a challenge at the airport it is difficult to indicate the exact barriers”. Ravndal believed that if seniors are not that used to travel, the perception of many automates and counters, sounds and people might be perceived as confusing.

Sand stated that each quarter there is performed a survey at the airport accomplished by the Airports Council International. This is a survey that concerns the overall satisfaction in relation to access, check-in, environment and so forth. The results are presented in a general overview in comparison to other airports in Europe. This gives a picture off the passengers overall satisfactions, but it does not provide us with any specific information about the elderly perceptions.

In general, Avinor don’t have any clear strategies on arranging their products for “special” segments, but they do recognize that it is important to look after all segments that visit the airport.

Ravndal and Sand indicated that they do arrange efforts when they are aware off such occasions. They have for instance recently provided extra service-staff and signs when big groups of seniors have travelled. However, they do not have any clear strategies of being updated about such occasions, as it depends on feedback from travelling agencies or the Ground Service that informs when big groups are travelling. Ravndal recognized that this is of great advantage while efforts can then be discussed and planned. She further recognized that the consequences of not being pro-active are inefficient systems, for instance long queues

at the check-in and the security.

Stavanger airport is undergoing massive development and have come a long way with implementing the demands of Universal Design. Sand recognized that they will have implemented the demands of Universal Design by year 2019, or even at an earlier time. The construction of Avinor Sola started 2 –3 years ago, at the same time as this law (Universal Design) became affective. Ravndal and Sand stated that at that present time they unfortunately "missed" some of the obligations they needed to have. Consequently they took action and got involved with several alliances, such as The Norwegian Association for Disabled, The Norwegian Association of the Blind and Partially Sighted and the Asthma and Allergy Association. Sand; "It is important that everybody can utilize our facilities".

All the construction work is based on Universal Design, and much of the work that have been accomplished involves arranging for people that have weakened eyesight, are blind or people in wheelchairs. Examples of such arrangements are tracks for blind people and automatic door openers.

Sand recognized that many of the elderly people have the need for assistance, such as wheelchairs. He stated that the airport is responsible to provide assistance. They therefore hire the Ground Service to provide this assistance to people who need it.

Signs and Boards; Direction. The participants seemed to find the signs and boards at the airport custom-friendly and understandable. Twenty-one out of the participants expressed that there were no problems locating any facilities at the airport. The general perceptions were that the airport was quite small or/and they were familiar with the building. However, one participant stated that the signs over the counters were confusing and it could be difficult to locate the right counter or the bag-drop station. This person also needed help from the researcher to locate the right counter.

The employees had a slightly different perception about the signs and boards and as

E#4 stated; “In relation to all the questions I have received, I have an impression that older people are not that good with interpreting and understanding signs and boards at the airport. It does not matter how many signs there are if people are not able to understand them. For instance, sign 14b – 16; many of the elderly do not understand where gate 15 is located”. Two of the employees, E#2 and E#3 also mentioned that a problem, slightly higher for the elderly, were the fact that people unintentionally managed to enter the international terminal. This is inconvenient, while it is not possible to go back, as you have to go down and throughout security again. They stated that the reason could be because that they had problems interpreting signs. E#1 believed that the seniors did not struggle to find their way at the airport because it is quite small. All though, as E#1 stated; “even if I believe they manage to find the way around the airport, I experience that they can have problems in relation to interpreting flight numbers and often mix up the airline companies resulting in ending up at the wrong gate”. Another element that was brought up by E#2 and E#4 was the fact that the elderly were in general more straight forward in asking personnel for help in terms of locating the right direction and gate at the airport.

Service and Information; Human. The information flow is a central element in relation to the automated services and personal service. Twenty-one out of the 22 participants stated that the information flow is good enough at the airport. The general statements were that the service was good and that automated services were understandable. One participant believed that the service and information flow was not good. As a further contribution, he also stated that Stavanger airport in general had lower quality at the check-in area, security and facilities than other airports in Norway.

The participants were asked where they preferably would check-in if they had the choice, either at the automated services or at the counter (see Table 3). Ten of the participants stated that they would rather have approached the counter if they had the choice, including

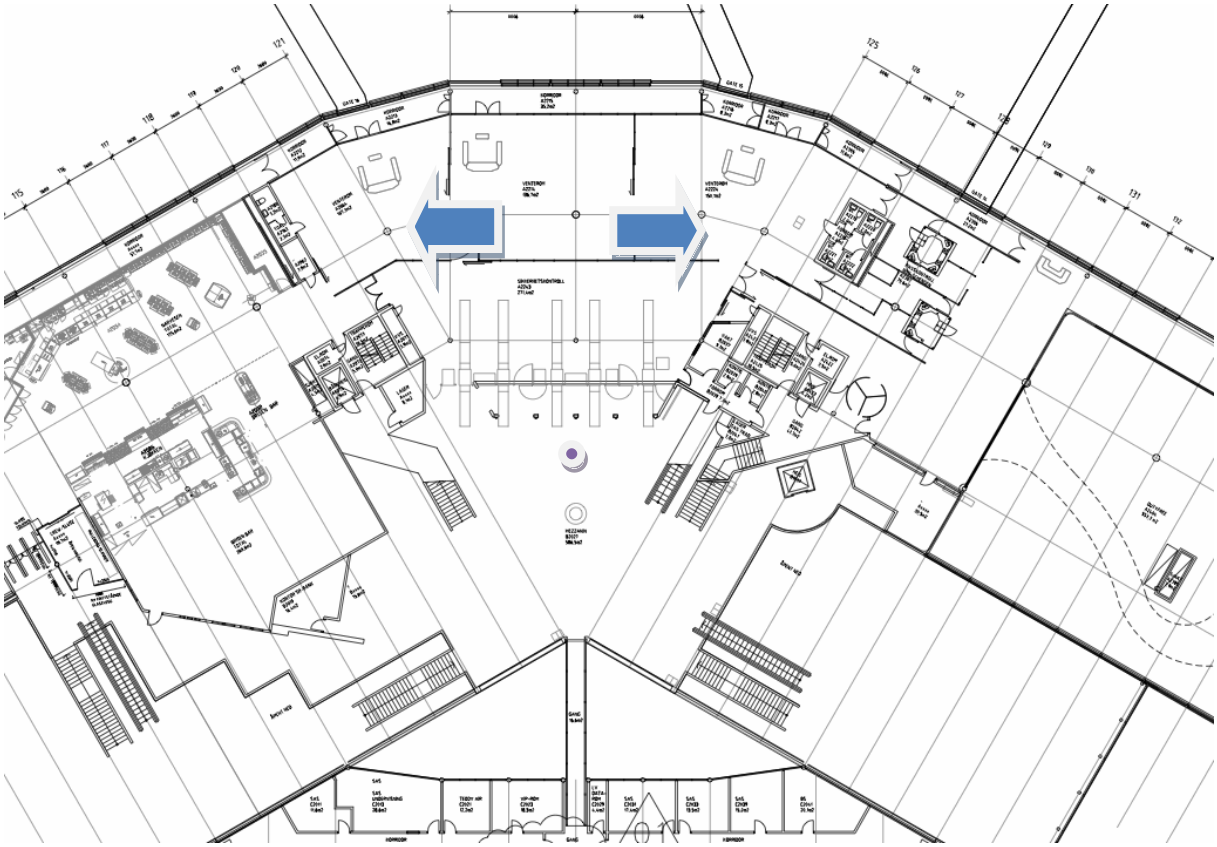
four of those who had checked-in at the automated services. Four out of these, three who had utilized the automated services, indicated the reason was because they preferred human interaction and the feeling of being looked after. P#13; “I do check in by the machines and I know how to interact with them, but I would rather have approached the counter if I had the choice as I appreciate the human interaction”. P#21; “To day I am travelling with charter, but either way I would have approached the counter as I prefer to interact with people during the service encounter”.

Sand recognized that this might be an aspect perceived negatively among the elderly segment; “I believe the technology might be an obstacle for the elderly people …and also that they don’t receive the personal service that they are used to”.

The rest of the participants stated the reason they wanted to approach the counter was because of weakened eyesight, never tried the automated services, found them too complicated, and easier approaching the counter. P#14 booked the ticket at the computer at home and pre checked-in, but as she entered the airport she got confused and stressed by all the people. She also found the buttons and functions at the screens slightly difficult to utilize, so she would rather have approached the counter if he had the choice. One participant, P#6, did not care where he checked-in.

Even if some subjects had a negative attitude towards the automated services, this was not the case among all the participants. P#7 was a woman probably in her late 60`s. She hesitated during the whole of checking in at the automated services and needed assistance from the researcher several times. Still, she had never tried the machines before and said; “now that I have tried them, and you have helped me, I know that they are understandable and manageable”.

Security



Map 2. Security and gate terminal, second floor. From Morten Sand, Manager of airport experiences at Stavanger airport.

Security

International departure area. Domestic departure area.

The next checkpoint was the security area. Of all the participants, five of the subjects had a very negative attitude towards the security process. The main reason was because the enormous queues. P#10 for instance was a woman who found the security inefficient with too long lines. She further stated that her husband who travelled regularly, found Stavanger airport as the worst airport in Norway in terms of security and efficiency. Five of the subjects found the security exhausting, but necessary. They said that it could be difficult to know all the regulations and restrictions and it was not always that easy to exactly remember what they had placed in their hand luggage. P#2; “The security can be a pain; there is so much to be

aware off". Two participants found it tiring if shoes and jackets needed to come off, and P#22 never looked forward to it as she had metal in her hips that always generated "bibs" and a body visitation. P#9; "The security is exhausting, but I recognize that it is necessary. As long as I don't have to take of my shoes and coat is basically okay".

The remaining 10 subjects found the security "okay". They either saw it just as a part of travelling, where used to it or as P#6 stated; "I think the security is improving, and the queues are not that long anymore". Two of the participants that perceived the security as "okay", also stated that the employees in Securitas were very friendly.

In relation to the four participants that were followed throughout security, all found the situation stressful (P# 1, 3, 5 and 6). There were no outstanding queues at that moment. One of the participants was unsure if PC had to be taken out of the hand luggage, and one participant did not take off his jacket that contained coins, which generated a "beeps". This subject stated that body visitations was annoying, and believed the scanning system were too sensitive. Nevertheless, he understood the necessity. The two last participants seemed knowledgeable about the process and managed the process without any implications.

There seemed to be an agreement among the employees that long queues could be exhausting for older people during the security process. Three of the employees also believed the regulations and restrictions could be confusing for them and the process of taking off shoes and clothes (E#1, 2 and 4). E#4 stated; "in relation to what I experience by check-in in terms of confusion and stress, I don't believe it gets any better throughout security. I can imagine it may be difficult for many of them to know all the regulations and restrictions". She believed the security area was a stressful situation for the elderly, especially for those who rarely travelled. She further believed that these people needed more guidance throughout security, and had experienced situations where the elderly were not assisted and guided with sufficient curtesy. She thought this was important for the elderly in order to create a positive

image of the security process. Even if E #1 believed long queue were tiring for the elderly segment, she did not believe the security area were more problematic for older people than for other segments.

The two employees from Securitas stated that the elderly were slightly less aware of the restrictions and regulations than younger adults. However, it did depend on how much they had been travelling. They also addressed that it was important that their employees were pro-active in order to guide and help people in terms of what to do. Most of the passengers did not complain, and even if people had implants, especially elderly, they usually took the whole process with a smile. They did experience that the elderly could have more problems than younger in relation to understanding why belt, clothes, shoes etc need to come off, but in general, the elderly did not struggle more the other segments. The employees did also believe that long queues could be a barrier for the elderly, especially if they had problems with their back or legs.

Lux was measured after the security check. This was conducted because people often check their ticket in order to locate the right direction, and simultaneously because signs and boards are located in that area. The lux device was placed on the floor and showed a lux at 147.

Chairs, Cafés and Stores; Facilities. Over the last years new cafés and stores have opened at Stavanger airport. The airport is still undergoing massive constructions and more offers will be completed. There have for instance been changes in seat offers as new sofa sections have replaced plain seats in the domestic terminal. At the present moment, two new cafés has opened. One at the international terminal and one at the domestic terminal, located at the first floor.

Photo 4. New Café at the domestic terminal (private photo).

The participants were asked about the offers of chairs, stores and cafés at the airport. In general the participants were pleased with the offers and only one of the subjects had a very negative perception. He stated that the new cafés in the domestic terminal had a bad location, as it was too far to walk. Seventeen of the participants found the offers okay, good or improving. Two of these participants complained about the seat comfort in the international terminal, saying that they were too hard, especially for older people and people with back-pains. Three of the subjects also thought it was too expensive and they therefore avoided purchasing food or beverages. Three of these participants stated that the offer was good enough at the departure terminal, but they longed for seats by the check-in area since it could be tiring to stand up for a long time during the check-in process. The last four of the subjects did generally not utilize the facilities and had therefore no opinion in terms of the offers. Three of the employees said that the supply was good enough in the departure terminal. However, E#4 stated that the offer of seats was far from good, especially at the second floor in the domestic terminal, where she often experienced that people had to stand. E#1, 2 and 3 said that there should be more seats by the check-in area as it could be tiring to stand in long queues. E#1 stated; “if we need to go and get wheelchairs for older people it would have been nice if they had a place to sit meanwhile”. E#2; “even if there should be more seats by the check-in area I believe there are no room for it. The place is small enough as it is”.

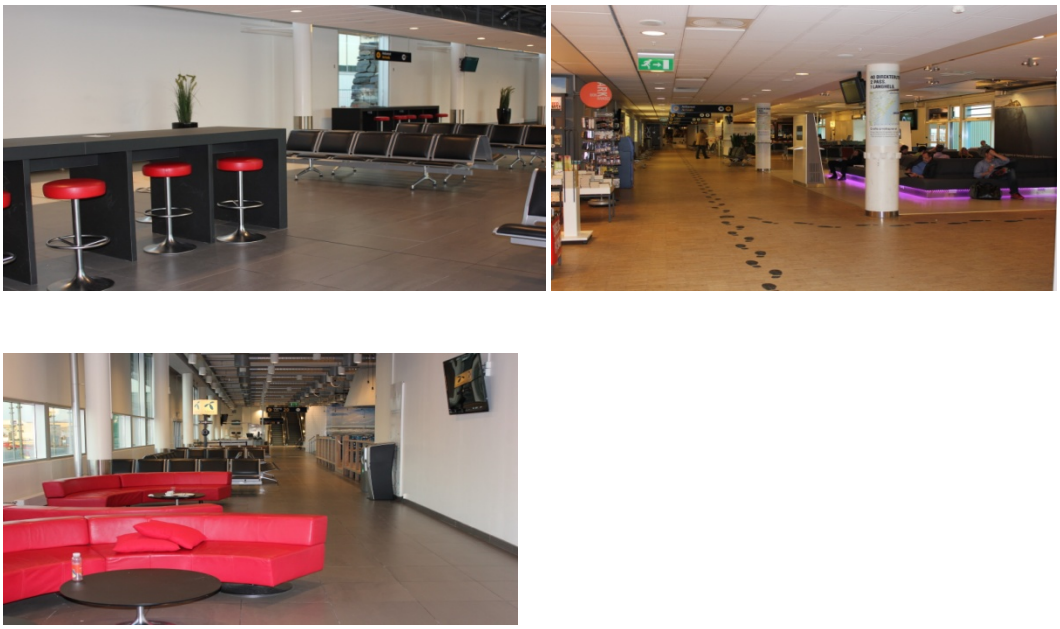


Photo 5. Seating areas at the domestic terminal (private photo).

Photo 6. Café at the international terminal (private photo).

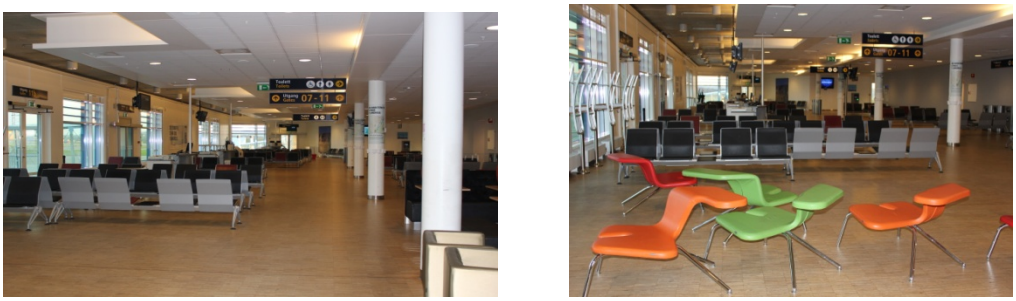


Photo 7. Seating areas at the international terminal (private photo).

As previously mentioned the researcher did not manage to measure the (sound level) Decibel at the airport. On the other hand, the information received regarding the current system was valuable. The current system shall basically be utilized for announcements

regarding flights and messengers from the traffic department and airport security. The system is also to be used when there is announcement regarding fires, evacuation, tests and exercises. It is therefore a requirement that the announcement system provides first class sound and speech appearance. The system is implemented according to demands from HO-2/98 (*Brannalarm, Teamveiledning* developed by the Directorate for Civil protection and Emergency planning and the Directorate for Construction Quality), including other standards and public demands (Stavanger Lufthavn, n.d.).

Discussion

Overview

In the present chapter, findings will be discussed in the light of the literature review in order to try and answer the research question asked; do the elderly segment experience any challenges in relation to the user interface design at the airport. As established from the method and analysis, the discussion will be divided between the five themes; technology, direction, human, security and facilities. Moreover, a conclusion will be made and finaly, limitations and further research will be discussed.

Check-in; Technology. There is an increase in automated services at airports and as established in the theoretical review previous research has shown that the elderly segment don't favour these systems and service processes that are standardized (Grougiou & Pettigrew, 2011). Several researchers have discussed the situation where the elderly segment interact with technological devices (Christopher Sze Chong, 2010; Grougiou & Pettigrew, 2011; Roupa et al., 2010) and not only do they adjust to new technology in a slower rate than younger adults (Christopher Sze Chong, 2010; Roupa et al., 2010) but previous experiences and unfamiliarity, prospective impairments and mental deficits may also have an influence on how they interact with the technological devices, or if they at all want to interact with them.

The automated services is a part of the physical setting at the airport, and as Bitner (1992) argue, there is a constant development of the surroundings that may have an great impact on the customers in relation to the cognitive, emotional and behavioural reactions. She further states that the physical environment has the ability to create an image and influence the behaviour of the consumer (Bitner, 1992).

As mentioned, Stavanger airport has over the last years had an enormous growth resulting in new sections added, enhanced technology, more rigours security and so forth.

However, it can be discussed whether these changes are constructed to meet the demands of the heterogenic society, or is it essentially constructed around the modern and high-tech fashion!?

Photo 8. Automated services (private photo).

Inclusive design and Universal Design brings up important elements of developing products that can meet different needs for the elderly and also other segments of the population. It deals with finding the right balance between the fast development and the needs and capabilities for elderly and people with impairments (Christopher Sze Chong, 2010). However, it is likely important to consider the generation effect during the design phase of technological products as this can play a vital part during the interaction with technological devices (Christopher Sze Chong, 2010).

The demands within Universal Design have to be implemented by the year 2019. It basically concerns developing products, services, communication and surroundings that is applicable and approachable for a larger part of the population (Rogaland Fylkeskommune, 2007). Avinor has come a long with implementing the demands of Universal Design as they have included several alliances in order to adapt to the heterogeneous society. Efforts that have been conducted are for instance track for blind people and automatic door openers. In relation to adapting their automated services to customers, they have placed them in a wheelchair friendly height. Chong (2010) state that technological products are often too complex for the elderly segment and it is therefore important to adapt to the aging population

and people with disabilities (Christopher Sze Chong, 2010).

Even if there are no technological adjustments in relation to the automated services, Avinor recognize that it is important to take care of all segments that visit the airport. They therefore make necessary arrangements if they are aware of such occasions where big groups of elderly are travelling, such as extra floorwalkers or signs. It can therefore be argued that this can compensate for difficulties the elderly may encounter as they have the possibility to be assisted with the automated services or be guided directly to the counter if there is a preference for that. This can on the other hand exclude elderly people where Avinor are not aware of such occasions and when people are not travelling in big groups.

As established in the literature review, the Norwegian Government have an ambition to create a holistic digital solution in order to improve electronic self-service for the public society (Fornyings-og Administrasjonsdepartementet, 2007). At the present time as this was suggested, Avinor did not want to get actively involved with that work as they were already involved with their own ICT-project (Samferdselsdepartementet, 2008). The author were however not able to receive any relevant information within that area, so this situation is undisclosed.

The present project focuses on people aged 55 and older, thus born in 1957 or earlier. This generation is called the baby boom generation (baby boom, 2012) and these are all people born before the information revolution. Cohort refers to a segment of people born within the same generation and who are influenced by similar views and experiences in their late youth and early twenties (Yoon et al., 2009). Schewe and Meredith (2004) state that the cohort will follow you throughout your life and most likely have an effect on the consumer behaviour in the future (Faranda & Schmidt, 2000; Schewe & Meredith, 2004). Moreover, people born before 1977 are most likely not as used to dealing with technology as people born after this period (Schewe & Meredith, 2004) and different generations will interact with

technology differently than the last generation. It concerns “the technology generation” where each generation will approach and interact with technology differently based on what they were used to during their formative period (Christopher Sze Chong, 2010).

The present findings indicate that some of the subjects are probably influenced by the cohort effect and/or the generation effect. Even if 13 of the participants checked-in at the automated services, only four of the nine subjects observed by the automated services interacted “perfectly” with them, as the rest needed some form of assistance from the researcher. Additionally, one of the subjects did also indicate that she would not approach the automated services as she had never tried them before, and she perceived them as too complicated (P#19). As this is a generation born before the information revolution, it can be expected that the reason for not wanting to approach the automated services or for the difficulties they did experience are because they were not used to operate technological devices during their formative period. Chong (2010) argue that if a person is not exposed or taught to interact with certain technology in the formative period, it can be expected that this will have an influence on the behaviour in the future (Christopher Sze Chong, 2010).

There are other reasons that may have influenced the subjects while interacting with the automated services. Even if one is to believe that the generation effect and cohort effect plays a vital part during the process, physical impairments can also be an additional or the specific reason for encountering difficulties.

In relation to pre check-in, it can be difficult to predict a trend since people who are travelling with Norwegian do not have the possibility to utilize this facility. As mentioned, 13 subjects were observed within the check-in area or at the gate terminal, and none of these participants indicated the type of airline company they were travelling with, except from five subjects who stated they were travelling with charter. Nevertheless, the findings reported that six subjects had checked-in at home experiencing no problems, and two subjects had tried, but

did not manage to check-in. However, the findings are to vague to analyze further.

Yoon et al. (2009) state that scripts and schemas are developed to organize knowledge of products. This may especially benefit seniors during decision-making and the process of remembering information when it is presented in a similar way (Yoon et al., 2009). Since all of the participants indicated that they had previously utilized similar machines, it can be assumed that script and schemas have been developed and are taken into use while interacting with the automated services. However, these scripts and schemas may cause confusion, while people forget important details from the past, slightly more common among the elderly segment (Yoon et al., 2009). It can therefore be assumed that the research by Yoon et al. (2009) is consistent with the present findings, and some of the subjects experienced problems when interacting with the automated services because they were not able to retrieve vitally information that concerned the process.

As argued in the literature review the cognitive processes changes during aging (Daatland & Solem, 2011). Memory will decline (Daatland & Solem, 2011; Drolet et al., 2010; John & Cole, 1986; Yoon et al., 2009) and the fluid intelligence is affected (Daatland & Solem, 2011; John & Cole, 1986). For instance, it becomes more difficult to retrieve information stored and new information can become mixed up with similar information stored (Daatland & Solem, 2011).

Chong (2010) state that the abilities for utilizing a product is located in the long term-memory; procedural and semantic memory (fluid intelligence is also needed to construe introductions). These are all elements that will decrease as age progresses (if the innvolved knowledge. procedural and episodic knowledge, means a lot to the person or are highly learnt/practiced, this will however not be the case). Furthermore, Yoon et al. (2009) state that processing information of small amounts during cognitive tasks can create difficulties for seniors as it is strongly connected to working memory. Working memory is very sensitive to

aging and is utilized in processes where information needs to be held and manipulated (Drolet et al., 2010).

It can be difficult to assume that the subjects hesitated because of loss of memory since there might be other reasons. Due to the fact that approximately 2/3 of the subjects observed experienced some sorts of problems during the interaction with the automated services, it cannot be ruled out that some have impairments in the cognitive functions.

In relation to the four subjects who did not experience any problems concerning the automated services, it can be assumed that their procedural and episodic knowledge are not affected in this specific situation. Thus, this might be a highly learned task to them. It can further be seen in relation to familiarity, and that this is a chore that is executed without much mental effort (Yoon et al., 2009).

Moreover, intelligence could also have influenced the process of interacting with the automated services. Fluid intelligence is used during the solutions of new problems and includes the ability of fast accommodating of information and to be able to detect new connections (Daatland & Solem, 2011). John and Cole (1986) argue that it becomes more difficult to utilize and acquire new information as people age. Since intelligence basically concerns the process of thinking and problem solving, especially in situations that is not based on routines and habits (Daatland & Solem, 2011), it might be assumed that some subjects hesitated because of a decrease in fluid intelligence. If the subject rarely utilizes automated services, it will, based on the discussed assumptions, create challenges for the subject as it requires the ability to accommodate much information and simultaneously, detect new connections. For instance, John and Cole (1986) conducted a research about processing deficit among older adults, and the findings indicted that the elderly segment scored worse than the adult population in situations such as problem-solving and learning (John & Cole, 1986). Thus, it can be argued that the findings are consistent with the findings of John and

Cole (1986).

The loss of memory and fluid intelligence can also be connected to not wanting to approach the automated services, as people are “afraid” to not manage the process. This was in fact recognized by participant number 8 who indicated that she never approached the automated services as she had tried them before and it always resulting in her feeling like an idiot because she did not manage to complete the task.

As reported in the findings, it seemed like many of the subjects experienced problems when reading the information on the screens in terms of what to do. John and Cole (1986) argue that the quality and the amount of information and its format influence the processing of the information, choice and decision making. Similarly, lack of cues and guidelines can create problems during the performance of tasks. This is because the processing system declines during aging and the more information available; the higher processing skill is needed (John & Cole, 1986). As the automated services include several sequences with an assortment of information, it can be assumed that they are too complex and there is a lack of cues and guidelines. Moreover, the present findings indicate that they are consistent with the findings by John and Cole (1986).

Furthermore, Yoon et al. (2009) argue that decision making can be influenced in a negative matter if the subject is under time pressure. This goes for all segments but it especially has an influence on the elderly segment (Yoon et al., 2009). Even if none of the subjects stated anything regarding time pressure, it can be a valid factor for experiencing problems while interacting with the automated services. Because people are going to catch an airplane, they do often feel stressed as they usually have a limited time at the airport. It can therefore be assumed that some were affected by time pressure. However, two of the employees did indicate that a common attribute among the elderly is the fact that they are most often at the airport long time before departure.

It is important not to overlook the fact that the researcher could have had an influence on the participant's performance. For instance, Daatland and Solem (2011) indicated that the elderly have greater problems overlooking factors that are interrupting their concentration. This is due to the decrease in working memory (Daatland & Solem, 2011). Since the researcher did ask question as they were interacting with the automated services it can be assumed that some subjects became disturbed and interrupted which further caused them to experiencing problems.

As established in the literature review the eyesight weakens during aging and a person aged 60 needs three times the light compared to a person aged 20 in order to see (Wolfe & Suen, 2007). In the present study, one of the participants did indicate that they would not approach the automated services because of bad eyesight. As mentioned, the process of self check-in concerns several sequences of reading and interpreting information and if a person has weakened eyesight it may cause difficulties, especially if the light level within the environment is not optimal. Lux was measured within the same area where the automated services are located, indicating a value of 395 (see Table 4).

Table 4

Recommended lux at workplaces (The Engineering Toolbox, n.d.) *and actual lux at the check-in area*

Activity	Illumination (lux, lumen/m^2)	Actually light level at the check-in area
Public areas with dark surroundings	20 - 50	
simple orientation for short visits	50 - 100	
Working areas where visual tasks are only occasionally performed	100 - 150	
Warehouse, Homes, Theaters, Archives	150	
Easy Office Work, Classes	250	395
Normal Office Work, Pc Work, Study Library, Groceries, Show Rooms, Laboratories	500	

The author has previously presented a table over recommended lux at workplaces (see Table 1) ("The Engineering Toolbox," n.d.). In order to provide a holistic picture of the findings, a summary of Table 1 have been presented combined with the actual findings at the check-in area (Table 4). Compared to these levels it should be assumed that the light level at the check-in area is good enough. The light level should not be the main reason for having problems reading the relevant information. However, with severely weakened eyesight it can be stressful utilizing the automated services since the text may be quite small.

Signs and Boards; Direction. None of the participants had any negative perception about the signs and boards or the process of finding the way at the airport. However, two of the employees believed that seniors had problems interpreting signs, for instance locating gate 15 in relation to the sign 14b-16. Two of the employees did also address the situation where the elderly entered the international terminal, even if they were travelling domestic. One of the employees did also think that elderly had problems in relation to interpreting flight numbers and often mixed up airline companies.

Based on the participant's perceptions it can be argued that the elderly segment experiences no problems with understanding and interpreting signs and boards. This can be connected with previous experiences (Christopher Sze Chong, 2010) and their familiarity with the process of interpreting signs and boards. If we focus on the employees perceptions, and that some elderly do in fact experience difficulties within this area it can be seen in the light of memory loss and an affected fluid intelligence (Daatland & Solem, 2011; Drolet et al., 2010; John & Cole, 1986; Yoon et al., 2009).

The process of interpreting signs, boards and so forth involves cognitive processes, especially if the situation is not based on habits or routines, for instance if a person rarely travels. It can therefore be assumed that the difficulties some may have encountered in terms of interpreting signs and boards, are more or less connected to the phenomenon's previously

discusses, thus loss of memory and a decrease in fluid intelligence (Daatland & Solem, 2011; Drolet et al., 2010; John & Cole, 1986).

A final reason that can cause problems in relation to interpreting and understanding signs is time pressure. As mentioned, Yoon et al. (2009) argue that the decision making of elderly can be affected in a negative manner when there is a time pressure (Yoon et al., 2009). As people more or less are under time pressure at the airport, it can be assumed that some of the subjects have been affected by time pressure resulting in problems with interpreting signs and boards.

After the security area the direction (right or left) will depend on whether people enter the domestic terminal or the international terminal. People may therefore read tickets, signs or boards in order to locate the right direction. As mentioned, two employees did observe that some subjects unintentionally entered the international terminal. It can be argued that poor light conditions and problems reading relevant information may have contributed to this. As previously stated, older people often experiences weakened eyesight (Daatland & Solem, 2011). Lux were measured at the security area, and showed a value of 147 (see Table 5).

Table 5

Recommended lux at workplaces (The Engineering Toolbox, n.d.) *and Actual Lux at the Security area*

Activity	Illumination (lux, lumen/m^2)	Actually light level at the Security area
Public areas with dark surroundings	20 - 50	
simple orientation for short visits	50 - 100	
Working areas where visual tasks are only occasionally performed	100 - 150	147
Warehouse, Homes, Theaters, Archives	150	
Easy Office Work, Classes	250	
Normal Office Work, Pc Work, Study Library, Groceries, Show Rooms, Laboratories	500	

Table 5 is a summary of Table 1 (Recommended lux at workplaces by "The Engineering Toolbox, n.d.) combined with the actual findings at the security area. This will make it easier to compare the findings.

In relation to the recommendations by The Engineering Toolbox (n.d.) there should be a lux at 50 – 100 in workplaces for simple orientation for short visits, and a lux at 100 – 150 at working places for working areas where visual tasks are only occasionally performed. It can therefore be argued that the light level is good enough for reading flight information, especially since this is not a room where people stay for a long time.

When people have entered the gate terminal, announcements regarding flight information are regularly made over the personal announcement (PA) system. Even if the researcher was not able to measure the Decibel at the airport, the relevant information received indicated that the sound level over the PA-system is up to standard. The system is accomplished according to demands from HO-2/98 "*Brannalarm, Teamveiledning"* developed by the Directorate for Civil protection and Emergency planning and the Directorate for Construction Quality including other standards and public demands (Stavanger Lufthavn, n.d.). It should therefore be assumed that the system operates with a sound level adapted for people with minor hearing loss. However, it is important to be aware of that the noise level at the airport can be relatively high, which further can have an impact on the ability to hear all that is being said over the PA-system. Likewise, acoustics can also have a negative impact (Daatland & Solem, 2011).

Service and Information; Human. None of the participants had any severe complaints about the service and information received in relation to check-in, and most of the subjects indicated that the information flow and service was good enough. Thirteen of the subjects indicated that the automated services were reasonable and there were no need to approach the counter. Four of these subjects did on the other hand indicate that they

appreciated if employees were present to assist.

An important element that must be highlighted is the fact that the remaining nine subjects indicated that they would have approached the counter if they had the choice, including four who usually did utilize the automated services (see Table 3). Four of these subjects, hereby three who utilized the automated services indicated that the reason was because of the social connection and that they preferred human interaction during service encounter. These three subjects even stated that the automated services were manageable and understandable, but not preferable. As previously argued, related research have shown that elderly don't favour automated services. Grougiou and Pettigrew (2011) documented that the relationship with the service provider is important for the elderly. Some even seek service providers just because of the emotional and social advantages that take place during the service interaction (Grougiou & Pettigrew, 2011). Even if this may not be the case at the airport, as most of the people are passengers or picking up acquaintances, it shows that this is an element which is important for the elderly segment. It can therefore be argued that the findings are consistent with the findings of Grougiou and Pettigrew (2011). Similarly, Patterson (2007) argues that a lack of social network increases the need and wishes for social interaction with service providers (Patterson, 2007). It can be assumed that this is the case among some subjects, but it is impossible to predict as there were no discussion regarding that subject.

Moreover, the reason why the subjects' preferred the social interaction during service encounter may be grounded in the phenomenon of the cohort effect and/or prior experiences. The cohort effect will follow you throughout your life, and people born within the same generation have a commonality that can be seen as one market segment (Schewe & Meredith, 2004). It can therefore be assumed that the subjects who favoured the human interaction during service encounter is an affect from their earlier experiences and what they were used to

during their formative period. The cohort effect can also be seen in relation to previously experiences that deal with what people have been used to in the past. This will have an effect on their attitude towards changes in service practise (Grougiou & Pettigrew, 2011).

Security. All of the employees believed that queues at the security area were exhausting for the elderly segment. Three of the employees also believed the restrictions and regulations could be confusing for them. Even if the findings reported some problems within this area, the general perception from the subjects' point of view is not exclusively negative. Ten of the participant found the security "okay". Five of the participants had a very negative attitude towards the queue system, and five found it difficult keeping up with the restrictions and regulations. Queues are a phenomenon most likely not favoured by anyone. However, if people have some physical impairment it is understandable that it can become exhausting with long queues. In terms of the restrictions and regulations, it can be argued that people who don't travel that much can have problems keeping updated. However, long-term memory is affected by age (Drolet et al., 2010) and it can therefore be assumed that some people may have problems retaining the right information concerning this subject.

It is important to discuss the situation that all the employees believed the security were a negative experience for the elderly segment. The reason for this might be grounded in the phenomenon of stereotypes and ageism. People often perceive the elderly as more fragile than they really are and people have a tendency of considering the elderly segment as homogeneous mass. The core of ageism it is that "they" are different from "us" (Daatland & Solem, 2011). The employees at Securitas recognized that the subjects were less aware of restrictions and regulations, but they did not struggle more than other segments in general. It can therefore be assumed that people, in this case the employees, who do not have a clear insight to this specific situation can have the tendency of stereotyping the elderly segment.

Chairs, Cafés and Stores; Facilities. The airport area has become a place that offers more than just travelling facilities to its customers. It has become a styled and designed "landscape" where the technological meets the modern and aesthetic design. As previously mentioned, there is a constant increase in offers at Stavanger airport and there is an assortment of cafés, stores, TV's and relaxing seating areas that can be utilized by the customers. People have the possibility to consume experiences of comfort and excitement before they travel. The phenomenon can be connected to essence of experiensescape and that the surroundings in our daily life are constantly developing in order to provide customers with better, newer, bigger, more genuine, thrilling and flexible experiences (O'Dell, 2005).

The general impression was that the subjects perceived the offers of facilities at Stavanger airport in a positive manner, and that they had a positive experience before departure. Seventeen of the subjects indicated that the offers were okay, good or improving. It can therefore be assumed that the construction and development undertaken by Avinor has been for the better. However, it must be argued that not all of the participants were pleased with the offering of seating areas, and both employees and subjects stated that this offering was not good enough, especially at the check-in area.

Conclusion

The aim of this study was to investigate whether the elderly segment experiences any difficulties or obstacles in relation to the user interface design at Stavanger airport. The reported findings do indicate that the elderly segment encounters problems in some areas at the airport. The results of the study have been reported and discussed under *Findings* and *Discussion*. The following section will highlight the key findings in order to provide a conclusion.

Stavanger airport has come a long way with implementing the demands of Universal Design. An assortment of arrangements has been developed, and in general it can be

concluded that their construction work will portray the demands of Universal Design and reflect the importance of constructing products applicable for a larger proportion of the community. However, there seems to be a lack of adaption of the automated systems to older adults in terms of considering the generation effect.

The area that appeared to cause the most challenges for the subjects was the process of checking-in at the automated services. The findings reported that a large proportion of the participants experienced problems when interacting with the automated services and it also revealed that it was a situation not favoured by many subjects. This gives an indication that the automated services may not be properly adapted to this segment and further adjustments should be made in order to make the automated services more attractive. Ravndal (Human Resource Director) and Sand (Manager of airport experiences) stated that there were no special arrangements considered for the elderly when designing the automated services (except for people in wheelchairs). The results document that it is highly important to consider the cohort and the generation effect during the design phase in order to increase the independence of the elderly segment in situations like this. In cause of the current situation many subjects may experience uncertainty when utilizing automated services and in the worst case avoid consulting organizations were automated services are pervasive.

To avoid problems that are caused by physical impairments it is possible to supplement the environment with even more cues and guidelines. These arrangements can provide support and safety in a process that otherwise may be perceived as frightening. One possible solution in relation to the automated services could have been automatic voice recorders that gave instructions in relation to the tasks. However, this would not improve the issue that many of the participants' prefer personal interaction and social benefits that occur during service encounter. Assistance is offered to people who are approaching the automated services and this may compensate for the social connection that is lost by utilizing automated

services. Even if people may in general perceive the replacement of automated services over staff in a negative matter, it is a part of the development in the society and all people need to adapt to this situation.

Throughout life, people will at some point experience physical and/or psychical impairments, especially as age progresses. It may therefore be easy to believe that the process of security would show more negative results than the actual findings. The results did indicate some minor problems in terms of the restrictions and regulations, but as there was no indication of any severe problems, it can be concluded that the security process is in general not a severe challenge to the senior segment. However, since the researcher was only able to observe four participants throughout security, it can be argued that the actual problems may be more severe than the reported findings.

All of the participants had a negative attitude towards queues, and many of the subjects stated that it was exhausting and tiring. Furthermore, three of the subjects and three of the employees argued that there should be more seating areas by the check-in as it could be tiring to stand up for a long time during check-in. This is an element that should be taken into consideration by Avinor. As the population is aging, and many people do experiences different types of impairments, it can be expected that the needs and wishes for more seating areas by the check-in area will increase in the future. However, as Stavanger airport is still under construction it can be argued that the offer of seating areas will be enhanced.

The last issue that will be highlighted is the process of interpreting and understanding signs and boards. There seemed to be no general problems for the subjects, and it can therefore be assumed that the offer of signs and boards are good enough. However, the employees' perceptions were different. The significant gap may lie in the fact that the subjects statement were made before they approached specific signs and boards at the departure terminal. The employees, who daily deals with these situations may consequently

have a greater insight into the situation and be more aware of this problem encountered by this segment. Consequently, there should be more signs that are to guide passengers to their final gate and simultaneously, signs that are even more understandable and easier to interpret.

Even if the older segment did encounter several difficulties at the airport, especially in relation to check-in, the results are not entirely conclusive. In general, it seems like this segment is willing and able to adapt to the more complex and challenging airports. However, most of the people who do travel by airplane are in general aware off the more advanced and changing airports. The concern should perhaps be placed on the people who rather choose train or boat as transportation and consequently would experience even more challenges at the airport. The researcher was able to sample a large proportion of participants and it can consequently be assumed that the findings may be generalized to the entire population, but substantiating this would require a more throughout investigating using a larger sample.

If the findings can be generalized to the older population, it can be assumed that it can be representative to people within a similar airport setting such as Stavanger airport. Therefore, it should not be ruled out that a large proportion of the elderly population are faced with challenges when approaching automated services, interpreting signs and boards, and points where the queues are long. It might also be naive to believe that this problem is restricted to the specific area under investigation, as public spaces in general are becoming more complex with enhanced technology and information systems put into operation.

Limitations

Research is an uncertain task that can be influenced by several limitations. This was recognized by the researcher, and the present thesis is influenced by several limitations that can have affected the quality of the project.

The most challenging issue was the limited timeframe and resource for the present thesis. As a result, this caused process intensity and challenged different phases during the

process. Consequently, it could more or less have influenced the whole project, from the theoretical review to documenting the empirical research. It certainly reduced the possibility to sample more subjects during a longer period. Likewise, there are many external and internal elements that can influence a subject's performance, and because of a restricted timeframe the researcher might have overlooked important elements. Finally, developments of new ideas that could have influenced the project in a positive manner could also have been under prioritized.

As mentioned in the method section the researcher's subjectivity towards the phenomenon under investigation is a factor. As the researcher had an insight to the issue, there is a possibility the result might have been influenced by her perception. Similarly, as this was a case undertaken in the researcher's home culture, she had several advantages that were beneficial during the whole research process. Therefore, the subjectivity of the researcher can be perceived as a negative and/or positive attribute within the present thesis.

Further Research

More extensive studies should be completed within this area, as there is a lack of knowledge about this issue. The current thesis shows that this is complex and challenging area.

Because the population is aging and airports (and public areas) are in general becoming more complex and advanced, it is important that there is an enhanced understanding of the real situation. It is possible to picture a framework for further research, as described below.

An ideal approach would have been a study where data collection was done at multiple airports in Norway, different times during a year. As this was a research undertaken in March, it excludes the seniors who travel during the summer and winter season that may be even travelling more rarely (or often!) than those in March!

Experimental research is also an approach that can be utilized to increase the insight to this phenomenon. The elderly segment can randomly be divided into two groups during the check-in process where one group only utilized the automated services and the other group checks-in at the counter with help from employees. This will make it possible to measure and compare the participant's experience, and consequently present more accurate findings than utilizing a non-experimental research. Another possibility within experimental research is dividing younger adults and seniors into two separate groups during check-in. This can make it possible to measure whether there are any significant differences during the specific interaction, and preferences for the automated services between the two segments.

It would also be of interest to increase the selection of subjects and sampled participants who don't travel by airplane in order to see if any of the subjects avoid this type of travelling possibility because of more advanced and complex airports.

Finally, because the findings showed negative results with the use of automated services it would have been fascinating to measure and compare a person's occupation in relation to their use and interaction with automated services.

Practical Recommendations. As a recommendation for Avinor there should be more extensive consumer tests in order to increase the user applicability of the automated systems, signs and boards. As this will make it possible to receive feedback on the facilities, accommodations can be accomplished. This can enhance the customer satisfaction and independence of the customers.

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Appendix

Intervju med passasjerer:

1. Har du forberedt deg på å sjekke inn og levere bagasjen?

   - Hvis personen har sjekket inn på forhånd? - Hvordan var det?
   - Hvis nei, hvor har du tenkt å sjekke inn (skranke/maskin)?

2. Hva synes du om oppmerkningen til skranke og maskiner? I forhold til skilter, tavler.

3. Hvordan foretrekker du prosessen med å sjekke inn å sende bagasje? … automat eller skranke? Og hva synes du evt. Er vanskelig med dette?

   - Hvis person unngår automat; Hvorfor?
   - Går direkte til automat; Hvordan synes du det er å sjekke inn på automat?
   - Har du kjennskap til andre typer automater, og evt. prøvd selvbetjening tidligere? (eks. bensinpumper, butikker osv.)

4. Hvordan er veiledningen/informasjonsflyten i forhold til det å sjekke inn? Er det forståelig?

5. Hvor viktig er det for deg å ha en person å snakke med under innsjekking og bagasjelevering?

Ferdig med innsjekk, opp til sikkerhetskontrollen.

6. Hva synes du om prosessen gjennom sikkerhetskontrollen?

7. Hvordan synes du det er å finne fram til riktig gate? I forhold til skilter, tavler.

8. Hvordan synes du tilbudet av butikker, kafeer og sitteplasser er her på flyplassen

Interview with passengers

1. Have you prepared yourself for checking-in and delivering your luggage?

   - If the person has checked-in in advance; how was it?
   - If the person has not pre checked-in; where will you check-in (machines/counter) and why?

2. How do you perceive the process of finding the way to the right automated service and counter? ..... In relation to signs and boards.

3. How to you prefer to check-in and sending your luggage? Self check-in, bag-drop or counter? And what do you find difficult with this process?

   - If the person avoids the automated services: Why?
   - Goes directly at the automated services: How do you think it is to check-in by the machines?
   - Are you familiar with utilizing similar machines/ automated services? (Online banking, gas pumps, stores etc.)

4. How do you perceive the guidance/information flow in relation to checking-in? Is it understandable?

5. How important is it for you to have a personal interaction during service encounter?

Check-in process is over, next stop is the security

6. How do you perceive the security process?

7. How to you find the process of finding the way to the right gate in relation to signs and boards?

8. How do you perceive the offer of cafés, stores and restaurants at the airport?

Intervju med Else Ravndal and Morten Sand

1. I hvilken grad møter eldre reisende utfordringer ved Stavanger lufthavn som har med aldersbetingede endringer / funksjonsnedsettelse å gjøre?

- Med hva har de eldre eventuelt problem med?
- Spesielt om innsjekk maskiner?

2. Er dette et tema ved lufthavnen?

- Hvis ja – hvordan tenker dere og hva gjør dere i denne sammenhengen
    - Konkrete eksempler/planer / fokus
- Hvis nei – vil dette komme på agendaen i nær fremtid? Hvordan?
    - Konkrete eksempler /planer / fokus

3. Har dere noen strategier for å holde dere oppdatert innenfor dette området?

4. Har dere noen tiltak for å tilpasse deres produkter til ulike segmenter, blant annet de elder?

5. Universalt design handler om å designe produkter, kommunikasjonssystemer og områder generelt som er attraktivt og brukervennlig for en større del av befolkningen. Dette er noe som må bli innfridd innen 2019.

- Hvordan arbeider/kommer dere til å arbeide med dette?

Interview with Else Ravndal and Morten Sand

1. In what degree does the elderly segment encounter challenges at Stavanger airport that is caused by age/impairments?
    - What do they find difficult?
    - Any special obstacles in relation to the automated services?
2. Is this a topic of discussion at the airport?
    - If yes; how do you consider this issue and what are your actions?
        - Prospective plans/focus areas
    - If no; will this be on your agenda in the near future? How?
        - Prospective plans/focus areas
3. Do you have any strategies to keep updated within this field?
4. Do you have any strategies of adapting your services to any segments in the society, for instance the elderly segment?
5. Universal Design concern about designing products, communication systems and general areas that is attractive and usable for a greater proportion of people in the society.
    - Have you started implementing the demands/are you going to start focusing on this area?

Intervju med bakkeansatte

Få de ansatte til å visualisere seg steg for steg om hva de mener kan være en utfordring for det eldre segment.

1. Innsjekk; sjekket inn på forhånd, maskiner, sende bagasje
2. Sikkerhetskontroll.. i forhold til regler og prosedyrer, kø
3. Det å finne fram på flyplassen, skilter og tavler.
4. Sitteplasser, restauranter, butikker og kafeer.

Interview med employees at the Ground Service

Make the employees visualize each process during the time at the airport at what can be perceived as an obstacle or difficulties for the elderly segment.

1. Pre check-in, check-in, automated services, sending luggage
2. Information flow, guidance during check-in
3. Security, restriction and regulations, queues
4. Finding the way at the airport
5. Offers of seats, cafés, stores

Intervju med Securitas

1. Hva er ditt inntrykk av elder i prosessen gjennom sikkerhetskontrollen? I forhold til regler og restriksjoner, kø, aldersbetingede nedsettelser

Interview with Securitas

1. What is your perception of how the elderly segment handles the security process?
    - Restrictions and regulations, queues, impairments due to age.