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Too Old for Future Mobility?

A Qualitative Study of the Digital Inclusion of Elderly People in the Mobility Sector

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ABSTRACT (MAX. 200 WORDS):
Technology has revolutionized various industries, including the mobility sector. While many new mobility services have entered the market, the shift towards a more digitalised environment fostered the digital divide, making various mobility services more accessible for those that are tech-savvy. Especially elderly people however often face significant challenges adapting to new technologies. So far, research focussed intensively on technology adoption by the elderly, resulting in models like Senior Technology Acceptance Model (STAM). The resulting implications for businesses however seem to have been overlooked. This study thus aims at further exploring the challenges mobility companies face when developing products and services for the elderly. For this, existing challenges identified by literature are compared with the empirical findings of this study which resulted from conducting interviews. This study concludes by arguing that the current approaches by research lack a holistic and comprehensive view of the business challenges that occur in this context. A new research model is thus proposed structuring the implications into challenges in product development, product and strategy layers.

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Abbreviations

B2B	Business to Business
CaPs	Citizens as Pilots of Smart Cities
DFKI	Deutsches Forschungszentrum für Künstliche Intelligenz (German Research Center for Artificial Intelligence)
EU	Eurpean Union
EIT	European Institute for Innovation & Technology
FHNW	Fachhochschule Nordwestschweiz (University of Applied Sciences of North-western Switzerland)
ICT	Information and communication technology
IS	Information Systems
MaaS	Mobility-as-a-Service
MSP	Mobility Service Provider
NTNU	Norwegian University of Science and Technology
OECD	Organisation for Economic Co-operation and Development
OADR	Old-age dependency ratio
PTA	Public Transport Authority
STAM	Senior Technology Acceptance Model
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
UITP	International Association of Public Transport
UN	United Nations
UTAUT	Unified Theory of Acceptance and Use of Technology
WAI	Web Accessibility Initiative
WCAG	Web Content Accessibility Guidelines
WHO	World Health Organization
W3C	World Wide Web Consortium

1 Introduction

This chapter gives an introduction to the study. Section 1.1 introduces the background of the topic, followed by the problem area in Section 1.2. The research purpose is explained in Section 1.3, followed by the research question in Section 1.4. The chapter concludes with the delimitations in Section 1.5.

1.1 Background

By 2050, one in six people in the world will be over the age of 65 and thus considered elderly (UN - Department of Economic and Social Affairs, 2019). Population ageing is a global phenomenon with a significant growing trend (UN - Department of Economic and Social Affairs, 2019; UN Economist Network, 2020). While research expects the proportion of elderly people to double until 2050, various business models of today's world seem to often focus more on younger generations than on the growing elderly consumer groups (Renaud & van Biljon, 2010). Especially among information and communication technology (ICT) topics, the inclusion of the elderly has not always played a key role in product development (Mallenius, Rossi & Tuunainen, 2007). Characteristics like 'tech-savvy', 'agile' or 'digital' seem to shape various markets and also the dominating persona especially in the technology world, while the elderly customer base seems to be left behind (Cirella, Bąk, Kozlak, Pawłowska & Borkowski, 2019; Nikou, 2015).

A lack of focus on elderly people in product development and design can lead to the risk of digital exclusion of elderly people (Hanson, 2010; Kim, Gajos, Muller & Grosz 2016). Indeed, many researchers argue that this digital divide is thought to have already turned into a significant 'grey divide' reflecting the striking usage, skill level and valuation differences between younger and older generations (Friemel, 2014; Van Dijk and Hacker, 2003). This divide has been researched in depth in various disciplines ranging from political, economic, social to ICT studies and has provenly resulted in various negative implications especially for the elderly (Friemel, 2014; Nimrod, 2010; Pfeil, Zaphiris & Wilson, 2010; Sourbati, 2009; Vicente and López, 2011).

The urgency of the current digital divide is furthermore that current and also the upcoming generations of elderly will consist mainly of Digital Immigrants that provenly have a different understanding, acceptance and usage profile of IS (Information Systems) technologies than younger generations of Digital Natives (Prensky 2001a; Prensky 2001b). Digital Immigrants are thus even more likely to be excluded from the technology-driven society because compared to Digital Natives they did not grow up with technologies (Friemel, 2014; Seifert, Hofer & Rössel, 2018). The risk of technology exclusion of the elderly is not only a risk for Digital Immigrants but, because of the constant technology development, will also concern next generations of elderly people (Hanson, 2010; Kim et al. 2016).

Therefore, including current and future generations of elderly people more in technologies, seems to be highly important. As a result of the growing digital divide, an EU directive was created in 2021 that further regulates the accessibility of websites and mobile apps of companies in the public sector (Directive 2102, 2021). By June 2021, all public companies in the EU must assure accessibility according to guidelines, which were intentionally created for people with

disabilities but address, according to research, also the needs of elderly people due to ageing (Arch, 2008).

The directive could lead to more inclusion of the elderly in technology, which is highly important as research shows that especially elderly people could often benefit in many different ways from ICT innovations (e.g. Czaja, Boot, Charness, Rogers & Sharit 2018; Guner & Acarturk, 2020; Kakulla, 2020; Seifert, Cotten & Xie, 2021). Here, especially advances in the field of the booming mobility and transportation sector is expected to offer an enormous added value in terms of quality of life and successful ageing to the elderly (Battarra, Zucaro & Tremiterra, 2018; Cirella et al. 2019; Stein, Meurer, Boden & Wulf, 2017). Despite these findings, the mobility field mainly fails to provide an accessible, and inclusive digital solution for urban mobility options aimed to serve the needs of the elderly (Almao & Golpayegani, 2019; Battarra, Zucaro & Tremiterra; 2018; Span, 2019; Stein et al. 2017;).

The mobility sector has seen significant growth with the new technological progress resulting in new business models like car-sharing, e-hailing and on-demand shuttles (Schade, Krail & Kühn, 2014). However, the recent boom of the mobility market is dominated by some of today's biggest companies like Uber and Lyft whose key user groups spread across the age group of 16 to 34-year-olds, while not even one per cent of the key users are considered elderly (Wong, 2020). These statistics show that the advances and innovations in mobility seem to mainly be used by the younger users, while the elderly seem to lag behind despite them being one of the biggest beneficiaries of new mobility trends. So, if the needs are there, and the benefit is proven – why does it seem as if the mobility market has become exclusive with the new future mobility concepts which are all based on smartphone applications?

1.2 Problem Area

Previous research shows that elderly people can benefit in many different ways from today's digital technology. Technology can reduce isolation and loneliness, it can offer help for handling daily tasks and it can support a longer independent life (Guner & Acarturk, 2020; Kakulla, 2020; Seifert, Cotten & Xie, 2021). Access to mobility can be seen as one important factor for a more independent life for the elderly as it can for example help elderly people who cannot drive on their own due to age-related restrictions or who do not own a car due to financial restrictions (Banister & Bowling; Battarra, Zucaro & Tremiterra, 2018; Cirella et al. 2019; Stein et al. 2017). However, new digitised mobility services are often only accessible through mobile applications (Schade, Krail & Kühn, 2014). As research shows that elderly people often think that interacting with a technical device, such as a smartphone, is difficult the access to mobility services can be problematic (Almao & Golpayegani, 2019, Petrovčič, Taipale, Rogelj & Dolničar 2018; Seifert, Hofer & Rössel, 2018).

The current research focuses dominantly on further exploring the needs of the elderly to successfully adopt new technology, while it seems to overlook the business point of view and their approach to inclusion and more accessibility of their services for the elderly (Kim et al. 2016; Seifert, Hofer & Rössel, 2018; Yu-Huei, Ja-Shen & Ming-Chao, 2019). Factors influencing the use and acceptance of technology by elderly people have been heavily researched in the IS sphere resulting in various models like Technology Acceptance Model (TAM) as well as the Senior Technology Acceptance Model (STAM) (Guner & Acarturk, 2020; Renaud & van Biljon, 2008).

There is, however, a lack of research that focuses on how organisations and companies should integrate the needs of the elderly into their digital product development process to facilitate the technology adoption by the elderly (Lee, 2011). Only a few researchers have focused on identifying the implications and challenges of technology adoption of the elderly for practitioners (Lee, 2011; Moschis, 2016; Wang, Redington, Steinmetz & Lindeman, 2010).

Furthermore, research studies have so far strongly focussed on eHealth topics in this context while the mobility or transportation sector has so far not been studied in depth even though various researchers have proven that mobility services directly impact the quality of life of the elderly (Banister & Bowling, 2004; Battarra, Zucaro & Tremiterra, 2018; Stein et al. 2017). So far, research has not yet addressed the reasons behind the missing focus of the mobility services on the rising population group of elderly people and what challenges companies might face when trying to integrate the needs of the elderly. This linkage on the operational side seems however to be an integral part to ensure a comprehensive approach that could bridge the digital divide and thus ensure digital inclusion of the elderly.

1.3 Research Purpose

This thesis further explores how businesses or organisations approach the inclusion and accessibility of their digital products and services for the elderly. The focus is on digital solutions in the mobility sector, which has seen an enormous shift towards more digitised business models. This thesis would thus contribute to the IS community by further assessing the technological mobility landscape for elderly people and by thus helping IS companies in the mobility sector to better integrate the needs of older people in technology development.

The purpose of this study is thus to explore what challenges organisations face when developing digital products or services for elderly people by comparing the identified issues by research with newly conducted empirical findings.

1.4 Research Question

The scientific literature on new digitised mobility services shows a lack of understanding challenges that companies face when integrating the needs of elderly people into their digital products. Therefore, to provide more detailed insights into this topic this research aims to undertake a qualitative study of the digital mobility products to identify the main challenges for companies when trying to digitally include the elderly in their mobility product portfolio. This research, therefore, aims to answer the following research question:

What are the challenges when integrating the needs of elderly people into digital products of the urban mobility sector?

1.5 Delimitation

The scope of this thesis is on companies and organisations in the mobility sector. Other sectors are therefore not included. Moreover, the focus is on a company point of view, which means

that experts in product development and strategy of the mobility sector, as well as research experts in the field of gerontology and technology adoption, are interviewed. Interviews are therefore not held with end-users of the digital mobility solutions of the mobility sector.

The findings are based mainly on the European mobility market as dominantly European mobility companies are interviewed. Therefore, the findings of this study can mainly be applied to the European mobility market while the technological component of the product development may apply to a larger geographical scope.

2 Theoretical Background

To gain a thorough understanding of the challenges organizations may face when integrating elderly people into their digital products, a comprehensive analysis of the focus group of elderly people, their technology adoption and acceptance as well as the mobility sector is conducted. Here, in Section 2.1, a focus is first laid on the societal changes due to population ageing and the key characteristics of the elderly. With the insights gathered, also the theoretical background of relevant ICT topics namely the Technology Acceptance Model (TAM) and the newly derived Senior Technology Acceptance Model (STAM) are further examined and presented in Section 2.2. Section 2.3 concludes with a thorough analysis of the mobility sector with a focus on the role of mobility for the elderly as well as an overview of the new mobility services and business models.

2.1 Exploring the Role of the Elderly

Before further analysing the technical level of the topic at hand, the role of the elderly must be further explored. For this, research on the megatrend of population ageing and its implication are further analysed to then focus on the literature on the current and upcoming generation of the elderly.

2.1.1 The Impact of Population Ageing

The age structure and size of populations are determined by three main factors: fertility, migration and mortality (Grundy & Murphy, 2017). While the world's population has been constant for various centuries, various causes led to improvements of all factors so that a significantly increasing world population resulted (Grundy & Murphy, 2017; UN Economist Network, 2020; WHO, 2015). A trend directly linked to this increase in the total population is the global population ageing (UN, 2019; UN Economist Network, 2020). While in 2019, one in 11 people in the world has been over the age of 65, the ratio will double by 2050 according to a UN study (UN - Department of Economic and Social Affairs, 2019). The growth of elderly people over the age of 80, is predicted to be even more dramatic as it is expected to triple from 2020 to 2050 especially in Asia-Pacific countries (OECD/WHO, 2020). By then, one in six people in the world will be considered elderly and by 2100 it is foreseen that the majority of the world's population will be 65 or older (UN - Department of Economic and Social Affairs, 2019). While this trend is expected to be more pronounced in developing areas of the world, also Europe is expected to see a significant population ageing within the upcoming century (Eurostat, 2021). More precisely, by 2100 more than 30% of Europe's population will be considered elderly, see Figure 1 (Eurostat, 2021).

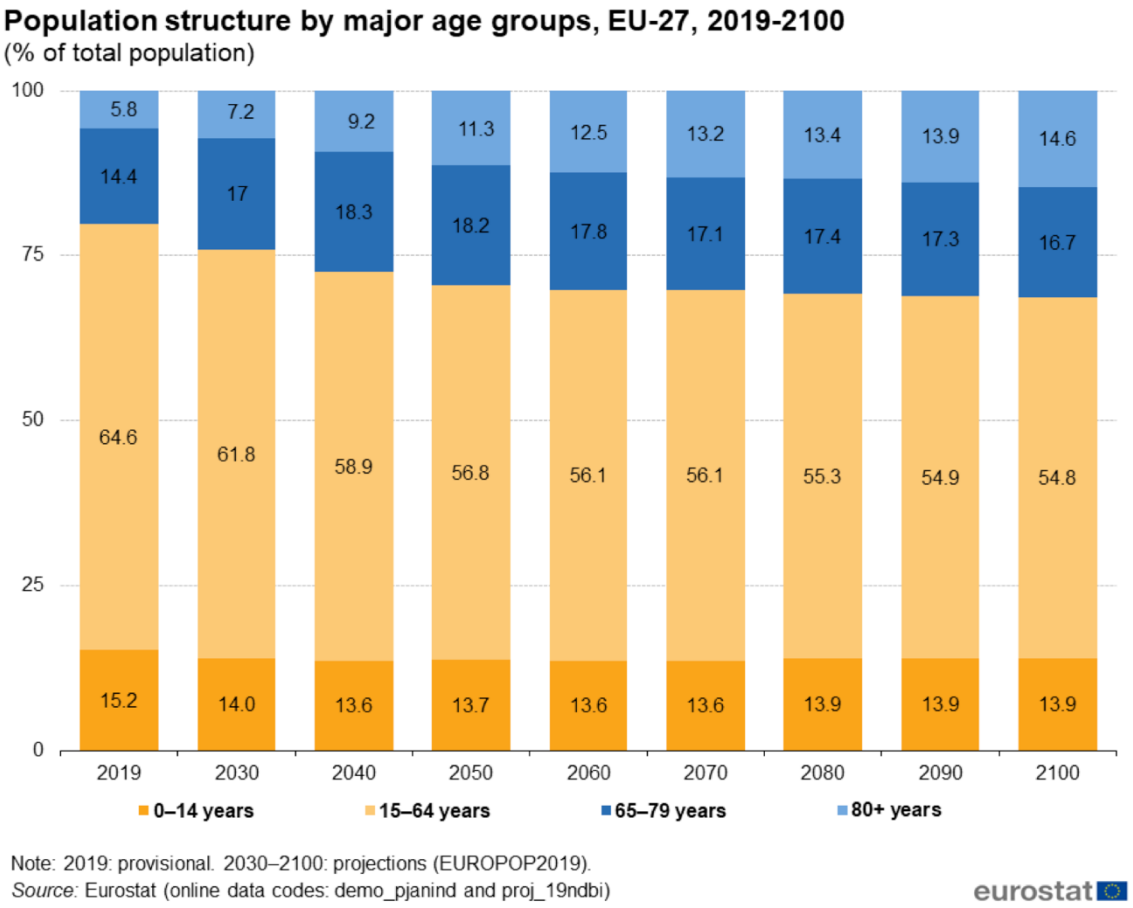


Figure 1 Population Ageing in Europe (Source: Eurostat, 2021)

To assess this phenomenon of population ageing, research uses two different ratios to measure and predict the development of the population (UN Economist Network, 2020). The most commonly used old-age dependency ratio (OADR) is measuring the relation of old people aged 65 or older per 100 persons of working age, which is defined as 20-64 years of age (UN Economist Network, 2020). Another ratio is measuring the dependency ratio of the younger generations by assessing the number of people under the age of 20 relative to the working-age group (UN Economist Network, 2020). Both ratios are expected to predict a significant population ageing meaning that more people will soon be over the age of 65 while also the proportion of the younger population is declining (Grundy & Murphy, 2017; UN - Department of Economic and Social Affairs, 2019; UN Economist Network, 2020). Especially the latter results in a larger dependency of elderly people on the help and support of younger generations that however are decreasing in numbers, which are expected to result in societal and social misfits (Guner & Acarturk, 2020).

Factors for this population ageing are considered to be a successful implementation of public health, significant medical advancements and a global improvement in social and economic development for diseases, injuries and early deaths that have so far limited the time span (Grundy & Murphy, 2017; UN - Department of Economic and Social Affairs, 2019). From a UN perspective, these statistics are thus seen as a "human success story" (UN Economist Network, 2020, p. 3), various other researchers however see with this societal change also upcoming challenges (World Health Organization, 2015).

Overall, these statistics show that population ageing is a global phenomenon with expected significant growth in the near future so that it is seen as one of the four global demographic megatrends next to urbanization, population growth, and international migration (UN Economist Network, 2020).

From a biological perspective, "ageing is a stochastic process that occurs after reproductive maturation and results from the diminishing energy available to maintain molecular fidelity" (Hayflick, 2000, p.267). From a social science perspective, however, research has gotten a more complex approach in defining elderly or ageing by trying to understand different factors and facets that characterize elderly from other elderly, or also from other generations with leading researchers like Prensky (2001a; 2001b) and Howe and Strauss (2000).

2.1.2 The Characteristics of the Current and Upcoming Generations of the Elderly

To further investigate potential challenges as well as the key characteristics of elderly people, the focus group of elderly people must first be further specified. According to the UN, elderly people are understood as all people aged 65 or older (UN Economist Network, 2020). This threshold was mainly set due to economic and social factors like the average retirement age and current life expectancy (Grundy & Murphy, 2017). While these factors are not static and may thus also be changed in the future, this thesis uses the UN's current classification as it is commonly used in research at this stage.

With this definition, the specific current and shortly upcoming dominating generations of elderly people can be further specified and characterized to better understand the needs of the targeted persona group. To clarify the meanings, first, a generation has to be defined. A generation is widely understood as an age group, differentiating people of a certain age within a society (Cambridge Dictionary, 2021). Further, it is understood as a type of subculture reflecting the values and morals that have been developed over a specific period of time (Egri & Ralston, 2004). Generations are thus seen as key to understand a cultural change making it a baseline predicting and indicating which potential values and characteristics a person of a certain age group has (Egri & Ralston, 2004; Howe & Strauss, 1992).

Until circa 2050, elderly people will consist predominantly of the, by Howe and Strauss (1992) defined generations of the Silent Generation (1923-1944), Baby Boomers (1945-1964) and Generation X (1965-1980) before Millennials (1981-1997) will become elderly. These generations have been studied in depth which allows a characterization. These characterizations could be valuable also for this study to better understand the target customer group at hand and to better understand and reflect on the upcoming empirical findings.

Generations at a glance				
Generation	Silent Generation	Baby Boomers	Generation X	Millennials
Years Born	1923-1944	1945-1964	1965-1980	1981-1997
Age in 2021	77-98	57-76	41-56	24-40
Age in 2050	>106	86-105	70-85	53-69
Key Technology	Car	TV	PC	Smartphone
Digital Proficiency	Digital Immigrants			Digital Natives

Figure 2 Generations at a glance (Source: Howe & Strauss (1992); own design)

During the generation of Baby Boomers (1946-1964) various political events like the Vietnam War marches for civil rights and women's movement as well as an increasingly improving economic situation after WWII leading to one of the highest birth rates of the past century directly influenced the upbringing of this generation (Altizer, 2010; Howe & Strauss, 1992; Salkowitz, 2008). Individuals of this generation were often described as having a lack of trust towards authorities while on the other hand valuing social recognition and positions of power (Barbuto & Gottfredson, 2016).

The key political events for Generation X (1965-1979) were a growing economic uncertainty resulting from the Cold War, the start of the global AIDS pandemic and the fall of the Soviet Union (Altizer, 2010). From thorough research, a shift of mindset and work ethics towards higher flexibility and work-life balance instead of a strong hierarchy and focus on power and social recognition has been explored which is already differentiating this generation significantly from the Baby Boomers (Barbuto & Gottfredson, 2016; Salkowitz, 2008).

The term Millennials was first introduced by Howe and Strauss (2000) as the generation of Americans being born between 1980 and 1999. This generation has been impacted by terrorism with the 9/11 attacks as well as the financial crisis while also being born in times of economic and social stability and were raised with a high level of care and attention (Altizer, 2010; Barbuto & Gottfredson, 2016; Salkowitz, 2008). One of the biggest influences however is the rise of the Internet as well as various technological innovations (Altizer, 2010; Howe & Strauss, 2000; Salkowitz, 2008). Millennials are seen as the first true Digital Natives, having been raised with the internet and technology (Howe & Strauss, 2000; Leidner, Koch & Gonzalez, 2010; Salkowitz, 2008).

These short biographies of what research has concluded to be key impacts per generation are seen as highly influential not only on how each generation is characterized but also by how it perceives the world and how it sets values on a personal level (Altizer, 2010; Howe & Strauss, 2000; Salkowitz, 2008). These characteristics may be important to understand the context of intergenerational exchange as in this study in which the situation of the elderly is further analysed.

The term "Digital Native" was first used in research about the declining rates of knowledge among American graduates in 2000 (Prensky, 2001a). It was found out that especially the rise of the Internet and technology played an important role in the learning and thinking behaviour of students of the new generation. In Prensky's (2001a) research, thus differentiated between those that were raised with technology, namely *Digital Natives*, and those that had to adapt at a later stage in life, namely *Digital Immigrants*. From his research, Prensky (2001a; 2001b) found out that each group would react differently to stimuli and that different motivators would be needed to engage individuals of each group. Digital Natives prefer graphics over texts and could be engaged and motivated with direct reward over hard work (Prensky, 2001a). Also, significant for Digital Natives is that technological solutions are on top of their minds, as they are more used to the internet and technologies, whereas Digital Immigrants are more hesitant to directly use technology instantly to solve problems (Prensky, 2001b). The difference between Digital Natives and Digital Immigrants is compared to the process of learning a new language so that the term "Digital Immigrant Accent" (Prensky, 2001a, p.46) was introduced. Next to the different approaches of learning about technology, it was further found out that there is also a difference in processing information between Digital Natives and Digital Immigrants, which directly also influences their capabilities and skills (Prensky, 2001b). Digital Natives have shown to be more capable of multitasking, visual stimulation and filtering of information tasks than Digital Immigrants (Tapscott, 2009).

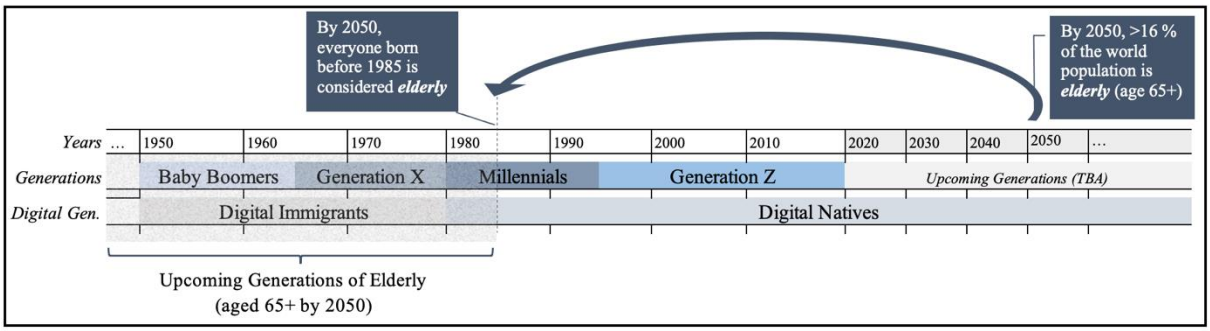


Figure 3 Timeline of the Generations (Source: Prensky (2001a; 2001b); own design)

Prensky's research had an immense impact on various research disciplines including ICT (Egri & Ralston, 2004; Leidner, Koch & Gonzalez, 2010; Tapscott, 2009; Neves & Amaro; 2012). The research showed how different technology is perceived and how technology should integrate the principles accordingly. For the upcoming generations, elderly people will be predominantly Digital Immigrants, while the workforce will consist almost only of Digital Natives. To ensure fair participation in the market, product development, business development and strategy should keep the focus on both, Digital Natives and Immigrants even though they are not represented in the workforce, i.e. in product development in companies.

2.2 ICT Adoption by the Elderly

The following sections focus on ICT adoption by the elderly. Section 2.2.1 first explains what role ICT can play in the life of elderly people. Afterwards, Sections 2.2.2 explains the widely accepted model for technology acceptance and adoption, TAM, followed by the technology acceptance model derived for elderly people, namely STAM in Section 2.2.3.

2.2.1 Elderly People and ICT

In recent years more and more elderly people bought new technologies and the usage statistics among the elderly show a significant increase (Kakulla, 2020). While in 2015, 30% of the American population aged 65+ owned a smartphone (Pew Research Center, 2015), in 2021 this number doubled to 61% (Pew Research Center, 2021). This trend can also be noticed in other countries, e.g. the number of smartphone users in Germany aged 55+ rose from 14% in 2012 to up to 55% in 2017 (O'Dea, 2019), and in 2020 already 82.1% of the German population aged 60-69 used smartphones (Koptyug, 2021). These numbers show a steady market growth, making the elderly potentially an attractive customer segment.

However, many elderly people also think that interacting with a smartphone is difficult (Almao & Golpayegani, 2019). The use of smartphones by the elderly can be affected negatively by different age-related changes, such as visual impairment, changes in motor skills and/or cognitive skills (Petrovčič et al. 2018). Other problems that seniors can face with technology and smartphones can be a lack of experience, a lack of social support or a missing motivation to use digital technology when it is not needed for work (Seifert, Hofer & Rössel, 2018). This means that the elderly often need to put more effort into learning a new technology (Seifert, Hofer & Rössel, 2018). Almao and Golpayegani (2019) and Hanson (2010) say that not enough attention is given to the needs of the ageing society in product design and that there are not enough

websites and apps available that meet their needs. The special needs of elderly people, such as larger UI elements due to visual impairment or simplified menus due to cognitive loss, should be part of UI design processes (Almao & Golpayegani, 2019). Those age-related changes make it important to consider differences between technology for the elderly and younger people. A reason why the differentiation is important specifically regarding Digital Immigrants is named by Seifert, Hofer and Rössel (2018). The authors say that Digital Immigrants are more likely to be excluded from the internet and the technology-driven society as they did not ”grow up with digital technologies and, therefore, [have] not been socialized into using them” (Seifert, Hofer & Rössel, 2018, p.777). But the risk of exclusion from technology that elderly people can face is not just a risk for Digital Immigrants but can also be present for the next generations of elderly people as technology is constantly evolving (Kim et al. 2016; Hanson, 2010).

Furthermore, it is important to overcome the problems that elderly people face with technology as the literature suggests that they can benefit in many different ways from it. For example, ICT can help elderly people to reduce the risk of isolation and loneliness and it can help to integrate elderly people more into society (Czaja et al. 2018; Guner & Acarturk, 2020). Therefore, the elderly often make use of social media apps, such as WhatsApp and Facebook for communication and connection purposes (Guner & Acarturk, 2020). Inclusion through technology became especially important during the ongoing coronavirus pandemic when social participation in society is often enabled digitally (Seifert, Cotten & Xie, 2021). The elderly should limit physical contacts to prevent getting infected but if they do not make use of technology to stay connected, they might face double exclusion, socially and digitally (Seifert, Cotten & Xie, 2021). Moreover, ICT can support elderly people who live on their own to handle daily tasks by themselves, such as accessing online health services and information, doing online shopping or participating in digital social events (Guner & Acarturk, 2020; Seifert, Cotten & Xie, 2021). ICT also offers to reach help in case of an emergency or track their health and therefore, it helps elderly people to live longer independently at home and it can allow them to age in their own homes (Kakulla, 2020).

In this section, it was shown that more and more elderly people own technical devices and that they can benefit in many different ways from them. However, not just owning a device is important. Even more important is the actual use of it. A recent study showed that elderly people often own technical devices but do not take full advantage of them (Kakulla, 2020). The use and acceptance of technology are studied a lot in the IS field so that one of the most accepted theories, the TAM as well as a derived variant for technology acceptance by elderly people, the STAM are explained in the following.

2.2.2 The Technology Acceptance Model

The TAM was originally developed by Fred D. Davis in 1986 and it is based on the theory of reasoned action (TRA) and theory of planned behaviour (TPB) (Davis, 1986). TAM is used to provide a clearer understanding of the technology acceptance of individuals and it is widely cited and accepted (Guner & Acarturk, 2020). According to the model, the acceptance of a technology depends on behavioural intention, which is determined by the attitude an individual has towards using a system and that in turn is influenced by perceived usefulness and perceived ease of use (Guner & Acarturk, 2020). Perceived usefulness is defined by Davis (1986, p.82) as “[t]he degree to which an individual believes that using a particular system would enhance his or her job performance”. Perceived ease of use is “[t]he degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1986, p.82). Perceived ease of use and perceived usefulness determine the acceptance to use a specific

technology, i.e. a person is more likely to adopt a technology if the person believes that it is easy to use and useful (Guner & Acarturk, 2020). Perceived ease of use and perceived usefulness are moreover influenced by external variables, which could be demographic or personal characteristics of the user (Davis, 1986). TAM is illustrated in Figure 4.

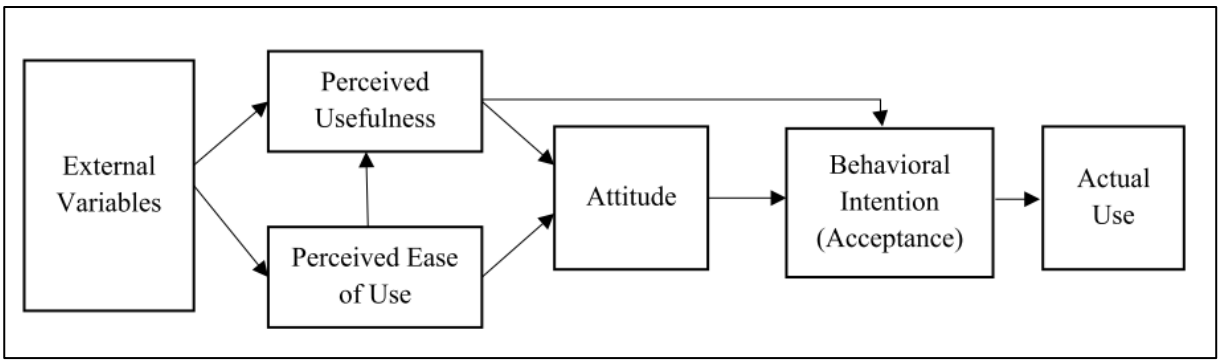


Figure 4 Technology Acceptance Model (Guner & Acarturk, 2020, p.313)

The popularity of TAM led to many follow-up studies that are also based on the initial assumption that perceived usefulness and perceived ease of use influence the acceptance of technology but include various further extensions. The most popular versions of TAM are TAM2, the Unified Theory of Acceptance and Use of Technology (UTAUT), and TAM3 (Guner & Acarturk, 2020). Extensions in TAM versions often include different external factors that influence the two main components of perceived usefulness and perceived ease of use (Kim et al. 2016). For example, UTAUT by Venkatesh, Morris, Davis and Davis (2003) combine elements of eight user acceptance models into one unified model. The model consists of four core determinants to explain user intention and usage behaviour, namely performance expectancy, effort expectancy, social influence and facilitating conditions, and up to four moderators of key relationships, such as age or gender (Venkatesh, Morris, Davis & Davis, 2003). The model is mainly aimed at managers so that they can assess the success of new technology and initiate measures, such as training, especially for those users who tend to be less likely to accept the new technology (Venkatesh et al. 2003).

2.2.3 Senior Technology Acceptance Model

Technology acceptance was studied intensively from many different perspectives so that a variety of technology acceptance model variants were developed in different research papers (Renaud & van Biljon, 2008). While some focussed on further investigating additional factors, others further explored the TAM for specific target groups (Renaud & van Biljon, 2008). As TAM can be applied to different user groups and in different contexts, it was also used to investigate the acceptance of technology by elderly people which resulted in different studies (Guner & Acarturk, 2020). This research focuses further on the three widely accepted studies by Kim et al. (2016), Renaud and van Biljon (2008) and Yu-Huei, Ja-Shen and Ming-Chao (2019). They were published between 2008 and 2019 and their results are based on data coming from qualitative studies by conducting interviews with elderly technology users at that time aged between 50 and 80, i.e. Digital Immigrants. The results of the studies show that there are indeed differences in technology acceptance between younger and older technology users, which led to new variants of TAM, namely STAM.

STAM was first introduced by Renaud and van Biljon (2008) for the adoption and acceptance of mobile technology by elderly people. The model is based on TAM, UTAUT and other models but differs on various levels adapted to their empirical findings. The model, which can be seen in Figure 5, consists of three adoption phases as well as different influencing factors that can impact the acceptance and use of mobile phones by elderly people (Renaud & van Biljon, 2008). Renaud and van Biljon (2008) say that in phase one, which is called *objectification*, it is determined which role the technology will play for the person. They further say that this phase includes the constructs *User Context* that includes social influence and personal factors like age and the construct *Perceived Usefulness*, which both influence the *Intention to use*. Moreover, they explain that the second phase describes how the user is interacting with the technology, the *incorporation phase*. According to the authors, the construct *Experimentation & Exploration* describes the person's first use of the technology, in which the person assesses the ease of use. They also say that *Ease of Learning & Use* result from the perceived ease of use of the TAM and is an essential construct that is only available in STAM because elderly people need to assess how easy it is to learn new technology. Moreover, they explain that the construct *Confirmed usefulness* says if the technology is considered as useful or not. Further, they state that the construct of *Actual use* depends on experimentation and exploration, ease of learning and use as well as *facilitating conditions*, such as the price of technology. In the last phase of their model, they put the acceptance or rejection of technology. The authors call this phase *Non-Conversion*, which differentiates this model from other technology acceptance models that often say that all users will eventually accept technology. STAM on the other hand says that some elderly people tend to never completely accept a technology (Renaud & van Biljon, 2008).

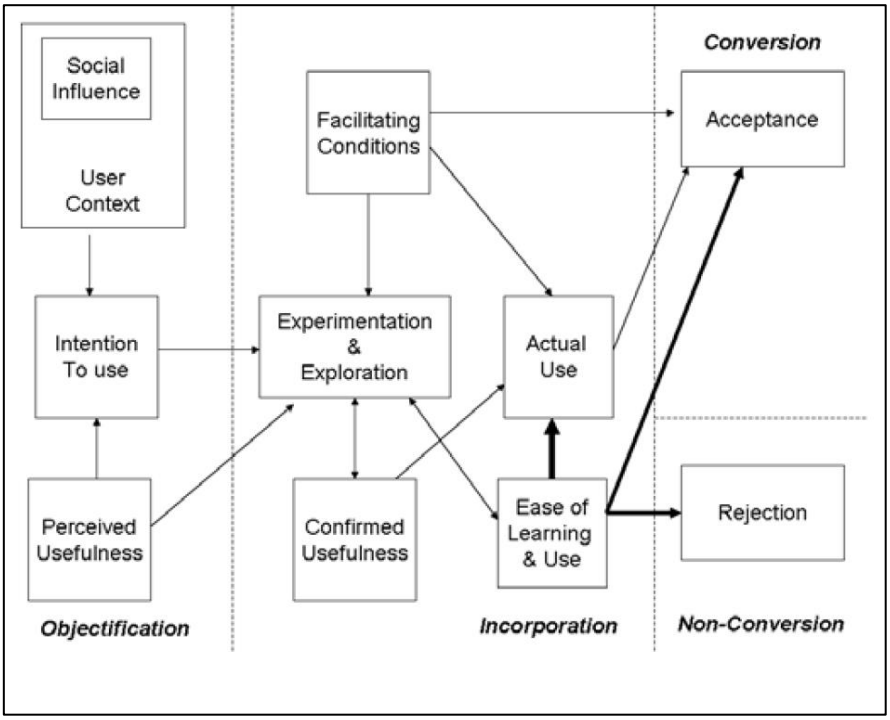


Figure 5 The STAM (Renaud & van Biljon, 2008, p.217)

A variant of STAM was published by Kim et al. (2016). In this study, the authors argue that elderly people often show no interest in learning new technology and that they do not want to put the effort into learning it, regardless of how useful the technology might be for them. The authors, therefore, added another phase to the STAM, which is called *intention to learn* and includes the constructs of *self-efficacy*, *conversion readiness*, and *peer support*. They define self-efficacy as "the degree to which a person believes that she or he will be able to operate a

technology" (p.153). Kim et al. (2016), moreover say that elderly people refuse to learn a technology if they think they are not capable of doing so and that they are often afraid of learning new technology because they think they could embarrass themselves when making mistakes. Conversion-readiness refers to the fact that elderly people often resist learning technologies because they are happy with their way of doing things without the use of technology and are afraid that they might lose skills of doing things by adopting a technology (Kim et al. 2016). Kim et al. (2016) moreover say that it is important whether an elderly person has someone who can provide help and support to learn new technology. The authors, therefore, added the construct of peer support. Thereby "[a] peer refers to a person of similar age, social status, and ability as oneself" (Kim et al. 2016, p.153). Seniors are more likely to learn from peers than from younger people because they have a different way of approaching technology (Kim et al. 2016).

Another follow-up study of STAM is provided by Yu-Huei, Ja-Shen and Ming-Chao (2019). The authors applied the model to test the acceptance of wearable devices by elderly people. They found out that with wearable devices, healthcare and alert functions are the most important aspects for elderly people to use the technology. Moreover, they say that the devices must be practical and efficient instead of fashionable. The authors added two constructs to the original STAM. The first construct is called *Information Source*, which aims to explain in more detail the reasons why an elderly person would accept a technological product (Yu-Huei, Ja-Shen & Ming-Chao, 2019). The second construct is called *Group behaviour*, as elderly people are more motivated to use technology when there is a group dynamic (Yu-Huei, Ja-Shen & Ming-Chao, 2019).

Whereas perceived ease of use and perceived usefulness are the main constructs of the variants of TAM and also STAM, external factors that influence those main constructs and enable the use of technology, differ, especially between younger and older users (Guner & Acarturk, 2020). For example, one external factor that is named in different studies of STAM is that elderly people are more concerned about safety, security, and privacy issues of technology (Hanson, 2010; Peek, Wouters, Van Hoof, Luijkx, Boeije & Vrijhoef, 2014). In a recent study about the smartphone usage behaviour of elderly people, it was again emphasized that this user group is especially concerned about privacy issues online (Kakulla, 2020). Many widely accepted studies of STAM however do not further investigate this topic so that only a few have incorporated a focus on privacy issues.

When comparing the presented STAM with TAM one main difference is the learning aspect. Due to a lack of skills, it can be especially difficult for elderly people to learn and interact with new technology (Kim et al. 2016; Renaud & van Biljon, 2008). This learning aspect can be positively influenced by the support of friends and family, which makes social influence another important aspect of technology acceptance by elderly people (Kim et al. 2016; Renaud & van Biljon, 2008;). Moreover, elderly people have different expectations on the technology functions and design, therefore the design of technology can be seen as another important differentiating aspect that influences technology acceptance for the elderly compared to younger user groups (Yu-Huei, Ja-Shen & Ming-Chao, 2019).

Whereas TAM and STAM focus on the adoption of technology from a user perspective, the focus of this research is on identifying the challenges from a practical point of view. Therefore, the next chapter explains what implications for the development of a technological product, derived from TAM and STAM, have been identified by research.

2.3 Implications and Challenges for Product Development

Existing literature further analyses the implications and challenges of technology adoption of the elderly (TAM and STAM) for practitioners (Lee, 2014; Lee et al. 2013; Moschis, 2016; Wang et al. 2010). While research is dominated by a focus on the needs of the elderly to successfully adopt new technologies, only a few focus on how organisations and companies should integrate their needs into their digital product development process (Lee et al. 2013). In the following sections, the main challenges and implications that have been proposed by research derived from TAM and STAM are presented.

2.3.1 Technology Design

According to STAM, elderly people can have different expectations on the design of technology than younger people and they might have special needs, which should be considered in the design of a technology (Almao & Golpayegani, 2019; Yu-Huei, Ja-Shen & Ming-Chao, 2019). The consideration of these special needs of the elderly in form of accessibility features can be challenging for companies (Lee, 2014). Research experts (Almao & Golpayegani, 2019; Lee, 2014), as well as experts from industry (Arch & Abou-Zahra, 2018), say that design standards and guidelines should be part of the technology design for elderly users as it can help to make technology more accessible and user friendly especially when suffering from limited motor functionalities or cognitive and/or visual skills. Resulting design standards and guidelines were also developed and provided by the industry, such as from the World Wide Web Consortium (W3C) or technology companies, like Apple and Google (Almao & Golpayegani, 2019; Friedman & Bryen, 2007; Morris & Mueller, 2014).

The W3C, the main standards organization for the web, developed the Web Content Accessibility Guidelines (WCAG) (Arch & Abou-Zahra, 2018). Research showed that existing web accessibility standards for people with disabilities from the W3C, called Web Accessibility Initiative (WAI), also address the needs of elderly people with web accessibility due to ageing (Arch, 2008). Therefore, the WCAG guidelines were developed based on the WAI (Arch & Abou-Zahra, 2018). WCAG 2.0 provides advice for designers, managers, and developers on how to make websites and web applications more accessible and easier to use for elderly people (Arch & Abou-Zahra, 2018). WCAG 2.1, an extension of the WCAG 2.0, provides recommendations on how to make web content on desktops, laptops, tablets, and mobile devices more accessible for people with disabilities, such as blindness, deafness, or speech disabilities (Kirkpatrick, O Connor, Campbel & Cooper, 2018). The foundation of web accessibility is provided by four principles, namely perceivable, operable, understandable, and robust (Arch & Abou-Zahra, 2018). *Perceivable* says that the way information is presented must be in a way that users can perceive it and that it addresses issues related to visual impairment, such as text size, text style, and colour (Arch & Abou-Zahra, 2018). *Operable* includes cognitive issues, such as easy enough navigation on interfaces so that users can operate the interface (Arch & Abou-Zahra, 2018). *Understandable* says, e.g., that information on interfaces should only consist of easy sentences and should be free of technical jargon so that it is understandable for the users (Arch & Abou-Zahra, 2018). *Robust* refers to the fact that elderly people might use older equipment or software and content must be compatible with a wide variety of technology (Arch & Abou-Zahra, 2018). The principles are accompanied by 13 guidelines, which provide the basic aims that should be fulfilled to make content more accessible for users with disabilities and those guidelines can be checked by testable success criteria (Kirkpatrick et al. 2018).

Design guidelines for developing accessible apps are also provided by mobile operating systems, such as iOS and Android which have been also discussed partially in research (Friedman & Bryen, 2007; Morris & Mueller, 2014). Apple Inc. (2021a) provides "built-in accessibility features, accessibility APIs, and developer tools" (n.p.) all aimed at app developers to help them to develop apps on iOS that are accessible to people with different kinds of special needs. In Apple's Human Interface Guidelines there are moreover best practices for inclusive design concerning vision disabilities, hearing loss, physical and motor challenges, and literacy and learning challenges (Apple Inc., 2021b). Best practices and guidelines for building accessible apps, especially for people with disabilities, are also provided by Google Inc. for Android developers (Google, 2021). They, for example, say that descriptive texts should be added to user interface elements or that there should be audio as well as visual prompts to supports both people with hearing or visual disabilities (Google, 2021). Moreover, they provide an accessibility scanner app, which makes suggestions to improve an app's accessibility (Google, 2021).

Despite these publicly accessibly frameworks and guidelines, studies further found out that nevertheless, applications show low accessibility features for their users. In a study, Almao and Golpayegani (2019) found that the usability and accessibility needs of elderly people are not integrated enough in the design of mobile apps for smart cities which can be seen as comparable to the topic at hand of this study. They tested different apps in the smart city area and their results say that all apps showed weaknesses in the accessibility guidelines provided by the W3C. The most common missing features were suitable instructions or features for people with visual impairments, such as zooming or resizing of text (Almao & Golpayegani, 2019). The lack of focus on technology development for elderly people is partly addressed by legal foundations. The Directive (EU) 2016/2102, standardization of accessibility laws across the European Union, aims to make websites and mobile applications of companies in the public sector more accessible (Directive 2102, 2021). It regulates the accessibility of mobile apps and websites based on the WCAG (Directive 2102, 2021). According to the directive, all websites of the public sector that are newly created must comply with the WCAG guidelines and all mobile apps of the public sector must be made accessible from June 2021 (Directive 2102, 2021).

2.3.2 Development Process

Directly connected to technology design is the development process of the technology, which is named as challenging for companies by Lee (2014), as different aspects of the development process, especially in the early stages, are essential to successfully integrate the needs of elderly users into the product. A product development process can differ widely from company to company, depending on the company size, industry, product and other factors (Cantamessa & Montagna, 2016). Some typical phases can however be identified, which are found in most product development processes (Cantamessa & Montagna, 2016). Eppinger and Ulrich (2015) defined six phases as the main phases of a product development process, namely planning, concept development, system-level design, detail design, testing and refinement and product ramp-up. Two of the phases can be considered as especially important and challenging for a successful development process of technology for elderly users, the concept development phase, in which user research plays an important role and the testing and refinement phase (Lee, 2014; Schulz, Wahl, Matthews, De Vito Dabbs, Beach & Czaja 2015).

In phase two, the concept development phase, the needs of the target market should be identified and different concepts, which describe the features and functions of the product, should be developed and evaluated (Eppinger & Ulrich, 2015). According to Schulz et al. (2015), integrating

the needs of users into the product development process, i.e. doing user research from the beginning can avoid usability problems. In connection to the elderly, user research should focus specifically on the different factors of technology adoption provided in STAM, such as researching the social influence or personal factors of the user group, researching what factors can influence the perceived usefulness of technology by elderly users, or how the users want to learn to use the technology (Renaud & van Biljon, 2008). Moreover, prototypes should be developed afterwards with the help from the inputs of user research conducted with the end-users (Schulz et al. 2015). Lee (2014) says that identifying the needs of the target group and involving them in the development process is especially important when developing technology for elderly people because their needs and characteristics can differ significantly from those of the technology designers and developers. The challenge of the age difference between product designers who design technology for elderly user groups is further emphasized by Mynatt and Rogers (2001). The authors say that it is hard for younger technology designers or developers to imagine the goals and previous experiences of those users and to know the special needs for the technology they might have. These research perspectives further align with the earlier presented different characteristics of the generations at hand (Altizer, 2010; Howe & Strauss, 2000; Salkowitz, 2008).

Phase five, testing and refinement, should include the testing and evaluation of prototypes of the product, to check whether it meets customer requirements and if the performance and reliability of the product is satisfying (Eppinger & Ulrich, 2015). According to Schulz et al. (2015), for the development of new products for elderly users, it is essential to closely link product development, product testing and evaluations. The inclusion of the end-users in the testing and evaluation phase can optimize the development of technology and can help to avoid usability problems, which can make technology more attractive for elderly users and thus leads to a better acceptance of the technology (Schulz et al. 2015).

Eppinger and Ulrich (2015, p.12) define a product development process as ”the sequence of steps or activities that an enterprise employs to conceive, design, and commercialize a product”. However, more recent practices of product development say that the different phases should not be carried out in a sequential structure but in parallel with overlapping phases as well as iterations (Cantamessa & Montagna, 2016). These characteristics can be found in agile technology development methods, which are also known for a cooperative development style, which means that users and developers should be working closely together all the time (Abrahamsson, Salo, Ronkainen, Warsta, 2017).

2.3.3 Learning, Education and Continuous Support

While technology has proven to be an effective mean to enhance the quality of life for the elderly, appropriate access to training and education is necessary to achieve this benefit (Aula, 2005). A vital factor of the STAM and key difference to the TAM is therefore the “ease of learning & use” as well as the *Conversion-readiness* component (Kim et al. 2016; Renaud & van Biljon, 2008). When introducing the elderly to new technologies, further training and education are necessary to not only understand the functionalities and features but to also fully understand the benefit of the product or service (Aula, 2005). This was found out as researchers concluded that due to psychological, cognitive, physical and perceptual issues resulting from ageing, the general learning process also for new technologies can be more difficult for the elderly resulting in the need for more training, education and support (Dijkstra, Lee, Rogers & Fisk, 2008; Mitzner, Fausset, Boron, Adams, Fletcher & Jensen, 2015). Next to physical and cognitive factors, also low self-efficacy and confidence hinder the learning and adoption

process resulting in negative emotions and connotations when experiencing new technologies (Czaja, Charness, Fisk, Hertzdog, Nair, Rogers & Sharit, 2006; Kim et al. 2016; Leung, Tang, Haddad, Mcgrenere, Graf, & Ingriany, 2012). Research thus suggests that the elderly can benefit strongly from receiving educational support and training, and thus concludes that companies should integrate learning opportunities further into their product portfolio when approaching the elderly (Chen & Chan, 2014; Yoo, 2021). In this context, research further explored effective methods of educational training and concluded that especially slow-paced training sessions (Chen & Chan, 2014; Tenneti, Johnson, Goldenberg, Parker & Huppert, 2012) and in-group training fostering peer-learning (Chen & Chan, 2014; Kim et al. 2016; Tenneti et al. 2012; Yoo, 2021;) or supported individual learning (Leung et al. 2012) proved to be most successful.

This can lead to challenges for digital products as less physical training or support can be ensured on an immediate and constant level (Aula, 2005). User training and educational tutorials are expected to improve an efficient onboarding for full adoption of the technology (Czaja et al. 2006). This training however needs to take into account the cognitive abilities of the elderly to ensure successful onboarding and confidence instead of overpowering (Czaja et al. 2006). Further, not only for the initial onboarding period, continuous support and maintenance are expected to be needed for the elderly to feel safe and confident with the technology (Wang, Redington, Steinmetz & Lindeman, 2010). Here, also informal and social support from peers is expected to increase the success (Kim et al. 2016; Wang et al. 2010)

2.3.4 Societal Perception of Ageing

Technology adoption of the elderly seems to be further dependent on social and emotional factors linked to the public perception of "ageing" (Mynatt & Rogers, 2001). In the STAM, the *user context* with its *social influence* directly impacts the general *intention to use* for a senior to adapt to new technologies (Renaud & van Biljon, 2008). The social dimension is thus expected to have a big impact on the willingness and the actual adoption making it not only highly important for users but also companies and organisations.

The resulting interactions between the elderly and technology are not only affected by individual characteristics or traits but also by social and societal contexts and ties, which are directly influenced by the social perception and definition of ageing and how it is viewed in public (Lee, 2014). The public image of "ageing" is often portrayed with various negatively stereotyped characteristics resulting in a connotation of less attractive attributes to consumers even of higher ages (Moschis, 2016). These negative attitudes are seen as stereotype threats. A stereotype threat is a concern of confirming negative stereotypes targeted to a particular group to which one belongs (Steele, 1997; Steele, Spencer & Aronson, 2002). It was for example found out that the elderly that have been confronted with the negative stereotype of age-related memory decline perform worse at memory tests than others (Chasteen, Bhattacharyya, Horhota, Tam & Hasher, 2005; Hess, Auman, Colcombe, & Rahhal, 2003). Stereotype threats have thus been further identified as a strong hindrance in various cognitive and physical tasks (Lamont, Swift, and Abrams 2015).

Negative stereotypes of ageing have also shown to have a negative effect especially on the *ease of use* dimension of the TAM resulting in hindering the technology adoption and usage for the elderly (Mariano, Marques, Ramos, Gerardo, Lage da Cunha, Girenko, Alexandersson, Stree, Lamanna, Lorenzatto, Mikkelsen, Bundgård-Jørgensen, Rêgo & de Vries, 2021). In detail,

studies have shown that older adults seem to partially underuse technology out of the threat of confirming their age stereotypes (Mariano et al. 2021).

As a result, social and emotional barriers to the adoption of smart technologies have resulted leading to a lower technology adoption even though a potential elderly-friendly product was developed (Lee, 2014). The challenge of organizations is thus to develop a strong product strategy aiming at the right segment with attractive attributes and without stereotypes (Moschis, 2016; Mariano et al. 2021).

2.4 The Urban Mobility Sector

Having analyzed the underlying target group of the elderly as well as the integral technology adoption component of this study, the industry at hand must be further explored. A focus was set on the urban mobility sector as it offers a large potential to increase the quality of life for the elderly while it has also seen a strong digitalization boom, resulting in new business models and new mobility services. The role that cities play for the elderly, as well as the new digitised business models in the mobility sector, are further explored and analysed in the following two sections.

2.4.1 Urbanisation and the Role of Cities for Elderly

Next to the trend of population ageing, Urbanisation has become one of the biggest megatrends of the past decade and is expected to increase further in the future (UN - Department of Economic and Social Affairs Population Division, 2018). While the term *Urbanisation* has emerged to having various definitions, it is widely accepted that it refers to the shift of population from rural to urban areas while the definition of "urban areas" may vary in research and practice (Mcgranahan & Satterthwaite, 2014). Since the second half of the century, this shift has increased dramatically on a global dimension, so that the percentage of the population living in urban areas has increased from 30% to 54% between 1930 to 2014 (Pearlman-Avnion, Goldschmidt & Shamis, 2020). In 2018, one in five people worldwide lived in a city with more than one million inhabitants (UN - Department of Economic and Social Affairs Population Division, 2018). And in 2019, more than half of the global population resided in urban areas with a growing trend especially towards high-dense cities (Ritchie & Roser, 2019). This trend is expected to grow further in the future marking the need for a thoroughly planned urban transition on a global basis (Mcgranahan & Satterthwaite, 2014; UN - Department of Economic and Social Affairs Population Division, 2018). Figure 6 illustrates a forecast of the EU population living in urban areas from 1950 to 2050.

This trend becomes specifically important for this study when also referring to the trend of a growing community of elderly in cities (Ferreira, César, Camargos, Lima-Costa & Proietti, 2010). A growing percentage of the elderly is expected to live in urban areas, representing up to 25% of the urban population until 2050 (WHO, 2007). When looking at the inclusion of the elderly, an urban setting would become highly relevant to further analyse.

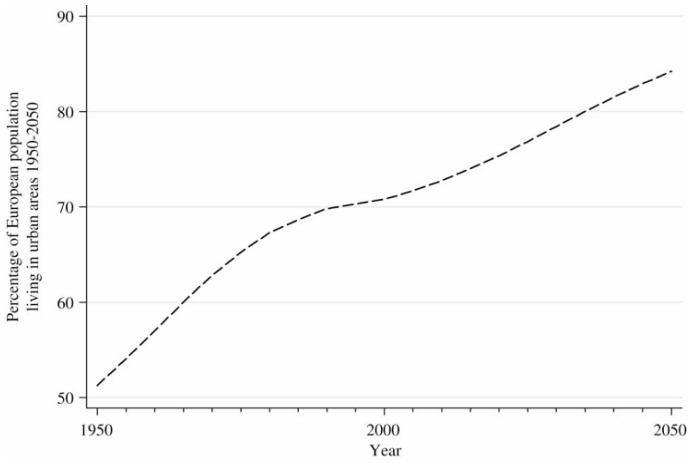
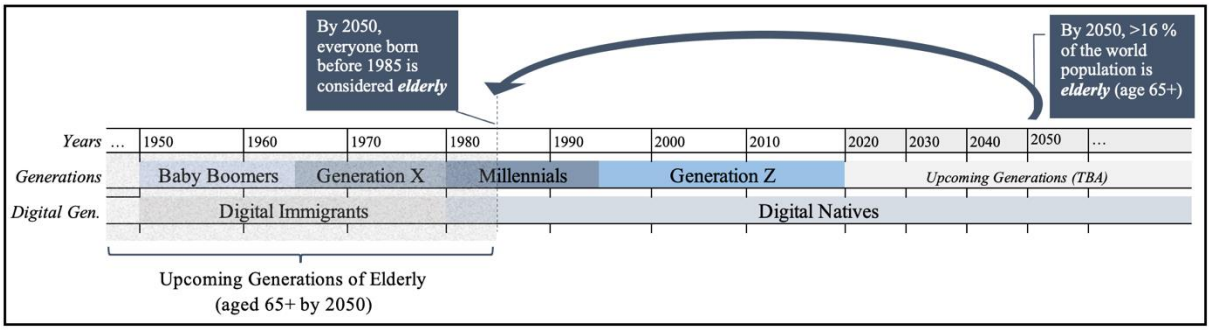


Figure 6 Percentage of EU population living in urban areas, 1950-2050 (forecast) Source: (UN - Department of Economic and Social Affairs Population Division, 2018)

First, however, it must be further investigated why these two trends of population ageing and urbanization seem to have a certain linkage. Research has shown that urban areas can benefit from a *Successful Ageing* (Bread & Petitot, 2010). Successful Ageing is one of the leading theories in social gerontology and was further defined with different sub-terms like Productive Ageing, Healthy Ageing and Active Ageing (Marsillas, De Donder, Kardol, van Regenmortel, Dury, Brosens, Smetcoren, Braña & Varela, 2017; Rowe & Kahn, 1987; 1997). Especially Active Ageing has been adapted largely in research and practice and is today a widely accepted concept as it is constructed to combine a broader range of relevant aspects for a successful ageing process (Foster & Walker, 2013). These aspects include a measurement of the physical, mental and social well-being and as well the contribution and productivity of the elderly within a community (Marsillas et al. 2017). Cities are seen to provide various advantages for the elderly resulting from a positive residential environment which can, with its many features, benefit Successful Ageing (Bread & Petitot, 2010). Those features include a higher level of accessibility, selection and partially also affordability that urban areas offer in comparison to more rural communities (Bread & Petitot, 2010; Fitzpatrick & LaGory, 2003). With these research findings, the link between urbanization and population ageing could be further described.



The growing number of inhabitants in urban areas is resulting in various challenges for cities. Cities have to take into account both megatrends in particular to define relevant and efficient policies which should aim at an increased quality of life for all inhabitants (Battarra, Zucaro & Tremiterra, 2018). Here, specifically, the transportation and mobility sector in urban settings (further referred to as "urban mobility") has seen various challenges with the growing number of inhabitants and new user needs and behaviours like growing intrinsic problems like traffic congestion, noise increase and environmental damages (Barreto, Amaral & Baltazar, 2018; Battarra, Zucaro & Tremiterra, 2018; Schrank, Eisele & Lomax, 2019). As a result, urban mobility

has become a large discussion topic for policymakers, urban planners, and private businesses and is seeing a large shift towards more sustainable, efficient and digital product and service offerings (Battarra, Zucaro & Tremiterra, 2018). For this paper, it is thus necessary to further investigate the urban mobility sector to understand the current environment.

Passenger transportation especially in urban settings is in most cases multi-modal (Schade, Krail & Kühn, 2014). This means that usually a set of different modes of transportation are used to reach a destination, which can include going by bike, bus, private car or by foot. These transportation chains have been researched in detail especially within the concept of a fostered sustainable mobility approach which mainly aims at a modal shift from private cars to alternatives transportation modes (Canzler & Knie, 2016; Schade, Krail & Kühn, 2014). Some cities have successfully started to initiate a modal shift with strategic investments or urban re-plannings having a significant impact on the usage rate of private cars (Freudendal-Pedersen, 2015). As a result, during the past few decades, City Management has seen a strong alteration enabled mainly by digitalization (Barreto, Amaral & Baltazar, 2018). Digital platforms have been created that enable more efficient and effective use of resources and a larger selection of transportation modes for the end-user.

2.4.2 New Digitalized Business Models

Various researchers predict an emerging "true multimodal transport paradigm" (Schade, Krail & Kühn, 2014, p.2) which not only comes from strategic investments made by cities but also from new business models and concepts that have risen with new endeavours in ICT (Barreto, Amaral & Baltazar, 2018). New business models have been mainly developed around the theme of seeing mobility as a service instead of a necessary ownership question which allowed

	Traditional Mobility Solutions	**New Mobility Services**	
Individual-based Mobility	**Private Car Ownership**	**Car Sharing: Peer2Peer**	A peer-to-peer platform where individuals can rent out their private vehicles when they are not in use
	Taxi	**E-hailing**	Process of ordering a car or taxi via on-demand apps. App matches rider with driver and handles payment
	Rental Cars	**Car Sharing: Fleet Operator**	On-demand short-term car rentals with the vehicle owned and managed by a fleet operator
Group-based Mobility	**Car Pooling**	**Shared e-hailing**	Allows riders going in the same direction to share the car, thereby splitting the fare and lowering the cost
	Public Transit	**On-Demand private shuttles**	App and technology enabled shuttle service. Cheaper than a taxi but more convenient than public transit
		Private buses	Shared and WiFi-enabled commuter buses available to the public or to employees of selected companies. Used to free riders from driving to work

Figure 7 Overview of Traditional vs. New Mobility Offerings (Source: Bouton et al. 2015; own design)

technology provider to develop viable business ideas for the sector (Schade, Krail & Kühn, 2014). A resulting new role of the Mobility Service Provider (MSP) has today been established within the market in form of new business models like Car Sharing, e-hailing and on-demand shuttles (Schade, Krail & Kühn, 2014). An overview of the resulting new mobility service, as well as their definition, can be found in Figure 7.

The new mobility offerings are mainly based upon the concept of Mobility-as-a-Service (MaaS) which provides access to transportation services with contracts that customers can sign digitally with specific MSP platforms (Barreto, Amaral & Baltazar, 2018). These business models have thus been enabled by digitalization and provide further technical advancements from traditional non-digital offerings including for example a new approach to route planning, demand predictions and more reliable route information (Gössling, 2018). Access to these services is usually provided by digital applications to the end-user only (Gössling, 2018; Schade, Krail & Kühn, 2014). This has so far led to various discussions in research and practice regarding digital inclusion as these new mobility services are said to have been mainly focused on young and more tech-savvy customer groups, while other customer groups seem to lag behind (Battarra, Zucaro & Tremiterra, 2018; Span, 2019; Stein et al. 2017).

For the elderly, access to mobility is a prerequisite for autonomous living and active ageing and thus for their quality of life (Banister & Bowling, 2004; Battarra, Zucaro & Tremiterra, 2018; Stein et al. 2017). The autonomy and participation in and with mobility for this age group are however challenged by various factors like incapabilities to drive, financial limitations or decreasing social networks (Stein et al. 2017). Various newly developed mobility services like e-hailing and on-demand shuttles have shown various benefits for the elderly and are expected to have the potential to significantly increase their perceived quality of life (Battarra, Zucaro & Tremiterra, 2018; Cirella et al. 2019; Stein et al. 2017).

Overall, the urban mobility sector shows to be an integral part of the quality of life for the elderly making it a potential focus area for accessibility. These mobility services as such should thus show a high level of accessibility and inclusion for the elderly. Current statistics and research however suggest the opposite (Mallenius, Rossi & Tuunainen, 2007; Schade, Krail & Kühn, 2014; Wong, 2020). Indeed, even though the mobility sector seems to be so essential for the elderly, it seems to have missed on digitally including the elderly in their technological progress throughout the past years. This dilemma should thus be further explored to better understand the reasons for MSPs to not further include the elderly.

2.5 Thematic Overview

Based on the presented literature review, a thematic overview is derived, which can be viewed as guidance for the theoretical part of the thesis as well as a summary of the conducted literature review of existing research. Moreover, the thematic overview is taken as a basis for building the interview guide. The following table summarizes the key messages of each sub-theme, which are derived from the four main topics (themes) of this thesis: elderly people, ICT adoption by the elderly, implications and challenges for product development, and the urban mobility sector. The thematic overview is illustrated in the following table.

Table 1: Thematic Overview

Sub-Theme	Key Message	Supporting Literature
Theme: Elderly People		
Population Ageing	- The share of elderly among the European population is rapidly increasing - Higher dependency of elderly on younger generations	Grundy & Murphy (2017) Guner & Acarturk (2020) UN Economist Network (2020) WHO, (2015) OECD/WHO (2020) UN - Department of Economic and Social Affairs (2019)
Generations and their Characteristics	- Generational differences in characteristics and values between Baby Boomer, Generation X and Millennials - Digital Natives vs. Digital Immigrants often show different understanding and skill level when it comes to technology	Howe & Strauss (2000) Egri & Ralston (2004) Howe & Strauss (1992) Altizer (2010) Salkowitz (2008) Leidner, Koch & Gonzalez (2010) Prensky (2001a; 2001b) Tapscott (2009) Neves & Amaro (2012)
Theme: ICT Adoption by the Elderly		
ICT Benefits for Elderly	- Reduction of isolation and loneliness - Better integration into society - Live longer independently at home	Czaja et al. (2018) Guner and Acarturk (2020) Kakulla (2020)

Technology Acceptance by the Elderly	- Main constructs of TAM also part of STAM:
	  o perceived usefulness
	  o perceived ease of use
	- Other important constructs of STAM:
	  o Learning
	  o Support
	  o Design
	  o Security and privacy
		Renaud & van Biljon (2008)
		Kim et al. (2016)
		Yu-Huei, Ja-Shen and Ming-Chao (2019)

Theme: Implications and Challenges for Product Development		
Technology Design	Accessibility features: - Special needs of elderly users due to limited motor function,	Arch & Abou-Zahra (2018) Almao & Golpayegani

	cognitive and/or visual skills can be a challenge in technology design Guidelines: - Design standards and guidelines should be part of the technology design for elderly users - WCAG design guidelines for elderly users are based on guidelines for people with disabilities - European mobility companies in the public sector are soon forced to apply WCAG guidelines due to legal foundations	(2019) Directive 2102 (2021) Lee (2014) Lee et al. (2013)
Development Process	User research and testing: - Concept development phase with user research and testing phase especially important in the development process of products for elderly users Product development team: - Age difference between young development teams and elderly target groups can be challenging Product development style: - Agile technology development methods more focused on cooperative development between developers and users	Eppinger and Ulrich (2015) Lee (2014) Schulz et al. (2015) Mynatt and Rogers (2001) Cantamessa and Montagna (2016) Abrahamsson et al. (2017) Seifert, Hofer & Rössel (2018)
Learning, Education and Support	- Directly influences the *ease of use* component of the STAM - Elderly people need more training & education to adopt new technologies - Initial training and continuous support are relevant	Aula (2005) Mitzner et al. (2008) Fletcher & Jensen (2015) Czaja et al. (2006) Leung et al. (2012) Chen & Chan (2014) Yoo (2021) Wang et al. (2010) Tenneti et al. (2012) Seifert, Hofer & Rössel (2018)

Societal Perception of Ageing	- The social influence directly impacts the *intention to use* in the STAM - Stereotype of ageing often holds negative attributes - Stereotype threats could lead to lower technology adoption	Mynatt & Rogers (2001) Lee (2014) Moschis (2016) Chasteen et al. (2005) Hess et al. (2003) Lamont, Swift & Abrams (2015) Mariano et al. (2021)
Theme: The Urban Mobility Sector		
Urbanisation and the role of Cities for Elderly	- Cities are growing constantly and are expected to grow further in the future - More elderly people are expected to move to cities - Cities are expected to provide a good basis for "Successful Ageing"	UN - Department of Economic and Social Affairs Population Division (2018) Mcgranahan & Satterthwaite (2014) Pearlman-Avnion, Goldschmidt & Shamis (2020) Ritchie & Roser (2019) WHO (2007) Bread & Petitot (2010) Marsillas et al. (2017) Battarra, Zucaro & Tremiterra (2018) Barreto, Amaral & Baltazar, (2018)
New Business Models in Mobility and the role of Mobility to the Elderly	- Mobility provenly has a direct positive influence on the quality of life for the elderly - ICT as backbone of new mobility services - new mobility services are expected to be highly beneficial to the elderly - Access mainly through digital platform or application	Schade, Krail & Kühn (2014) Freudendal-Pedersen (2015) Canzler & Knie (2016) Barreto, Amaral & Baltazar (2018) ben Letaifa (2015) Caragliu, del Bo & Nijkamp (2011) Gössling (2018) Span (2019) Banister & Bowling (2004) Stein et al. (2017) Cirella et al. (2019)

3 Methodology

This chapter presents the used methodology for the conducted research. Section 3.1 explains the research strategy together with the reasons why it was chosen. In Section 3.2, the data collection method is elaborated, which includes the literature review, the interviews and interview guide, as well as the selection of the respondents. Afterwards in Section 3.3., the data analysis is described, followed by the ethical considerations in Section 3.4 and the scientific quality in Section 3.5.

3.1 Research Strategy

According to Recker (2013), the choice of the right research strategy depends on the type of research question. The research question "*What are the challenges when integrating the needs of elderly people into digital products of the urban mobility sector?"* leads to the choice of a qualitative research methodology. To answer the research question a literature review identifies existing challenges according to academic literature. The literature review shows that existing studies mainly focus on the challenges of technology adoption by the elderly, while challenges that companies can face when integrating the needs of elderly users into their technologies is rather lacking. According to Bhattacherjee (2012) and Recker (2013), qualitative research methodologies are most suitable for research phenomena that have not been fully explored and thus have not been researched thoroughly. This seems to be the case as only a little literature has been developed for the topic at hand. A qualitative research approach moreover helps to provide rich knowledge and insights into the experiences and opinions of people and helps to explore why people make certain decisions and act the way they do (Patton, 2015; Recker, 2013). This study aims to get detailed insights from experts working in the mobility sector as well as research specialists in the field of gerontology and technology adoption on the presented topic to derive further challenges from their experience. Furthermore, the study aims to get a comprehensive view of challenges that companies in the mobility sector can face regarding the topic of technology adoption by elderly users. According to Saunders, Lewis and Thornhill (2009), qualitative methods are most suitable when the aim is to get deep insights into a topic.

The qualitative research approach is moreover seen from an interpretive perspective as Saunders, Lewis and Thornhill (2009) explain that interpretivism is most appropriate for qualitative research as it is used to help understand different perceptions and evaluations. They moreover say that this form of research helps to develop new, in-depth understandings of different contexts and their perspectives. Furthermore, interpretivism as a research philosophy is best suited to study a phenomenon with a deductive approach and a recognized theory behind the study because it enables a strong comprehension of the collected data (Saunders, Lewis & Thornhill, 2009). In this study deductive reasoning is thus applied to identify theoretical concepts to the observed data, which fits well with the interpretive approach (Bhattacherjee, 2012; Recker, 2013).

3.2 Data Collection Method

3.2.1 Literature Review

To investigate the presented topic, a thorough literature review was conducted. According to Recker (2013), a literature review is important to get insights into a specific topic, to find existing theories related to the topic and to determine the best suitable methodology for the topic. The main related topics and theories were identified according to the underlying research question and then examined in detail. Identified topics included population ageing and characteristics of current and upcoming generations of elderly people. For population ageing, mostly official statistical sources were used paired with more academic journals as well. Moreover, the topic of technology adoption by elderly people was explored, by identifying benefits and problems that elderly people can face with technology. TAM and STAM were identified as the relevant existing theories for this study and were therefore further investigated. The models focus mainly on technology adoption from a user point of view. Some researchers however also derive implications and challenges of technology adoption for companies from STAM and TAM. The existing challenges are part of the literature review as they represent the theoretical foundation for the practical part of this study. As this study further focuses on companies and organisations in the mobility sector, insights into the current mobility sector are given to demonstrate current business models, trends, and services.

Following Bhattacherjee (2012), the literature review was conducted with a combined keyword search in online search engines, more specifically in the LUBSearch, by Lund University and Google Scholar. The combination of search terms led to queries and some of them are listed in the following :

- (”Elderly people” OR ”older people” OR ”senior citizen”) AND (”urban mobility”)
- (”Elderly people” OR ”older people” OR ”senior citizen”) AND (”technology acceptance”)
- (”Elderly people” OR ”older people” OR ”senior citizen”) AND (”mobility innovation”)
- ”MaaS”
- ”Senior technology acceptance model”
- (”Elderly people”) AND (”ICT” OR ”technology”)
- ”Digital product development”

After conducting the literature review, a thematic overview is built to summarize the key findings of the identified topics and to provide guidance in answering the underlying research question.

3.2.2 Interviews

Interviews can have a high impact on qualitative research so that they are considered one of the most common techniques used for this research strategy (Bhattacherjee, 2012; Recker, 2013). Interviews are moreover suitable to provide deep insights into a topic as well as to determine links between concepts and real-life settings (Recker, 2013). Both aspects are aimed to achieve in this study and therefore interviews are seen as the appropriate data collection technique.

However, interviews can also be connected to certain risks and disadvantages, which need to be considered. According to Recker (2013), interviews can lead to reflexivity, which means that interviewees can be focused too much on what they think the interviewer wants to hear. It can also lead to unsatisfying responses due to poorly prepared questions (Recker, 2013). To avoid those risks a well-structured set of interview questions was prepared, which were of a neutral and unbiased nature. During an interview, no judgements were included and comments were decreased to a minimum. Another risk of interviews is that it can lead to inaccuracy of what was said or meant to be said (Recker, 2013). The interviews were, therefore, recorded and afterwards transcribed in detail. All respondents were offered to proofread the developed transcripts to further ensure the accuracy of the information.

The interviews intended to find out why companies in the mobility sector seem to not focus on the rising population group of elderly people and what challenges they face when trying to integrate the needs of the elderly. To reach this aim it was intended to create a more personal interview setting, to make the interviewees feel more comfortable so that they are more likely to add personal opinions and experiences and elaborate on them. Furthermore, this was especially important as a variety of organisations as well as views were among the respondents. While some targeted the elderly specifically, others also did not. It was thus highly important to create an environment throughout the entire connection to the respondents that did not allow any judgment or criticism. Furthermore, also a semi-structured interview approach was chosen, as with this approach a more conversational focus can be achieved (Recker, 2013). Also, interviewees have shown in previous studies that with semi-structured interviews interviewees are more likely to discuss sensitive topics and to give more open answers (Recker, 2013). Moreover, a semi-structured interview guide allowed that different questions could be asked in response to what the interviewee said, which provided flexibility during the interview (Myers and Newman, 2007).

The interviews are structured by following the four key steps presented by Myers and Newman (2007). This includes the opening, the introduction, the key questions and the closing. This structure provides the researchers general guidance but still allows a high level of flexibility. According to Myers and Newman (2007), the introduction of all participants is part of the opening, while the purpose of the interview is explained in the next step, the introduction. This structure is also followed during the interviews. The key questions are part of the interview guide, which is presented in the next section. In the closing, permission for contacting the person in case of needed clarification is asked and it can be asked if the respondent knows another expert in the field that could be interviewed (Myers & Newman, 2007).

Due to the ongoing coronavirus pandemic, all interviews were conducted virtually on Zoom. The interviews were preferably held in English, however, as some interviewees spoke German as their main language, some interviews were held in German to not decrease the quality of the interview due to language problems. Those interviews were later translated into English on the website ”deepl.com/translator”. The translations of the key phrases of the interviews, which were also cited in this study were double-checked by both researchers to ensure that no information gets lost and to reduce the risk of misinterpretation during the translation process. A summary of all conducted interviews can be found in Table 2.

Table 2: Summary of Interviews

Interview ID	Date	Language	Length	Appendix
I-1	April 28th 2021	English	53 min	Appendix 1
I-2	April 28th 2021	English	55 min	Appendix 2
I-3	April 28th 2021	German	48 min	Appendix 3
I-4	May 3rd 2021	English	48 min	Appendix 4
I-5	May 3rd 2021	English	55 min	Appendix 5
I-6	May 6th 2021	German	71 min	Appendix 6
I-7	May 7th 2021	German	59 min	Appendix 7

3.2.3 Interview Guide

An interview guide should be constructed by including questions that help to answer the research question without being too specific (Bell, Bryman & Harley, 2018). The interview guide, which can be seen in Table 3, is therefore based on the thematic overview which is developed according to the underlying theory (see Section 2.5). The key questions in the interview guide are categorized based on the presented themes. Consistency between the thematic overview and the interview guide makes sure that the interview questions are all aimed at achieving the main goal of answering the research question.

As the interview approach is semi-structured, the used interview guide does not include every question that is asked during the interview but only the key questions, which leaves room to react and adjust to each respondent but still helps to prepare for the interview and to achieve consistency among different interviews. The introductory questions are aimed at better understanding the background of the interviewees and their role. This is followed by the key questions, which are structured according to the thematic overview. The structure of the themes in the interview guide is, however, slightly different to the structure of the themes in the thematic overview. Both start with the theme of *elderly people.* The interview guide then continues with the topic of *the urban mobility sector* and the last theme combines the previous two themes and adds the topic of ICT, which results in the theme of *digital inclusion of the elderly in the urban mobility sector*. While all themes from the thematic overview are included in this structure, the structure of the interview guide allows to slowly build up to the topic and to ask the most detailed questions towards the end of the interview. The interview guide was sent to all interviewees before the interview to further introduce them to the topic at hand and to the questions that might be asked during the interview. Interviewees were however informed that the interviews are semi-structured and that they do not need to prepare anything.

Table 3: Interview Guide

Theme	Key Question	Interview Questions
Opening Introduction of researchers and consent check		
Introduction		• Please introduce yourself with your name and role/position • Shortly explain your project/company/area of research
Elderly People	Is there a focus on the inclusion of the elderly in your company?	• Are you aware of current megatrends (e.g. Population Ageing & Urbanisation)? Are you discussing these topics in your company/in your area of research? • Are elderly people considered in your current customer group?
The Urban Mobility Sector	How ready is the urban mobility sector for the elderly?	• What potentials do you see in the mobility market for elderly people? • What challenges do you see in the mobility market for elderly people? • How do you see their needs currently covered by the mobility product landscape?
Digital Inclusion of Elderly in the Urban Mobility Sector	Is the app age-friendly? Are the needs of the elderly part of the product development process?	Specific questions for mobility experts: • Do you consider your solution/app as elderly-friendly? Explain your answer. • How have your app or features of your app changed to become more accessible? • Is an elderly person included in your group of Personas? If yes, what are the identified characteristics? And, how did you research it? • How is your product development team structured? • Do you use accessibility guidelines or frameworks for your app development? • Do you test the usability with old people? • Do you promote your app differently for elderly people? Specific questions for research experts: • How important should “age-friendliness” be in the digital mobility sector?

		• Would you consider the current digital mobility product landscape as "age-friendly"? Please explain your answer. • Do you see a current gap between research & practice for this field?
Closing Potential further comments of interviewee		

3.2.4 Selecting Respondents

According to Recker (2013), in qualitative research, it is especially important to select the respondents according to their knowledge and experience connected to the research topic, instead of selecting them randomly. Therefore, a detailed stakeholder analysis was needed to identify and understand the key stakeholders.

Key stakeholders of this thesis were identified as experts of different companies from the urban mobility sector as well as research experts in the field of gerontology and technology adoption. To identify companies that are relevant for the research topic, the mobility sector was first subdivided into different segments and then different companies were identified for each segment. Segments included: public transportation, ride-hailing, bike-sharing, eScooter, carsharing, MaaS, on-demand transportation and research. The selection of companies was based on either popular companies in the mobility sector or companies that are known personally by the researchers. Moreover, a collaboration with the EU initiative EIT Urban Mobility Innovation Hub North was used to benefit from high profile contacts. Potential respondents within the companies were identified over the social networking service LinkedIn by going through the employee list of each identified company. It was specifically searched for employees with job descriptions that are product- or research-related. Product specialists can deliver important information about the digital product from a business point of view, whereas researchers in the field can share their expertise and experience of the topic. Job descriptions of respondents could be the following: product owner, director of product, research associate, mobility researcher, user researcher, or head of research. A lot of different experts were contacted; however, many did not reply. Therefore, not all identified segments in the mobility sector could be covered. However, nine respondents of different areas of expertise agreed on an interview and a total of seven interviews were held. As the respondents are from different segments of the mobility sector they can deliver a diverse overview and the number of interviews is therefore considered sufficient for this research. A summary of all respondents, including their role, their company, as well as the segment and country, can be found in Table 4.

Table 4: List of Respondents

Interview ID	Respondent	Role	Company	Segment	Country
I-1	Aleksander Bjorøy (R1)	Project Manager	Skyss	Public transportation	Norway

I-1	Bjørn Klimek (R2)	Innovation and Business Development Consultant	Multiconsult	Public transportation and research	Germany
I-2	Laurie Orlov (R3)	Industry analyst and thought leader/research about ageing-related technologies	Aging and Health Technology Watch	Research	USA
I-3	R4	Product Manager	Large scale European MaaS company	MaaS	Germany
I-4	Dave Collins (R5)	Researcher Smart City Engagement	NTNU	Research	Norway
I-5	Arne Nys (R6)	Lead Product Manager	door2door GmbH	On-demand transportation	Belgium
I-6	Jan Alexandersson (R7)	Project Lead mobisaar	DFKI	Public transportation	Sweden
I-6	Moritz Wolf (R8)	Lead Developer mobisaar	DFKI	Public transportation	Germany
I-7	Alexander Seifert (R9)	Professor Gerontology – Focus on Elderly & Technology	FHNW	Research	Switzerland

The respondents provide the data from which the empirical findings of this qualitative study are derived. It is thus important to further examine the respective profiles per respondent to fully understand the background and expertise which is necessary to analyse and derive the information from their interviews. In the following, a description of all respondents is given based on the introduction of the respondents during the interviews, which can be found in the appendix.

R1 - Aleksander Bjorøy

Aleksander Bjorøy works as a project manager at Skyss, a public transportation company in Bergen, Norway. He is a specialist in on-demand transport systems and was the project manager of different on-demand projects. His projects for example focused on creating better access to

public transport to customers who cannot use the regular fixed routes and a focus was also set on elderly customer groups. With his expertise in public transportation, on-demand transport as well as experience in projects considering the topic of inclusion of elderly people he delivered valuable insights for this research.

R2 - Bjørn Klimek

Bjørn Klimek has a research background in the transport field. At the moment he works at a consultancy firm in Oslo, Norway, called Multiconsult. His main focus is on innovation and business development in mobility with a focus on pilot projects. Currently, he works together with Aleksander Bjorøy for Skyss in the so-called *MUST Mobility Network*, where they work on pilots for smarter transport. Withing the MUST Mobility Network there is an ongoing innovation competition to develop an ordering solution for transport that is user-friendly and adapted to elderly and non-digital people. He was interviewed together with Aleksander Bjorøy as they both work together on this innovation competition.

R3 - Laurie Orlov

Laurie Orlov is an industry analyst and researcher about ageing-related technologies from Florida, the U.S. She does market research, writes blogs and reports that provide thought leadership, analysis and guidance about health and ageing-related technologies and services that enable the elderly to sustain and improve their quality of life. She has a lot of experience with companies as she worked for many years in the technology industry before. Moreover, she advises large organizations and non-profit companies about trends and opportunities in the age-related technology market. She is the founder of the market research company Aging and Health Technology Watch.

R4

The fourth respondent wished to stay anonymous and is therefore referred to as R4. This person works as a product manager for a large scale European MaaS company. R4 is very experienced in the mobility area, as R4 has worked for different mobility companies already. Especially the experience from working in a MaaS company is very helpful for this research, as MaaS is one of the newer business models in the mobility area and it was covered by interviewing R4.

R5 - Dave Collins

Dave Collins has worked for seven years at the Norwegian University of Science and Technology (NTNU). At the moment he works for a smart city project, which is called Citizens as Pilots of Smart Cities (CaPs). Within this project, the aim is to make sure that all demographics are equally participating in the development of their city and services provided within the cities. The focus of inclusion should not just be on young people but the project aims to also get in touch with people who are less technologically engaged, such as the elderly. Interviewing an expert from a smart city perspective was of high importance for this research as smart cities represent the new and digitised business models in urban areas in which mobility also plays an important part.

R6 – Arne Nys

Arne Nys works as the lead product manager at door2door, which is an on-demand ride pooling software and services company based in Berlin. Door2door offers its products and services to mostly public transport organizations in Germany. Door2door is considered a very interesting

company for this research as on-demand transport is one of the newer business models of the mobility sector. In his role as the lead product manager, Arne Nys is responsible for building the door2door passenger app, which the passengers use to book rides and he, therefore, delivered valuable insight into the door2door's digital product development process.

R7 - Jan Alexandersson

Jan Alexandersson works at the German Research Center for Artificial Intelligence (DFKI – Deutsches Forschungszentrum für Künstliche Intelligenz) and was the project lead of *mobisaar– mobility for all*, a project which aims to make the use of public transportation easier for people with mobility constraints. The project started in the German state Saarland already more than ten years ago with an interdisciplinary team of sociologists, computer scientists, and public transport operators. At that time it was called *Movia*, which was first launched in the German city Saarbrücken, a city in the state Saarland. The project was extended to the whole of Saarland after the team won an innovation competition. Today, the mobisaar project includes 15 different public transportation companies. As Jan Alexandersson was part of the project from the beginning he provided very helpful information about the project, the collaboration with different stakeholders and what factors influenced a successful project outcome.

R8 - Moritz Wolf

Moritz Wolf also works at DFKI. He was the lead developer for the project mobisaar. The project aims to make the use of public transportation easier for people with limited mobility. Therefore passengers can book so-called mobility guides who help them getting on and of a bus or a train. Mobility guides can be book over an app, a hotline or a website. Moritz Wolf is the key developer for the mobisaar app. Therefore, he worked in close contact with end customers and provided valuable insights into the development process of the app. As he worked together on the project with Jan Alexandersson, they were interviewed together.

F9 - Alexander Seifert

Alexander Seifert is a professor in gerontology with a focus on the elderly and technology. He works at the University of Applied Sciences of Northwestern Switzerland (FHNW – Fachhochschule Nordwestschweiz). He has been specialized in the field of gerontology, i.e. the research on ageing for many years now. His research includes the role of digitalisation in the everyday lives of the elderly, how elderly people use the internet and what the reasons and barriers are for the elderly for not using technologies, like smartphones, tablets or the internet in general. Moreover, he researches how technological products can be developed better and together with people. Therefore, he delivered important information for this research.

3.3 Data Analysis

For answering the underlying research question, the collected data of the conducted interviews were thoroughly analysed and interpreted. This step was crucial to find and understand the relevant data and to make sense of it (Patton, 2015). Therefore, the interviews were first transcribed in detail. Transcription was done with the help of the app "Otter.ai", which offers immediate speech to text transcriptions. As the service is only offered for English transcriptions another tool was needed for the interviews that were held in German. For those interviews, the

transcription function of "Word online" was used. Transcribing the semi-structured interviews led to a huge amount of data, which made a manual analysis and comparison challenging. Therefore, coding was taken as a data analysis technique to analyse and interpret the interviews. According to Recker (2013, p.92) coding is "the most commonly employed, popular, and vastly useful technique for reducing qualitative data to meaningful information". When coding is used as an analysis technique parts of the text are connected to a code, which stands for a reference of a thematic idea (Gibbs, 2007). Similar coded text among different interviews can afterwards be compared to see how it varies through the different interviews (Gibbs, 2007).

Research differentiates between inductive and deductive coding (Mai & Steffen, 2019). The latter is based on pre-defined codes that are important according to the literature review and can therefore also be referred to as concept-driven coding (Gibbs, 2007). This approach seemed appropriate for this thesis to make sure that the coding of the interviews follows the same pre-defined themes given in the thematic overview. As the study aims to identify *the challenges when integrating the needs of elderly people into digital products of the urban mobility sector*, the codes are created based on the identified challenges that were derived from existing academic literature. The coding model can be seen in Table 5. The four themes represent the four identified challenges from literature – *Technology Design, Development Process, Learning, Education and Support* and *Social Perception of Ageing*. The themes *Technology Design* and *Development Process* are further divided into sub-themes according to the key messages of the thematic overview (see Section 2.5).

Table 5: Coding Model

Theme	Sub-Theme	Code
Technology Design	- Accessibility Features - Guidelines	TD-AF TD-G
Development Process	- User Research - Testing - Product Development Style - Product Development Team	DP-UR DP-T DP-S DP-TEAM
Learning, Education and Support	-	LES
Social Perception of Ageing	-	SPA

As multiple researchers are part of this thesis, multiple coding was applied to verify the applied technique. Multiple coding means that the data was coded independently by the different researchers and the results were then compared (Mai & Steffen, 2019). It leads to a higher quality coding process and more consistency in coding (Mai & Steffen, 2019).

3.4 Ethics

According to Patton (2015), a qualitative research approach together with interviews needs strong ethical considerations as people's personal life is investigated and as it is aimed to not just talk about their knowledge and experience of the subject but also about their thoughts and

feelings. Therefore, different ethical aspects needed to be considered, which are presented in the following table.

Table 6: Consent Check Table

CONSENT CHECK
• Aim/Purpose: disclosing the intention of this study by informing the respondents of the aim and use
• Possibility of Anonymity: anonymity and confidentiality was assured by letting the respondents know that they can stay anonymous (Name, Role, Company)
• No harming information: respondents are informed that they are not harmed or criticized in any way when publicising this thesis
• No force: not forcing any participant to take part in this study
• Option for withdrawing: the participants were informed that they can withdraw at any point of the study if they do not feel comfortable or because of time restrictions
• Recording: respondents were asked permission for recording, by informing them of the use and aim of the recording, which is only for transcription purposes
• Option for member check before using the data

Informing an interviewee about ethical issues must be done before the interviewee starts and therefore a consent check was carried out at the beginning of each interview (Patton, 2015). The consent check started by explaining the purpose of the study and what it is used for, to increase the transparency of the study. Moreover, the interviewees were asked if they wish to stay anonymous in the study or if their name, their job role as well as the name of their company can be mentioned in the study. Otherwise, it was replaced by a pseudonym or a general description of the company, as recommended by Wiles (2013). The interviewees were also informed that it is not intended to harm or criticise anyone with the research and they were reminded about their rights, such as the right to withdraw from the study at any point, in case they would not feel comfortable or because of time restrictions (Wiles, 2013). Moreover, permission to record the interview was asked as recommended by Patton (2015). Also, the option for member checking was given to the interviewee. When member checking is applied, the transcribed interview is sent to the interviewee so that the person has the chance to check the transcript for accuracy and review if any information should not be included in the research (Birt, Scott, Cavers, Campbell & Walter, 2016). This method increases the transparency of the work. The interviewees were also informed that the research paper will be published on the Lund University website, which makes the interviews and findings publicly accessible online.

Ethical aspects were also considered during the data analysis part. Thereby a special focus was given to handle the data with confidentiality and that sensitive or private data is not published in the research paper and was therefore excluded from the transcripts.

3.5 Scientific Quality

During the development process of this research, scientific quality was of high importance. According to Kaplan and Maxwell (2005), research quality is ensured by considering reliability and validity. The reliability of a study can be achieved by providing a consistent and precise research study (Bhattacherjee, 2012). Consistency was achieved by using the same interview guide for each interview so that the key questions that were asked were consistent and did not vary from the aim of answering the underlying research questions. Moreover, the respondents were only asked questions of their field of expertise and the wording was as simple as possible. Both aspects also increase the reliability of a study (Bhattacherjee, 2012).

Ensuring the validity of the research quality is especially important during the data collection and analysis process (Kaplan & Maxwell, 2005). The validity of this research was confirmed by applying independent coding for the data analysis part. The transcribed interviews were therefore analysed and coded by both researchers. An important part of validity is external validity or generalizability (Bhattacherjee, 2012). Generalizability says if the findings of a study can also be applied to other contexts, people, or organizations (Bhattacherjee, 2012). It is argued that the findings of this thesis can be generalized as the interviews were held with respondents from real-life settings, which were moreover from diverse mobility companies, either from a private or public sector. As respondents were not only selected from mobility companies but also research it can be argued that the findings of this research could also be applied to apps outside the mobility sector.

Transparency is another important aspect of research quality (Patton, 2015). Complete transparency was given to the respondents by informing them about how the data is used within the research. The transparency of this thesis is moreover increased by translating all interviews that were held in German into English. Therefore, the reader can also examine the transcribed interviews on which the analysis is based. Besides the consideration of ethics and the possibility for the respondent to stay anonymous, respondents could also confirm the data that was transcribed and analysed from the interviews by giving them the option of member checking. According to Bhattacherjee (2012), confirmability is an important aspect when it comes to research quality.

4 Empirical Findings

This chapter presents the findings of the study. The structure of the findings is based on the identified challenges which are further derived in the coding model. Chapter 4.5 presents other identified challenges. All quotes are based on the interview transcripts, which can be found in the appendix. For an improved overview of the results, each challenge or sub-challenge has a respective "Key Findings" section summarized in an overview at the beginning of each paragraph. For this, expressions like "some", "all", "most" or "few" have been used to show results or similarities of the respondents. These expressions are further described in the associated paragraph and should be seen as summarizing indications.

4.1 Challenge: Technology Design

The theme "technology design" further includes two sub-themes, namely accessibility features and guidelines. The findings of these sub-themes are explained in the following.

4.1.1 Accessibility Features

Key findings:
○ Most accessibility features in technology for elderly users seem to come from accessibility features for people with disabilities ○ A multichannel approach is considered the best way to make mobility services more accessible for elderly users ○ Various mobility apps show accessibility features also for the elderly ○ Many however currently doubt the effectiveness of apps for the elderly and use call centres specifically for this age group

The topic of accessibility and its challenges played an important role in all interviews. When discussing the topic of accessibility, many of the respondents said that their accessibility features are designed for blind or disabled people and not primarily for elderly people (R6:4; R4:8; R7:14). R6 says that the accessibility features in their app are focused on helping blind people or visually impaired people to use it and therefore the app includes a screen reader functionality (R6:4). Also, R4 explains one of the accessibility features in their app. The feature is called "Accessible Routing" and helps movement impaired people to find the most suitable routes for them, e.g. routes that only include subway stations with elevators (R4:8). However, R4 assumes that this feature could also be beneficial for elderly people, although it was not originally designed for that customer group (R4:8). In alignment with R4, R2 (22), R7(14) and R9 (10) also say that there is a connection between mobility features for disabled people and elderly people and that in most cases both customer groups can benefit from it.

Different design principles seem to be used in practice that either aim at targeting specific user groups or at a universal approach. R3 agrees to the connection between accessibility features for disabled people and elderly people as there is an overlap between health issues in general and health issues in connection with people who are ageing (R3:22). However, R3 also criticizes when technology companies see ageing directly as an accessibility issue (R3:4). She says that

it cannot be assumed that all elderly people somehow benefit from accessibility features in apps and instead it should be put more emphasis on making technology clearer in general (R3:4). As a solution, R3 proposes the so-called "design-for-all" approach, which is in her opinion more beneficial than age-friendly apps and leads to more accessibility in technology for everyone (R3:14). The design-for-all approach is also supported by R9 and means that an app gets designed in a way that makes it so self-explanatory and easy to use that it is accessible for everyone (R9:22). He says that instead of producing age-friendly apps, design-for-all would try to take the diversity of all people into account (R9:22). In R7 and R8's project, however, they seem to not follow this approach as they target specific segments and create a stand-alone application specifically for the elderly and not for all (R7:4).

When asking the respondents about how their mobility services can be reached and which of the channels is from their perspective the best approach for elderly people, the so-called multichannel approach dominated their answers. The multichannel approach is supported by four respondents and means that the mobility services can be reached over different channels, such as an app, a website, or a hotline (R3:6, R6:6, R7:2, R9:16).

"[A]nd that's why the access or the flexible access to such a system is of fundamental importance and that's why we have three interaction ways for the passengers developed. One is a call centre, one is a website and one is an app." (R7:2)

R9 agrees on the importance of a multichannel approach, however, says that in the future it could shift to more app usage (R9:26). He bases his statements on his extensive research.

"And I would rather say that at the moment it's still a bit like it doesn't have to be either or, but that it has to be parallel. And that will certainly change, so that more people will use the app." (R9:26)

As the topic of this research is the inclusion of elderly people in digital products, it was further discussed with the respondents if and which accessibility features are integrated into their app design. Two of the respondents explained that they have certain accessibility features within the apps, such as larger icons, increased font sizes, good colour contrasts for text and images or voice-overs (R4:16, R6:4). Moreover, R4 also adds that every function within the app is explained in detail, for example, how a ticket can be booked and for which areas the ticket is valid (R4:38). R8 adds that for the design of their mobile solution, which is specifically targeted at elderly people, it was important to design the app using various screens in a small-step approach so that every function in the app can be clearly shown and explained and should not be hidden in submenus (R8:45). R8 mentions voice control as an additional accessibility feature within an app for people who do not have advanced knowledge in smartphone usage so that they could use their voice instead of having to operate the app (R5:18).

In terms of accessibility for elderly users, various challenges for the user were further pointed out by the respondents. R3 criticizes that privacy agreements are one part of technology where accessibility is lacking, as they are always too hard and complex to understand and that reading them thoroughly takes a lot of time (R3:4). Moreover, R3 says that not just accessibility within an app can be challenging, but that the challenge can already start with finding an app, as most devices are not intuitive (R3:12). That leads to another accessibility challenge as an app can be designed as easy as possible, it will not make any difference if the user does not manage to install the app. This challenge is also addressed by R9, who says that an app should come with an additional service that includes reaching out to the users and explaining to them the benefits of an app and how it can be installed and used (R9:14).

Many MSPs seem to be overwhelmed with building an appropriate digital solution for the elderly and further elaborate on non-digital solutions for them. Although R6 said that certain accessibility features are considered within the app, he explains that their app is currently not considered as the preferred access channel to their service for elderly customers (R6:4). Also, R1 further reflects on the efficiency and effectiveness of their app solution for elderly people and states regarding an ongoing tender:

"*It [Our solution for the elderly] could also be something [else]. It doesn't even need to be a digital solution, as long as it solves the problem and can communicate with our service.*" (R1:51)

Currently, call-centre solutions seem to dominate the non-digital service distribution for MSPs. Four of the respondents said that they operate a call centre because that channel is expected to be used the most by elderly people to access mobility services (R1:19, R4:28, R6:4, R7:2). Following the call centre solution R6 says that they also offer the customers of their on-demand service to pay in a non-digital way, in cash or with a voucher (R6:24). However, R1 says that the non-digital solution of a call centre also leads to problems and customers cannot take full advantage of the benefits an on-demand transportation service would normally offer when it would be accessed digitally. For example, he explains that one of the problems they have with customers who use the call centre is to inform them about a delay of a flexible bus because they cannot reach them digitally (R1:19). Therefore, R2 explains that they are trying to find an alternative solution to the call centre solution

Overall, the interviews show that accessibility features are highly discussed in practice and research and that the level of integration and implementation vary largely.

4.1.2 Guidelines

Key findings:
○ Two respondents make use of the WCAG guidelines ○ One respondent uses guidelines from iOS and Android ○ The value and use of guidelines however is currently being discussed

As literature proposes design standards and guidelines to make apps more accessible for elderly people, the respondents were asked during the interviews if they make use of guidelines, such as the ones provided by the W3C. Two of the respondents say that they apply the WCAG in their app design (R4:16, R8:37). R4, however, explains that they only applied them recently to their existing apps due to the new EU directive, which makes it mandatory for companies in the public sector to make apps and websites accessible according to the WCAG (R4:16). In contrast to this, R8 says that they made use of the guidelines only in an early stage, for the basic design of their app (R8:37). He further explains that at a later point of the app development process the sole application of the guidelines would not help to achieve more accessibility, but it would then be more important to ask the users about their needs for the app design (R8:51). In alignment with R8, R9 says that although guidelines are important to use there is also the risk of not meeting the needs of the user pool when only following the guidelines (R9:14). One respondent says that they do not follow the WCAG guidelines but instead the guidelines for iOS or Android app development:

"*And in those cases actually the ones provided by the platform's themselves so Apple for iOS apps and Google for Android apps are probably really kinda like the Bible's for interface accessibility rather than like the web ones".* (R6:14)

In addition to making use of the WCAG, R4 also says that they often aim to align with the industry standard when it comes to the accessible design of new app features:

"And we then orient ourselves on [the industry standard] so that users who have used the app of the other company and then use our app at some point get a seamless process and understand the app." (R4:36)

When discussing the topic of guidelines the respondents did not only view that topic from a technology design perspective but also a perspective regarding accessibility in the mobility sector in general. When asking R6 whether they make use of the WCAG guidelines, he replied that they make use of the guidelines provided by the International Association of Public Transport (UITP) instead (R6:14). Those guidelines are however focused on making mobility services accessible in general and they do not focus on a technology point of view.

To conclude, the interviews showed that most respondents were aware of accessibility guidelines. The integration however varied as well as its overall valuation.

4.2 Challenge: Development Process

The theme "Development Process" further includes four sub-themes, namely product development style, user research, testing and product development team. The findings of these sub-themes are explained in the following.

4.2.1 Product Development Style

Key findings:
○ Different Product Development Styles have been used ○ Scrum and Co-Creation are named as applied development styles by two respondents ○ Co-Creation may be the most appropriate Product Development approach for digital product targeting the elderly

The respondents were also asked questions about their product development style. Almost all respondents say that a successful development style should be user-centred, which means that the users are directly included in the technology development (R1:32; R3:16; R4:8; R7:2; R9:24). R4 specifically names *Scrum* as their applied product development approach; an agile development approach, which places a strong focus on user research and the involvement of people who are going to use the product or app feature at the end (R4:6). However, R4 criticizes that the Scrum approach is not fully applied in the company. R4 further mentions potential reasons for this by naming a lack of resource as well as the outsourcing of their IT development for the app (R4:6). R7 and R8, the respondents of the mobisaar project name *Co-Creation* as their applied product development style. They explain Co-Creation as an iterative process, in which apps are developed based on a close collaboration with their users (R8:37; R7:23). R8 moreover explains that part of the Co-Creation approach is to send drafts to potential users who can then choose an option from different drafts and give feedback on what should be changed,

e.g. the arrangement of a button (R8:37). In alignment with R7 and R8, R9 also claims that Co-Creation is a successful product development style for the creation of apps for elderly people, as it is a good way to find out the needs of the potential users (R9:24).

Two of the respondents say that they outsource the development of their app solution, which can be considered as another product development style (R2:20; R4:6). The respondents at Skyss say that they have not yet found a proper solution to combine the needs of elderly people with their mobility service (R1:12). Therefore, they now started a tender, hoping to find someone else to develop "such a tool for elderly people that are not used to use mobile applications" (R2:20). R4 says that the development of their mobility solution is mainly built by an external company (R4:6).

To summarize, the interviews showed that different product development styles are used which may also affect the upcoming findings of user research and user testing.

4.2.2 User Research

Key findings:
○ Only a few respondents have personas of at least one elderly person ○ Most argue that elderly users should be divided into different personas or user groups ○ Most are aware of their user research gap

Another central topic during the interviews was user research as part of the development process. The importance of user research was mentioned by different respondents. R7 says that app-based solutions in the mobility sector often fail due to missing user research (R7:2). R3 further states that user research in form of observations, user experience sessions or the inclusion of elderly people in the development process is essential to prevent that some groups of elderly people get excluded from the use of a certain technology (R3:16). Neglecting certain user groups can be challenging in the mobility sector as mobility services, especially of public MSPs, normally aim to reach as many people as possible and not necessarily a specific target group (R1:38).

The respondents were asked about their applied techniques for user research. They were asked if personas are part of user research and if an elderly person is included in their persona groups. Four respondents say that they generally work with personas in their development process (R2:40; R612; R5:8; R7:12). However, only two of these respondents who use personas say that they specifically have personas for elderly users (R5:8; R7:12). R6 says they do not have a persona for elderly people but believes that personas could help to better define their needs:

"I don't think we've actually had a good or proper persona for an elderly person that might also be one of the reasons that we're not like that aware of what their kind of needs might be." (R6:12)

Both respondents who use personas for elderly user say that they have defined different personas for this user group. R5 explains that in his smart city project there are about five to six different groups of personas for the elderly users and that differentiating factors can for example be health or income (R5:10). R7 says that for the mobisaar project they defined three different

kinds of personas (R7:14). The importance of dividing elderly users into different personas or user groups is further emphasized by R9:

"So we have people who are very fit. But we also have people who are rather fragile. So you can't always look at them as one group." (R9:8)

Relating to that R3 also mentions that a common mistake is to consider the needs of elderly people equal to the needs of disabled people for technology development (R3:4). She says that this approach is not appropriate as the group of elderly people is very diverse and not every old person benefits from accessibility features aimed at users with disabilities (R3:4). R9 says that he does not see personas as the most appropriate user research technique to include the needs of elderly people better into the product development process (R9:10). Instead, he says that it is better to include the actual users in the development process (R9:24). This approach is also supported by two respondents who say that they do user research by including different groups of people or different stakeholders in the app development process (R4:12; R7:6). However, R4 also says that elderly people are not necessarily part of those users (R4:8).

Besides the use of personas and the inclusion approach, respondents further elaborated on other types of user research techniques. R4 says that they applied qualitative user research, which means that they conduct interviews with different user groups (R4:24). The interviewing approach is also applied in the smart city project of R5 (R5:4). R5 however also criticises the approach and mentions that interviewing can only be valuable when also the right user groups are asked (R5:4). Alternative to interviews, R4 further explains their approach which is focused nearly solely on industry standards as user research strategies may be too resource-intense (R4:36).

"Of course, it would make much more sense to first create personas and then research everything and build the features together with the users themselves. But it's simply a question of resources" (R4:36)

A respondent also shared challenges they face with user research for elderly users. Next to the needed resources and resulting cost issue, R4 says that one big issue is that public companies need to be very careful in terms of data protection and that they are therefore not allowed to track their user data, which means they do not have much data available for user research (R1:40; R4:24; R4:34). R4 moreover explains that elderly users are more concerned about data protection issues and more cautious about tracking features than younger people, which also leads to fewer user data from elderly users (R4:34).

When talking about the topic of user research it was noted that the respondents have different definitions of when a person is considered elderly. Two respondents say that they set the age for elderly users according to the retirement age in their country, which is 65 in Switzerland (R9:10) and 67 in Norway (R1:14). R1 further says that this age is then also linked to getting discounts on bus tickets (R1:14). Another respondent however said that he believes that a person can be considered as elderly starting at the age of 75 (R6:20).

Overall, the interviews showed a high level of awareness of the importance of exhaustive user research for the elderly. While most have integrated user research approaches, many also discussed challenges in this regard ranging from cost issues, data security and limited efficiency.

4.2.3 Testing

Key findings:
○ All companies include user testing as part of their development process ○ Only very few actually test with elderly users ○ The key challenge seems to be to effectively reach out to them

When focussing on the challenges of the development process, the topic of testing was also discussed. All interviewed MSPs say that they include user testing in the development process of their digital products (R1:34; R4:8; 6:14; R8:22). However, only the companies that have a specific product for elderly people, Skyss (R1) and mobisaar (R7; R8), say that they tested the product with elderly users (R1:34; R8:22). Especially for the mobisaar project, user testing with the target users took over an important role from the beginning of the development process (R8:22):

"[…] involve the intended target group from the beginning. So that is a totally important integral part of such projects". (R7:6)

Another way of bringing user assessments into their products is mentioned by R1, who says that they adopted their project for the elderly with experiences from other pilot projects (R1:19).

The two other MSPs that do not have specific mobility solutions for elderly users say that they apply user testing into their app development process but that they have problems reaching out or including elderly people (R4:24; R6:14). R4 explains that they have a so-called "customer plenary", which includes different kinds of passengers who test products of the MSP, for example, a complete app, and the testing starts already when there is a developed prototype (R4:8). However, R4 says that it is difficult for them to include older people in testing, as the people who apply for the test are most of the time mobile-savvy and younger people (R4:24). The challenge of including elderly users into user tests is also named by R6:

"The thing is, like in terms of age, the oldest that we've really gone, is I'd say, Yeah, I would say like 65 years old or something. So depending on what you define as elderly persons, those haven't really been included in user testing, Because it's also much harder to reach them." (R6:14)

The importance of permanent user testing and feedback collection for a prototype is emphasized by two research experts (R3:4; R9:12). However, R3 criticizes that companies rarely include elderly people in technology testing:

"It is rare that they would actually test these technologies with older people, especially older people who might have physical limitations, whether it's vision related, dexterity, hand movements tremors in the voice, inability to speak to a smart speaker, clearly." (R3:4)

Overall, while user testing seems to be viewed as a highly important step to ensure an effective app development process, many challenges occur especially when trying to integrate the elderly in all testing stages.

4.2.4 Product Development Team

Key findings:
○ The product development teams of the respondents are rather young ○ Some respondents say that age can be a challenge ○ Some respondents believe that the involvement of end-users or frameworks into the product development can solve this challenge

The respondents were further asked questions regarding their product development team, such as the average age of the development team and their experience and opinion on whether this may influence the success of user-centred product development.

Most of the respondents indicated that the average age of their development teams is 30 years (R4:39; R6:16; R8:39). Respondents were also asked if they think that a young product development team can be problematic for the development of digital products for elderly users. While five of the respondents said that it is or was a challenge in the past (R3:14; R5:12; R6:18; R7:8; R8:41), two said that the age of the product development team is not an issue (R4:32; R9:25). R3 criticizes that the whole technology industry may be youth-oriented and that developers often make products for themselves (R3:4). R5 and R7 agree by saying that developers can only be experts on the demographic field they represent R5:12; R7:8). However, R5 also states that frameworks can help to overcome these challenges (R5:12). R6 explains that the young age of their team was an issue only at the beginning but that it changed when they started to focus more on inclusivity topics (R6:18). The developer of the mobisaar project says that he experienced challenges himself when first developing the app for the project (R8:41). He explains that the problem was that he approached the development process by aiming for a design that pleased himself primarily (R8:41). However, R8 says that this changed with the co-creation approach and by including end-users in the technology development process:

"But you don't realise that there are still a few intermediate steps that are important for older people. And that becomes clear after a while. The more you talk to these people and find out what still needs to be adapted […] it's better to really develop it with co-creation and with the involved people" (R8:41).

Also, R4 and R9 see challenges with developer teams of a different age or generation that develop products without further including the respective target group (R4:30; R9:25). R9 further argues that this issue even grows in significance when talking about Digital Natives and Digital Immigrants (R9:8). Those having grown up with technology seem to have an intrinsic understanding of technology which may differ from those that have not (R9:8).

The interviews showed different perspectives regarding the impact and potential challenges resulting from young development teams building products for elderly customers.

4.3 Challenge: Learning, Education and Support

Key findings:
○ Most seem to show an awareness of the importance of educational features ○ All see it as a big effort while the benefit is not clear yet ○ Only some have tested it and only a few still have workshops or training

A common conjecture of the respondents is a lower level of digital literacy among the elderly resulting in lower technology adoption in the end (R1:4; R5:10; R9:12). These assumptions seem to have mainly resulted from pilot projects in practice or their specific research discipline. R9 further elaborates on a potential root cause as well as giving an introduction to the challenge of educating the elderly in technological topics:

"One is, so to speak, the aspect of socialisation, i.e. how did I grow up? What technology did I grow up with? As a result, today's existing technologies are new and you have to learn them new and enter a phase in which, on the one hand, you may have more difficulties learning new things" (R9:8)

Most of the respondents of the interviews show a high awareness of the importance of educating the elderly (R1:42; R5:16; R7:10; R9:8; R9:12). Few also seem to be aware of a potentially increased importance of educational support because the current generation of elderly is considered to be Digital Immigrants; meaning that they have not been raised with technology (R9:8; R2:12). Those that show awareness of the difference between Digital Natives and Digital Immigrants come as well from a research background. R3 further brings the topic of "resistance to change" that she had further researched (R3:18). According to her studies, there is a change in adaptability to new things with age which directly also influences the ability and the speed of learning (R3:18).

Many respondents see an educational service or support as a strategic investment in terms of improving independent ageing for the elderly (R1:42; R5:16; R9:12).

"We need to have a method or a technology to serve this target group, in order for them to be able to be more self sufficient, and get better service. And for us to save costs on customer support" (R1:42)

These views and objectives seem to show a combined aim to on the one hand support the user in seeing the benefit of the product while also benefit in return from lowered operational costs. Further, R9 argues that training or support features could help to communicate the benefits more clearly which could improve the "perceived usefulness" factor (R9:14). One of the challenges for this however seems to be the communication channels (R1:19; R9:26). R1 shares that reaching out to the elderly had become a major issue for training and promotion purposes (R1:19). Cooperation with public institutions as well as offline channels like newspaper advertisements or leaflets have proven to be only semi-successful (R1:32).

While many seem to think that training of the elderly can be successful, R6 shares his doubts on training and learning approaches:

"*And I, my personal belief is that it's probably going to be really hard to try and train, an elderly person to start using our app. I'm sure there are different things that we can do to make it easier to do."* (R6:4)

Also, R7 and R5 partially share their views by stating that while educating is highly important, it would also come with a large effort (R5:10; R9:12). R5 further states that to ensure a successful adaptation of the learnings, constant support and training would be necessary:

"You give an old man a smartphone with an app on it to do that unless you train them how to do it, and probably train them a couple of times it's completely useless technology." (R5:10)

R8 however argues that from his past experience of five years as a software developer for the mobisaar project in which he conducted various workshops and training with the elderly, that digital literacy has improved significantly (R8:55). From his past practical experiences, he states the hypothesis that potentially also less training is needed for the elderly as the technical progress would also influence older generations (R8:55). R3 and R9 though share an opposite view, arguing that technical progress will introduce ever more challenges also to upcoming generations that may also not be Digital Immigrants as *resistance to change* are dependent on age and not on technology (R9:26; R3:18).

"With every new product there are new challenges […] and the other thing is that, ultimately, because it is so dynamic now, it is also the case that technical things always emerge with a new technology" (R9:8)

Even though many respondents showed a high awareness of the importance of educating the elderly, only a few had offered practical solutions to their customers (R9:14; R1:28; R8:51). R1 shares that a training workshop was part of a pilot project for the elderly (R1:28). R5 argues that several training sessions may be required (R5:10). Also, R7 and R8 shared that they offered weekly training sessions over several months or years including not only the app itself but also general handling functionalities of also different smart devices:

"We had also sneaked in some workshops where generally older people were introduced to the concept of "how to use tablets". This is typing, this is sliding etc how does it work? How do you even operate that? And that's sometimes a really long struggle to even explain that when you're typing something on a tablet or mobile phone, it's different whether you keep your finger on it for three seconds or lift it straight up." (R8:51)

R8 further elaborated on the long process of further educating the elderly from the perspective of a Digital Native and software engineer (R8:51). Others also shared that they did not focus on training or support features in or outside of their digital product (R4:38; R6:22).

"I'm not going to pretend that we've put all energy and effort into making sure that elderly people right now or in the near future can make use of the service I think we should actually spend more time on it." (R6:6)

While no direct educational training was offered to customers, also no further in-app guidance or onboarding has been integrated into the app of R6 and R4 (R6:22; R4:38). A phone hotline however is in place that provides further assistance if needed but only reactively to a request made by the customer (R4:38; R6:22). R6 however argues that the lack of training options had so far also not been mentioned in customer feedback (R6:22). Another potential reason for the lack of training options or features was mentioned by R9 who states that these educational

approaches also come with high costs (R9:22). R2 also argues that it is often not only the app itself but also the smartphone (R2:12). If a customer is not able to handle or use an application, the customer might also have problems with the device in general. Following this, an overarching training session like the one mobisaar (R7 and R8) had presented would be necessary. If not, then in-app guidance might be sufficient. These topics however were not further differentiated by the respondents.

Overall, regarding the topic of education, learning and support various empirical findings were observed. Most of the respondents seem to be aware of the importance of educating the elderly on how to use their app specifically or technological devices in general. All are however also aware that this potential strategic investment comes with big efforts regarding needed time and resources. Some interviewees have already educational features in place or have at least tested some. While many see this training opportunity as a requisite, others doubt its influence. Overall, it seemed however that a concrete training approach or structure was missing.

4.4 Challenge: Perception of Ageing

Key findings:
○ Some respondents show potential stereotypes of the elderly ○ Especially those not targeting the elderly seem to have more negative stereotypes ○ Many respondents show awareness of a potential stigma and try to act against it

During the interviews, some insights also to the social definition and perception of ageing were discovered. For this, no specific question was asked but an overall review of potential stereotypes was used to further analyse a potential stereotype threat. Various respondents commented on their perception of the elderly with potential stereotypes (R1:12; R5:10; R6:4; R7:18). Here, those passages of the transcripts were coded that showed generalizations of characteristics of elderly or assumption without further user research basis.

The interviews showed that negative stereotypes of the physical and cognitive abilities were mentioned, generalizing the whole group of the elderly (R1:12; R1:21; R5:10):

> *"[…] gave them a cheap smartphone or gave them a cheap tablet computer, and help them sign up to Facebook, they still couldn't access the survey, they would still be totally lost."* (R5:10)

Significant could be that most respondents shared their perception of the target group and their characteristics while also stating to either not be an expert in the field or while mentioning that no concrete user research was conducted so that the target group was rather unexplored (R1:21; R6:4). With this argumentation, generalized characteristics were seen as potential stereotypes. R6 for example states that elderly people have not been the target of their services as well as their research and reflects various times that research would be necessary (R6:4; R6:6; R6:22). In contrast, R6 mentions various potential stereotypes as reasoning for not further focussing on the target group (R6:6; R6:10; R6:12; R6:20; R6:33):

"*They don't need the additional comfort of an on-demand service necessarily so in those cases we would more targeted towards people who are willing to pay extra compared to a bus. […]*

I guess that the elderly population doesn't really come into account, they might just not be willing to pay extra and they might just be okay with taking the bus that they already know." (R6:10)

"*Yeah, well, as an elderly, you might probably also not have to be somewhere at a strict hour. So, that waiting for a bus might not be a big problem. So, as long as the bus is running, it is fine.*" (R6:33)

Many respondents however also show awareness and reflection of stereotypes and partially also voice criticism (e.g. R4:28; R5:8; R3:18; R9:12). R9 and R4 criticise in general a homogenous approach when creating personas or characteristics (R4:28; R9:8). From his research, R9 shares that the group of elderly is highly heterogeneous so that any kind of stereotype reflecting elderly could be damaging (R9:8). Despite not having researched it in-depth as R9, also R4 shares his views and argues that stereotypes generalized for all elderly people are an incorrect approach (R4:28).

R9 further comments on how the social perception of ageing may lead to severe challenges for companies and organisations with the example of smartphone for seniors (R9:12; R9:18). He argues that these products did not succeed because when promoting the product with age-related stereotyped attributes the threat of stereotypes hinders the adoption:

"Because it creates a stigma. Because many people say, I don't want a senior citizen's mobile phone, that's how you can tell that I'm old." (R9:12)

Overall, it seems as if the interviews revealed a potential level of existing stereotypes among some respondents. It seems as if a certain pattern could be detected as most respondents that have not yet been exposed to much research about the elderly tend to have more negative stereotypes than those having studied the user group. Most however based their assumptions on research or their specific empirical findings.

4.5 Other Empirical Findings

The interviews provided intensive insights into the views and experiences of the respondents that could exhaustively be captured with the semi-structured interview approach. During the interviews also further insights and discussion topics were explored outside of the initial range of interview questions. As a result, also topics that were initially not further focussed in detail nor proposed by the literature were discussed in the course of the interviews. These topics were mainly addressed by the respondents during the interview and thematise a strategic perspective of the topic at hand from a company's point of view. With these additional insights, further empirical findings were collected that may be significant for this study and are thus further presented.

Key findings:
○ All interviewees are aware of population ageing and, in most organisations, it is also being discussed internally ○ Only very few integrate the megatrend into their strategy or vision ○ Private MSPs seem to value the market as not profitable due to various initial investments and a potentially low purchase power ○ Public companies see a societal obligation to offer a solution despite financials

As one of the opening questions, all respondents were asked about their awareness of the previously presented megatrends of population ageing and urbanisation. Most respondents answered that they were aware of the population ageing megatrend (R1:8; R3:2; R4:14; R5:4; R6:6; R7:6; R9:6). When comparing the answers from practitioners and researchers some differences can be explored.

Those respondents from organisations, whether it is a public or a private company, that have a respective project for the elderly show a high awareness of the megatrend of population ageing (R1:8; R7:6). Those that do not focus primarily on elderly customers seem to have a lower level of awareness of the population ageing as they often use terms like "I believe" (R6:6) or "I think" (R4:14) when describing how they view the megatrend. This distinction of views however was almost expected as the level of exposure differs respectively as well. Those respondents from elderly-focused projects were expected to have researched more about the ageing of the population while those having mobility projects targeted not specifically at the elderly were expected to show a lower awareness. Nevertheless, it is important to point out the difference to understand the strategic valuation as well and their upcoming argumentation in the interview as well.

Furthermore, the level of awareness or reflection seems to vary between practitioners and researchers. While some have studied the topic thoroughly from their research background or specific job, others seem to be personally aware of the trend, while no implications have been further explored (e.g. R5:4 vs. R6:6). Here, it can be observed that those having a strong research background in gerontology or technology acceptance (R3; R5; R9) seem to have the largest understanding of the topic and answer that the trend of population ageing is highly discussed in their field of research and their work in practice:

"It's massively discussed, because we're working on a couple of smart cities projects in Norway, and also in Finland and Denmark […]. They're very much looking at it, because the elderly population will be so significant so soon." (R5:4)

These research perspectives also bring various strategic implications and dilemmas into the discussion by further presenting their respective projects. For instance, R5 mentions aspects of the inter-generational contract by explaining that the generation of Baby Boomers is significantly bigger than his generation of Millennials, which will lead to the dilemma that in the future "few people [will be] looking after a lot of people" (R5:4). From his experiences in researching citizen engagement and future models of smart cities, city management and within it the transportation field will play an increasingly important role to leverage on this dilemma (R5:4). Current cities should thus incorporate that a large percentage will be elderly (R5:4). Also, R3 and R9 show a high awareness that the upcoming generation of elderly will be statistically significantly bigger than previous as well as current, younger generations but strengthen here more the challenge with aligning Digital Natives and Digital Immigrants (R9:6). These different perspectives of the megatrend and its implications can be explained by the respective research focus areas of the two respondents. While R5 is focussing on the development of smart cities, R3 and R9 study technology for the elderly. These presented statements should thus not be seen as contrasting but more as complementary.

When differentiating between Digital Natives and Digital Immigrants, the research perspective can further give insights into the questions, whether the topic at hand should be viewed as a strategic problem or a one-time problem, as Digital Immigrants will become instinct within the next generations. R3 and R9 strongly argue that the technology gap should be viewed as a strategic long-term dilemma as technology in itself is highly dynamic so that "with every new

product there are new challenges" (R9:8). R3 further argues that it will not be the same challenge with the same technologies, but that it will be the same challenge with different, newer technologies (R3:18).

"But the fact is that technology is developing faster than we are developing. And that is what I mean. I think my topic will still be relevant in 20 or 30 years." (R9:26)

Population ageing thus seems to be a strategically relevant topic for the future, especially regarding technology development and progress. The mobility field as part of city management seems to play a significant role while the awareness of population ageing, in general, seems to vary between different players in the market.

The urbanisation megatrend was indeed less discussed by the respondents. While R5 strongly focussed on the importance of smart cities for the elderly, R1 and R4 focussed more on the challenges of the elderly in rural areas (R5:4; R1:38; R4:14). These challenges seem to be only partially linked to each other and could be thus viewed as two separated ones. While R5 argues that cities will play an important role so that transportation within should be strengthened, R1 and R4 argue that especially due to urbanization the urban-rural transportation should be strengthened as the elderly are also expected to stay in rural settings as well (R5:4; R1:38, R1:4; R4:14). For this, some respondents see a high potential for new mobility services to target these challenges.

Overall, however, from the empirical findings of this study, population ageing seems to be seen as a stronger factor and influence into the current market of mobility services. Urbanization seems to be less discussed in this context.

Despite the high general awareness of current megatrends, only very few respondents had integrated a factor of population ageing or urbanization into their specific strategy or vision. While the mobisaar project (R7 & R8) that is directly aimed towards the elderly was already expected to target them directly, only R1 as a public transport authority (PTA) and R5 in smart city projects also shared that they specifically targeted the elderly in their overall company or project strategy (R1:8; R5:2).

"We are working on a new strategy now, that is saying that we should develop mass transport and try and meet the crowds. But we should also develop mobility services for those people who actually can't adopt and doesn't have an offer from […] the fixed mass transport system. […] the aim is to try and meet the elderly, so they can participate more in society and actually use their skills and help us develop in general." (R1:8)

R1 works on a project specifically for the elderly at a public transport authority. This role is comparable also to R4 and R6. These respondents however did not further integrate any facets of the population ageing or urbanization into their company strategy or vision explicitly (R4:14; R6:6). Coming from a public transport authority himself, R4's company focuses on public accessibility instead of a specific target niche which in its core target comes close to the mass market focus of R1 (R4:8). R6 however works closely with public transport authorities while himself being employed by a private company. While R6 mentions that these megatrends have not been integrated into the company's strategy or vision, he does mention that the company has targeted strongly younger generations in its beginning (R6:4). He mentions however that this focus has shifted to also older customers, which was mainly initiated by their customers, public transport companies (R6:10). When he explains their newer customer target, he further explains that the overall focus areas have shifted from cities to urban-city settings in which the

strategy shifted as well (R6:19). From a company's point of view, PTAs seem to mainly target mass transportation solutions that focus on a maximized accessibility so that mobility services are provided to everyone. A strategy for a niche target group seems to not be part of their current strategy. From a researcher's point of view, R5 brings a new perspective to the topic. He describes the strategy of his citizen engagement project as follows:

"We're looking at finding ways to get in touch with the groups of people in society that are not traditionally technologically engaged, such as the elderly, which is I think the biggest challenge" (R5:2)

This project, which shows also similarities to R7, R8 and R9 in which specific projects were established targeting the elderly, integrated the knowledge and underlying statistics of the presented megatrend very thoroughly (R5:2). All projects however were as well developed in close collaboration with public authorities or governmental institutions. Here, R1, R5 and R9 argue that this close collaboration may be needed as it should be seen as a societal problem so that a governmental obligation may arise (R1:8; R5:16; R9:20; R9:22).

"It's the municipality and the government who's actually responsible for the customers." (R1:8)

With this reasoning, R1 argues that the strategy or vision should be developed on a political level and not with public MSPs themselves. R7 sees this however as rather critical as the process would then be slowed down and would become less flexible and agile (R7:6).

Overall, much fewer respondents have integrated or adjusted their strategy or vision to the megatrends, they were previously highly aware of. While most argue that the overall market remains highly interesting, strong reasoning was not provided so that a follow-up question was developed to identify potential core problems.

To better understand the decision whether to integrate the elderly into their company strategy or not, various respondents give insight into their reasoning for this decision. Most respondents value the market of new mobility services for the elderly as not lucrative (R1:38; R4:12; R5:4; R6:10; R9:18).

"I got really cynical answer to this question and it's an honest one: it is that it doesn't make money. […] I think that's very, very unlikely because the R&D costs versus the income is going to be huge […]" (R5:14)

The profit motivation seems to become particularly apparent for private companies that are not financed by taxes or state money. For MSPs, the cost issue seems to be a significant challenge. Offering their mobility service for elderly customers seems to come with high costs. All interviewed MSPs mention high investment costs and high operating costs as key drivers of this challenge (R1:38; R4:12; R5:4; R6:10; R7:25; R9:18).

For many companies and organisations, high initial investments are needed to develop the infrastructure to provide an accessible mobility solution for the elderly (R1:38; R4:36; R5:8; R9:12). Here, especially the development costs of the digital platforms seem to be particularly high. While the technology is expected to be less complex and thus less cost-intense, the user-centred development approaches are expected to be very resource and time intense resulting in high costs (R5:14; R1:40; R4:36; R7:36; R6:10).

Furthermore, in the case of this study, various private companies including well-known large companies have shown interest in participating in this study while they were at the end not available for a specific interview, stating that they currently were not involved in this topic as much as they would like to be. In the end, mainly public companies or private companies that offer Business to Business (B2B) services for PTAs participated in this study. This may be seen as a potential argument of a rather unattractive market from an economic standpoint but is further discussed in the upcoming chapter. However, various public companies argue that the current market seems to only consist of public players out of the reason of a lack of profitability (R4:12; R5:14; R6:10; R9:18).

"And that it is simply the task of a public company to go into these actions or to go into this field. Because in the private sector world it doesn't exist, because it's probably not that lucrative, I can imagine." (R4:12)

This reasoning mainly comes from the idea that on the one hand a high investment is needed to provide the needed infrastructure (R1:R5:4; R6:10) as well as the potential stereotype that the elderly are not as wealthy as other consumer groups due to low income or low pensions (R6:20). However, R2 and R9 argue that this might be a stigma that needs a re-evaluation (R3:20; R9:20, R9:18). According to R2, the market of the elderly should be perceived as lucrative as the generation of Baby Boomers seem to show a high concentration of wealth (R3:20). Further, R9 argues that companies would be missing out on a large target group by focussing on this stigma (R9:20).

"It's always about the fact that it has potential, so to speak. And I'm always amazed that people don't actually realise that when we talk about older people in retirement, we don't always have to talk about people who don't have any financial means. There are a large number of people who could actually afford services such as on-demand services." (R9:18)

These arguments aim towards private companies and the overall business value of the target group. R1, R5 and R7 further give arguments that the topic should also be evaluated from a societal standpoint including also costs and benefits for the society when providing mobility solutions to the elderly (R1:38; R5:14; R7:2).

"That we can give them the sufficient help they need in order to be able to stay in their homes, and not having to go prematurely into healthcare facilities, elderly homes, etc. and the mobility service is a specific tool that we can use in order to meet that issue." (R1:8)

By giving the elderly access to mobility services, more quality of life can be provided while also potentials costs of retirement homes could be minimized (R1:8; R1:38; R7:2). For this, however, R1 argues that a clear measurement of the actual benefits and costs should first be developed which is at this stage still ongoing (R1:38; R1:8).

To conclude, there seems to be a different approach when evaluating the market potential between private and public MSPs. Private MSPs seem to view the market as unattractive due to high investments and potentially low purchase power. Researchers however argue that these stereotypes could be untrue. Public MSPs seem to not focus as much on the financials but more on the societal obligation of their services.

5 Discussion

In this chapter, the empirical findings are discussed by comparing them to the presented academic literature and further reflecting on them. The chapter is structured based on the identified challenges from the literature. Section 5.5 moreover discusses other identified challenges. The chapter is concluded with a summary and the implications for research.

5.1 Technology Design

Technology or system design is a largely discussed topic when it comes to technology adoption (Almao & Golpayegani, 2019; Yu-Huei, Ja-Shen & Ming-Chao, 2019). In both TAM and STAM, various respective components target topics of technology design. Partially derived from the theoretical model, various further guidelines and frameworks also for practitioner were created, giving guidance to product and software developers to ensure accessibility (Lee, 2014; Moschis, 2016).

From the presented empirical findings, most of the accessibility features in respondent's technology were designed for disabled or blind people and not necessarily for elderly users. However, most respondents argue that elderly people could benefit from those accessibility features as well. This is in alignment with the literature, as Arch (2008) says that accessibility standards for people with disabilities can also address the needs of elderly people due to ageing. Accessibility features in apps that are named by the respondents include larger icons, increased font sizes, good colour contrasts, voice-overs, clear navigations and descriptions. Those accessibility features named by the respondents overlap with the ones provided in the WCAG under the perceivable, operable and understandable principles (Arch & Abou-Zahra, 2018). The accessibility features are also named by literature as important for technology design to include the special needs of elderly people due to age-related changes (Almao & Golpayegani, 2019; Petrovčič et al. 2018). The findings show that practitioners follow what is already proposed in the literature that the technological needs of elderly people can often overlap with those of disabled people. One respondent (R3) however also argues that this approach can be risky as a generalization of the needs for elderly people and those of people with disabilities can also lead to an exclusion of one target group.

The findings moreover show that MSPs make use of design standards or guidelines for app design, such as the WCAG or guidelines from Apple or Google. This follows the advice given in the literature (Almao & Golpayegani, 2019; Lee, 2014) and advice from the industry (Arch & Abou-Zahra, 2018), which says that design standards and guidelines should be included in technology design to make it more accessible and user friendly for elderly people who might suffer from limited motor function, cognitive and/or visual skills. One respondent (R3) however criticizes the effectiveness of guidelines and frameworks and thus challenges the presented research. She argues that many frameworks indeed fail to include the elderly by generalizing the customer segment of elderly users. One MSP (R4) explains that they only adopted their app design to the WCAG recently because of the EU directive that makes an accessible design of websites and apps according to these guidelines mandatory. This shows that legal foundations can have an impact on companies in the mobility sector to make apps and websites more

accessible. However, this only concerns mobility companies in the public sector and private mobility companies are not obliged to do so.

Furthermore, the presented literature concluded that most new mobility services are usually only accessible over digital applications to the end-users (Gössling, 2018; Schade, Krail & Kühn, 2014). The empirical findings of this study further show that despite having digital offerings like apps or webpages, most MSPs focus on offering alternative non-digital channels specifically for elderly people. One alternative that is often used is call centres. However, respondents also criticize that a call-centre solution cannot offer all benefits that a digital channel like an app would offer. For example, real-time information about a delay of a bus can be accessed over an app but not with the call-centre solution. This seems to show certain limited accessibility for the elderly.

The literature further states that the focus of new mobility services is mainly on younger and tech-savvy users (Battarra, Zucaro & Tremiterra, 2018; Span, 2019; Stein et al. 2017). The findings seem to confirm that MSPs often focus on younger people with their digital mobility solutions instead of the elderly. In this context, the respondents were further also discussing whether apps should in general be focussed on certain segments or whether they should follow a “design for all” approach. The empirical findings revealed divided opinions. Most respondents from research however showed to favour a “design for all” approach which was in contrast seen as too ideal for practice by some practitioners. Literature does not have a clear standpoint in this regard but presented findings of the digital visiual stimuli for Digital Natives and Digital Immigrants may pose a challenge for a design for all concept (Prensky, 2001a).

Conclusively, the technology design findings seem in line with the literature as both views conclude that the digital solutions in the mobility sector are not aimed at elderly people but younger user groups. The findings show that the topic of accessibility plays an important role in the mobility sector and that guidelines can help MSPs to integrate the needs of elderly users in digital mobility solutions. However, it also seems that companies struggle to find a well-functioning and effective digital solution that combines the needs of the elderly with all the functionalities of the mobility service.

5.2 Development Process

The empirical findings show that most interviewed MSPs consider user-centred product development styles as most successful for the development process of mobility solutions for the elderly, as users are directly involved in the product development process from the beginning. Two concrete development process styles are named by the respondents (R4; R7; R8), namely Scrum and Co-Creation. Both are iterative approaches that place a strong focus on the involvement of users in the product development process. Also, the literature argues that user-centred development approaches seem to be most appropriate when developing products for the elderly (Lee, 2014; Schulz et al. 2015). Further, research suggests that agile development methods would serve this purpose most effectively (Abrahamsson et al. 2017; Cantamessa & Montagna, 2016). The empirical findings showed however that even if a recommended development style is used, various other factors, like IT-Outsourcing vs. IT-Insourcing, may influence the actual success and effectiveness of the development process.

MSPs seem to be aware of the importance of user research as part of the development process of products for elderly people. Many respondents say that digital mobility solutions tend to fail

or are likely to exclude certain user groups if there is a lack of user research. These findings align with the literature where it is said that user research is especially important for the successful development of technology for elderly users (Lee, 2014; Lee et al. 2013). The interviewed MSPs apply different techniques for user research, such as personas, qualitative user research, or co-creation approaches. The latter is also seen as a successful method according to literature, as it is said that integrating the needs of the users in the development process from the beginning can avoid usability problems (Schulz et al.2015). The findings however also show that not all structure their development process according to widely accepted and proven frameworks and techniques. Some MSPs are aware of successful techniques and methods but use industry standards from their competitive environment as a basis of their development process. These techniques have not been further tested as highly successful by literature.

Respondents seem to be aware of the diversity of the user group of elderly people. Those segmenting their customer group of the elderly, divide the user group based on different aspects such as health, income, or technology skill level and include different personas for the user research of the elderly. This heterogeneous view of elderly people matches the presented literature where it is said that the use of technology by elderly people can be affected by many different factors, which can be health-related or related to a lack of skills to interact with technology (Kim et al. 2016; Petrovčič et al. 2018; Renaud & van Biljon, 2008). Furthermore, some also differentiate between the presented characteristics of generations among the elderly which fits as well to the presented literature as it suggests that these generations hold certain specific characteristics inherent (Egri & Ralston, 2004). Some even use the differences between Digital Natives and Digital Immigrants according to Prensky (2001a) within their respective expertise area. However, while differences of customer segments may and indeed also do vary from company to company, the empirical findings of this study also show integral differences in how these different segments are created, starting for instance already with different definitions and perception of the age range of the elderly. Literature proposed a rather clear definition as most studies define it according to the UN (2019; 2020). Nevertheless, with an increasing population ageing this definion may also be further discussed and adjusted.

MSPs further also face challenges with user research for the elderly as it is more challenging to get user data from elderly people because they seem to be more concerned about data protection issues than younger users. This matches with what is said in literature about elderly people being more concerned about safety, security, and privacy issues related to technology (Hanson, 2010; Kakulla, 2020; Peek et al. 2014). A lack of user data can complicate user research and hence the whole development process of a mobility solution for the elderly.

Next to user research, literature also argues that testing is especially important for the development process of technology for elderly users (Schulz et al. 2015). Furthermore, testing was incorporated as an integral component also in the STAM as *Experimentation & Exploration* (Renaud & van Biljon, 2008). These studies seem to confirm that statement, as all respondents consider permanent user testings and feedback collections as an important phase of the development process. However, some respondents say that it can be challenging to include elderly people in user testing and that young, mobile-savvy people are more interested in technology tests and are easier to reach. This can be linked to what is said in STAM about elderly people showing often no interest in learning new technology as they consider it as too complex (Kim et al, 2016). The challenge of including elderly people in user testing can also make the development process more difficult and the inclusion of more younger people in testing can explain the lack of consideration of the needs of elderly users in digital mobility solutions.

Following Mynatt and Rogers (2001), some of the respondents of this study say that it can be challenging for a young app developer to develop an app for elderly users as the needs and experiences of those users can differ widely from their own. However, respondents argue that the challenge could be solved by integrating elderly users in the technology development process or by using appropriate development methods like personas or user stories. This aligns with Lee (2014), who says that identifying the needs of elderly users and involving them in the development process is important to overcome the challenge of the age difference and the different needs and characteristics between software developers and elderly users. Nevertheless, it could be argued that this needs to be further verified also with a progressing population ageing as according to the UN (UN - Department of Economic and Social Affairs, 2019; UN Economist Network, 2020) soon fewer young people will care for more and more elderly people. This could result in more complex customer segments and fewer people that monitor them. Furthermore, these statistics would lead to a workforce responsible for creating and developing solutions for a large group of elderly that is generational also part of the by Prensky (2001a) defined Digital Immigrants, while those in the workforce would be Digital Natives. Here the "Digital Immigrant Accent" (Prensky, 2001a) could further challenge the efficient targeting of the segment of elderly as there is a difference in processing information between Digital Natives and Digital Immigrants. One respondent (R8) already in this study described his experiences with a similar situation in which he as a Software Developer could not fully relate to the needed system design by the elderly.

Considering the development process it can be said that MSPs are aware of the importance to include elderly people more in the development process of the digital product. User research and testing are considered important phases for the development process, which aligns with what is said in the literature. However, the main challenge for companies seems to be that elderly people are hard to reach and hard to include in the development process. Furthermore, companies seem to struggle to define an appropriate development process whilst also ensuring profitability.

5.3 Learning, Education and Support

The empirical findings regarding the learning, education and support features in or in addition to the product or service differ largely within the empirical findings. While some offer continuous face-to-face support and guidance also in general technology questions, others doubt the impact of educational features or services. The presented literature takes over a rather clear position, arguing that education is especially for the elderly of high importance and can lead to successful adoption of technology (Aula, 2005; Czaja et al. 2006; Seifert, Hofer & Rössel, 2018; Wang et al. 2010).

From the presented literature, an exhaustive and constant level of educational support should be provided to the elderly to strengthen and ensure a successful experience with new technologies (Wang et al. 2010; Czaja et al. 2006). If educational training is not provided, the STAM further holds also a "non-conversion" component which would indicate that according to the STAM also a non-adoption is possible if no education is ensured (Renaud & van Biljon, 2008). For MSPs, this would mean that various educational training or features would become necessary to provide in and outside the application (Chen & Chan, 2014; Yoo, 2021). Further, literature provides a more structured approach by evaluating and validating various kinds of educational support services and by concluding that slow-paced training sessions, as well as in-group training fostering peer-learning or supported individual learning, would have the highest

efficiency for technology adoption for the elderly (Chen & Chan, 2014; Yoo, 2021; Leung et al. 2012; Tenneti et al. 2012).

The empirical findings of this study show that the practice field seem to have lack of a clearly structured approach based on the provided literature. One interviewed MSP project, mobisaar (R7 & R8), seemed to have followed a similar approach to the presented literature. Various in-person workshops were conducted as well as a fostered peer-to-peer learning sessions. These however were not further mentioned by other respondents despite their rather integral part also in the STAM. Despite being aware that educating the elderly seems to be important, only very few actually provide effective training to the elderly. Various offer one-time introductions to the app or in-app guidance but only very few indeed provide a structured learning approach.

This gap between literature and empiricism may have different reasons. Firstly, despite the proven success of training by research, one respondent (R6) still doubts the overall effectiveness of training elderly users to use the app as according to his belief, the app would never become the preferred channel for them. It would thus be irrelevant to train them for a service they would not enjoy using. The same respondent however further elaborates that he has not researched the target group himself and also that his company were not focussing on user research for this target segment. This seems to show that this respondent may have not studied the existing research which seems to contradict his standpoint. As his view differs from all other respondents, one may argue that the topic of education should potentially be extended to also propose educational training with product managers and software engineers in companies that create products for the elderly. This could increase awareness as well as enhancing the technology adoption options for the elderly.

Secondly, the proposed solutions for training purposes by the literature seem to suggest resource-intense operations. Recurring in-person training is seen by most respondents as a high financial burden for the company making it less profitable so that alternative solutions are needed. Here, the peer-to-peer approach of the STAM could be further explained and strengthened by companies potentially. Not all elderly users need to be trained in person but STAM suggests that especially the peer-to-peer component could increase the success of technology adoption for the elderly (Kim et al. 2016; Wang et al. 2010). Furthermore, one respondent (R1) mentioned that partnerships with institutions for the elderly could foster this approach which also led to partially saved costs. Nevertheless, the costs of training and educating the elderly seems to be significantly higher than for other customer segments which seems to result in big challenges for MSPs. Further research for effective learning approaches in practice could help companies to use their resources more effectively.

5.4 Perception of Ageing

The empirical findings of this study showed that potentially even among mobility experts and practitioners stereotypes of ageing may occur. These findings can be seen as partially worrying as the underlying literature identified negative stereotypes as an integral hindrance for technology adoption (Lee, 2014; Mariano et al. 2021; Moschis, 2016). This may even become more significant when stereotypes not only from the general public influence the experience and behaviour of the elderly but by those that are developing the product.

Research suggests that especially negative stereotypes have the potential to impede a successful technology adoption by elderly user groups (Chasteen et al. 2003; Lamont, Swift, and Abrams 2015; Mariano et al. 2021). The empirical findings suggest that also in the case of this study, certain negative stereotypes may have been detected. Here, especially those that have not had further exposure to research or further user research of the specific target group seem to tend more likely towards negative stereotypes. This seems to suggest a similar view of the general public potentially. These empirical findings could be the first indication of a potential stereotype threat. The findings however seem to also suggest that with increased education of the user group of elderly, fewer negative stereotypes occur. A potential idea could thus be to use educational training with product managers targeting the elderly or a co-creation approach which includes a close collaboration with the elderly to prevent the development of negative stereotypes.

Further investigations must however be conducted to fully confirm stereotype threats. The empirical findings of this study however should be significant enough to argue that further research in these areas is necessary as literature has already provided proof that technology adoption can be hindered by them. Companies and organisations that aim at providing services or products targeted at the elderly should proactively engage themselves against them especially when working more with personas and user stories than with co-creation approaches as these could also be impacted by potential stereotypes.

The exposure could also be further influenced by the chosen product development style. If personas and user stories are built without extensive user research, as some respondents of the interviews seem to do, stereotypes may have a larger impact on the overall product development process and thus also on the product. From the empirical findings, some respondents seemed to create personas very thoroughly and detailed on the one hand, however also do not use extensive user research for their initial creation. This process in general may be rather subjective and more limited when trying to display a comprehensive view of a user group however it also seems to be rather vulnerable especially also for subjective perception of ageing or stereotypes.

5.5 Other Identified Challenges

The interviews showed that for many MSPs next to challenges on product or product development level also various strategic challenges occur. These discussed topics were only partially covered by the literature review from STAM and its derived challenges and implication in practice.

The empirical findings show that all respondents are aware of the presented megatrends of population ageing and urbanization. With the underlying research and statistics provided from the literature, these megatrends are thought to have long-term and strategic implications (Grundy & Murphy, 2017; UN Economist Network, 2020, WHO, 2015; OECD/WHO, 2020). These insights provide a strong basis for developing strategies and visions in practice especially for those organisations that have a long-term approach. Here, it was expected that for example start-ups or younger companies may show a lower integration of these megatrends into their company strategy than larger companies as the focus may be more on market entry at this stage. Public companies especially were expected to have potentially larger awareness and integration of these strategic megatrends, as their market lifespan and survival is nearly ensured by public entities which enables them to potentially have a more strategic view. The empirical studies however showed that while all are aware of the megatrends on a personal level, only very few

had actually integrated the market changes into their company's strategy or vision. Only one (R1) indeed shared that they adjusted their strategy to also tackle challenges in regards to the megatrend. This respondent comes also from a public transportation authority. While this result as well as the general sample may be too small to generalize any findings, the empirical findings of this study suggest that there may be integral differences in the strategic perception of this topic from a public or a private point of view that should be further discussed and explored.

From the empirical findings, public MSPs show a higher awareness of current and upcoming megatrends and often focus also on their societal obligation to the public. Their strategic aim focuses on providing mobility service for everyone which seems to result in mass-market targeting. They mainly struggle to now approach specific target groups but do not further worry largely about lucrativeness or profitability of the market in general as their business model is based usually on taxes.

For private MSPs however, the key question seems to be on the financial market valuation. Most respondents from private MSPs value the market as rather unattractive in terms of profitability which seems to be one of the biggest drivers of the lack of private MSPs offering a mobility service for the elderly. Research seems to partially contradict this valuation as various staistics of recent years suggested a steady growth of smartphone owner and user, suggesting a possible growing digital literacy (Koptyug, 2021; O'Dea, 2019; Pew Research Center, 2015; 2021). Also one respondent (R8) during the interview shared that he believed that the digital literacy significantly increased throughout the last years. A concrete financial valuation if these experiences and statistics however have so far not been provided. The actual monetary value of an elderly user in comparison to a younger one in terms of online advertisment or click rates however have not been further investigated in this study. Also, the financial doubts may partially be also displayed by research as well, as the STAM, in contrast to the TAM, holds a *non-conversion* component as well as a *intention to learn* component indicating that the authors do not expect all elderly users to adopt to technology (Kim et al. 2016; Renaud & van Biljon, 2008). While this financial motivation could be seen as apparent for the private market, one of the key target groups, the elderly, seem to lag behind as research clearly concludes that new mobility services enabled by technology would improve the quality of life of elderly people immensely (Battarra, Zucaro & Tremiterra, 2018; Cirella et al. 2019; Stein et al. 2017). These services however are so far mostly provided by private MSPs and not necessarily by public ones. While some private companies serve this target group with non-digital offerings like call centres, most respondents argue as well that their new mobility service could only fully work when also a technological user interface is used. So, it seems as if the lack of technological adoption by the elderly results in a lack of integration in smart mobility services suggesting that one can indeed be too old for future mobility.

One can however only criticize private MSPs to a certain extent. Their obligation logically lies more with their business success and not necessarily with societal and sustainable goals. Politics could thus play an integral part to fully tackle the challenge also companies face when trying to provide service to those that have issues with technology adoption. Regulation and guidelines could be in place aiming at integrating all to a fairer playing field and to incentivize also more innovative private MSPs to focus on this large target group. This however would not only be achieved by compulsory WCAG guidelines but by more comprehensive approaches and strategic investments in education, infrastructure and research. The most efficient approach has however so far not been further investigated. Research could play an integral part to support policymakers in finding the best approach to ensure an appropriate measurement that includes

private MSPs, PTAs, the elderly and research respectively to find a solution for an ever-growing part of our society.

The identified challenges of integrating the needs of elderly people into products of the urban mobility sector seem to exceed those that have been identified by research. A more exhaustive perspective seems to thus be necessary. Furthermore, research so far focussed dominantly on the user perspective which leads to a potential lack of integrating a business perspective of the topic of TAM and STAM and how it can be put into practice.

5.6 Discussion Summary and Implication for Research

When comparing the empirical findings of this study with the presented research in the relevant fields, many overlaps can be explored. It thus seems as if many challenges that have been identified by research, seem to be indeed also challenging in practice. Nevertheless, the practice seems to not fully incorporate suggestions that have resulted from intensive research. Many practitioners thus seem to not be aware of certain frameworks or guidelines and, partially seem to align with research only with further incentives or regulations imposed by policymakers. A potential reason for this could be that research may have overlooked challenges that have been identified in this study. These challenges could be described as strategic challenges that organizations face when aiming for the digital inclusion of the elderly. So far, it seems as if research mainly focussed on implications on practice from a user-centred point of view derived from the widely accepted TAM and STAM frameworks. These frameworks however focus strongly on what is needed for users to ensure technology adoption, while it gives no further indication on how practitioners should incorporate their needs. Using solely the TAM or STAM as a basis to derive implications may thus lead to an incomprehensive view of the challenges and might be the reason why this discussion led to the identification of additional challenges.

From the empirical analysis of this study, an overview of connections and dependencies between identified challenges that companies can face and the successful technology adoption by elderly people could be derived. The overview is illustrated in Figure 8.

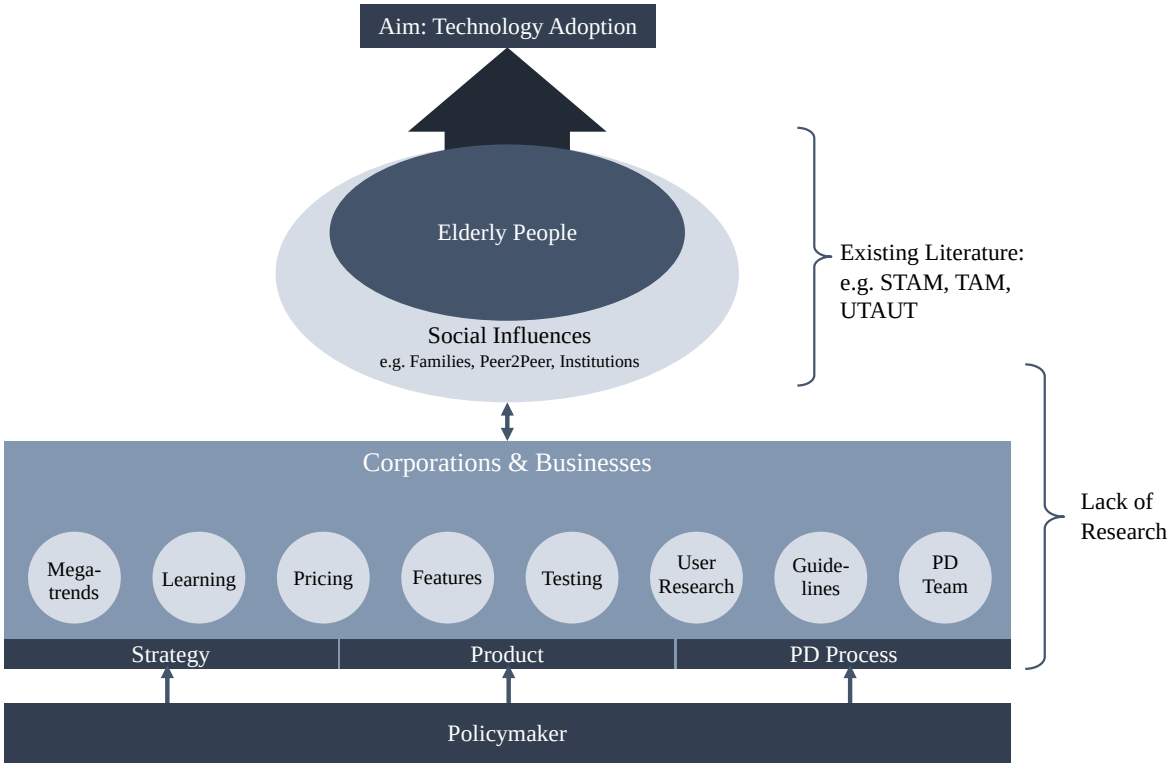


Figure 8 Discussion Summary Overview

The overall aim is to improve and ensure a high level of technology adoption for the elderly for which the existing models of TAM and STAM play an integral role. As the adoption is performed by the elderly, they clearly become a core element of the adoption model. Literature however further suggests that the role partners and social contacts have an increased impact on the elderly so that the model shows a strong linkage and potential dependency between both. This social layer could include family, friends or also retirement homes or other institutions for the elderly that could improve a peer2peer learning process according to STAM (Czaja et al. 2006; Wang et al. 2010). The presented STAM and TAM models do not further analyse other connections or dependencies with other players of this model. Other researchers derive implications for businesses according to STAM, ranging from the presented technology design, process development, learning and perception of age (Lee et al. 2013; Lee, 2014; Moschis, 2016). These however seem to not fully provide a comprehensive view of all challenges companies face when further consulting the findings of this research. The empirical findings seem to show that further challenges do not only occur on a product or development level but also on a strategic level. Furthermore, from an entrepreneurial point of view, also the political level plays an important role in representing regulations and laws. This level thus also directly influences the elderly and therefore the technology adoption as well.

It seems as if the topic of technology adoption should take over a more holistic point of view as it seems to be only successful if all components play along. Technology adoption is at its core highly user-centred and user-dependent but also other factors play an integral part. This user-centred layer seems to have been studied extensively by research while other implications seem to have been overlooked. However, in the case of the mobility market and the empirical findings from it, it seems to be as if most respondents are aware of various components of the

STAM or TAM while there are too many entrepreneurial and managerial business challenges preventing the market to be more digital inclusive for the elderly as well.

To facilitate future research in these fields the identified challenges of businesses could provide a helpful basis. The empirical findings suggest extending the challenges that have so far been identified by research with a more strategic view. The following figure shows the division of challenges into three general business layers, namely *product development*, *product* and *strategy*, which could be used for further research and testing of hypothesis about the topic.

Figure 9 Layers of Technology Adoption for Companies

The conducted interviews within this study show that companies seem to aim at integrating the needs of the elderly on three different business layers: within the *Product Development Process*, within the *Product (Features)* and on a *Strategy and Vision* layer. This structure was developed based on the discussed topics during the interviews and they represent three different viewpoints of "integration". The strategy level focuses on long-term topics and shows how the elderly, as well as closely related megatrends, play a role in the future strategy of the company. The product development layer takes over a more internal, operational and short-term approach and considers all steps within the current product development process of a company and how it was adapted to integrate the needs of the elderly. The product level holds a position between the layers as it can be considered more strategic than the product development process but less strategic than the vision. It includes all features and customizations of an existing product or service and how it serves the needs of the elderly.

In all conducted interviews, all three layers were further discussed so that a respective model was derived which holds a more comprehensive overview of the challenges companies face in terms of technology adoption for the elderly. The following table further explains the delimitations of each layer. Each identified challenge by literature as well as the newly identified challenges from the empirical findings of this study can be rearranged so that a more comprehensive view is developed. Challenges in the field of User Research or within the Product Development Team (representing the potential age dilemma) could then be included in the Product Development layer which could lead to more focussed research approaches. The testing of existing digital accessibility features as well as support and education mechanism for the customer or end-user would be added to the Product Layer. All strategic topics including, for example, megatrends and the market evaluation would be part of the Strategy Layer. Table 7 further displays how the identified challenge topics can be mapped to the proposed new research structure.

Table 7: Mapping Table of Challenges and Layers

Layer	Sub-Layer
Product Development	Including topics like: • User Research • Guidelines and Frameworks • Product Development Team • Testing • Learning, Education & Support (for the product development team)
Product	Including topics like: • Digital Accessibility Features • Pricing • Learning, Education & Support (for the user)
Strategy & Vision	Including topics like: • Awareness of Megatrends • Company Strategy • Market Evaluation

With these approaches, further research in technology adoption from an entrepreneurial point of view should be facilitated as a more precise focus can be initiated. This proposed structure resulted from the in-depth empirical results of this study. This structure could thus be adjusted and further specified with further research on the topic at hand. As a result of this, the proposed model further was developed on a more high-level approach to allow a certain structural approach despite the complexity businesses face in this.

6 Conclusion

6.1 Research Question and Key Findings

Technology adoption is a complex problem that requires the alignment of various factors to succeed. Especially however for elderly people, adopting new technologies is seen as particularly difficult due to many internal and external factors. Despite the complexity, efforts to increase the digital inclusion of the elderly is seen as crucial to prevent a spread of the digital divide especially as population ageing is going to increase the share of elderly generations in upcoming generations.

Technology adoption however mainly focuses on what is needed for users to bridge the gap towards digital literacy. The topic has so far been only scarcely translated to the implications product development teams have in order to improve technology adoption for their customers. The purpose of this study was thus to describe what challenges organisations face when developing digital products or services for elderly people by comparing the identified issues by research with newly conducted empirical findings. In the case of this study, the focus was set on the mobility sector as it provides on the one hand an integral service that provenly improves the quality of life for the elderly, while it on the other hand has seen a large digitalization over the last decade which created many new mobility services that are thought to bring large benefits also to the elderly. The research question at hand was thus set as following:

What are the challenges when integrating the needs of elderly people into digital products of the urban mobility sector?

Interviews with nine experts in the field of either gerontology and technology adoption or from practice working for MSPs were conducted to collect relevant data aiming at answering the proposed research question. Based on the empirical findings of these interviews, it is suggested that many challenges described in practice have also been identified by literature.

The business standpoint however is argued to not have been captured appropriately, so that a new research structure is proposed, which aims at helping to integrate technology adoption approaches on a company-wide perspective. This newly proposed structure also holds the identified challenges by literature but rearranges it to allow a more comprehensive view for organisations and future research in this field.

The identified challenges can be displayed in the following, structured according to the newly proposed model:

- **Product Development**
  While literature strongly suggests that user research and a user-centred development approach are necessary to create a product or service ensuring a high technology adoption of the elderly, many MSPs seem to struggle mostly with properly integrating the needs of the user group of elderly into their product development process. The key drivers seem to be the lack of resources and the lack of user-centricity also in their internal organisations. Furthermore, targeting the elderly as a non-elderly seems to be challenging for many while also stereotypes seem to influence decisions on this level. Trainings not only for the elderly but also for Product Managers and Software Developers could be helpful.

- **Product**
  Literature has contributed largely to the field of accessible design resulting in many derived frameworks and guidelines also for practitioners. On this level, the study showed that many face challenges when choosing the appropriate technology or system design as well as effective educational training for the elderly.

- **Strategy**
  The strategic layer has so far not been a focus of research, resulting in only a little literature even though the empirical findings of this study suggest that this might be one of the key areas where organisations decide against further endeavours towards digital inclusion of the elderly. Market evaluation and a potential cost issue are identified as key challenges in the course of this study.

The proposed new model could be used to further investigate the challenges and implications of technology adoption frameworks and research for organisations.

6.2 Future Research & Limitations

This study identified different challenges that companies and organisation in the mobility sector face when integrating the needs of elderly people into their services. Future research should further explore the identified challenges in more detail.

A focus of future research should thus be set on further examining if the age of product development teams influences the outcome of product developments especially in the case of digital product for the elderly.

This study moreover showed that the education of elderly people regarding technology is important but it seems that the best approach has not yet been identified which results in challenges for companies. Therefore, future research could focus on further exploring which educational methods are most effective for elderly technology users.

Furthermore, future research could explore in more detail if stereotypes towards elderly people present a problem in product development teams, which so far has not yet been a focus in research. This could especially be important for the upcoming generations as there will potentially be more elderly than younger people according to the presented statistics.

The proposed models further also showed an overview of the market dynamics between the elderly, companies (public and private) and policymakers which especially in the mobility sector seems to be rather complex. The influences and implications of this playing field should be further explored and researched to better understand which measurements could be most beneficial for the elderly and society.

Further, as in this study mainly experts of mobility companies in the public sector were interviewed future research could moreover set a higher focus on the private mobility sector to further explore the different challenges they face regarding elderly people.

Appendix 1 - Interview 1 (R1, R2)

Participants: Aleksander Bjorøy, Bjørn Klimek, Theresa Elbert, Sophia Schimpgen
Company: Skyss
Date: April 28th 2021
Interview Length: 53 minutes
Language: English

Row	Person	Transcription	Code
1	Researcher	Okay, so first of all, can you please both introduce yourselves shortly with your name and the role you have in the company and also shortly explain the projects you've worked for.	
2	R1: Aleksander Bjorøy	Do you want to start?	
3	R2: Bjørn Klimek	No, you, please.	
4	R1: Aleksander Bjorøy	Okay. So, my name is Aleksander Bjorøy. I work for the PTA [*Public Transport Authority*] in Bergen, Vestland County, which is a very large, a large county of about the size of the Netherlands. But it's only about I think we're about 700,000 people, something like that. There's not a lot of people in the area. My role is that I work with developing both existing mobility services, better specialized in on demand or demand DRT [*demand-responsive transport*] systems, especially focusing on people in the rural areas, as well as people who is not available to use the existing fixed system. And I'm also involved in different groups, nationwide groups as well as discussing these, these questions. So say it's mine. I say it's mine the concept side of developing these services.	
5	Researcher	Okay, thank you.	
6	R2: Bjørn Klimek	Yeah, about me and Bjørn Klimek, actually working in a consultancy, called Multi Consult. I have a research background, was working with transport research. But now working for a consultancy, and my main area is innovation and business development in mobility, but not only mobility, and in particularly pilot projects. It's where science meets business developers - getting new innovations into the market. It's where I'm working. And yes. For this year, in 2021, I work together with Aleksander in his company, *skyss* actually developing pilot projects in a network that we call *Must Mobility Network* for smarter transport. So that's my relation to Aleksander and my background.	
7	Researcher	Okay, thank you - very interesting. I would then go into a general question regarding elderly people. And just going to ask how	

		aware you are at the moment of the aging of the population. And also, if it's a topic that is discussed in your company.	
8	R1: Aleksander Bjorøy	Yeah - we're very much aware of the aging in the population. And it is definitely a topic that we discuss. There's an aim from so. So, there's different participants such as, right, so we develop the mobility service, but we don't really, it's not the customers, it's the municipality and the government who's actually responsible for the customers. You know, the population and we develop the mobility service on behalf of them to say it that way. But there is a name that we should try to develop our society in a way that elderly can stay at home longer. That we can give them the sufficient help they need in order to be able to stay in their homes, and not having to go prematurely into healthcare facilities, elderly homes, etc. and the mobility service is a specific tool that we can use in order to meet that issue. So, one of the things we are working on is one of the challenges we have is how do we actually measure if an increased mobility service actually has an effect on elderly being able to stay at home longer. We are working on that and we are working on a new strategy that says that… Just to take it from scrap from our old strategy says that we should develop a mobility service where most people use it. So, we'll try, we're trying to develop mass transport solutions for the big crowds in order to reduce number of private cars on the road. We are working on a new strategy now, that is saying that we should develop mass transport and try and meet the crowds. But we should also develop mobility services for those people who actually can't adopt and doesn't have an offer from the ordinary, the fixed with the mass transport system. And among these is, the aim of this is also to try and meet the elderly, so they can participate more in society and actually use their skills and help us develop in general. Big answer for just a small question but again, you get a picture of how we think about trying to reach out to for the elderly. This is a new strategy. It's not it hasn't gone through all the paperwork still, but we are working towards that direction.	+Strategy
9	Researcher	Okay, interesting. And so elderly people are also included in that strategy.	
10	R1: Aleksander Bjorøy	Yes, yes.	
11	Researcher	Okay. And you said that the demands come from governments and municipalities, does that mean that they reach out to you about what is needed? by their citizens? Or how do you find out what the needs are?	
12	R1: Aleksander Bjorøy	So basically, we haven't found a good method in order to combine the needs of the elderly with the mobility services. What we have done in a project I'm working on right now, is that we took some, we had, we did some objective measures, to see how good the mobility service was for the group elderly 67 Plus, in specific areas in in Bergen, that's the main city in Vestland. And what we did is that we combined, we got a list of all the elderly in that in specific areas, we combined walking time to the closest bus stop, and with the frequency on the buses per serve that bus stop. And	DP-S DP-UR

		we also increased the walking time. So we made the assumption that elderly people walk slower than the young people, right. So walk slower than what Google Maps normally say that he would walk and from that objective measurement, we found that Okay, so there is a demand for you know, there is actually a demand to develop a better mobility service for these people in this area. Does that sort of explain our approach?	SPA
13	Researcher	Yes! Thank you. Can I actually ask the question - you mentioned earlier, I think it was 67 plus. How do you come up with the 67? Because I think the UN as well as the WHO for example, they always define elderly with 65 plus? What are the reasons for your definition?	
14	R1: Aleksander Bjorøy	The reason we use it is to actually - well, one is that in order to buy the, you know, the ticket for the elderly, the bus ticket for the elderly in our area, and that is set at 67 because it's also the normal age where you retire, you can get to retirement here.	DP-UR
15	Researcher	Interesting. Okay.	
16	Researcher	And you also said that, for example, elderly people walk slower than younger people and that you consider that fact. And but do you think there are other characteristics that differentiate elderly people from your younger customer groups?	
17	R1: Aleksander Bjorøy	When it comes to the mobility in itself? Well, the biggest challenge when it comes to the elderly, and I guess this is what you want to get into is the technology of the new services. What we see is, I'm not really sure if I'm getting the question, right is, you know, the characteristics of the elderly in terms of the mobility or the actual understanding of the services, etc? Because it's both relevant, right?	
18	Researcher	Yes, I would say both.	
19	R1: Aleksander Bjorøy	Okay, so I'm no expert in, you know, how people age so I'm not going to get too much into that. What we've learned from the pilots we've done and from what I've read from other pilots and learned from other pilots in Norway is that, so, when it comes to the mobility services, the DRT services were setting up in order to actually meet customers or to be able to do to pick them up where they live and drive them to where they need to be or not, you know, setup bus stops, is that the elderly, they don't use the mobile application in order to get the bus, they call, so we set up call centres for them. They did a big study in Oslo, or they have a big pilot in Oslo, where 92% of everyone traveling with the buses is 60 or more where the target group is 67 plus there, they call in order to get the bus. So that that's one of the big differences with elderly and the youth. Because when you have the opposite, when the target group is youth, 90 something percent would use an app or mobile application in order to get the bus. The other thing we've learned is that we have issues; we have difficulties reaching out to the elderly with digital information. So	DP-T DP-UR TD-AF DP-UR

		when you order these kind of flexible systems, so flexible buses, we have to put in some flexibility in the systems in order to actually serve as many customers as possible within a certain limited timeframe. And we normally we are so far the systems, it only allows us to reach out to the customers via text messages. Or they don't really pick these text messages up, they don't really notice them at all times. When the bus doesn't appear at the scheduled time, without degree time, even though we have informed them that it will be five minutes slower or later, they get very uncertain. And they don't like that, you know. Well, they feel uncertain about it. So, in some areas, we've actually noticed that the elderly people want the fixed routes back even though they with a on demand transport system, they can get the bus within 10 minutes, they want to go back to the fixed routes where you had like hourly service and maybe a bus every two hours because it's more predictable for them. And that has been sort of like the main observation we've done so far.	LES TD-AF DP-UR DP-UR
20	R2: Bjørn Klimek	And that's what we're talking about in this innovation competition. That's out now. We try to get in touch with business developers, innovators that can develop such a tool for elderly people that are not used to use mobile applications.	DP-S
21	R1: Aleksander Bjorøy	That's exactly the thing but because we don't really have the answer. That's why we have this tender out because we want someone to - we want to help someone come up with an answer because there's a great market. I do have contacts around in Europe and also in America. And it's the same issue everywhere. It doesn't look like anyone's found like a decent solution for it yet. And it's not just about you know, not wanting to learn how to use the mobile applications either is that like, like something when you grow older, you lose – as I said, I'm no expert in how people age, but I know when you grow older, you use sensibility in your hands, I think it's because you get less blood in the blood flow is reduced when you get older. And that also makes it more difficult actually to use smart applications, right? So it's not even just about, you know, creating a more age-friendly application you need to develop a more age-friendly *something* because it's difficult to use the smart devices just physically. So it's quite a complex situation really.	DP-S SPA
22	Researcher	Yeah, that's also what we've seen from our research. So, we've seen various dilemmas, basically, when you really look at the topic because in a way, also how you basically phrase your challenge as well by saying that elderly people don't use digital apps. But we also digital that we, we want to make them basically use them. So the question appears: how can we actually make them accept technology a little bit better? But we also see, for example, when we have now started researching that we have digital immigrants and digital natives, as big buzzwords. But if you actually see that in this context, you see that at the moment, or it starts now, that the elderly people that have now retired, and they're not part of the workforce anymore, so they don't actually are part of	

		developing products anymore actively, they are now seniors or retired or elderly. And the ones that actually create products are dominantly digital natives. And we see that the market is currently dominated by digital products. Product designer might see the big benefit of the service itself without thinking about the differences of how technology is perceived and adopted. Interesting is also when you say that you want to create products that are for a mass market, and the elderly are still perceived as some sort of a niche market. When looking at population ageing, it is debatable whether this is actually true. So, why does Google, for example, not have some sort of a walking speed option for elderly strategy in there as well? It will be a huge market. And that market will probably also be quite interesting from an economic perspective, because there's also quite a lot of money potentially, as well. So that's actually quite interesting why that's have not really been such a focus as well. Also from your perspective that it just started to also be integrated into your strategy. So, regarding your competition. Have you already had a lot of projects that have applied for your challenge. So do you think it's basically just start, but have you already had some applicants? Or how many people have already had some great ideas? Do you have some insight today?	
23	R1: Aleksander Bjorøy	We have not come so far. This is a still ongoing competition. And we get some responses from them, too. We will have to wait until the 14th of May, I guess. Yeah. But there hadn't been officially one of the you know, the one of the developer companies that develop the backend system for these kind of flexible services, and they got in touch with me. It is a French company. And it was funny, because, you know, he contacted me and said that, you know, we have this exact same issue. And they have several pilots in France, and some in Sweden as well, because they collaborate with another bus company. But they have the exact same challenges. And they're looking for companies who actually investigating this issue, right? Because they want to develop something to pay their debt, they need to be able to test it on the market.	
24	Researcher	Do you look there a little bit also into the research, because I think especially also regarding the needs, especially for technology acceptance for senior people or for elderly, there has actually been quite a lot of surveys and research. So we already know, for example, in regard to UX UI design, how to design it properly. Have you had a look at that? Has that perhaps been some source of resource for you?	
25	R1: Aleksander Bjorøy	No. So, as I said, I work closer into sort of the concept, right? So I don't go too deep into the technology. And that's what we're trying to outsource with the tender that beyond a should we want someone to develop that for us. So, but it is a nightmare.	DP-S
26	R2: Bjørn Klimek	You mentioned a senior acceptance. Is this topic about acceptance? Or is it more usability? As I understand these older	

		people are not able to use these existing solutions? Maybe that's why they don't accept these solutions.	
27	Researcher	I think so what we've seen currently from a research point of view is that it has been quite a big topic also in research. So, we have one rather big technological part, which is called the TAM, which is the technology acceptance model where they research how people actually start to accept a certain digital product and how they actually adopt to that product as well. And that has proven to be rather helpful also when it comes to product development. And that has already been adapted to some sort of a senior technology acceptance model. So it's basically some sort of a framework or theoretical model. And that model when it's adopted to seniors or elderly is much bigger and more complex. So it has a lot of new steps where it's more about not only the ease of use, but they also have to be educated, otherwise they don't really trust technology that much. So therefore, there are a lot of things that basically then are part of that model. But a lot of current mobility players, they seem to only focus potentially on the technology acceptance model, which is a little bit leaner and smaller. And therefore potentially, the research could provide some sort of a solution support. But at the moment, the market seems to not really have a decent solution there as well, because apparently, a lot of people still think that elderly people would not really use digital products. But we can also see that at the moment already 70% of elderly people actually own a smartphone. And therefore, we see that we do have a market of people that have smartphones, but they use it differently. So potentially, we just need to have a digital product that serves their needs in a way. That's basically what we saw in the research so far that there has been already quite a lot of research, but the market seems to lag behind at the moment. But as we've already discussed, there's so many dilemmas, you cannot really serve it all directly. And in the end, you probably really need to have a person trying to educate people on how to actually do it. And that's, of course, also a resource problem, as well as, you cannot just have like an icon, explaining how an app works, you probably really need to have a person doing that just to have the trust level, potentially or so.	
28	R1: Aleksander Bjorøy	The latter is one thing we actually include in our projects, the workshops, so, you know, giving them the opportunity to learn from someone else how to use the products, but we do set them up so that they can, you know, when they order the bus, they can phone them, because we don't really you know, our experience show that the majority doesn't use the application of is there. Even though if we, you know, set up some sort of workshops, etc.	LES
29	Researcher	Yeah, it's not on top of their head, that’s interesting. So you're actually at the moment, we have a resource there that would help them basically set up anything or help them still have that, right.	

30	R1: Aleksander Bjorøy	We're working on a pilot project that's going to start this year, especially for elderly, and they're the aim of the project there is to do it that way and we've done it in small scale and on different projects, but due to COVID-19 has been difficult to actually reach out physically to the to these to the target group. So, the last you know, couple of two years, which is quite a bit of you know, the development of the kind of smarter flexible systems says the difficult to reach up to this group.	
31	Researcher	And how do you plan to promote that service?	
32	R1: Aleksander Bjorøy	So, potentially, we are reaching out. So, there are different sort of like elderly services, we are collaborating with, so for example municipalities who actually run all the servers is there you know. IT. The people living in the municipalities, it is actually the municipalities responsibility directly, right? So, they organized - they have sort of like volunteer activities to have specific activity centers focused on elderly. So, we are getting in touch with those kind of institutions to try and get in touch with them directly. And we use normal information such as you know, we don't really market it at the digital level that much but we go to the paper and we sent over leaflets etc. And we are also trying to establish some sort of a focus group representative of the target group who can help to adapt some of the things in the parlor such as opening time, you know, we know that we can run for eight hours. So, when should it be open? When is the actual demand? When is the biggest demand? As well as the flexibility of service - should it be quite flexible in order for us to serve as many people as possible? Or should it be quite rigid so that it becomes more predictable? So we want to get them to actually be able to affect the way we build up the pilot.	LES DP-S DP-S
33	Researcher	Okay.	
34	R2: Bjørn Klimek	And finally, we use this pilot to test these solutions in real life settings. This is part of the competition that is out now. So getting in touch with innovators who can develop such a solution, then go further to test this solution in real life settings. And that's a collaborative learning process.	DP-T
35	Researcher	I read about a project you did in collaboration with spare. I think that's one of the on demand projects you work for. Could you shortly also tell us about this project and whether you already have results from it?	
36	R1: Aleksander Bjorøy	Okay, so that's a project outside Bergen is a place called Oda one of the Fjord cities, with about 5000 people, and we are currently running that project as well, we are, but we did change the focus. So what we did there is that we actually replaced the local fixed routes, completely with a on demand transport system, right. And our aim was, basically our aim was elderly and youth. So people in this area who is not able to use a car, the topography in this area is quite the challenging because it is basically a fjord town. So in between the you know, from on each side of the town, it's, you know, various deep, you know, 1000s something meter	

		mountains. And people sort of, you know, live on the hillsides, the mountain sides, so it's quite difficult to drive where you can't drive to address with a big bus. So we found out that we had to do like a bus stop the bus stop sort of service. And from that project, we learned that, you know, if we want to develop this kind of services for the elderly, we actually had to adapt it more, it's to be more door to door kind of service because it just became too unpredictable for them. So what we've done is start with actually amended the service with putting back the fixed routes in the opening hours where most of the elderly wanted to travel. So that's the feedback we got from them. And we've just kept it open the DRT system, we've kept it open in the in the afternoon and evening, wherever most of the youth travel. So still running, there's not really focusing on elderly anymore.	
37	Researcher	So, if I understood it correctly, so you do already started to test the on demand transportation idea. For elderly this was not really very well accepted. So, you went back to the fixed routes?	
38	R1: Aleksander Bjorøy	So for this concept, yeah. And what we've learned is that when.. So you have to remember, that when you develop a mobility service, a mass transport service, you don't necessarily have a specific target group, right, you try to reach as many people as possible. And this is how our mobility service and most you know mass transfer services are built. They don't really target a specific group. So, this is a whole new way for us to actually introduce our services to actually go into specific target groups. And the new technology with demand systems is allowing us to reach out to the people we've missed, or to the people we didn't reach actually get with the mass transport systems. It's especially towards people who are not able to use the public transport system in general. So it's also in the in the urban areas and the rural areas. But in general, also in the rural areas, which, you know, obviously, no, it has a lot of Sweden as well. In general, the mass transport system, so the fixed system doesn't really work. Because you get in, so you get 6 departures a day with, you know, three people on board doesn't really encourage us to, to put in, you know, another six, right, because there's hardly any people. And the reason for that is that there's not a lot of people living there, but they still need a mobility services. So you make sort of like a halfway service. But what we've learned is that, okay, so we can make general on demand services, which are quite flexible, quite efficient. But if we want to go into like a specific group, and maybe like, especially for the elderly, who needs a bit of from our experience, they need more predictability, we need to try and customize that service as much as possible. And that means driving to the door, you know, well as close as we can get, we need to drive them to the door they want to travel to, and we need to try and have, you know, if we can't make it as efficient as we would, with a mass transfer system, we need to find the perfect balance between flexibility and predictability, which is something we're testing now in our flexible Canvas system be and still be predictable for the customer. And the customer information as part of this, ie the tender that Bjorn has issued now. But there's also basically the service	DP-S DP-UR DP-UR TD-AF DP-UR

		level. And it's expensive, right? It's very expensive, and it's not really environmentally friendly either. So you can't use those arguments. And when on demand transport systems first came, came especially into Norway, the politicians owners, right? They were thinking about, okay, we're going to save a lot of costs, because it's so easy, we don't need to plan anything, we just put the system into real life, and it's gonna solve everything, and it's gonna be half the price. But what we've seen is that the customization that's actually needed to serve these kind of customers, especially the ones who needs the extra service level, makes it real expensive, is from a operations perspective. Right. So if we're going to establish one of our services for the elderly, so we're going to give them a really nice service level, it's going to be like a taxi, but you pay, you pay just a regular bus ticket fee. And we might do some details, but on most of them, we might pick up some extra customers, but not a lot of them either. We need to look into two other budgets. So we need to look into budgets related to aged care, right? Does the municipality save money on having people helping the elderly, during their shopping? Or maybe coming to collect them to drive them to the senior center, etc? Because they can handle it themselves now? We're trying to figure out sort of how can we actually how can we actually identify the savings or the benefits for the society as a whole. And in the end, you know, it's a lot about the trunk rebalancing the economy, right? So it's sort of, well, that, to me, is a very complex operation that we need to look at when we're developing these kind of services.	+Strategy +Strategy +Strategy
39	Researcher	And from the product development part, if I understood you correctly, then usually you go if you have a new mobility service, as you said, you go for the masses, so you don't really specify certain user. In those more specific new pilots aimed at elderly however, you probably have to specify it so you probably research and then in the end have personas, or how do you usually go with that?	
40	R2: Bjørn Klimek	There are some general personas has been that's been made sort of from, it's called *kollektivtrafikk i Norge*, which is sort of like the nationwide society for PTAs in our way, you know? But they're not really that specific. Right. So we should have, ideally, we would have, we just spoke about this a bit before actually, ideally, we should sort of map out the target group and map out the different kind of personas in that target group into that specific areas that we aim to, to to serve this pilot. But we don't have the resources to do it, because it requires a bit of work. So we haven't done it.	DP-UR +Strategy
41	Researcher	If I understood you correctly, so from the technological point of view, you probably then will rely a little bit on the tender applicants basically. So how will they then develop a product, a technical product, to really serve the needs that you have identified for the mobility product, right?	

42	R1: Aleksander Bjorøy	So that's what we're doing, we will we are issuing a so what we're saying that we, we need to, we need to have, we need to have a method or a technology to serve this target group, in order for them to be able to more be more self sufficient, and get better service. And for us to save costs on customer support, of course, because right now we need to have a call centre. For every, every pilot, every developer, every DRT we develop, and that's that also is quite costly for us. And makes it difficult to develop more pilots. So there's two ways it's both the cost aspect of it and the user friendliness of it. But we're not a technology company, so we don't really develop these things ourselves.	+Strategy LES +Strategy
43	Researcher	Understood. And so regarding, then the tender, do you have some sort of a criteria metrics, how to identify which one would be the best? I mean, as you said you're not a technology company, but you still probably have to evaluate which would serve the best product in a way. So, do you already have some sort of a criteria matrix there? is your approach in the evaluation?	
44	R2: Bjørn Klimek	We have a group of experts. These experts are Aleksander and me, and a few more other experts. Finally, we aim to go in the pilot project financed by the Norwegian agency of innovation, Innovation Norway. This is the government's business agency, with business developers, and this is about business development there. So they will evaluate the solution, whether there is a growth potential or not.	DP-UR
45	R1: Aleksander Bjorøy	So we haven't we haven't put too many constraints on the work, we've said that it needs to be possible to use whatever they come up with on different modes. It can't be sort of, it has to be sort of like an open API and something like that so that we can use it a different kind of concepts. But our expertise is not about, you know, the technology itself, we try to make it as open as possible for the visual constraints. And just to add to what Bjorn said, we also, in the expertise, we'll also have someone representing the target group as well as from the elderly society in the municipality.	
46	R2: Bjørn Klimek	So in the competition, in the call, we say you might, I don't know whether you used Google Translate. We say mobile apps doesn't work. And the new solution should reduce calls to the call centre drastically, right? Yes. And at the same time, make the product more accessible for the customer. So we want a better product for us. We want the better product for the customers right.	+Strategy TD-AF
47	R1: Aleksander Bjorøy	Yes. And at the same time, make the product more accessible for the customer. So we want a better product for us. We want the better product for the customers right.	+Strategy
48	Researcher	Out of curiosity. Are you planning to have that service whether it will be digital or not, running for the next decades? Or should this be more of a medium- or short-term solution?	

		I am asking because with the demographic change, one could perhaps argue that upcoming generations of elderly are more tech-savvy than the current ones.	
49	R1: Aleksander Bjorøy	It depends. We are going to run pilots for DRT sytems regardless, what the tender might result in. We will of course have to compensate with having calls and actually those that really don't use mobile apps. When it comes to the development of the solution, it will probably depend on the quality of what they will come up with. So, what we are doing. We are positioning ourselves to help them and give them a push for their idea. Then, they will get into the process further with Innovation Norway, as they are more specialized with helping companies in developing innovations and new concepts. And, we are saying that if it will be a product that we will use it in our product landscape. So, not specifically a pilot. If we don't see that we can benefit from it, we will not use it.	
50	Researcher	I am also asking because in our research we found that current statistics actually say that the percentage of elderly having smartphone has rocketed during the past years. So, there has been a strong growth. So, perhaps, if you say, that "Digital Apps don't work", that this hypothesis might perhaps not be true in the upcoming years.	
51	R1: Aleksander Bjorøy	We are actually just saying that it doesn't have to be an app. It could also be something. It doesn't even need to be a digital solution, as long as it solves the problem and can communicate with our service. But in that regard, that is probably not possible. I don't know how else they could communicate if it is not a digital service.	LES TD-AF
52	R2: Bjørn Klimek	We were actually more describing with that phrase that current apps are not viable. They don't work. But we are open to other digital solutions as long as they work.	
53	Researcher	I think, we don't have any more questions actually. You have given us a great insight into your current approach of the digital inclusion of elderly by answering our questions. Thank you very much!	

Appendix 2 – Interview 2 (R3)

Participants: Laurie Orlov
Company: Aging and Health Technology Watch
Date: April 28th 2021
Interview Length: 55 minutes
Language: English

Row	Person	Transcription	Code
1	Researcher	Okay then I would now basically start the interview. Could you perhaps just at the start of the interview shortly introduce yourself and explain what you've done so far in the mobility fields.	
2	Laurie Orlov	So I'm an industry analyst about technology for older adults. I've been doing this for more than a decade prior to that I was an industry analyst at Forrester Research, which is the general technology market, and prior to that I was an executive in IT. So that's me. The so-called mobility landscape which is the services and apps to help people get around, get transportation is a small component of the overall technology industry of offerings to help older adults, so it's a small piece of what I write about or think about. And I had actually have not formed a particular opinion one way or the other about its usefulness. I know that there are specializations within these ride hailing services, such as gogo grandparent a version of a ride hailing service that's intended for older adults, but I don't, I don't write much about this topic so you're welcome to interview me but up to some point or another, I'm not even sure I have a thought.	
3	Researcher	And the overall interest of ours is also, basically, the elderly and technology combination because that's been a focus area of ours. And I think you've already gathered a lot of really, really exciting experiences also coming from a business landscape so perhaps starting just rather general, what have you seen as one of the biggest challenges for companies to serve elderly with technology does it really come from making a good product in the way for elderly or is it more that elderly don't really use technology at all or. Where have you seen the biggest challenge basically coming from there.	
4	Laurie Orlov	Well I think the technology industry in general is a youth oriented industry. Okay, and often the developers who themselves are young developed technologies for themselves. So that would explain the evolution of the smartphone market, and the wearables market and all the other tech market segments that you can think of, including the ride sharing services they're developed by young people for the young person. There are limitations found with technology for older adults to be used by older adults because of the lack of consideration of the older person, and any limitations they might have in the	DP-TEAM

		design of the technology in the first place. A small example of this would be the Samsung phone for which there is an option on it called Easy mode and easy mode limits the number of icons on the screen. So that possibly to the benefit of an older adults so they don't have to look at the screen clutter of a standard Samsung phone smartphone screen. That's best to me is an example of a software based modification to the use of a device that could be helpful to older people now is the Samsung phone developers sit down and think about older adults when they design the smartphone. I doubt it. In fact if you, you'd have a hard time finding companies out there that make technologies, largely designed for general use in the overall population. It is rare that they would actually test these technologies with older people, especially older people who might have physical limitations, whether it's vision related, dexterity, hand movements tremors in the voice, inability to speak to a smart speaker, clearly. Many many technologies are not tested with the view towards making them usable, unless they bought the usage falls under what the tech companies are required to do, which has to do with accessibility for people who have disabilities, and often the accessibility features of technologies like the iPhone is a good example if you want to see. Go to the accessibility section of the iPhone website or Apple's Web go to Apple's accessibility section and you will see to what incredible lengths companies will go to in terms of creating detailed information about how to configure for various accessibility related issues, but in general we do not see aging as an accessibility issue. And so as people get older, they don't necessarily need the features that Apple or other companies would quote under Accessibility, they, they may simply need options to make technologies, clearer to themselves before they use them. And I would say they've completely failed in that regard, in the smartphone world in the online app world, this morning I just wrote a blog post about a research study that just came out this week you might want to read it. It's the AARP Tech Trends for the 50 Plus, just out of the past week is 2021 Tech Trends and the 50 Plus it's on the AARP website and they published a press release about it so you can find the full report. In that report many things were pointed out about concerns that the older population that they interviewed have about technology. One of the concerns has had to do with not understanding privacy. The privacy issues associated with technology whether their own personal privacy is well protected, and is the privacy policy even understandable. So, and in fact, the New York Times did a study the past couple of years, evaluating the privacy policy of multiple companies including Facebook, and quite a slam quite a critique of the impenetrability of privacy policies in a way too hard to really read the whole thing often takes 30 minutes, and the terminology used is not intended to really explain their policy. It's intended to comply with some form of revelatory requirement to have such a policy, and at the very end, you're given a choice that you if you want to use this product, you have to agree to the terms and conditions.	DP-TEAM DP-T DP-UR TD-AF TD-AF

		Facebook is probably the best example of that. That would also be true of the ride hailing ride sharing apps, all of them are apps that you can download on a phone. And I'm sure at the start of the use of each of those apps I don't have them on my phone Lyft and Uber, but if you had them on your phone, you would have had to agree to privacy rules around your data, and in terms of conditions, and they would, I haven't looked at them but I bet you they're not clear. So that's a problem, and gogo grandparent is a good example of attempting to deal with a limitation of the app when apps first came out when Uber was growing in popularity. There was a young man who said his grandmother would not use the Uber app, but she still wanted to get Uber rides. And so he created gogo grandparent, which is a telephone based access to Uber, and I thought this was never going to succeed, but he did actually get it implemented in all 50 states in the US, I don't know how much is used outside of the US. But that's an example of attempting to deal with the limitation of the products of the online products in the first place. People want the rides, and there's other ride sharing services in the United States for older people, but people want the rides. They don't want to use the app. And he created a workaround for that. The other thing that's pretty interesting, is the rides to doctor's visits that come from things like Lyft concierge and Uber health. So in this case the ride has been paid for by the medical practice to ensure that patients get to their appointments on time. Right. So they are the payers. Apparently there's a big problem with people missing medical appointments. And so, sending them a ride. The requester of the ride in that case is probably not a patient. Right, it's the medical practice that saying, We request the ride, it's Uber health or Lyft cost years or whatever it is, and then they tell the patient probably on the telephone that the ride will arrive at such and such a time to get them to the appointment. That's a, that's another point about this. And then the final point I guess I would say in my initial thoughts about these online services is their background checking of the drivers and the nature of risk getting a ride through a ride hailing app. And it's not an unknown risk it's well documented that many really bad incidents have happened in the ride sharing services that are not actually licensed limousine drivers with limousine licenses. And you can basically be a driver in a ride sharing service at a very inexpensive entry point, using your own vehicle. And so, you know, I don't think this is affected, necessarily, whether older people will use those services. I think more an issue in the older ranges age ranges that are not necessarily technology proficient, whether they will use the app as a question, but it's still quite feasible to get into a vehicle and a ride sharing service where you're actually put at some danger from the point you sit down and close the door. So, that's my opening.	TD-AF DP-UR

5	Researcher	Yeah, really, really interesting, especially because we actually already had an interview earlier today, And we there talked with a Norwegian project which is a little bit similar to the gogo parent, grandparent idea. So they actually had on demand services, picking up or basically not really have like strict routes for the buses, but more that if someone wants a bus, then someone can order it through an app because then the overall economy or the business could be more efficient, but they actually really saw that elderly people are not really using the app that much so therefore in the end they did not even call a bus anymore and they did not really use it overall. And so they actually just started to open a tender, where people could actually apply to with ideas on how to actually serve elderly with ideas that are potentially not even that digital. So do you think, overall, perhaps, that apps are not or digital products overall can actually not really be feasible for the elderly, or is that perhaps only just a current problem that the current elderly generation seems to not really adopt a technology that much and therefore we should find alternative solutions. So for example, of working with telephone lines or anything like that, or is there a potential, perhaps to really educate them or make them learn on how to really use an app more.	
6	Laurie Orlov	Well, this is just a tiny instance of an app in the whole sea of apps that people consider using. And so to the degree that older people become proficient with other apps, which could include, you know, interactive chat sessions with grandchildren, Facebook, and all the other to end ordering food to come to your house, time when you're isolated as a result of COVID-19. There's many reasons for people to overcome resistance to technology that AARP report, definitely showed there was more on gross and online use of wide variety of services among the older people that were surveyed for that research. So, now, I would say there is no offering that is appropriate for older people that shouldn't have a multi channel methodology to it. So, doesn't the gogo grandparents example is, to me, a better way of thinking about technology for older people, if what it is you want them to do is access a service, if that's really what we're talking about the services to get arrived, the services is to get food the service, you know the point is to get the service, not to use the app. So, these apps should be part of a multi channel strategy that should include and it's amazing to me that this project you talked about finally gave up and said there should be a phone number. That is a sign of defeat. Yeah, to get to the phone. I mean, seriously, what percentage of older people in any of the countries that might use this have phones. Yeah, wow. Would it be all of them. Therefore, yeah is one way to reach them through television advertising, radio advertising newspaper advertising, call this number two, get a ride. How hard is that, yeah. And yet, if you're on the app mindset that everything is an app, and that people need to use apps, then you get the silliness you just described, or the need for a gogo grandparent,	DP-UR TD-AF TD-AF

7	Researcher	Yeah. Well, on the other hand, I think, I mean it does sound silly now, because in the end the solution that they have created is rather simple and really, like, more on the top of their hands in a way. And, I think also that, I mean, research has also showed that elderly	
8	Laurie Orlov	How old were the people in the group that developed this particular offering	
9	Researcher	around 30 and 40	
10	Laurie Orlov	Okay	
11	Researcher	That's actually a question that we ask everyone that is currently in some sort of a product development in practice. How old or what's the average age of a product developer or a product manager, and do you actually test also with elderly as well and they actually do have a focus group where they actually really test with a lot of elderly, and in their first pilot project they said that it was rather successful, but when actually using it on a daily basis that seemed to have failed so therefore they only have that service during the night, when younger people are partying or are out and elderly people are not so that's actually quite funny. But on the other hand, they also said that, I mean the new technology ideas or what or what technology is offering can actually really very much benefit elderly as well so therefore they actually there is a world that could really benefit elderly very much, but it is in the inability adoption and also their learning process that they seem to not really be able to really benefit from it that as much as younger people that are building those products are currently thinking about. So, therefore, that's also some things that we were also really seeing in the research and some things that you have actually mentioned also before so how can you actually really construct an app that could or a digital service does not only need to be an app that where you can actually really have a higher technology adoption or acceptance also and you've already said it's about UX design is about privacy, it's also about learning and how to promote those things as well, and making it rather simple. And that's quite hilarious to really see that it's sometimes really failing on those larger steps.	
12	Laurie Orlov	So I have an observation about learning technology. Okay, so, and maybe in your research studies since we're talking about apps here. You should consider trying to unbox a couple of phones. From the point that they're actually physically in the box, and that you want to add apps to, and they're not the apps that came with the phone because most phones do not come with the apps that you're describing. So unbox the phone. Figure out where you find apps, install the app, place it on the screen, where it's most appropriate understand the instructions for using the app, make sure that they're accessible and easily found by the user, and then go back to the people who are saying we found that people aren't really using the apps. Then I'll give you a contrasting example.	DP-UR

		So if you have a smart speaker in your home that you plug in for the very first time. And you have like an Amazon smart speaker, we'll just call it for that and plug it in for the very first time and the very first thing it does is it says, Hello. And so voice based interface, the first thing it says is Hello, it already has the ability to answer a wide range of questions which you don't even have to know what they are in advance to think of what they might be, what time is it, what's the weather. What will the weather be tomorrow. Simple questions that are part of day to day life, the interface to the device is your voice. That's also true of Siri on a smartphone. And if you had the Alexa app on a smartphone, and also true a google assistant on a smartphone and so forth. All of these things presume, you don't have to be trained to speak. That is the analogy to app usage for older people because I just described to you unboxing a phone. Okay, so that's my thought about that. Most startups of devices are not intuitive. And most finding the apps is not intuitive. You have to know for example, how do you use the app store or where is Google Play. How do you identify and when you search for an app on Google Play, it shows you 27 other apps that are similar to what you just searched for. How do you know that you're picking the one that's right for you is because the picture looks familiar. What is the decision-making criteria.	LES TD-AF
13	Researcher	True, yeah, yeah, you have already talked about, or something that has already been explored in research, that one of the reasons why this is the case that we do have partially some apps that are made for elderly but that are rather unsuccessful due to many different reasons could be that in the product development teams the people are not part of the elderly, or they don't really have any testing groups or any really good elderly insights in a way. Do you think that this is the only reason or could there also be other reasons, and could there perhaps also be an idea to how to avoid it because for example there are some guidelines even from the World Wide Web, how to, how to develop Age Friendly apps do you think that this would already solve the problem.	
14	Laurie Orlov	So I have a problem with the concept of Age Friendly apps, okay I think apps should be designed properly to be usable for all people. Okay, there's no need for Age Friendly apps, if they are well design. So I have a problem with that concept. And I actually think the whole age friendly Cities is particularly amusing things to me because I was one day in Boston, and Boston was designated as an age friendly city. And I was in a downtown park where you had to cross the street, a very wide multi lanes in either direction street to get from an exhibit hall for an event to another exhibit hall, right, it's an age friendly city. The walk, time to get across was basically short enough that you had to gallop across the street to make it all the way across, or you had to stop the divider in the middle, and wait for the light to change again so you can get the rest of the way across. And that is an	TD-AF

		age friendly city. I think the words Age Friendly are problem. It should be a report that I was involved in, with AARP, some years ago, was called Connect living for social living, and it had a concept in it called Design for All. And Design for All is literally designed for all. The options that you have and interacting with whatever it is, are such that you can reach, you can select a training option or a simple mode like the Samsung phone, or you can go into the configuration mode that you're getting in the user manual and pick from one of 700 options, but there are choices, and the choices of how to interact with a piece of technology, whether it's a car or an app they should be there. And there's a famous story, some years ago BMW came out with a car, a 750 something rather fancy BMW seven series car, and it had something it was just being introduced by BMW called iDrive, and iDrive was a sort of stick arrangement that you pressed various buttons on it to control what the car would do. And there are people, older people who got into the car, drove it a few blocks away from the dealer and came back and return the car to. Too hard to use. To me, that's a great testimony to what happened in the testing at BMW, because the people with all the money were the older people. Yes, they could afford the car. People are comfortable now with these car interfaces, they're more comfortable now than they used to be in many car interfaces are software based and you get a screen and you can tap at the screen from the steering wheel, and you can also use your voice so design has come a long way since that car was introduced, but it says something about the design process that the designers were designing for themselves.	TD-AF +Strategy DP-TEAM
15	Researcher	What do you think would be the best way to really make it usable and also accessible for elderly people just include them in the design process, or do interviews. We've had a lot of studies where they did interviews with older people who then tested the apps, or are there any other possibilities that you think are helpful to test?	
16	Laurie Orlov	It depends on how much you're offering needs to be adapted by older people, you know, if you're doing, you know, a bike racing rigid widget app for young people who are trying to run a marathon or trying to do something that really is more for the young, you know, they were not going to bother. If you're trying to do something that was intended to be used by all ages and you don't want to cut out an age group, or a physical dexterity, group, or envision limited group or a hearing limited group, or any of the many other things that can happen to one in one's later life. If you don't want to cut out any of those groups. You have to think about it. And I would say the only way to think about it, is to think about it and then include observation, user experience observation sessions include older people or people with those limitations in design. You can bet that the accessibility part of Apple's website that all those	DP-S DP-UR

		things you can find on Apple's website they that evolved over the number of years with input from people who needed those accessibility features. The people developing the iPhone and other Apple products, didn't make those, those rules up, they could help them with input, and it would seem a little crazy that you can actually go to a lot of trouble to get input on accessibility features which are now industry standard, and many categories of technology. It would be crazy to think that you could have input into accessibility standards and not have input into usability for all ages, for all products. If you thought the buyer of the product, the revenue stream coming from the product should be inclusive of people at the older ages.	
17	Researcher	Do you think that the problem that we currently have is only a current problem because I think the biggest dilemma that we have at the moment is really that rather young people are currently developing products for a group that is not really part of the workforce anymore so they don't really actually contribute to the product development because they have retired they're elderly and so that's a problem that will probably be for the next generations to come as well. But I think at the moment it is rather severe because if we look for example at those different generations of buzzwords now digital natives and digital immigrants so those that have been raised with technology and those that have not. Research at least says that there is already a rather big gap between how technology is adopted and understood and everything so I think at the moment the dilemma might be the biggest because the elderly group at the moment are digital immigrants and they will be dominantly at least also for the upcoming 30 years. But from then on, elderly people will be dominated by already digital natives. Do you think, at that stage, we don't really have that problem anymore or do you think all the time, every elderly generation will have the same problem.	
18	Laurie Orlov	They will have the same problem. It won't be the problem with the exact same technologies, but it will be the same problem and the reason for that is because technology does not stand still. It evolves all the time and there are new interaction points and new methods and, you know eyeball reading technologies and technologies that face recognition. I can just think of a couple of technologies that are somewhat problematic for people, and our new record now in 30 years, there will be an equivalent number, and the people who are in there, let's just say their baby boomers now they born in 1946 to 1964 Okay, so the oldest one is 76 and the youngest one is 50 something. So, the change in adaptability to the new things is a characteristic of resistance to change as a characteristic of aging, it is not about technology. So let's say you're in your 50s or 60s and you furnish your home exactly the way you like it. It's exactly your home is perfect. What are the chances that you're going out and fully redecorating your home, when you're 75. Not good. Because you like what you have. And that is true of technology. We like what we have. And as we get older our resistance to stopping, use what we have my Android phone is the best example of this. This has been an LG phone.	+Strategy DP-UR SPA LES

		Okay. I love this phone. So what did LG decide to do, they decided to get out of the phone business. Within the next few years this phone will be obsolete, and they're not going to be making any new LG G8 ThinQ 8 phones, which is what I have. So what do I do, I bought a second phone. When the first one wears out, I can have the second phone because I like the phone, I don't want to change. Now, does that make me old and resistant to technology change. Maybe, it may be that I look around my house and I look at all the time that my house is filled with technology, it's kind of a bit of a joke, but it may be that I like some of the technology I already have. And that's true, my little example of the LG phone is the way we're all going to be, as we get older, we had finally selected that which we like and we could afford that which we like. So we buy what we like, and keep it, and the new guys that come along with the brand new technologies that will help us to make our lives better and improve things, is a trade off the adoption of those is a trade off and that's really the Facebook problem for older people right. They may not want to be on Facebook, but their grandchildren are on Facebook. Okay, they may not want to look at YouTube, but YouTube has the videos of the dance recital of one of their children or grandchildren. So it's not like they sit around and say, Gee, what I really want to do is be a YouTube user or a Facebook user. No they overcome their resistance to that because of pressure from their families, and that will continue, and there may be new things to come out and in later time that we will be pressured into adopting or the phone will break and I'll probably have to go get a new phone. So anyway that's my, my thought is resistance to change is a phenomenon of aging. It's not about the technology.	SPA +Strategy LES DP-UR
19	Researcher	Okay, and perhaps also when we started researching we were rather surprised why this topic or digital inclusion overall but not only in digital terms but perhaps just from our perspective, as not being part of the elderly group, but the elders aren't currently not really focused from a commercial standpoint. So coming more from a business point of view. Even though we have this huge mega trend of population aging so we've actually seen that the UN as well as other international organizations really have some expectations that by 2050 I think every sixth person will be considered elderly and by 2100 already half of the whole population in the world will be considered elderly. What do you think about that when thinking about elderly in technology and how it might change.	
20	Laurie Orlov	So a good analogy to that is the baby boomers let's just take the baby boomers as an example. So the baby boomers were a population bulge in the demographic segment. Right. And they are moving through the population. So that right now there's the only segment that's as large as baby boomers in the United States is Gen X or whatever Gen Z I don't know whatever it is one of the younger generation. And the problem with baby boomers, of course it's the oldest is 76 The chances of them dying over the next few years is not insubstantial. But what the baby boomer segment caused was a	DP-UR

		vast change in the environment, and you could see it. If you went into a store and noticed a drugstore is a good example. You notice that where you pick up the drugs, there's chairs to wait for your prescription that the lighting has changed this was actually documented some years ago, CVS and other drug stores in the United States, change the lighting. To make it easier to see. I always have changed in stores. Rent a wheel-chair at the doorway of stores is, is a standard offering in de-partment stores. Many, many things are accommodating, an aging of a popula-tion when there's a large number of them, and especially when there's a large segment that has wealth, and in the case of the baby boomers, the United States right now, they have a high concentration of wealth. And so that's why the drugstore change the lighting and the aisle width. Right. They didn't do it because they wanted to do it, or even that they were required to do it. Instead we're gonna have more people coming into this store, why should they be crowded around a particular aisle that's this narrow, why shouldn't we widen the aisles, improve the lighting, make it a more appealing place to wait to pick up your prescription and whatever. So, my point is that business already accommodates an aging population, whenever it's enough of us, a segment with money to influence purchasing.	+Strategy DP-UR +Strategy
21	Researcher	Okay, interesting, really interesting. Probably I'm going to look at that documentary. Okay, um, perhaps jumping back to one thing that I just came across actually just when you also, when you're also saying something like, I stick with my phone and I have this re-sistance to change as soon as I might become a little bit older. Do you think there is, then still potential for innovation for that group of people or is innovation really tough to actually really get through because, I mean, it could be really interest-ing, Because it would be really an improvement.	
22	Laurie Orlov	So here's a good example okay so Apple came out with a smartwatch, right? And I was at maybe it was the Apple Watch Series five, they came out with fall detection, and then they added this cardiac thing arrhythmia, checking capability. The fall detection capability they set up in Apple Health, that if you're 65, plus in age, and you press the Help button on the watch wherever that is. If you press the Help button an emer-gency responder will respond to that request. So, another company came along, called for call solutions, which created an app for the Apple Watch. For call solutions. The app on the Apple Watch can be configured in such a way that if you press for the emergency button it will contact a call centre of responders, people who will clarify that you really have a problem, and that you really fallen down. And this past five months few months, that's why they created an app for the Apple Watch that you can now get the best buy app, and it is a fall detection app, it does the same thing as the one I just described, which is, if you're press for an emergency call a context that or call centre of responders 24 by seven hours, and they will answer the phone and clarify that you need help, or what kind of help you need.	DP-UR

		So, you probably would have thought that when the Apple Watch came out, nobody was thinking about older people. However, what is important to remember is that there is an intersection between the circle of aging and health. So if you were to look at a Venn diagram. There's a big overlap in the middle between the health issues of people who are aging, which is all part of the health industry market, and the phenomenon of aging itself. So, wearables, as an example, the Apple Watch being one example, wearables are increasingly likely to be helpful to older people to mitigate conditions that they might have, whether it's the onset of a stroke or Parkinson's disease, or low vision issues where you need an audio description of what you're looking at, or the camera, you know this possible to have a camera that's looking ahead of you to warn you about obstacles you're about to interact with. So, this overlap in the diagram of Health and Aging is a very important overlap that is going to be more and more obvious as the baby boomers age. And then the people who are aging behind them, will benefit from that. Because they will be able to be monitored for diseases that are often encountered when you're aging hearables are a good example of this also. Things you can put in your ear, that enhance the volume of sound, and that are adjustable, right. Hearing aids cost $4,000, or $6,000 for a pair of hearing aids configured by an audiologist in the US hearables are very cheap, but you can still enhance the volume of sound, if you put a hearable like the Apple whatever it is, pods. You put a hearable in your ear, you can enhance the quality of sound. These markets are starting to intersect. And that is true in general of the app world is the intersection of markets that are intended to be useful technologies for lots of purposes ride hailing services being an example, and the needs of older people. And one of the needs of older people at some point is to stop driving, especially in some cities that's really very feasible in some cities it's not so feasible. But to stop driving is a major driver of innovation today when you see the work going on in self driving cars, self driving taxis. The entire autonomous world, having things run themselves is driven by believes that it would be a great benefit to society if older people didn't drive whether that works everywhere is subject to question but it anyway it's a big driver of business investment. And I think that's true. If many aspects of getting older there are many drivers of business investment that will emerge in greater and greater quantity as this baby boomer population moves into the true Greatest Generation. So the Greatest Generation are the people I guess 75+, I'm not sure how that was ever defined. But that generation is really the generation of the oldest overall. And they are called the greatest generation because they were around at world war 2. There are a few of them in the world 'cause they're dying. However the baby boomers will then become the equivalent of the greatest generation. As they age into their 80s and beyond they will become the edge generation and they will take that technology with	TD-AF +Strategy +Strategy +Strategy DP-UR

		them but then many new technologies will be presented to them.	
23	Researcher	Really interesting how that is also going to change in the next years. As you said technology is evolving all the time so potentially innovations in technology that is now suitable for the current elderly in 10 years potentially they have different needs and we will also have a completely different landscape which makes it hard to find a really good innovation for always changing needs.	
24	Laurie Orlov	That's true. That's true. The minute you say the word health, innovations that are useful for older people start to pop up everywhere. And in the U.S. that's because insurance companies will pay at some points for many technologies to be used by older people. Or the innovative That's a belief that technology will be paid for by governments and insurance companies. And they won't have to be paid for by people. Therefore, the adoption will be very broad because of that trend. Whether that is a trend you now, who knows.	DP-UR +Strategy
25	Researcher	Very interesting. You've been working in this area for many years. Would you say it becomes easier for elderly people and technology because there are more options available or does it become even harder for them to use and adapt to it as there are so many different technologies available and evolving all the time?	
26	Laurie Orlov	In some ways it's getting easier. The AARP study that I told you about says that 77% of the population aged 70+ has a smartphone. On the other hand what studies have also shown is that people don't use apps that much. And the other thing is that I know someone who has a smartphone you know. She is in her mid 70th and she says that when she doesn't know what to do she goes back to the store where she bought the phone and she just asks them to fix it. set it up so that I can use it a certain way. And that's actually true in most stores they are going to charge you for the service. Okay so I have a service that is my ability to connect to the internet and use the phone right. And it's not inexpensive. So why do not go back to the store and have the store help you. And that's you know people will get their help they need or they will give up.	
27	Researcher	Okay, thank you so much for the interview and your help.	

Appendix 3 – Interview 3 (R4)

Participants: R4, Theresa Elbert, Sophia Schimpgen
Company: Large scale European MaaS company
Date: April 28th 2021
Interview Length: 48 minutes
Language: German

Row	Person	Transcription (Original Text German)	Transcription (English Translation)	Code
1	Researcher	Mal starten. Perfekt. Wäre super, wenn du vielleicht ganz am Anfang dich einmal ganz kurz vorstellst und sagst, was deine Rolle ist und was genau die App aus deinem Unternehmen aus deiner Perspektive macht.	Let's start. Perfect. It would be great if you could introduce yourself very briefly and tell us what your role is and what exactly the company app does from your perspective.	
2	R4	Also mein Name ist XX Genau und hab meinen Bachelor in International Relations and Management in Regensburg gemacht, an der Hochschule. Und bin danach auch nach Lissabon gegangen und hab dort meinen Master gemacht in International Management. Und habe dort dann meine Masterarbeit auch Product Development geschrieben und zufälligerweise war es dann auch Mobilitätsbereich weil ich eben zu einem Mobility Service Provider, einer der Pioniere im Maas Segment und vor allem im Platform Segment. Genau. Und die sind ja mittlerweile aufgeteilt worden. Genau zu dem Zeitpunkt wurde uns dahin gesagt, also als dieser Aufkauf stattgefunden hat, da war ich dort für ein zwei Jahre. Also entweder ihr könnt bleiben und werdet halt irgendwohin transferiert oder ihr schaut mal selbst wo es weitergeht. Und dann hab ich ein MaaS Unternehmen gesehen eben und hab dort als Studi angefangen und dann eben als Produktmanager irgendwann genau. Und dort bin ich tatsächlich nur diese Woche. Also ich hab Urlaub wie gesagt und bin dann ab ersten Mai bei einem	My name is XX and I did my Bachelor's degree in International Relations and Management in Regensburg, at the university. And then I went to Lisbon and did my Master's degree in International Management. And then I also wrote my master's thesis there in Product Development and by chance, it was also in the mobility area because I worked for a mobility service provider, one of the pioneers in the Maas segment and especially in the platform segment. And they have been split up in the meantime. Exactly at that time, when we were told that this buyout took place, I was there for two years. So either you can stay and be transferred somewhere or you look for yourself where continues. And then I saw a MaaS company and started there as a student and then as a product manager at some point. And there I am actually only for this week. So I'm on vacation as I said and then from the first of May I'll be at an innovative transport company where I'll be a mobility consultant there.	

		innovativen Transportunternehmen und bin dort Mobility Consultant.		
3	Researcher	Spannend. Die hatten wir auch schon kontaktiert.	Exciting. We had already contacted them as well.	
4	R4	Genau, die eben auch super viel spannende Sachen für ja elderly, aber auch accessible Mobility machen. also ich kenne es nur von außen und ein bisschen tiefer recherchiert, aber nicht von innen. Aber die haben bestimmt auch einiges wohl, wo man bestimmt drüber reden kann. Genau und genau ich bin der Produktmanager, heißt wir haben ein Team von drei Leuten, die die App mitgebaut haben. Kam halt so ungefähr nach einem Jahr rein. Also die ganze Basis und so war schon gebaut und dann mit mir kamen mehrere MSPs rein neue Features. Genau MSPs sind Mobility Service Provider kennt ihr vielleicht. Manche wissen es nicht. Ja genau. Und das ist jetzt der Status quo. Und da habe ich gekündigt und gehe jetzt eben zu einem innovativen Transportunternehmen.	Exactly, they also make super much exciting things for yes elderly, but also accessible Mobility. so I know it only from the outside and was researching them a bit deeper, but not from the inside. But I'm sure they have a lot to talk about. Exactly, and I'm the product manager, which means we have a team of three people who helped build the app. It came in after about a year. So the whole basis and so on was already built and then with me several MSPs came in new features. MSPs are Mobility Service Providers as you might know. Some don't know it. That's right. And that's the status quo now. So I quit my job and now I'm going to an innovative transport company.	
5	Researcher	Und als Produktmanager, dann hast du im Grunde so ein bisschen bei der Produktentwicklung das Management im Grunde übernommen, vermute ich richtig?	And as a product manager, then you basically kind of took over the management in product development, I guess right?	
6	R4	Genau. Also eigentlich ist der Produktmanager und vor allem Product Owner in einem agilen Umfeld heutzutage in der Software Entwicklung, gerade in diesem Scrum Umfeld. Wisst ihr vielleicht noch etwas darüber, aber könnt ihr auch nochmal nachlesen als es geht praktisch darum nicht wie in so einem Wasserfall Diagramm. Erst machen wir das, dann machen wir das dann das, sondern eher wie so ein Kreisdiagram, dass man eins nach dem anderen macht und dass man es immer wieder hinterfragt, macht es überhaupt Sinn, um dann immer wieder auch User Research betreibt und auch die Leute,	Exactly. So actually the product manager and especially product owner is in an agile environment nowadays in software development, in this Scrum environment. Do you know maybe something about it, but you can also read it again. It’s practically not like in such a waterfall diagram. First, we do this, then we do that, then this, but rather like a circle diagram, that you do one thing after the other and that you always question whether it makes any sense at all, and then you always do user research and also really involve the people who are going to use the feature in the end.	DP-S DP-UR

		die das Feature am Ende nutzen sollen, auch wirklich mit einbezieht. Allerdings klappt es bei dem Unternehmen nur so halb auf dem Papier. Das war dann auch einer der Gründe, warum ich gewechselt bin und weil die App wird hauptsächlich von einem externen Unternehmen gebaut. Entwickler aus Litauen und genau mein Unternehmen ist praktisch der Kunde den anderen Unternehmens. Also wir sind Dienstleister. Genau. Und das Verhältnis ist allerdings so ein bisschen mehr auf partnerschaftlicher Ebene. Also auch wir haben eigene Ideen mit eingebracht, haben Prozesse von uns auch beschleunigt und gemanagt. Genau. Aber es ist halt nicht 1:1, wie wenn du jetzt eigene Entwickler im Haus hättest.	However, it only works halfway on paper for the company. That was then also one of the reasons why I switched and also because the app is mainly built by an external company. Developers from Lithuania and exactly my company is practically the customer of the other company. So we are service providers. And the relationship is a bit more on a partnership level though. So we also contributed our own ideas, we also accelerated and managed processes. But it's just not 1:1, as it would be if you had your own developers in-house.	DP-S DP-S DP-TEAM
7	Researcher	Habt ihr im Team verschiedene Personas gehabt für User Research et cetera? Und wenn ja, hattet ihr beispielsweise auch eine Persona für Ältere?	Did you have different personas in the team for user research, etc.? And if so, did you also have a persona for eldery, for example?	
8	R4	Naja. Wir müssen glaube schon vorher anfangen. Und zwar. Es geht halt um ein bestimmtes Feature jetzt, was eben auch wahrscheinlich in die Richtung von älteren Personen schlägt. Also um beim normalen Aufbau der App haben wir tatsächlich keine älteren Personen beauftragt, befragt oder die Interessen mit einbezogen. Es gibt allerdings im Unternehmen einen sogenannten, ich weiß es gar nicht ganz genau. Das heißt irgendwie so Fahrgast Plenum oder so. Es ist auf jeden Fall ein Sammelsurium an verschiedensten Fahrgästen und diese spielen dann eben die Produkte durch des Unternehmens und das kann total beliebig sein. Von einfach nur ein Ticket. Ob es Sinn macht überhaupt für die Kunden oder auch eine komplette App. So und genau das passiert auch nachdem das Produkt wie so ein Prototyp schon	Well. We have to start before, I think. It's about a certain feature now, which is probably also in the direction of older people. So in the normal development of the app, we have not actually commissioned any older people, asked them or included their interests. However, there is a so-called, I don't know it exactly. It's kind of called a passenger plenary or something. It's a collection of different passengers and they play through the products of the company and that can be totally arbitrary. From simply a ticket. Whether it makes sense at all for the customers or even a complete app. So and exactly that also happens after the product like such a prototype is already half finished, then the testers start with it. Now that was the complete app. But what we did for a feature that is called in	DP-S DP-UR DP-S DP-UR DP-T DP-T

		halb fertig ist, fangen dann die Tester an damit. Genau. Das war jetzt die komplette App. Aber was wir für ein Feature gemacht haben, das heißt in der Produktion oder jetzt in der Planung heißt das Accessible Routing, also barrierefreies Routing. Und das ist eigentlich ganz spannend und ich glaube, es war ursprünglich eigentlich gedacht für movement impaired people, also Personen, die halt schwach zu Fuß sind, die im Rollstuhl sitzen, die auch mit einem Kinderwagen unterwegs sein. Es kann alles mögliche sein, was halt die normale Gehleistung, wenn man so will, beeinflusst oder beeinträchtigt. Genau und dieses Feature würde ich jetzt sagen, wäre auch was für ältere Personen genau. Und anhand dieses Features kann man dann anhand von Daten haben wir praktisch festgestellt welche U-Bahnstationen Treppen haben und welche nicht und welche Aufzüge haben und welche nicht. Und ob diese Aufzüge funktionieren in Echt-Zeit. Und wenn man dann dieses Feature aktiviert wird dem User sofort die Route vorgeschlagen, die dann eher Sinn macht.	production or now in planning is called Accessible Routing. And that's actually quite exciting and I think it was originally intended for movement impaired people, i.e. people who have difficulty walking, who are in a wheelchair, or who are on the move with a stroller. It can be anything that affects or impairs normal walking performance, if you will. Exactly, and I would say that this feature would also be something for older people. And on the basis of this feature, we can then use data to practically determine which subway stations have stairs and which don't and which have elevators and which don't. And whether these elevators work in real time. And if you then activate this feature, the user is immediately suggested the route that makes more sense.	TD-AF
9	Researcher	Also konnte man als User direkt sagen ich bin beispielsweise schwer zu Fuß oder ähnliches und dann hat das die App direkt verstanden?	So you as a user could directly say I have, for example, difficulties to walk or something similar and then the app understood that directly?	
10	R4	Genau. Allerdings, nicht in den Einstellungen oder im Profil, weil das datentechnisch nicht ganz sauber ist, sondern wirklich dann erst bei der Routen Auskunft, dass man dann praktisch mit so einem Schieberegler aktiviert. Okay, ich bin nicht so gut zu Fuß, deswegen bräuchte ich eine Route, bei der ich nicht Treppensteigen muss, nicht Plattformen wechseln muss usw.	Exactly. However, not in the settings or in the profile, because that is not quite clean in terms of data, but really only then in the route information that you then activate practically with a slider. Okay, I'm not so good on foot, so I would need a route where I do not have to climb stairs, do not have to change platforms, etc.	TD-AF
11	Researcher	Und wie kamt dir dazu, dass ihr generell da ein Feature gemacht	And how did you come-up with making a feature there in	

		habt? Kam das vom Unternehmen selbst? Habt ihr da selber Research gemacht?	general? Did it come from the company itself? Did you make your own research?	
12	R4	Ja, also, ihr habt es ja in euren Beispiel Fragen hineingeschrieben, ob das ein Markt ist. Generell von der Seite hab ich noch gar nicht betrachtet, sondern immer so ein bisschen aus der sozial politischen Sicht. Und das es einfach der Auftrag von einem öffentlichen Unternehmen ist, so in diese Handlungen reinzugehen oder in dieses Feld reinzugehen. Weil in der privatwirtschaftlichen Welt existiert es ja nicht, weil es wahrscheinlich nicht so lukrativ ist, kann ich mir vorstellen. Ich weiß nicht, was Uber gesagt hat oder FreeNow, von denen weiß ich z.B., dass sie halt nichts haben. Und dann haben wir das zusammen mit dem Team im Unternehmen, das sich eben nur um solche Sachen kümmert. Da gehören aber nicht nur ältere Personen und Senioren dazu, sondern auch blinde, taube. Also Personen, die halt auf so etwas angewiesen sind. Genau. Und die man eben mit seinem Mobilitätsangebot auch abholen möchte. Genau. Und daher ist der Impuls entstanden. Es ist schon ein bisschen aus dem Inneren rein. Aber auch wenn man einen politischen Auftrag hat und alle Bürger gleichmäßig behandeln und mobilisieren sollte.	Yes, well, you wrote it into your example questions, whether this is a market. I haven't looked at it from that point of view in general, but always a bit from the socio-political point of view. And that it is simply the task of a public company to go into these actions or to go into this field. Because in the private sector world it doesn't exist, because it's probably not that lucrative, I can imagine. I don't know what Uber said or FreeNow, for example, I know about them that they just don't have anything. And then we have that together with the team in the company that just takes care of things like that. But it's not just older people and senior citizens, but also blind and deaf people. In other words, people who are dependent on such things. Exactly. And you also want to pick them up with your mobility services. Exactly. And that's where the impulse came from. It came a bit from within. But even if you have a political mandate and should treat all citizens equally and mobilize them.	+Strategy DP-UR +Strategy
13	Researcher	Interessant. Weil wir hatten tatsächlich bisher glaube ich immer mehr aus einer Business Sicht gesehen, wenn wir mit einem Unternehmen gesprochen hatten, die relativ häufig zwar Partnerschaften eingingen und im Zweifel dann nur um das abzuhaken, dass sie auch was in die Richtung accessible Mobility haben, was allerdings nicht wirklich viel genutzt wird anscheinend. Weil wenn man sich z.B. die Berichte wirklich mal anschaut oder	Interesting. Because so far, I think we've always seen things more from a business perspective when we've talked to companies that have entered into partnerships relatively frequently and then, in case of doubt, only to check off that they also have something in the direction of accessible mobility, which is not really used much, though, apparently. Because if you really take a look at the reports, for example, or at least the forecasts, especially if	

		zumindest mal die Prognosen, gerade auch wenn man z.B. Bevölkerungsalterung sich mal anschaut oder Population generell. Bis 2100 prognostiziert die UN wird die Hälfte der kompletten Weltbevölkerung Alt sein, also 65 plus. Und dann ist natürlich auch einmal ein soziales Ding, also das man wirklich denen auch die Möglichkeit gibt, dass die weiterhin alle möglichen technologischen Apps und Produkte auch nutzen und den Zugang einfach auch zu Mobilität gewährleistet. Aber auch für Unternehmen ist es perspektivisch eigentlich relativ interessant, weil das Potenzial ja auch ein lukrativer Mark ist, weil natürlich auch gerade die ältere Generation relativ mehr Geld hat, voraussichtlich als Junge, auf die der aktuelle Mobilitätsmarkt eher abzielt. Aber dieses Business Gedanke, den gibt es wahrscheinlich bei dir im Unternehmen gar nicht unbedingt oder?	you take a look at population aging or population in general. By 2100, the UN predicts that half of the world's population will be old, i.e. 65 plus. And then, of course, it's also a social thing, so that you really give them the opportunity to continue to use all kinds of technological apps and products and simply ensure access to mobility. But it is also relatively interesting for companies in perspective, because the potential is also a lucrative market, because of course the older generation in particular has relatively more money than young people, who are more likely to be targeted by the current mobility market. But this business idea probably doesn't exist at all in your company, does it?	
14	R4	Nee, also nee, also vor allem nicht in dem Segment. Also generell vielleicht schon, aber nicht in dem Segment. Und ich glaube, was man auch noch beachten muss mit dieser Statistik mit 2100, dass vielleicht auch zu dem Zeitpunkt. Klar, es gibt viele ältere Menschen, aber vielleicht ist die Medizin auch schon so weit, dass diese Person nicht mehr schwach zu Fuß sind. Sowas müsstet ihr glaub auch so bisschen abgrenzen in eurer Masterarbeit. Genau. Wo waren wir? Ich weiß es gar nicht mehr.	No, so no, especially not in that segment. Well, maybe in general, but not in that segment. And I think what you also have to consider with this statistic with 2100, that maybe also at the time. Sure, there are a lot of older people, but maybe medicine is already so far that this person is no longer too weak to walk. You would have to delimit something like that in your master thesis. Exactly. Where were we? I can't remember.	+Strategy SPA
15	Researcher	Vergessen, aber gar kein Problem. Gerade auch bezüglich Accessability. Schaut ihr dann beispielsweise nur, Ich bin schwach zu Fuß, ich komme vielleicht die Treppen nicht runter oder baut ihr auch zusätzlich vielleicht auch der Zugang zur Technologie. Ist der auch angepasst? Also sprich	Forgotten, but no problem at all. Especially with regard to accessibility. For example, do you only look at, "I'm weak on my feet, I might not be able to get down the stairs," or do you also build access to the technology? Is it also adapted? So are icons perhaps larger or something	

		werden Icons vielleicht größer oder ähnliches. Habt ihr da auch von App Seite Anpassungen?	similar. Do you also have adjustments from the app side?	
16	R4	Genau, haben mir nach diesen WCAG Kriterien. Und da ging es uns aber ursprünglich darum, Leute abzuholen, die einfach zum Beispiel komplett erblindet sind oder komplett taub sind. Und für uns war es dann voll gut, dass das dann natürlich mitschwingt, dass es dann eben größere Icons gibt, Voice-Over, die Kontraste drei zu eins sind und das Farbverhältnis. Dass das dann eben auch positiv dank der Personen ist, die generell schlecht sehen können, genau oder schlecht hören können. Genau. Also da haben wir schon drauf geachtet. Allerdings auch wieder ein bisschen gezwungenermaßen, weil eben öffentliche Unternehmen bis 23. Juni glaube ich, kann auch nochmal nachlesen, ihre digitalen Services barrierefrei anbieten müssen. Und da spielt das eben genau rein. Das sie leserlich sind. Ich glaube, es geht sogar soweit, dass du auch teilweise leichte Sprache brauchst. Eben für Personen, die genau einfach halt komplexe Sprache nicht verstehen.	Exactly, we did it according to these WCAG criteria. But our original aim was to meet the needs of people who are completely blind or completely deaf, for example. And for us it was really good that this then naturally resonates, that there are larger icons, voice-overs, the contrasts are three to one and the color ratio. That this is then also positive thanks to people who generally have poor eyesight, can see exactly or hear poorly. Exactly. So we have already paid attention to that. However, we were also forced to do so because public companies have to offer their digital services barrier-free until June 23. And that's exactly where it comes in. That they are legible. I think it even goes so far that you also partly need easy language. For people who simply don't understand complex language.	TD-G TD-AF TD-G +Strategy
17	Researcher	Davon habe ich bisher noch gar nichts gelesen. Gilt das nur für Deutschland. Oder ist das auf EU-Ebene?	I haven't read anything about that yet. Does that only apply to Germany. Or is that at EU level?	
18	R4	Also das würde mich wundern, wenn es nicht auf EU-Ebene ist, aber müsste ja glaub ich nochmal nachlesen. Es geht wirklich nur um öffentliche Unternehmen. Also zum Beispiel jetzt FreeNow muss es halt nicht machen.	I'd be surprised if it's not at EU level, but I think I'd have to read it again. It's really only about public companies. So now, for example, FreeNow doesn't have to do it.	TD-G +Strategy
19	Researcher	Also trotzdem ganz interessant eigentlich, meistens puschen die ja dann schon so ein bisschen. Potentiell kommt das vielleicht dann doch auch für private Unternehmen oder ähnliches.	So it's still quite interesting, actually, they're usually pushing it a bit. Potentially, this could also be used by private companies or the like.	

20	R4	Also ich glaube hauptsächliche geht es da so um Behörden und, weißt schon, Reisepass ausmachen und weiter und so fort. Aber da mein Unternehmen halt auch öffentlich ist, spielt das hier auch eine Rolle.	So I think it's mainly about authorities and, you know, making out passports and so on and so forth. But since my company is also public, that also plays a role here.	
21	Researcher	Wie lange nutzt ihr so was schon? So was wie die ganzen Frameworks und Modelle. Wie lange ist das schon richtig etabliert bei euch? Oder ist das etwas, womit ihr gerade noch ein bisschen experimentiert?	How long have you been using something like that? Something like all the frameworks and models. How long has that been really established in your company? Or is it something you're just experimenting with a little bit?	
22	R4	Ja, genau. Also das ist eigentlich dieses Jahr hochgekommen, auch auf unserer Website, weil die eben auch barrierefrei sein muss. Und jetzt halt auch in der App. Genau. Also ich würde sagen Januar bis Juni muss es stehen. Deswegen halbes Jahr. War eigentlich kein Thema bisher.	Yes, exactly. So this actually came up this year, also on our website, because it also has to be barrier-free. And now also in the app. So I would say it needs to be done January to June. That's why half a year. That hasn't really been an issue so far.	
23	Researcher	Und bezüglich eurer App generell habt ihr da auch Statistiken, wie eure Nutzergruppe aussieht. Sind das hauptsächlich Jüngere? Sind das auch Ältere? Sieht man vielleicht auch Unterschiede im Nutzerverhalten?	And regarding your app in general, do you have statistics on what your user group looks like? Is it mainly younger people? Are they also older people? Do you perhaps also see differences in user behaviour?	
24	R4	Genau. Also grundsätzlich haben wir halt sehr, sehr wenig Daten, weil wir eben wieder als öffentliche Unternehmen brutal auf Datenschutz achten müssen. Das heißt, man könnte zum Beispiel Leute auch nur tracken, wenn die wirklich ihren Consent dazu geben und Ja ausdrücklich sagen Ja, ihr dürft zu Verbesserungszwecken mein Verhalten tracken und auch dann nur gesammelt. Also nie auf die User selbst runtergebrochen oder Userin. Genau. Und was wir aber dann machen ist halt qualitative User Research, dass wir dann sagen okay, wir schreiben, vereinzeln oder wir schreiben aus, ob sich User bei uns bewerben möchten für ein Interview und versuchen dann aus den Anfragen schon	Basically, we have very, very little data, because as a public company we have to pay a lot of attention to data protection. That means, for example, that we can only track people if they really give their consent and explicitly say yes, you may track my behaviour for improvement purposes, and then only collectively. So never broken down to the users themselves or user. Exactly. But what we do is qualitative user research, we say okay, we'll write, or we'll advertise whether users would like to apply for an interview with us and then we try to get those from the requests that represent a broad and diverse spectrum. But since the company is a bit experimental, a	DP-UR DP-UR

		die zu bekommen, die ein breites und diverses Spektrum abbilden. Aber da das Unternehmen halt ja, ein bisschen experimentell so ein bisschen Pionier-lastig unterwegs ist, findet es so im Hauptmarkt gar nicht so statt. Also es ist zum Beispiel super beliebt bei LinkedIn, für so privilegierte Wissenschaftler oder Wissenschaftlerinnen. Also generell in so einer in so einer Welt, wo halt alles zukunftsbasiert ist. Aber so jetzt für den wirklichen Enduser, der einfach nur von A nach B kommen will, findet das noch gar nicht so richtig statt. Also es ist eigentlich noch viel zu weit gedacht. Und deswegen sind die User, die sich bei uns bewerben, hauptsächlich so wie ihr junge mobile-affine, Mobilitätsaffine Personen. Genau deshalb interessiert sie das Thema und haben Lust, daran mitzuarbeiten, mit zu entwickeln. Genau. Also ich würde sagen, nicht sehr viele ältere Personen.	bit pioneer-heavy, it doesn't really take place in the main market. For example, it is super popular on LinkedIn for privileged scientists or academics. So generally in such a world where everything is future-based. But for the real end user, who just wants to get from A to B, it's not really happening yet. So it's actually still much too far-fetched. And that's why the users who apply to us are mainly young, mobile-savvy people like you. That's exactly why they are interested in the topic and want to work on it and help develop it. So I would say not very many older people.	DP-UR
25	Researcher	War das bei deinem früheren Unternehmen auch ähnlich?	Was it similar at your previous company?	
26	R4	Ja, dort war ich auf der anderen Seite, also ich hab praktisch ÖPNV Fuhrunternehmen beraten und mit denen zusammen die Produkte entwickelt und da war ich selbst weniger in der in der Entwicklung selbst drin, deswegen kann ich da nicht so viel dazu sagen. Und zu dem Zeitpunkt, also vor zwei, drei Jahren war auch dieses ganze Thema Barrierefreiheit noch nicht so aktuell wie jetzt eigentlich.	Yes, I was there on the other side, I practically advised public transport companies and developed the products together with them, and I was less involved in the development myself, so I can't say that much about it. And at that time, two or three years ago, the whole issue of accessibility was not as topical as it is now.	
27	Researcher	Interessant. Wir haben tatsächlich heute früh erst noch mit einem Projekt in Norwegen gesprochen, was ein bisschen auf Transport on Demand geht. Also auch ein bisschen in Richtung Future Mobility, aber auch nochmal bisschen was anderes. Und die haben tatsächlich erzählt, dass die dieses Mobility	Interesting. This morning, we actually spoke with a project in Norway that is a bit focused on transport on demand. So it's also a bit in the direction of Future Mobility, but also a bit different. And they actually told us that they had started this Mobility on Demand project, but that they	

		on Demand Projekt zwar gestartet haben es allerdings relativ schnell, gerade auch für Ältere wieder ein bisschen eingestampft haben. Weil sie gemerkt haben, dass die ein bisschen überfordert waren mit Technologie und perspektivisch dann zum Schluss doch wieder das Telefon zur Hand genommen haben und dann beim Kundenservice angerufen haben. Gibt's sowas auch bei dir im Unternehmen. Gibt es eine Kundenhotline, bei der dann perspektivisch z.B. ältere Leute anrufen?	had relatively quickly abandoned it, especially for older people. Because they noticed that they were a bit overwhelmed with technology and in the end they picked up the phone again and called customer service. Do you have something like that in your company? Is there a customer hotline where older people, for example, can call?	
28	R4	Ja. Also bei meinem Unternehmen nicht, weil das ist ja einfach nur eine Plattform, wie z.B. Amazon, die alles zusammen kombiniert und dann kannst du das beste Angebot raussuchen. Aber beim Mutterunternehmen kann ich mir das schon vorstellen, dass sowas existiert und vor allem auch eine Telefonnummer gibt. Und ich weiß auch bei einem on Demand Transport Unternehmen, die on Demand Software und Shuttle Software haben, dass es neben dem normalen Buchungsknopf auch immer noch eine Festnetzleitung gibt, mit dem du das Taxi sozusagen rufen kannst oder den Bus rufen kannst. Aber ich glaube man muss auch so ein bisschen aufpassen, dass man generell, also in diesen ganzen Barrierefreiheit Segment, die Personen einfach nie bevormundet. Weil klar man kann jetzt sagen, ältere Personen haben Probleme irgendwie digital zurechtzukommen. Aber man kennt dann natürlich das Bild, die Person braucht irgendwie große Knöpfe und noch ein Nokia 3310, weil sie dann haptisches Feedback haben. Aber vielleicht ist es ja auch gar nicht so. Ja, genau. Also zum Beispiel meine Eltern, die jetzt auch schon 60 bis 70 sind, jetzt auch geimpft worden vor kurzem. Genau die würde ich sagen kommen natürlich nicht mit Ticktock und	Yes, not at my company, because it's just a platform, like Amazon, for example, that combines everything and then you can pick out the best offer. But in the parent company, I can imagine that something like that exists and, above all, that there is a telephone number. And I also know with an on-demand transport company that has on-demand software and shuttle software, that in addition to the normal booking button, there is also always a landline with which you can call the taxi, so to speak, or call the bus. But I think we also have to be a bit careful that in general, in this whole accessibility segment, we never patronise people. Because of course you can say that older people have problems somehow getting along digitally. But of course you know the picture, the person needs big buttons and a Nokia 3310, because then they have haptic feedback. But maybe it's not like that at all. Yes, exactly. For example, my parents, who are now 60 to 70 years old, have recently been vaccinated. Exactly, I would say they don't get along with Ticktock and anything and Facefilter and so on. But of course they know how to write on WhatsApp, send a voice message and so on.	TD-AF TD-AF SPA

		irgendetwas zurecht und Facefilter und so. Aber natürlich wissen die wie man auf WhatsApp schreibt, man eine Sprachnachricht schickt und so.		
29	Researcher	Ja, also da sehen wir auch ein relativ starkes Dilemma, tatsächlich. Weil einfach diese Altersgruppe wirklich groß ist. Also 65 plus. 65 und 85 ist ein Riesenunterschied. Also dementsprechend ist das auch wirklich ein Problem. Wahrscheinlich auch einfach schon diese Kategorisierung von elderly zu machen. Und jeder 65-Jährige, der sich schon angegriffen fühlt, wenn ein Rentnerteller bekommt, der wird es wahrscheinlich dann nicht ganz so gut finden. Und perspektivisch ist auch ein Dilemma da weil viele Leute oder z.B. alleine schon eine Kollegin von dir, die ich zum Thema angesprochen hatte, ob das Unternehmen die Nutzergruppe ältere Leute schon mal ein bisschen fokussiert hat, meinte sie ja schon, aber die nutzten ja hauptsächlich gar kein gar kein Smartphone. Aber mittlerweile ist tatsächlich bei den meisten relativ westlichen großen Ländern die Smartphon Nutzung 65 plus jährigen bei über 70 Prozent. Also die meisten haben ein Smartphone. Erstaunlicherweise haben allerdings Research Unternehmen auch herausgefunden, dass sie allerdings weniger Apps nutzen. Also der Zugang und Verständnis der Apps ist nicht unbedingt da. Und viele sagen da beispielsweise schon auch, dass teilweise auch das Problem darin besteht, dass aktuell die Leute, die älter sind, noch Teil der Generation Digital Immigrants sind. Also sprich die sind gar nicht unbedingt per Technologie aufgewachsen und haben sich das erst im Nachhinein anlernen müssen. Und die, die tatsächlich aber gerade die Produkte erstellen wie du und ich.	Yes, so we also see a relatively strong dilemma there, actually. Because this age group is really big. So 65 plus. 65 and 85 is a huge difference. So that's also really a problem. It's probably also a problem to simply categorise elderly people. And every 65-year-old who feels attacked when getting a senior's plate at a restaurant will probably find it so so good. And in terms of perspective, there is also a dilemma because many people or, for example, a colleague of yours whom I spoke to on the subject of whether the company had already focused a little on the user group of older people, she said so, but they mainly don't use smartphones at all. But in the meantime, the smartphone use of 65 plus year-olds is actually over 70 percent in most relatively large western countries. So most of them have a smartphone. Surprisingly, however, research companies have also found that they use fewer apps. So the access and understanding of the apps is not necessarily there. And many say, for example, that part of the problem is that people who are older are still part of the digital immigrant generation. In other words, they didn't necessarily grow up with technology and only had to learn about it later. And those who are actually creating the products like you and me. We are all digital natives. We actually build the products later that older people also use. Accordingly, a very interesting question might be about your	

		Wir sind alles Digital Natives. Wir bauen tatsächlich die Produkte später, die dann auch Ältere nutzen. Dementsprechend wäre vielleicht auch eine ganz interessante Frage von deinen bisherigen Erfahrungen im Mobilitätssektor. Wie alt ist denn so das Durchschnittsalter eines Produktmanagers in einem Unternehmen der Mobilitätsbranche? Es sagt erstmal nichts aus, aber wäre generell immer interessant.	previous experience in the mobility sector. What is the average age of a product manager in a company in the mobility sector? It doesn't say anything at first, but it would always be interesting in general.	
30	R4	Ich glaube so 32, 33 im Durchschnitt. Also schon relativ jung. Ja und ich glaube, es ist wie du sagst. Also an muss halt vor allem dann in diesem ganzen Entwicklungsprozess immer wieder schauen, dass man halt dann auch die Personen, um die es geht reinholt und vorführt und beobachtet. Und warum funktioniert es nicht so? Und dann sich immer wieder auch selbst hinterfragen, warum ist es so und weniger mit, ja mit großem, mit großer eigenen Erfahrung da reingehen oder großer Überzeugung, dass das jetzt der Button links oder rechts sein muss oder so und so groß sein muss, sondern einfach halt beobachten und auf die Daten achten, die man dann hat.	I think the average is 32, 33. So it's relatively young. Yes, and I think it's like you say. So above all, in this whole development process, you have to make sure that you bring in and present and observe the people who are involved. And why doesn't it work like that? And then question yourself again and again, why is it like that and not so much go in with your own great experience or great conviction that it has to be the button on the left or on the right or that it has to be so and so big, but simply observe and pay attention to the data that you have.	DP-TEAM DP-TEAM
31	Researcher	Ja. Meinst du, dass das ein Problem perspektivisch ist? Dass das Durchschnittsalter von Product Ownern relativ jung ist. Hast du gesehen, von deinen bisherigen Erfahrungen, dass das schon mehr so war, dass ich schaue mal, dass ich ein fancy Produkt erstelle, das ich auch ziemlich cool finde? Oder ist da schon so ein bisschen auch ich hinterfragt nochmal und	Yes. Do you thinks that's a problem in perspective? That the average age of product owners is relatively young. Have you seen from your previous experiences that it was more like, I'm going to create a fancy product that I think is pretty cool? Or is there also a bit of questioning and reflecting on whether it really fits the user group?	

		reflektiere, ob das wirklich auch zur Nutzergruppe passt.		
32	R4	Also ich glaube, es kann natürlich so auf so einer Meta-Ebene mitschwingen, dass sich die Person da nicht so rein versetzen kann. Aber jetzt so in so einer heilen Welt, sag ich jetzt mal, spielt das Alter eigentlich keine Rolle, weil in der Lehre des Produktmanagers oder Produktmanagerin muss sie/er ja sowieso immer alle Daten möglich in den Prozess rein holen und wirklich so holistisch wie es geht alle potentiellen User/Userinnen dazu befragen, was Sinn macht. Genau das heißt, klar es wäre super spannend nochmal zu sehen wie so ein 50 60 jähriger Produktmanager arbeiten. Und ich würde ihn gar nicht absprechen, dass es jetzt irgendwie, dass er die Tools nicht kann oder die Sprache, die englische Sprache, weil oft sind die Entwickler ja englischsprachig, aber ich glaube, das es so unterschiedlich gar nicht ist. Man muss sich halt immer nur wieder bewusstwerden, dass man selbst eigentlich gar nicht relevant ist. Also sein eigenes Verhalten sollte man nie darauf schließen, wie jetzt irgendwas funktioniert. Genau deswegen ist es ja auch voll auch oft so bei mir zum Beispiel in den letzten drei Jahren gewesen, dass ich mich immer frage, warum funktioniert das nicht. Das ist doch so eine gute App und so ein gutes Produkt. Aber es ist einfach nur so weil es irgendwie mich so anmacht. Aber 99 Prozent der User eben nicht.	So I think it can of course resonate on a meta-level that the person can't really put him/herself into it. But now, in such an ideal world, I would say that age doesn't really matter, because in the product manager's apprenticeship he/she always has to get all the data possible into the process and really ask all the potential users as holistically as possible what makes sense. Exactly that means, of course, it would be super exciting to see how a 50-60 year old product manager works. And I wouldn't think that the person somehow doesn't know the tools or the language, the English language, because often the developers are English-speaking, but I don't think it's that different. You just have to realise again and again that you yourself are not really relevant. So you should never infer from your own behaviour how anything works. That's exactly why it has often been the case with me, for example, in the last three years, that I always ask myself why it doesn't work. It's such a good app and such a good product. But it's just because it somehow turns me on. But 99 percent of the users don't.	DP-TEAM
33	Researcher	Sehr interessant. Nochmal eine ganz kurze Frage zu eurem generellem Produkt Entstehungsprozess. Wenn ich es richtig verstanden habe, erhebt das Unternehmen	Very interesting. Again, a very quick question about your general product development process. If I understand correctly, the company doesn't really	

		nicht wirklich viele Daten oder zumindest speichert nicht besonders viel, analysiert nicht so viele Daten. Habt ihr denn dann ein gutes Bild von eurem Nutzer generell? Oder ist das perspektivisch dann auch ein bisschen schwierig, da wirklich dann auch Nutzerdaten zu haben?	collect a lot of data, or at least doesn't store much, doesn't analyse that much data. Do you then have a good picture of your users in general? Or is it a bit difficult from a perspective to really have user data?	
34	R4	Ja, also wir haben z.B. schon Daten. Wie viele Buchungen werden durchgeführt, welcher Modus ist relativ beliebt. Aber wir haben ja zum Beispiel nicht solche Daten der User verweilt so und so viele Sekunden auf dem Screen. Dann klickt er da, dann muss er nochmal zurückgehen, dann verweilt er dort wieder weiter oder wie ist sein Weg generell. Aus Datenschutzgründen dürfen es einfach nicht tracken. Und dann haben wir halt noch Daten von Usern, die von sich aus dann irgendwie mit uns was teilen. Sie schreiben uns Supportnachrichten oder sie willigen ein, dass ihr Verhalten getrackt werden kann. Es sind aber super wenig Leute und es sind halt wie gesagt hauptsächlich die Leute die eh schon so native unterwegs sind und halt nicht abgeschreckt sind von so einer Tracking Geschichte.	Yes, so we already have data, for example. How many bookings are made, which mode is relatively popular. But we don't have such data, for example, the user stays on the screen for so and so many seconds. Then he clicks there, then he has to go back again, then he stays there again or what is his path in general. For data protection reasons, we are simply not allowed to track it. And then we also have data from users who somehow share something with us. They write us support messages or they agree that their behaviour can be tracked. But there are very few people and, as I said, it's mainly the people who are already so native and are not deterred by such a tracking feature.	DP-UR DP-UR DP-UR SPA
35	Researcher	Okay, interessant. Und geht ihr dann von vornherein, wenn ihr beispielsweise jetzt ein neues Feature habt, habt ihr dann so etwas wie Personas. Ich weiß, du hattest am Anfang gesagt, dass ihr erst später testet. Aber ganz am Anfang, wenn dir wirklich so ein neues Feature spezifiziert, geht ihr da von einer bestimmten Nutzergruppe aus. Wie macht ihr das?	Okay, interesting. And then do you go from the beginning, for example, if you have a new feature now, do you have something like personas. I know you said at the beginning that you only test later. But at the very beginning, when you really specify a new feature, you start from a certain user group. How do you do that?	

36	R4	Wir orientieren uns sehr stark am Industriestandard. Also bei uns ist ja so alles, was es so im Mobilitätsmarkt gibt, gibt's dann irgendwann auch in unserer App. Also wir haben bis zu zehn verschiedene Marken integriert bei uns. Und dann schauen wir halt zum Beispiel wie es ein anderes Unternehmen in der Branche gemacht hat. Und die haben es halt so und so gemacht. Und daran orientieren wir uns dann halt, damit User die die App des anderen Unternehmens genutzt haben und dann irgendwann unsere App nutzen, einen nahtlosen Prozess an die Hand bekommen und die App verstehen. Okay, das ist ja voll einfach. Ist ja genauso wie da drüben. Genau. Und da würde ich nicht sagen, dass so viele Personas aus dem Anfang mit reinspielen, sondern eher ja, Erfahrung, aber auch einfach Marktrecherche. Wie machen es die anderen? Und dann aber zu einem bestimmten Zeitpunkt, bevor man live geht, lässt man es dann doch nochmal testen, ob es jeder versteht. Oder ob es grundlegende Missverständnisse gibt. Klar, es würde natürlich viel mehr Sinn machen, erst Personas zu bilden und erst alles zu recherchieren und mit den Usern selbst zusammen die Features zu bauen. Aber es ist einfach eine Ressourcen Frage in vielen Varianten muss man auch sagen, braucht man das Rad auch gar nicht so viel neu erfinden, weil es gibt ja einen bestimmten Standard an den sich viele User einfach gewohnt haben. Wie z.b. hier jetzt bei Zoom, das der rote Button bedeutet, dass ich das Programm beende zum Beispiel. Genau da muss man jetzt nicht anfangen, okay, jetzt machen wir es blau und so weiter. Es macht halt wenig Sinn. Genau. Aber wenn man jetzt von Grund auf ein neues Feature baut für eine	We orient ourselves very strongly to the industry standard. So with us, everything that is available in the mobility market is also available in our app at some point. We have integrated up to ten different brands. And then we look at how another company in the sector has done it, for example. And they have done it this way and that way. And we then orient ourselves on that so that users who have used the app of the other company and then use our app at some point get a seamless process and understand the app. Okay, that's really simple. It's just like over there. Exactly. And I wouldn't say that so many personas from the beginning play into it, but rather yes, experience, but also simply market research. How do the others do it? And then at a certain point, before you go live, you have it tested again to see if everyone understands it. Or whether there are fundamental misunderstandings. Of course, it would make much more sense to first create personas and then research everything and build the features together with the users themselves. But it's simply a question of resources - in many variants, it has to be said, you don't need to reinvent the wheel that much, because there is a certain standard to which many users have simply become accustomed. For example, here with Zoom, the red button means that I am ending the programme. That's exactly where you don't have to start now, okay, now we'll make it blue and so on. It just doesn't make much sense. Exactly. But if you build a new feature from scratch for a fundamentally new target group, then you should act differently.	TD-G DP-UR DP-UR DP-UR DP-T DP-UR +Strategy

		grundlegende neue Zielgruppe, dann sollte man anders agieren.		
37	Researcher	Okay, ja interessant. Wir haben tatsächlich auch bei unserer Recherche herausgefunden, dass zum einen UX, also das Technology Verständnis von älteren Generationen stereotypisch nicht nur bei UX Design ein bisschen anders ist. Also sprich vielleicht muss dann ein Button ein bisschen größer sein oder was auch immer, sondern auch teilweise, dass das Learning ein bisschen spezifischer angegangen werden muss. Also sprich dadurch, dass dieses Technologieverständnis noch nicht unbedingt so stark vorhanden ist, muss man im Zweifel das stärker anleiten. Gibt's denn bei euch in App beispielsweise auch die Möglichkeit, mehrere Info, Hinweise, Buttons oder ähnliches einzubauen, sodass wirklich ein User relativ einfach auch wirklich weitergeleitet wird? Was muss ich hier überhaupt machen?	Okay, yes, interesting. We actually also found out during our research that, on the one hand, UX, i.e. the technology understanding of older generations is stereotypically a bit different, not only in UX design. So maybe a button has to be a bit bigger or whatever, but also partly that learning has to be approached a bit more specifically. In other words, because this understanding of technology is not necessarily as strong as it used to be, you have to give more guidance in case of doubt. Do you also have the option in your app, for example, to include several info, hints, buttons or the like, so that a user can really be redirected relatively easily? What do I have to do here at all?	
38	R4	Ja. Also es ist bei uns schon immer alles beschrieben. Also z.B. wie entsperrst du einen Scooter, wie entsperrst du ein Fahrzeug, wie buchst du ein Ticket, für welche Bereiche ist das Ticket überhaupt gut und für welche nicht. Aber das wird jedem User gleich ausgespielt. Also da haben wir jetzt nicht darauf geachtet, es irgendwie besonders groß und besonders einfach zu schreiben. Das fällt dann alles in die Barrierefreiheit, die eben noch stattfinden muss. Genau. Also es ist schon so, dass alles erklärt wird. Also wir sind nicht davon ausgegangen, dass das viele Sachen selbsterklärend sind. Außer vielleicht ganz am Anfang beim Startbildschirm. Man bekommt halt eine Karte und in dieser Karte sind dann in	Yes, everything is always described here. For example, how do you unlock a scooter, how do you unlock a vehicle, how do you book a ticket, for which areas is the ticket good and for which areas is it not. But that is played out to every user in the same way. So we didn't take care to write it in a particularly large and simple way. That all falls under accessibility, which still has to take place. Exactly. So everything is explained. We didn't assume that many things would be self-explanatory. Except maybe at the very beginning at the start screen. You get a map and in this map the different modes are shown where they are located in the city. But as soon as you click on something, it is immediately	TD-AF TD-AF LES

		verschiedenen Modes angezeigt, wo die eben stehen in der Stadt. Aber sobald man auf etwas klickt wird sofort erklärt, Was ist das? Wie muss man hier weitermachen? Wie reagierst du? Was passiert wenn du einen Schadenfall hast. Und so weiter.	explained, "What is this? How do you have to proceed here? How do you react? What happens if you have a claim. And so on.	
39	Researcher	Interessant. Ich schaue nochmal ganz kurz ob wir noch eine ganz neue Frage haben. Okay, vielleicht aus Business Sicht auch ganz interessant. Wir hatten ja gerade einmal ganz kurz auch über Population Ageing gesprochen und, dass sich im Zweifel unsere Bevölkerung nochmal so ein bisschen ändert. Im Zweifel geht es auch wieder um die Sache Digital Natives - Digital Immigrants. Irgendwann wird es keine Digital Immigrants mehr geben, sondern nur noch Digital Natives. Dementsprechend wäre dann die Frage, werden die überhaupt noch große Hilfe brauchen. Wird es irgendwann nicht mehr unbedingt das große Gap geben zwischen Technologieverständnis, weil irgendwann jeder im Grunde digital native ist? Gab es bei euch sowas wie eine Strategie 2030, 2050? Im Zweifel ist es sogar ein bisschen zu weit. In der es so ein bisschen stärker nochmal um Population Ageing geht. Oder gibt's sowas wie eine Strategie oder eine Vision 20 was auch immer?	Interesting. I'll take another quick look to see if we have a completely new question. Okay, maybe it's also interesting from a business perspective. We just talked briefly about population ageing and that our population is changing a little bit in case of doubt. In case of doubt, it's also a matter of digital natives - digital immigrants. At some point, there will no longer be any digital immigrants, only digital natives. Accordingly, the question would then be, will they still need much help at all? At some point, will there no longer necessarily be the big gap between technology understanding, because at some point everyone will basically be digital native? Did you have something like a 2030, 2050 strategy? In case of doubt, it's even a bit too far. Which is a bit more about population ageing. Or is there something like a strategy or a vision 20 whatever?	
40	R4	Ja, es gibt eine, aber die geht eher darum, weniger Autos in der Stadt zu haben. Also bei der Kampagne geht's aber eher darum, generell, ein gesundes Angebot an einem Mobilitäts-Mix zu schaffen, das eben ohne eigenes Fahrzeug möglich ist. Also wenn man jetzt eben auch die anderen Trends hinzuzieht, das ist halt immer mehr,	Yes, there is one, but it's more about having fewer cars in the city. But the campaign is more about generally creating a healthy offer of a mobility mix that is possible without owning a car. So if you also take into account the other trends, that is more and more, when megacities are getting bigger and bigger, it	+Strategy

		wenn Megacitys gibt Städte immer größer wird, dass es eben nötig wird weniger Autos gleichzeitig in der Stadt zu haben, weil sonst hast du halt so wie man es kennt aus den aktuellen Megacities Mexiko-City usw. einfach so Blechlawinen, die sich so durchziehen. Genau, da ist es jetzt nicht explizieren, oder Ich weiß es nicht, es kann bestimmt sein, also will ich jetzt nicht ausschließen, dass das nicht mitgedacht ist. Weil wie gesagt, es gibt eigene Abteilungen, die sich nur darum kümmern. Aber mir ist zumindest nichts bekannt. Genau. Aber die Idee ist ja mit einem starken ÖPNV, der halt eben auch wert auf Barrierefreiheit legt, dann hast du automatisch auch ein stärkeres barrierefreies Angebot. Wenn die These so aufgeht, wie ich es jetzt beschreiben habe.	becomes necessary to have fewer cars in the city at the same time, because otherwise you just have such avalanches of cars, as we know from the current megacities of Mexico City, etc., running through the city. Exactly, it's not explicit now, or I don't know, it can certainly be, so I don't want to rule out now that it's not included. Because as I said, there are separate departments that just take care of that. But at least I'm not aware of anything. Exactly. But the idea is that with a strong public transport system that also attaches importance to accessibility, you automatically have a stronger barrier-free offer. If the hypothesis works out as I have just described.	
41	Researcher	Um nochmal auf die WCAG Guidelines zurückzukommen. Werden sie generell einbezogen in Produktentwicklungen und heißt das, die App hat die gleiche Accessibility für jeden User. Oder kommt es dann wirklich nochmal darauf an, welcher User nutzt gerade die App. Und dann verändert sich z.B. ein Button.	To come back to the WCAG guidelines. Are they generally included in product development and does that mean that the app has the same accessibility for every user? Or does it really depend on which user is currently using the app? And then, for example, a button changes.	
42	R4	Ja also die werden auf die gesamte App drübergelegt, sozusagen, und darauf geprüft. Es ist allerdings nicht im Designprozess entstanden, dann hätte es vor 2-3 Jahren schon passieren müssen. Sondern halt jetzt erst, weil es jetzt eben nötig wird und von der Politik gefördert wird. Aber was eben passieren wird, zu diesem Stichtag ist ,weil es dann eben elementar wird, wird eben die App so aussehen oder kannst du dann in deinen Smartphone Einstellungen eben diesen Modus wählen und dann wird die App eben in diesem Modus sein, in dem du eben einen starken Kontrast hast, besser lesen	Yes, so they are put on top of the whole app, so to speak, and tested on it. However, it did not come about in the design process, in which case it would have had to happen 2-3 years ago. It's only happening now because it's now necessary and is being promoted by politics. But what will happen on this deadline is that, because it will be elementary, the app will look like this or you can select this mode in your smartphone settings and then the app will be in this mode, in which you have a strong contrast, you can read better, the texts are large enough, that there	TD-G

		kannst, die Texte groß genug sind, dass es immer alternative Texte zu den Icons gibt, dass die Vorlesung auch Sinn macht und nicht dass es mal oben, mal recht und dann wieder links ist.	are always alternative texts to the icons, that the lecture also makes sense and not that it is sometimes up, sometimes right and then left again.	
43	Researcher	Hast du noch Fragen oder Kommentare, die du am Ende loswerden möchtest?	Do you have any questions or comments you would like to share at the end?	
44	R4	Ja, also ich glaube, dass für ältere Personen, vor allem dieser on Demand Markt super spannend wird. Diese ganzen digitalen Rufbusse. Es ist bei dem Konzept ja so, dass du nicht mehr feste Haltestellen hast in der Straße, sondern virtuelle und der Bus kommt eben zu dir und du musst nur noch 100 Meter anstatt 500 Meter laufen. Und ich glaube, dass deshalb gerade für Menschen, die beeinträchtigt sind zu Fuß es super positiv ist, weil sie einfach kürzere Wege zurücklegen müssen. Sie haben auch auf jeden Fall einen freien Sitzplatz, das ist ja sonst auch nicht immer gegeben, wenn man in einen vollen Bus oder U-Bahn reinkommt und Glück haben muss, einen Platz zu bekommen. Und ich glaube, dass irgendwann, wahrscheinlich dann auch mit dem autonomen Fahren, werden die jetzigen genutzten Busse Userzentriert sein. Es wird nur noch so sein, wie man es brauche. Es muss nicht unbedingt sportlich oder fancy aussehen, sondern eben nur so, dass es für den User passt. Und ich glaube, dass das ein zusätzlicher Comfort für auch ältere Personen ist.	Yes, so I think that for older people, especially this on demand market will be super exciting. All these digital call-busses. The concept is that you no longer have fixed stops in the street, but virtual ones and the bus comes to you and you only have to walk 100 metres instead of 500 metres. And I believe that this is why it is super positive for people who are impaired on foot, because they simply have to cover shorter distances. They also have a free seat in any case, which is not always the case when you get on a full bus or underground and have to be lucky to get a seat. And I believe that at some point, probably with autonomous driving, the buses currently in use will be user-centred. It will just be what you need it to be. It doesn't necessarily have to look sporty or fancy, but just in a way that suits the user. And I believe that this is an additional comfort for older people as well.	TD-AF +Strategy
45	Researcher	Super interessant. Vielen Dank für die super interessanten Einblicke.	Super interesting. Thank you for this super interesting insights.	

Appendix 4 – Interview 4 (R5)

Participants: Dave Collins
Company: NTNU (Norwegian University of Science and Technology)
Date: May 3rd 2021
Interview Length: 48 minutes
Language: English

Row	Person	Transcription	Code
1	Researcher	Okay, and then as perhaps just the start of the interview, it would be really nice to have you introduce yourself about your research area and what you've been focusing on during the last years.	
2	Dave	Sure. So my name is Dave Collins. I originally from the UK but I'm now working and have worked for seven years in Norway at the Norwegian University of Science and Technology, NTNU. My background was originally in politics and I have a PhD in architecture, but I'm not an architect, so my research at the time was a lot on usability and how people interact with the built environment, and I've now moved on from that. I'm now a postdoctoral fellow working on a big Smart Cities project called CaPs, which stands for citizens as pilots of smart cities, where what we're trying to do is to make sure that all demographics of people will have equal placing in their participation in the development of their city and the services that will be provided for them. So, mobility is a big part of this because we're not just looking at trying to engage people that are young and have access to Facebook. We're looking at finding ways to get in touch with the groups of people in society that are not traditionally technologically engaged, such as the elderly, which is I think the biggest challenge with the most difficult solutions but with the most ground, that we can sort of catch up with. So that's me in a nutshell. Anything else - well, I brew beer.	+Strategy
3	Researcher	Also for the elderly? That's great. No, thank you very much, that's really really interesting for us. I think your insights really fit very well also to our area of research. So, from your research background or from your experiences so far, how much was population aging, a topic of discussion? So, is this something that is currently discussed in your area of research very much and are you very aware of it personally as well?	
4	Dave	It's massively discussed, because we're working on a couple of smart cities projects in Norway, and also in Finland. And in Denmark, but the discussions I've been having with the Smart Cities projects in Norway. They're very much looking at it, because the elderly population is so big. So, I think broadly speaking in Europe, my parents were born in the 50s and their generation is more than a third bigger than my generation, I was born in the 80s. So, there are very few people looking after a lot of people.	+Strategy +Strategy

		So we have to - so my parents, for example in 20 years will likely be kind of quite elderly. So we have to make sure that our cities of 20 years are planning a plan for a large amount of people that will be elderly, compared to the younger population and hopefully with medical care to these now these elderly people would be a bit healthier than my grandparents generation were but we really don't know. And the cities that we're looking at now they're thinking not just about how their population is going to grow, but they're looking at what kind of infrastructure will they need to have an inclusive society for the elderly and the way they are doing that is they're actually interviewing young people, who are not looking at where there'll be in 50 years from their old, but if they get an idea as to the kind of income potential, and where people will live if they're 50 in 15 years then we'll have a better idea as to what money and resources are available to look after the elderly people in 15 years time. So they're very they're actually more interested in tackling the elderly people issue than the young people issue, because people who are elderly need a much bigger infrastructure and investment the combination of health care, good transport infrastructure, etc. So this is a huge part of the discussion and surprised me actually, I knew it'd be a part of it but I didn't know it would be as big a discussion as it was.	+Strategy +Strategy DP-UR +Strategy
5	Researcher	Interesting, so they basically tried to really gather as much information also from the elderly, by doing interviews, if I understood it correctly? And you said that they would interview mostly young people do you think that this is overall a good approach, or would you say that this perhaps could also be improved?	
6	Dave	I think it could be improved. I've been a bit critical about approach in the sense that, you know, you two - when you were 15, you probably had an idea of what you were going to do when you grew up. Are you doing it? Probably not. I think this is the same now that you're asking 15 year olds, because if they're asking questions like “Do you think you would live in this new city in your future?”, “would you be interested in living in a house or apartment block?”. Nobody knows this at 15. I think that's a really, really big part of the problem. So, I think that you're almost far better asking people who are 30 what they'll be doing when they are expecting. Because when I was 30, I'm 35 now I probably, I had an idea of where I would be when I would be 40 I'll probably be about 60% accurate. So I think I would rather than make the same research from the slightly older group of people, when it comes to them contacting elderly people, they have really struggled with this partially because of COVID-19. So the idea	

		was that when they were developing this new city process they were going to have these big public hearings, which are much more accessible to people that don't use the internet. But that's impossible. Absolutely impossible so virtually all of their citizen participation mechanisms have been via things like Facebook, they had a big Facebook survey the other week. Another online survey that was separate from Facebook but that automatically excludes certain percentage, a certain percentage of the population that would benefit most from this. So the research they're trying to do to make it an elderly friendly city.	
7	Researcher	That's actually very interesting because I think that's what we've seen actually also from practice so we've talked to quite a lot of companies and we wanted to understand how they actually currently include the needs of elderly in their research and also in the product research or user research. And I think they actually also have a problem to really reach out to these because they - not all of them but dominantly - often don't really use any digital sources. So, they seem to also be challenged or they are really challenged to actually really find out what their user is actually really doing when they're elderly as they don't get any data. And so how do you deal with this? Did you create any personas there or anything for elderly? Or, how are you approaching this in your project?	
8	Dave	That's what we're currently working on, because, elderly people is not one demographic of people. It's an amorphous demographic that represents lots of different kinds of people. And your ideal demographic almost useful demographic of say the above 60s and people who are healthy, who are digitally engaged and know about their rights and access to public services and then that stretches up to people who have maybe a healthy but they don't own a smartphone maybe the grandkids bought them one that they never use. They maybe don't use computers at all or maybe they can just access FaceTime on their phones or their grandkids in Australia, to people who have health problems never an email in their lives. And those people are as varied in their needs as similar sets of topographies for younger people for middle aged people. The difference is that a disabled person who is middle aged might be more likely to be technologically engaged as an elderly person. So overall the money we're going to spend is gonna be mostly on the elderly, so we're not at the point yet where we got these topographies sorted but it's where we are, but that is the next step on this process of working out how to make sure that we meet their needs, is to accept that there's no such thing as just elderly people. There are lots of different groups that come into the banner of elderly people. So, I've been doing some preliminary work on this, and I think it's roughly about five or six different groups of people that fit under this banner. Let's see the easy ones. The Healthy People that hike in the mountains that use their smartphone, and the ones that we really have to struggle with I think of people who live independently, but are not digitally engaged and wouldn't even know, maybe that this city that's been developed, I mean, they might, they could be forgiven for not knowing this exists, because it's not even so big in the news	DP-UR SPA +Strategy DP-UR

		search that unless you are the kind of person that goes on Facebook or goes on Twitter or Instagram, you might not even know about it. It's the biggest change to happen in that area for hundreds of years. So, no we don't have that sort of yet but it's part of the solution.	
9	Researcher	Okay, okay. And you said five to six groups potentially I know that you're still working on it, and I've now heard that you will probably have those groups set, depending on their health status and their technological knowledge, potentially, are there any categories where you're currently discussing that could also become differentiating characteristics so that you can group them?	
10	Dave	That is exactly how they'll be put into different groups. There are sort of various factors that you have to consider like health, income, of course as well, but although it's cheaper to be technologically engaged than it's ever been. I mean if you've not got a WiFi router in your house and you don't have a laptop - you know that can be 600 Euro investment really. It is however the cognitive ability as well, that people are not as quick as they get older sometimes they're not as easy to pick up new things. And therein lies a huge problem that many alone can't fix is that we could, we could spend money and give people the technology, but it's the usability, that's a huge problem. My mother is 61, and trying to get her to use a microwave is a nightmare. So, she's not really elderly, she really just creeps into this elderly group, but she can't use the microwave, and, you know, she just wants something that works like a regular oven with on off and that's I think part of the problem here is that, in a way, maybe these demographic. Each these personas are no good to any of us unless we can also, if our only solution is to give people the technology we have to build it. Because the stuff we have now is just simply not fit for purpose. If I get, you know, if we took if we took one of the groups that were looking at if we took people that were 75 years old, did not own a smartphone but we're interested in citizen engagement, if I took taxpayers money and gave them a cheap smartphone or gave them a cheap tablet computer, and help them sign up to Facebook, they still couldn't access the survey, they would still be totally lost. And then what happens then I mean, which we were talking about. He hated, you know, things like getting taxis and things like this. You give an old man a smartphone with an app on it to do that unless you train them how to do it, and probably train them a couple of times it's completely useless technology. Yeah. So I think that our ability, although we're not at our project at least we're not completely finished yet in organizing these personas. I think the bit that we really need to step up with is to look at people in programming and software development and hardware development, to really add the bits on that we need.	DP-UR DP-UR SPA SPA LES LES
11	Researcher	Yeah, that's really interesting actually because in our research, we actually saw that in the end, it seems to be really often the technology adoption or adaption actually that really changes, or that really differs between younger people and seniors, and that basically in the end probably also makes a difference why they might	

		not use digital product because they don't really understand how it's working. They might not be as used to digital products as younger people or people that are already rather digital might be and there it's actually really also a lot about *learning* so we've identified as the four main areas, for example *usability* as well. So, they might not really have the best seeing or vision in comparison to younger people so the buttons need to be bigger, or they need to be a little bit more explicit with the information that they give, etc. So, and we've actually already seen that there are certain guidelines actually towards building apps and building better usability for elderly but they are, or they seem to not really be used. So have you already heard for example of Senior Technology acceptance frameworks or usability guidelines or anything like that? Have you heard that someone is working with it for example?	
12	Dave	Yeah, I mean, not in our project. But I was working couple of years ago, informally on a project in Chicago, on their big Smart Cities project where they had, and it was called "So Smart Chicago". It was a totally independent part of the project that was - and they were intentionally made independent to not seem like a cynical effort by the Council and the technology developers - as a way to better understand the usability needs for different groups of people at this technology so it was in part a public relations exercise because smart things are quite scary for people that don't know what they are. But the other thing was that they needed to find ways of making because they had a mandate as a part of their funding to make sure that all the people were included. So the actual out of their way to work out a framework for usability they came up with actually as far as I'm aware, they came up with a really good framework for usability. Working out the bare minimum of technical knowledge that you would physically need to run an app. And then we're doing things like having people with smartphones or smart tablets that literally have three icons, and each of those icons have two functions. So, it could be one icon could be for transport. And it could be the hail a taxi or something, and the other, and the other one could be surveys by the council or these kind of things, and they actually got this really robust framework by which all the developers could develop their technology, because it's all about you know I mean, we as developers and researchers on our most expert on the demographic that we represent. In my case it's a fat 35 year old British guy. My ability to know what a 75 year old woman who's never on the smartphone before her needs and her ability to interact with them, I have to find that out from other people and other researchers. So these frameworks are essential. I think that if we can come to a point where we can make this, These really generalizable and make like an international framework which is doable. I mean, we've done it for things like user interfaces for computers we have international guidelines on it, so that if you can use one operating system you can use them all. I think there's a lot of potential for us to create one of these user frameworks, who would use a framework that would work all over the world. But, smart cities and smart technology becoming so integral to the way that we, we work that we're going to have to do it I mean my doctors will	DP-UR DP-TEAM TD-G TD-G

		only allow me to book a doctor's appointment on my smartphone. Now, what does that do you know for all people, I'm in a demographic that's least likely to go to the doctor as nothing wrong with me that I'm aware of. So the idea would be that elderly people would have to be able to access that similar service but they're not probably going to access it on one of these like this.	+Strategy
13	Researcher	So just perhaps from your background, why do you think is something like an app for elderly in the mobility sector not yet really so popular, or not really in the market at all?	
14	Dave	I got really cynical answer to this question and it's an honest one: it is that it doesn't make money. If we take Facebook for example, I mean Facebook make their money by advertising to the things that I want and not enough elderly people will use Facebook to justify that kind of advertising investment from the people that pay for it. So I think it's so when you get people under the age of 40 what this huge captive market of people that you can make technology for whilst it's really difficult to try and convince older people to engage in that technology, but in this, this kind of thing has been done before. And, for example in the United States, with almost no women smoked until 1910. And then, because it was considered to be unladylike and then the tobacco companies worked out but they were losing 50% of their market and had this massive drive to get women to smoke at work, and it's in a way too similar sort of thing but I think it would take any company that knew how best to get all the people involved in technologies that say okay we've now got this huge market that nobody's making money off let's go do this. I think that's very very unlikely because the r&d costs versus the income is going to be huge. But what there does exist, is accessibility apps, or accessibility functions within apps to allow young disabled people to use things like Facebook, and that sort of technology can be used for the elderly, they just don't apply it for somebody who has a restriction in their hands, we see 20 -25 year old boy or girl who loves Facebook loves Instagram but has a disability that affects their ability to move their hands on most of the apps have simplifies user interfaces to allow them to have most of the functionality that people that are more able bodied, and I think that those functions could easily be transferred to elderly people, but there's no appetite for it I mean, My grandfather now would be 95 at 83 he went on launch day and got an iPad, because he loved technology but he never had Facebook. I knew what it was, and he had no desire, no appetite for it. And I think you'll get all the people who will want to have a limited degree of advanced technology in their homes to contact you know especially during COVID to contact family they can't have access to that kind of thing. But even if you get somebody o I get an older person an iPhone it's maybe not enough to tempt them to sign up the Facebook and things which is where the problem lies. Then a lucrative market, which is sad because I think, of course, I mean, this has been my prejudices coming out. I think that profit motivations are really tragic way of developing anything that I think that we really should develop technology to improve the lives of people, even if it's	+Strategy TD-AF

		expensive but not profitable. But that's just the way it is, and by that I mean maybe I should be more optimistic and say that maybe like the smoking campaigns, somebody will see this untapped market. So that's like that's what I think the reasons.	
15	Researcher	Okay. Really interesting I think, I mean, in the end it will probably be some sort of an ethical question when we go towards the commercial part so we've now already heard also from other companies that they say it's extremely commercially unattractive to actually target, elderly people because it's a lot of initial investment to make them first learn about the app, then also promote the app and other chat channels and everything. However, research has shown already various times that mobility is quite important for elderly people to actually also have some sort of a quality of life, and actually also some sort of an autonomy and in the end, for example from a more policymaker point of view we could actually also be profitable by having elderly people more or longer at home, as they are more mobile for a longer period of time. While not directly giving him into active care so what do you say for example that there should be policymakers that push this a little bit more as commercially, it's not really interesting for companies on their own.	
16	Dave	Yeah, I think that government has a lot of potential to make this change. I mean in the UK you already have rules about this, but the rules are not so much to affect elderly people, it's that everybody should have access to high quality internet, which is the first step of course. But, I mean I was having a chat with my mother, the other day about something that, in the UK most big supermarkets offer the ability to have food delivered to your house. To order online, and delivered to your house, and if you can imagine somebody who is elderly has a mobility problem that means they cannot really go long distances or carry things, but they can live in their own home they can clean themselves get on and off the toilet, they can cook for themselves. Then, having access to be able to order food or the or the or shopping online will mean that they don't have to engage so much with the welfare system because it's very expensive to maybe somebody who can't go out and go shopping may end up in a residential home. But if they have their food brought to the house so it's the same as if they've gone shopping, having bought the house then, then they can stay in their home for longer. So I think an investment of a couple of 100 traf to put this technology people's house would teach them how to use it will save the state many 1000s of euros because people can stay in their homes longer. My grandfather could live perfectly independently in his own house, but his arthritis meant that he couldn't go for long walks, he would have massively benefited from this hadn't existed 10 years ago. So I think if the state could subsidize, or pay for this infrastructure to be in people's houses I mean I would even go as far as to say that, you know, if when people get older they're often assessed by the state about what needs they have. And if it is the case that you get somebody who can live in their own home but can't travel. Then, there, then the first point of care should not be to say oh let's put them in a residential home, it should be, let's train them in the	+Strategy +Strategy LES +Strategy

		basics of very very simple bits of smart technology. So, we put up Wi Fi in their house, give them an iPad that will just allow them to order food. What has a couple of basic functions. And then that will cost 400 or 500 euros, but it's going to cost 600 euros a week to put them in a nursing home, so it's an investment. So I think that the state could fix this problem. And then of course the knock on effect would be that all of a sudden these elderly people would be much more technology, efficient. So then maybe the market would open up. Maybe you do this for a few years and elderly people are wanting to buy myself a second iPad it's open and I can't have things on it and talk to my grandkids, perhaps it will start this tidal wave in my mother can't use the microwave but she can use Skype because I live in Norway and my brother lives in Canada. So necessity meant that she could. My dad put the app on her phone and she could, you know, but necessity meant that she was able to expand her computer knowledge, and perhaps by introducing older people to this with a state level of support. The same can happen.	+Strategy
17	Researcher	Yeah. Yeah, I actually think so too. In a way, commercially or companies say that elderly are not really interesting to them but on the other hand, as we said population aging it's going to be a huge demographic it's going to be huge group actually, and therefore they actually could be really, really interesting and rather lucrative for companies. I think it has so far not really been explored, to be honest, because when I for example also see my parents are also, when I see Alexa or some sort of a voice devices also, that could be really really interesting for elderly as well because they don't really have to touch anything, or have to learn they basically just have to talk and that's actually really something that they know so	
18	Dave	It'll be the best starting point which is just to make it intuitive that you might not know how to use a smartphone but you know how to talk.	TD-AF
19	Researcher	Yes, exactly	
20	Dave	And make it that they don't have to learn anything you can say, Alexa, “ring my daughter, Alexa” or “call 911” and I haven't really, I mean, if you imagine somebody who's fallen over in their home. And they're not put the smartphone on and they can just lie on the floor and check Alexa call me an ambulance it'll save lives. People probably die every year because they are elderly and frail and they fall when there's nobody to help them and it was, and they don't even they don't carry their phone on them all the time. Yeah, you know, and if you put Alexa or Cortana in their house. That will save lives for a trivial amount of money. Yeah, I don’t know how much it costs to call 911 but if it is an ambulance versus buying an Alexa or so, but I bet you it's cheaper.	
21	Researcher	Yeah, that would be great. But I could imagine that a product owner or a product developer at Amazon Alexa probably would also have a persona for elderly then. I don't want to speculate or	

		anything, but we've heard in one interview that one problem could also be that these product development teams are “too young”, meaning that they don’t really have the knowledge for the needs of elderly so that the product becomes relatively quickly also digital then. Do you think that this is a problem that they are young themselves? I mean this in a way that some people argue that you can never actually act without any bias naturally. Do you think that this could be a problem, or what is your opinion about that?	
22	Dave	That is completely true and we see, I can't find any examples of that happening but there are many examples of men designing apps for women. And they're not being fit for various things and they're not being fit for purpose. For this reason, and I'm sure it's the same I mean, I can't think of many 85 year old, app developers. I think that I'm sure there are lots of very talented young programmers and young hardware developers who absolutely want to do the right thing, and, and look at maybe their own parents or grandparents and want to make their lives easier by developing this technology, but unless you are that age, I think it's very hard to know everything, especially that the nuances, like I said about you know, they'll call a doctor, I mean, or saying, Alexa call my daughter I'm sure those are things they would really appreciate but they're big issues, what about negligible little things, like it could be reminding to take your pills. No, little tiny nuances, I think those are the things that are lost by younger people developing, perhaps. Now, I know that I know that there are certain forms of technology that are not usable for certain groups of women because men develop and thinking they know women and I know as a man myself I know nothing about women. And I think I speak on behalf of all men. If women designed these apps, it would be much better and I can't think of any examples off the top of my head I remember reading about it in Scientific article... I think one of them was like a recruitment app, or some kind of recruitment app that was very sort of male-ish and meant that women were automatically disadvantage because of some features. But I have to double-check.	DP-TEAM DP-TEAM
23	Researcher	Really Interesting. Do you also consider in your persona group, the factor of digital immigrants digital natives, or is this more effective that you don't really consider at all?	
24	Dave	We are definitely considering both that's a longer term process we haven't done much on that yet, but it's on our list of, we have a list of stuff to solve within the scope of the project. And that's on there. At the moment we're trying to work out for sort of very we're trying to solve the elderly problem because it's more immediate.	
25	Dave	I got to go in a couple of minutes, my boss keeps nagging Yeah	
26	Researcher	no worries at all, no worries at all. That's already great thank you so much for your insights.	

Appendix 5 – Interview 5 (R6)

Participants: Arne Nys, Theresa Elbert, Sophia Schimpgen
Company: door2door
Date: May 3rd 2021
Interview Length: 55 minutes
Language: English

Row	Person	Transcription	Code
1	Researcher	Could you please shortly introduce yourself with your name and the role or position in your company.	
2	Arne Nys	So my name is Arne Nys, I'm the Lead Product Manager at door2door, which is an on demand ride pooling software and services company based in Berlin. My role is mostly with building our products specifically for me that means the app, so what we call "the passenger app". The passengers use in order to book rides and compare rides to other modes of transportation. But on top of that now also lately I have be more involved with the, what we would call the booking algorithm in the back of the whole system that basically decides whether a ride can be given to someone and whether it can be pulled with other people, and just generally also a product strategy and what kind of like New Directions, New markets to go into so that's what I've been working on.	
3	Researcher	Okay. That sounds very interesting. And now, maybe just start with a general question. You said that you are also responsible for your passenger app. Do you include needs of elderly people when you develop such apps?	
4	Arne Nys	Yeah I think it's a good question because I don't think that we've had already people in the focus of our minds when we were developing the app - so we started developing this app that we have now a couple of years ago, focus back then very much on kind of like the use cases that we were running in Berlin. We were running like a trial service of a ride pooling service, which back then was very early; was very new. And it was running in Berlin, alongside for example *CleverShuttle* [*other ride pooling MSP in Berlin*] which was a similar service. And I think back in those days, we were kind of focused on like how can we get like early adopters to start using the, the app, and those people are usually younger, very much in kind of like that digital world - digital mind. And definitely like around that time, the persona of like an elderly person was not really in focus. I would actually say that what we've done to try and include people of older age, was not to give them access to the app but instead to offer a tool that a call centre can use in order to book rides on behalf of people on the phone. So, what we offer to our customers - so just so you understand, we're not a company that is running these kinds of services, ourselves, but we offer the products and services	DP-UR DP-UR SPA TD-AF

		around it to mostly public transport organizations in Germany, sometimes also smaller private companies who are running them like a service like this as part of their existing public transportation service. So for example, DVG [*Duisburger Verkehrsgesellschaft AG*] in Duisburg [Germany] or MVG [*Münchener Verkehrsgesellschaft AG*] in Munich or wherever, so like Münster and also smaller towns in Germany are running this service with our product, and we offer them the ability to, aside from, you know, offering the app to their users to also be able to show like a phone number on their website for example or in some information leaflets that anyone can call in order to book, right? So, that's what a lot of our customers have been using and that has been quite successful. I mean, relatively successful, too, as a kind of like a booking alternative rather than the app. So, kind of like round that up like the short answer is, like, we do not consider the app to be a way of access to the service focused for people of elderly age. Basically so like in those cases, if that's the focus for the service, then doing it through this kind of like telephone booking mechanism, probably works better. I can elaborate a little bit further, because one thing that we are doing generally with the app however is working on the accessibility of it so not specifically for elderly people, but we've had a focus for a while on blind people, or people who aren't very good at like, don't have a very good sight. So one of the things in there was the effort to increase font sizes and also color contrasts of text and images inside the app, which may help also the elderly people to just be able to, you know, deal with working with the app but that was very focused on the kind of like blind people, or for example, including like a screen reader functionality so they kind of like listen to what everything is going, everything that's going on inside the app. So that was more for blind people. And the other focus that we're working on right now is more like accessibility towards women in more disadvantaged systems, who might not have access to like their own car, for example. So, again, not really focused on elderly people I guess, but those are the kind of ides of like the kind of inclusivity that we're trying to attain with the app is more on people who are probably already used to use apps. And I, my personal belief is that it's probably going to be really hard to try and train, an elderly person to start using our app. I'm sure there are different things that we can do to make it easier to do. But I'm not sure if that's going to be the Holy Grail.	TD-AF SPA TD-AF TD-AF DP-UR LES SPA
5	Researcher	Okay, thank you. Okay, so you said focus group is not on elderly people. So, maybe from your perspective or belief. Why do you think the focus is not on that specific age group, and whether you think that in future you might change it, so that at some point you might also include elderly people in some sort of your strategy for next years? Because what we found out from our research is that in 2100 that already half of the world's population will be aged 65, or older, which is quite impressive. So, are you keeping this larger demographic only out of your customer group or are you expecting there to be a change within your company?	

6	Arne Nys	Yeah, well I think, I think for sure that there's still - I'm not going to pretend that we've put all energy and effort into making sure that elderly people right now or in the near future can make use of the service I think we should actually spend more time on it. I definitely believe you know like the good there's going to be more old people, for sure, especially in those areas that are already kind of disadvantaged mobility wise so I'm thinking more rural or suburban areas where bus services may not be that reliable. Those are the kind of places that we're working with our current customers to like try and make it more accessible so that's where sort of phrase, coming back to the phone booking mechanism that we've made available that seems to be the most popular with our customers that are more in rural areas, so smaller towns in Bavaria we have three examples of services running in Bavaria in like really small towns actually where most of the rides are getting booked by through this phone booking system. At this point, I don't know the actual age of our users because we don't really ask them for it either. But my hunch is that there's probably an elderly population that might be using this, or is already used to doing this because there used to be like an external taxi or some kind of *Bürgerbus* [local bus system] that was accessible by phone. So going into the, into the future. I think it is worth. And we actually should spend some more time on figuring out what are those needs, from elderly people in order to get around. My hunch is still, even though I'm sure that we can make the app more accessible for older people, there may be reasons why, just at that age level it might not be the best way to offer a service like that so people who get older and might start getting certain like cognitive, like just cognitively might not be able to like deal with a smartphone that well anymore, even though they might have been using it before, gives me like a hunch that there will always be a need for some alternative way of getting access to a Bluetooth service like that. Then, a mobile app so there should be some kind of phone way of booking, maybe a website that isn't an app right like something that you can use on a big screen or something like that might be a good way as well. So I don't really know what those would be. Yeah, so I guess. Sorry. As a summary, kind of like, I think we definitely need to spend more time on it. But the answer may not lie in the app itself.	LES SPA +Strategy DP-UR SPA SPA TD-AF
7	Researcher	Thank you very interesting we already talked to Skyss in Norway and they have a rather similar product and business model actually. They also have on demand transportation service that they've also already had quite a few pilot projects with, and they basically also came up with the same result that you're working with at the moment. They also saw that on demand could be very beneficial for elderly but that at the moment elderly seemed to very much like a more predictable service of having either a bus that comes every certain hour and they know exactly when they operate, or that they don't have to use a mobile app but to call a Mobile Center. My question would be: where did your idea with the call centre come from?	

8	Arne Nys	I think it was very much because of going into our more rural areas, so we kind of started out with, offering our products and services in cities. But then, when you're doing that, like, in the beginning those services were mostly oriented towards like nightly and weekend operations so like people who are going out in the city and then want to go back home. Like, you know, very much like models where elderly people just weren't a target user, and then we started going and trying to sell to customers who were more in, you know, these rural areas, And then from that moment on that became a requirement, it's, it's just a hard requirement from either you know the local municipality or whatever public body that is ordering to service that the service is accessible to elderly people, meaning, according to them as well, a phone line, so that's it was kind of a hard requirement anyway and it makes sense to us as well. Because it's just there's probably so many reasons that we can find where an app isn't necessarily going to be the best way for an elderly person to get a ride while they're used to actually calling for such a service so most of the times we're replacing an older service that already existed. That was only accessible through phone, which was not attractive for a lot of people because they hate calling and like they don't have a lot of visibility on what's going to happen with that ride for example. But for a lot of people, elderly people, it's still valuable to have it. I think another like topic that needs to be worked out in more detail is probably what you're seeing what Skyss saw. This Norwegian company also found is, you know you have the certainty of a bus running every hour let's say, but it doesn't give you the flexibility of going when you need to go and also going where exactly you need to go to like with a bus, either you have to change or like doesn't really like then you still have to walk a really long time. And that also makes it hard for elderly people to get there right so a bus isn't necessarily the best accessible alternative. But the problem arises with these on demand services that we are also running, is that there's, there's a lot more uncertainty around when you know like, when the vehicle is going to be around your corner for example you have to you know make an active effort to get it, And then it's like, yeah and so that that unreliability because the operator needs to be able to plan for that as well we aren't able to give everybody who needs a ride at any points or with possibilities, sometimes we have to tell them, well, sorry there's just no vehicle available at this one with that I can do this because the one or two vehicles that this customer is running are already on the other side of the region, and just currently aren't there so there's the whole planning aspects and uncertainty aspects involved as well which regardless of whether you're getting access through an app or whatever else is just, it could be a level of, it could be a threshold for people to feel like they can rely on the surface so that's one of the biggest, kind of like struggles that we've been trying to figure out like - how can we make the service more reliable in terms of planning for the future. One thing that we are working on right now is the ability to be able to really plan. I want to have a ride, three days from now from there to there. And for the system to immediately be able to tell you like, Yeah, this is, this is possible, you're going to be picked	TD-AF LES SPA DP-UR SPA TD-AF SPA

		up at that time at that location. Because it's, it might not be expected, but that kind of planning requires a lot of additional product complexity on our side there's a lot of technical complexity. So that's, that's, that's one of the biggest struggles that we are dealing with. So, coming back to. I think what you're trying to like get to but there is a hard requirement from public bodies in Germany at least from what I understand that the service is accessible through phone which I think makes sense. And there's, there's another level of complexity that we still need to solve in order to make the service, generally more reliable into the future, not just for older people but for everybody, that will also help with making it more accessible.	
9	Researcher	Would you say that from a company point of view also now for example knowing that there are those hard requirements regarding elderly people, are elderly a lucrative user group for your kind of business models? Would you see them as economically attractive or would you say, we would serve them, but we actually don't really want to because it's too expensive to actually really reach out to them and promote our services to them. Have you already had some thoughts or discussions internally about that topic?	
10	Arne Nys	Yeah, I think, I mean, first of all like the we're beyond the phase of just looking at early adopters already so we are definitely looking into like how can we make a technology like this more ubiquitous and more like widely accessible in different use cases for different kinds of customers as well so we are trying to right now like develop that technology so that it can be used for a lot of different use cases like for example, providing medical transportation for people who need to get to their regular medical appointments at the hospital, who can't drive themselves, or providing transportation from into airport or providing transportation for employees who need to get to their to their factory or like their company while there's no good public transportation alternative for example, so that's kind of like the, the differentiation that we were looking at. So, different kind of use cases. And one of those is kind of like the rural transportation use case where we understand the actually the demographic data is mostly older people actually. So, when we're looking into, you know how interesting is the use case for us and how lucrative could it be, it depends a lot on how willing, a local municipality would be to pay for running such a service. And so, I, I would say that like, whether it's lucrative or not does not depend on the actual demographic or whether these people are older or not, it depends a lot more on. On one hand, the, let's say, economics took a local municipality like how willing are they to spend money on providing an accessible service to their whole, you know, citizenship. On one hand, it's like how willing is the municipality, but on the other hand also there's, there is just a geographic element to it so the more spread out that people live. And the more like the less dense that an area is just naturally, the harder it is to provide a mobility service that is economical in a circumstance so whoever is operating the service is going to	+Strategy DP-S +Strategy SPA

		look at how many people am I transporting versus how much am I paying to run that service. And just by definition, out of city centers and further out into, you know, the, the rural areas. It just becomes much harder to run such a service at an economical level so it requires a lot of subsidies, which, in Germany, exists, but it'll, I mean, that's not necessarily going to help you in the long run. And so we're dealing with a kind of like a scale problem like how can we run such a service that has, let's say, like a lot of customers only have like one or two cars that they can use to you know bring people around. Then you have to make sacrifices sometimes in terms of how flexible, those people can be when they want to leave. Or sometimes whether they can even get a ride. So those are the kinds of problems that you run into which I guess in those areas. Increasingly, affects people of older age just by the fact that there's, there's just a lot more there. So, comparing that to cities where older people live. I think what's interesting there is that either there might already be buses running at a reliable service so that they don't need the additional comfort of an on demand service necessarily so in those cases we would more targeted towards people who are willing to pay extra compared to a bus. And then, I guess that the elderly population doesn't really come into account, they might just not be willing to pay extra and they might just be okay with taking the bus that they already know. And that's kind of the difference I think so, trying to summarize again like the economics of it don't really depend, that much on age, necessarily, it's a lot more about where exactly are we offering the service and how economical it's gonna be, you know.	+Strategy SPA
11	Researcher	And if I understood you correctly, then you probably use a lot of use cases to develop a new product or service, right? Do you also work with personas, or do you get personas for municipalities or other clients? Could you please shortly explain your persona groups and also if an elderly is in there or someone with perhaps usability characteristics like an elderly?	
12	Arne Nys	Yeah, I mean we've used personas in different ways in the past and I would say that they differ from customer to customer as well, which makes it tricky to kind of give you a general answer. So we've used different kinds of personas that would for example be - one would be it's kind of like a younger person who was like, Who wants to go out and like they, they're still at the bar and like it's too late at night and they don't want to walk home or they don't want to open up and like take public transportation. So they would use an on demand ride instead. So that's one and then for every single use case we would have another one. So for our commuter one, it would be someone who wants to go to work at seven in the morning but there's no bus around the time and also they have unreliable work hours for example. I don't think we've actually had a good or proper persona for an elderly person that might also be one of the reasons that we're not like that aware of what their kind of needs might be. I think we do talk a lot to our customers when we're rolling out and they have a better sense of what kind of people that they're trying to reach. I can give one example where one of our customers started	DP-UR DP-S DP-UR

		rolling out in this was in Bavaria, and they had like an elderly woman as one of their kind of mascots for using service, and promoting her on like Instagram and whatever so like, they seem, and she seemed to be happy as well with like getting access to the service, so that our customers, who are the ones running the service usually have a much better sense of like exactly who they're with they're catering for, and we need to, as a company tried to kind of like generalize that. But yeah, it's probably a bit limited.	SPA
13	Researcher	And I think you also said that you're trying to make your apps more accessible, not necessarily for all kinds of people but more in general, and we already heard from another company that they make use of the WCAG - short for Web Content Accessibility Guidelines. Are you making use of the same guidelines or do you use any other guidelines or specific models to make them more accessible?	
14	Arne Nys	Yeah, I found that Go-web usability guidelines were focused a lot on like actual web content and like website content, which I think is no really going to help us with providing the physical service so like a lot of the considerations that we have are with the actual service itself, plus the fact that there's an app on top of it that can give access to it. We have used guidelines from UITP. Do you know the International Union for public transportations based in Brussels? Basically the global organization or association for public transport companies on all kinds of topics so I recommend that you go have a look at. So it's called UITP. Because I think their material is even publicly available, but we're a member of this, this organization. And so they gave. They have a lot of material on kind of like mobility accessibility related topics. That's one of the, kind of like materials that we've used in order to make the service, kind of like gauge whether the service is accessible enough. The other thing that we're currently involved with is a European project, project called INDIMO, which is also focused on accessibility for us specifically targeted towards women, but the research project itself is broader so INDIMO is really focused on making mobility projects more accessible and inclusive for different kinds of target groups. And they also have a lot of material on, like, accessibility, and inclusivity that we've also been using to check for. Those are kind of like the guidelines that we've been using for mobility accessibility. Then there's the kind of like user interface guidelines. And in those cases actually the ones provided by the platform's themselves so Apple for iOS apps and Google for Android apps are probably really kinda like the Bible's for interface accessibility rather than like the web ones. So we've been using Apples and Google's for example to make the app accessible for blind users, and checking against those guidelines for blind users they promote. So Apple or Google provide automatic tools to make sure that text is big enough, or contrasts are good enough and these kind of things. So those are kind of like the interface guidelines and packages that we've been working with. I wouldn't say that Interface Guidelines ever mentioned, necessarily, old age, other	TD-G TD-G TD-G TD-G

		than just the fact that, you know like text needs to be big enough. And, you know, generally, it needs to be understandable and clear and these kind of things. So that might be, I don't know. One of the issues. And then, kind of like lastly, this is not really like guidelines but like we do user testing with potential users. The thing is, like in terms of age, the oldest that we've really gone, is I'd say, Yeah, I would say like 65 years old or something. So depending on what you define as elderly persons, those haven't really been included in user testing, Because it's also much harder to reach them.	TD-G TD-AF DP-T DP-UR
15	Researcher	Yeah, sure. If I may ask, just out of curiosity, regarding your product development team, what is the average age in your team?	
16	Arne Nys	Its really young. It's between 20 to 30, or Yeah.	DP-TEAM
17	Researcher	Would you say that this could be seen as a problem as you don't represent the variety of demographics that you want to include in your product or would you say that this is not really a problem as you can still have personas of elderly for example?	
18	Arne Nys	I think that was definitely the case in the beginning while we were developing the product, because we were much more focused on, how can we run a successful service here in Berlin for people like us. And so, like, at that time that was never really a consideration or concern. I think by now that has changed, and I think he's sort of evolved a lot. I mean the company itself has also aged. So, especially outside the engineering team they're also like older people but like obviously not like elderly because they would not be working at that time anymore. But we're spending at least in my opinion, we're spending a lot of time looking into accessibility and inclusive topics. So we've spent a lot of time on, sort of like I've mentioned blind people. We've spent a lot of time on people who wheelchairs, making sure that people who will check in one of these vehicles as well. Then little lately. So the ability to book rides if you have children. So for example, making sure that there are child seats available in the vehicle, or if you're like carrying a lot of luggage. So, I don't know like you go to the airport or something or maybe you're an elderly person who's has like a trolley or so to go to the supermarket or something like that, even though I don't think we've made it that explicit. Yeah, like I do feel that we're spending a lot of time looking at kind of like inclusivity topics. So I wouldn't say that the young age of the engineering team is a hinderance there. Because I feel actually that they're quite engaged in the topic and quite proactive in trying to figure out if there's anything that we're missing. Yeah, like we might still be missing certain aspects or certain, I don't know, like, you know, parts of that.	DP-TEAM DP-TEAM TD-AF
19	Researcher	But I mean you could probably always balance it out also with testings and I mean you do testings and we for example we take the definition of elderly from the UN which is 65 plus, but	

		there's also 65 Plus, there's a huge difference of being 65 or 85 so potentially already there, you need to have different structures of the demographic groups.	
20	Arne Nys	So, yeah, I was really thinking about elderly of people who are like, 75 plus or something so I mean I guess there's definition question but like, that doesn't do away with the fact that we definitely need to test more with like 65 plus people so like I said, like I think the highest that we're doing right now we're this week actually and another run of like user testing that like we should probably try and get older people to test but there's also a question of like does it make sense to then at that point even test the app with them. It might. But I would also like thinking broader and we should like test, like the form and mechanism.	DP-UR SPA SPA
21	Researcher	We are basically also mainly researching this because we also see this demographic change with the population aging and more and more people become older as Sophia already said in the very beginning, and more and more digital natives now also come closer to the elderly stage as well as potentially even, those are the upcoming generations of elderly they might perhaps be a little bit more adapted to technology and they have perhaps really you can really have apps that would suit them very well and their technology adoption is definitely higher as the current elderly stage but also with our research we've seen that with those demographics 65 Plus already over 70% At least in the US, they actually have smartphones but they don't really understand that much of it so you probably need to have someone that basically gives them more of a guidance within the app or some sort of a training to actually get to an app, do you have that your app that you have those guidance or that information, things there as well so that everyone directly always understands what is offered and meant in each step and what needs to be done?	
22	Arne Nys	Yeah, that's a good point, we don't really have, like, in terms of onboarding. That's something that we've looked at as well. I think, like, I'm not sure if that's necessarily going to solve for certain accessibility issues in the app so usually what these recordings can do is can like they can explain to you, you know like the app does this and it does time does that so at least you know what kind of functionalities are there but then once it gets started, you still have to figure out like how do I now search for something like how do I make sure that like, I add a digital payment method or something like that. So these are things that we as well. So there's probably more to be done. But yeah like adding an onboarding could help. I'm not sure if that's going to be kind of like the magical bullet.	TD-AF LES LES
23	Researcher	How's it by the way, at the moment structured if I am for example calling a door2door bus. How, where do I pay in the bus then?	

24	Arne Nys	Yeah in the vehicle itself so with the like phone booking mechanism, what we found is that there's not really a good reliable way to offer any kind of digital payments, because you don't want to get your credit card over the phone and like it probably, like, there's probably just not a good reliable way to do that other than making sure that the payment is done inside the vehicle so we offer the ability to either pay with cash or pay with card in the vehicle if there's a terminal. Or like the customer could be using some kind of voucher system that maybe like you go by your vouchers beforehand and you go to, you go to the store and then like, show it to the driver and like one of them is taken. That could work as well or. Lastly, if you already have like a subscription for example, like your card, or something like that, that could work as well. So, if the service supports this, you don't really have to pay for anything you might already have this card or you just like, show it to the driver that might be sufficient. So there are different ways, but the actual kind of like verification of whether the person can be taken into the vehicle would happen inside the vehicle itself.	TD-AF TD-AF
25	Researcher	Okay, I think we already have a lot of questions covered.	
26	Researcher	Perhaps one more question from my side, just from our research we for example also partially looked into the groups of digital natives and digital immigrants as it also been part of your personas, or your use cases or anything or has that so far not really been a focus area.	
27	Arne Nys	No. No. I wouldn’t say so.	+Strategy
28	Researcher	Okay, thank you very much. Do you have any questions or anything you would like to add at the end.	
29	Arne Nys	Um, I mean I'd be interested to like kind of like see what kind of outcomes you have with research like what kind of, what are kind of the next steps from this.	
30	Researcher	Yeah, so we are still in the middle of conducting all the interviews, and we have basically interviews, on the one hand with companies within the mobility system so basically MSPs, but also we go towards also having interviews with people from the research or some sort of a thought leaders within the area of either signs and for elderly people, or science or mobility transportation ideas or also technology for elderly people so we tried to really have a rather broad identification of whether technology for elderly people in the area of mobility is currently well integrated or not. And also this could also lead to ideas towards what could be potential solutions how it could be improved eventually. At the moment we're still trying to get more data to actually come to find an answer to our research question, but the idea would really be to really have some sort of an overview of whether it's well done at the moment or not and how perhaps it could be strengthened at the moment.	

31	Arne Nys	The lucrativity is at the moment not really a big issue. The phone booking systems seems to be enough, actually. I don't know actually. I think, that why we need to make more research. But it seems as if the service can run smoothly and well. The focus may not always have to be on the digital interface rather than "are there alternative ways to get access to the mode of transportation". There is a lot of stuff surrounding it. What we are basically aiming for is to help public transportation companies to give the accessibility and inclusion as it is their role, right?	+Strategy DP-UR TD-AF
32	Researcher	That's really interesting. We were talking to another project, and there they hand similar insights than you have done so far. They find the service "on-demand transportation" as highly beneficial for elderly. And research shows that elderly can actually really benefit from it the most. However, when testing it, elderly seem to not very well accept it so that the company in the end actually went back to the original plan of having buses running every other hour.	
33	Arne Nys	Yeah, well, as an elderly, you might probably also not have to be somewhere at a strict hour. So, that waiting for a bus might not be a big problem. So, as long as the bus is running, it is fine. "I know how to get on a bus. So, why are you now coming at me with a new service" I think especially at those places, where the bus is not doing that and that's exactly those very rural areas in Germany – because honestly like everywhere else in Germany, there is a bus, right? There is something.	SPA
34	Researcher	Yeah. We are happy to share our results with you! It will probably take another month or so circa.	
35	Arne Nys	Yeah, no worries.	
36	Researcher	Thank you so much for your insights. It was very nice to hear your opinions and experiences.	
37	Arne Nys	Yeah, no worries. Let me know if you need anything else. But, yeah – looking forward to the outcome.	

Appendix 6 – Interview 6 (R7, R8)

Participants: Jan Alexandersson, Moritz Wolf, Theresa Elbert, Sophia Schimpgen
Company: DFKI (German Research Center for Artificial Intelligence)
Date: May 6th 2021
Interview Length: 71 minutes
Language: German

Row	Person	Transcription (Original Text German)	Transcription (English Translation)	Code
1	Researcher	Könntet ihr euch bitte einmal kurz vorstellen und auch erklären um was es beim Projekt *mobisaar* geht?	Could you please introduce yourselves and explain what the *mobisaar* project is about?	
2	R7: Jan Alexandersson	Okay, ja hervorragend also ich bin ja von vorne rein dabei und das ist über zehn Jahre her. Ich weiß das relativ ganz genau, weil wir gerade hier, Moritz und ich und alle anderen in diesem großen Projekt ein Abschluss Publikation, ein Buch schreiben und dann haben wir so archäologische Untersuchungen in meiner Mailbox zum Beispiel gemacht, wann hat das überhaupt tatsächlich angefangen? Und? Das war in 2011 gab es von BMW I und BMW F eine Ausschreibung zur Mobilität und AAL (Ambient Assisted Living) wurde ja, äh ja sagen wir 15 Jahre her so ein bisschen groß gemacht, weil demografische Entwicklung und da wollte man Technik entwickeln, um das hier ein bisschen abzufedern und was, man vielleicht kurz zu vielen vo diesen AAL Projekten und auch die bis vor kurzem gelaufen sind. Sind oft gefloppt, und das ist genauso die Erfahrung, die ihr da berichtet. Über verschiedene App gesteuerte Mobilitätslösungen mit Carsharing und sie sind deswegen gefloppt, weil sie vergessen die Menschen, die tatsächlich diese Technologie und die App oder sowas mit von	Okay, yes, excellent, so I've been involved from the beginning and that was over ten years ago. I know that relatively well, because Moritz and I and everyone else in this big project are writing a final publication, a book, and then we did archaeological research in my mailbox, for example, when did it actually start? And? In 2011 BMW I and BMW F issued a call for tenders for mobility and *AAL (Ambient Assisted Living)* was made a bit big, let's say 15 years ago, because demographic development and they wanted to develop technology to cushion this a bit and what, perhaps briefly to many of these AAL projects and also those that ran until recently. They often failed, and that is also the experience you are reporting. Various app-controlled mobility solutions with car sharing have failed because they forget to involve the people who actually use this technology and the app or something like that from the outset, in the research and development methodology. We then applied, and I was fortunately contacted by a sociologist, who was then the managing director of a sociology institute,	DP-UR DP-S

		vornherein mit einzubinden, in der in der Forschungs und Entwicklungs Methodologie also. Wir haben uns dann beworben, und ich bin glücklicherweise kontaktiert worden von einem Soziologen, der einen damals Geschäftsführer eines Soziologie Institut ziehen, zu wir können das ISO Institut. Und er hatte seit vielen vielen Jahren diese Idee mit der Kombination, Dienstleistungen und Technologie zu erforschen. Die das hängt damit zusammen, dass oft diese wunderbare technische Lösungen, Apps, Apps oder Apps oder sonst irgendwas die sind einer für sich total wunderbar, aber die treffen nicht richtig den Kern der Fragestellung und und der Kern die Fragestellung zum Beispiel Mobilität und im ÖPNV ist tatsächlich wie kriegen wir ältere Menschen dazu ÖPNV überhaupt zu benutzen, das hilft, die helfen, die Apps nicht. Das sind nicht die Probleme, sondern die Probleme sind eher eine Haltestelle, ist schwer begehbar oder ist so viele Leute und das ist so zu schwierig und oder Der Busfahrer fährt, als fährt er einen Lkw und Güter oder es gibt es ist geht nicht, oder Fakt ist praktisch unmöglich mit dem Rollator oder Rollstuhl in den Bus zu kommen oder so. Was sind die tatsächlichen Probleme? Und die Idee war dann ein Lotsendienst zu entwickeln in Kombination mit Apps, aber die Apps sind nur ein kleiner Bestandteil, das sind kleine Schmierer in dem eigentlichen Dienstleistungssystem. Das heißt, diese, was man in Paris oder Berlin oder in anderen	and he said, "We can do the ISO institute. And he had been exploring this idea for many many years with the combination, services and technology. That has to do with the fact that often these wonderful technical solutions, apps, apps or anything else are totally wonderful in themselves, but they don't really get to the heart of the issue and the heart of the issue, for example, mobility and in public transport is actually how do we get older people to use public transport at all, that helps, the apps don't. That's not the problem, it's the apps. Those are not the problems, but the problems are rather a bus stop is difficult to get to or there are so many people and that is too difficult and or the bus driver drives as if he is driving a truck and goods or there is it is not possible or fact is practically impossible to get on the bus with the wheelchair or so. What are the actual problems? And the idea was then to develop a mobility guide service in combination with apps, but the apps are only a small component, they are small scribblers in the actual service system. That is to say, what you find in Paris or Berlin or in other cities, such escort services or mobility guide services, as we called them, they are there but they are often organised with paper and pen. This means that if you need assistance to travel by public transport or train or whatever you want, you have to contact them 24 hours in advance. But we are still human beings, and we want to spontaneously go out for a coffee or to the cinema or something else. That is, a service or a service like that should actually be much more agile and that was the core. This idea.	

		Städte findet solche Begleitdienste oder Lotsendienste, wie wir dann genannt haben, die sind da aber die sind oft mir Papier und Stift organisiert. Das heißt wenn du Unterstützung brauchst im ÖPNV zu fahren oder mit der Bahn oder was du willst, dann musst du dich vor 24 Stunden vorher melden. Aber wir sind ja noch Menschen, und wir wollen ja spontan vielleicht Kaffee trinken gehen oder ins Kino oder sonst irgendwas. Das heißt, eine Dienstleistung oder so ein Dienst, das müsste eigentlich viel agiler sein und das war der Kern. Diese Idee. Dann haben wir uns beworben und das war dann ein interdiziplinäres Projekt mit Soziologen, KIler, ÖPNV Betreiber und wir hatten auch dieser charmante Idee, das kam auch von von dem Kollegen Soziologen, die Dienstleister, die Mobilitätslotsen zu akquirieren aus einem Pool von Arbeitslosen, also Arbeitslangzeitarbeitslosen und Dann ein Ausbildungsprogramm im Rahmen des Projektes zu entwickeln, sodass wir Arbeitslose schulen könnten zu guten Dienstleistungen also, da geht es darum, die Begegnung auf Augenhöhe, respektvoll, Konflikte beseitigen, Argument und solche Sachen und das war eigentlich der Grund dieses Projektes. Und dann haben wir das nach 3 Jahren gewonnen, zunächst mal das Projekt in Saarbrücken, Stadtkern Saarbrücken gehabt, also da hatten wir zum Schluss dann in ein funktionierendes System. Man hat dann telefoniert an den Callcenter des ÖPNV Unternehmens und einen Lotsen bestellt oder man hat mit App diese Dinge bestellt oder man hatte über eine Webseite dieser Dienstleistung bestellt und die	Then we applied and it was an interdisciplinary project with sociologists, computer scientists, public transport operators and we also had this charming idea, which also came from our sociologist colleague, to acquire the service providers, the mobility guides, from a pool of unemployed, i.e. long-term unemployed, and then to create a training programme within the framework of the project. Then to develop a training programme within the framework of the project, so that we could train the unemployed to provide good services, so it's about meeting at eye level, respectfully, eliminating conflicts, argument and things like that, and that was actually the reason for this project. And then after 3 years we won the project in Saarbrücken, in the city centre of Saarbrücken, so in the end we had a functioning system. You then phoned the call centre of the public transport company and ordered a guide or you ordered these things with an app or you ordered this service via a website and the idea was that the service is free of charge, the only thing you need is a ticket. And these different accesses, that's what, for example, in your car sharing apps, they're just apps and that's insane. It becomes so and there are in us people we are very different so we 4 on this call here we are also different, we have different references and that's why the access or the flexible access to such a system is of fundamental importance and that's why we have three interaction ways for the for passengers. developed. One is a call centre, one is a website and one is an app, which we then tested and evaluated, and in doing so we have this standardised, user-	DP- TEAM DP-S TD-AF +Strategy TD-AF TD-AF

		Idee war du dann die Dienstleistungen ist kostenlos, das einzige, was du brauchst, ist ein Ticket. Und diese verschiedene Zugänge, das ist ja das, was zum Beispiel in eurer Car Sharing Apps das sind ja nur Apps und das ist Wahnsinn so. Es wird so und es gibt in bei uns Menschen sind wir ganz unterschiedlich also wir 4 auf diesem Call hier wir sind auch unterschiedlich, wir haben unterschiedliche Referenzen und deswegen ist der Zugang oder der flexible Zugang zu einem solchen System von fundamentaler Bedeutung und deswegen haben wir 3 interaktions Wege für die für die Fahrgäste Entwickelt. Also einmal Callcenter einmal Website und einmal App und das haben wir dann ausprobiert und evaluiert und dabei haben wir dieses standardisierte, benutzerzentrierte Design, das ist ganz wichtig iterative Entwicklungsmethologie. Die Fahrgäste werden eingeladen, werden befragt, welche Präferenzen welche Ängste, Persona, Szenarien und alle diese Sachen, die man ihr vielleicht kennt oder auch nicht weiß ich nicht aus Benutzerzentrierte Designentwicklung. Und dann haben wir diese Entwicklungsmittel hier ein bisschen erweitern müssen. Weil eben Benutzerzentrierte Design, das hat man gerne verwendete Apps oder Webseiten oder sonst was und dann evaluiert man das und dann nimmt man die Ergebnisse der Evaluation und geht zurück und guckt, dass diese Spezifikationen oder die Idee die wir hatten am Anfang war das richtig hat das wirklich funktioniert und dann verbesserte man das so ein bisschen.	centred design, which is a very important iterative development methodology. The passengers are invited, they are asked what preferences what fears, persona, scenarios and all these things that you might know or not I don't know from user-centred design development. And then we had to expand these development tools a bit here. Because user-centred design is something you like to use with apps or websites or whatever and then you evaluate it and then you take the results of the evaluation and go back and see that these specifications or the idea we had at the beginning was the right one, that it really worked and then you improve it a bit. But in the service sector, in the provision of services, we started this once and then it ran all the time every day, 7 days a week, i.e. 5 days a week, because then came Tuesday and Saturday and Sunday. So you can only improve it incrementally. So we improved the development ethology a little bit. We applied for prizes and won some ideas and stuff from Germany and that was quite funny, but at some point the project was over and then the Saarbahn, which is the name of the public transport system in Saarbrücken, or the operator, took over these mobility guides and the costs and that was then continued and we said to ourselves that it would be great if we could continue this here. And then we applied for InnovaKom - Innovations for Communities. Then Then we luckily won the competition and suddenly had a 5-year project with the idea of extending what we had started in the city centre of Saarbrücken to the whole of Saarland, and at some	PD-T DP-S DP-S

		Aber wir haben dann in dem Dienstleistungssektor, in der Dienstleistungsausübung, das hat man einmal in Gange gesetzt und dann lief das die ganze Zeit jeden Tag 7 Tage die Woche, also 5 Tage Woche weil dann kam Dienstag und am Samstag und Sonntag. Also kann man das nur Inkrementell ein bisschen verbessert. Also die Entiwicklungsmethologie haben wir dann ein bisschen nachgebessert. Das lief dann im Stadtkern Saarbrücken und wir haben uns beworben auf Preise haben da so Deutschland Ideen gewonnen und so ein bisschen Kram und das war ganz lustig so, aber irgendwann mal war das Projekt vorbei und dann hat tatsächlich die Saarbahn, so heißt die ÖPNV in Saarbrücken oder der Betreiber diese Lotsen übernommen, die Kosten und das wurde dann weitergeführt und da haben wir uns gesagt das wäre doch toll, wenn wir das hier weiterführen können. Und dann haben wir uns beworben auf InnovaKom - Innovationen für Kommunen beworben. Dann haben wir das zum Glück auch gewonnen und hatten dann plötzlich ein 5 Jahres Projekt mit der Idee das, was wir im Stadtkern Saarbrücken zum Laufen gebracht haben, über das ganze Saarland so auszuweiten, und da ist irgendwann mal als Moritz auch ins Bild gekommen und dann ging es darum, dass wir alle diese verschiedenen Stakeholder, Gemeinden, im Saarland gibt es fast 20 ÖPNV Betreiber damals. Heute sind das 15. Die werden alle gebündelt über SMS, das Saarländischenahverkehrs, Dingsbums gmbh, irgendwas usw.	point Moritz also came into the picture and then it was a question of all these different stakeholders, municipalities, in Saarland there were almost 20 public transport operators at that time. Today there are 15. They are all bundled together via SMS, Saarländischenahverkehrs, Dingsbums gmbh, something or other. And then we tried to involve municipality after municipality, public transport, operators, etc. in these things. Then we can now involve town city country town city, country and the station commission and so on and immediately and then at the end of the project here we have also experienced the crowning glory that the state of Saarland has felt authors that they have also stepped in and taken over the whole system after the funding is over at the end of last year. So now the mobisaar system is running as an integral part of Saarland's public transport system. And you can travel from door to door, from Hinterpubsing to Weitwegweiler. In Saarland, that's more or less the short route.	

		Und dann haben wir uns bemüht und dann Gemeinde nach Gemeinde, ÖPNV, Betreiber usw zu involvieren in diese Sachen. Dann können wir jetzt also Stadt Stadt Land Stadt Stadt, Land und die Bahnhofskomission war dabei und so weiter und sofort und dann am Ende des Projektes jetzt hier haben wir auch so die Krönung erlebt, dass das Land Saarland hat Autoren empfunden, dass sie auch eingestiegen hat das ganze System, nachdem die Förderung am Ende letzten Jahres vorbei ist, übernommen. So jetzt läuft das mobisaar System als integraler Bestandteil des Saarländischen ÖPNVs. Und man kann von Tür zu Tür, von Hinterpubsing nach Weitweg-weiler fahren. So im Saarland ja so in etwa Kurzdurchgang.		
3	Researcher	Ist das denn ein Teil der ÖPNV App oder ist das eine zusätzliche App, die erstellt wurde?	Is this part of the public transport app or is it an additional app that has been created?	
4	R7: Jan Alexandersson	Eine zusätzliche. Zusätzliche das stimmt ja, aber das Konzept ÖPNV im Saarland ist jetzt erweitert. Das ist nicht nur ein Bus oder ein die Kombination Bus, Straßenbahn und Bahn, sondern es ist tatsächlich mit Lotsen so und dass dieses Verständnis muss man, darüber nachdenken was ist denn ÖPNV. Wenn ich euch frage, wenn ich ÖPNV sage, was denkt ihr euch dabei und was denkt sich Oma Lilli dabei? Oma Lilli war immer der Meinung, dass ist ein sportlicher Bus und der läuft römser und hab ich Glück, dann kann ich vielleicht mitfahren und wenn ich das für unheimlich findet, dann fahr ich nicht mit und dann bleib ich zuhause oder mein Sohn kommt mich abholen. Das Saarland ist das Auto dichteste Bundesland Deutschlands. Das ist interessante	An additional one. Additional, that's true, but the concept of public transport in Saarland is now expanded. It's not just a bus or a combination of bus, tram and train, but it's actually with mobility guides and that understanding you have to think about what public transport is. When I ask you, when I say public transport, what do you think about it and what does Grandma Lilli think about it? Grandma Lilli was always of the opinion that this is a sporty bus and it runs faster and if I'm lucky, then maybe I can ride along and if I think it's scary, then I won't ride along and then I'll stay at home or my son will come and pick me up. Saarland is the most densely populated federal state in Germany. That's an interesting challenge to pimp the public transport system and make it attractive, because yes.	

		Herausforderungen das ÖPNV zu pimpen und attraktiv zu machen, da ja.		
5	Researcher	Also kann man sagen, dass das Thema ältere Menschen schon bewusst ist im ÖPNV? Weil das Projekt ja auch erweitert wurde, weil sie es von sich aus erwitern und andere ÖPNVs einbezogen werden sollten. Ist das Bewusstsein in den Unternehmen oder sogar in deren Strategie?	So you can say that that public transport companies are aware of the topic of older people? Because the project has also been extended, because they are extending it of their own accord and other PTs should be included. Is the awareness in the companies or even in their strategy?	
6	R7: Jan Alexandersson	Ja, Bewußtsein ist so ne Sache, weil wenn du irgendeiner sagt, das über hundert Jahre immer so war und ÖPNVwar ja immer so, das war entweder Straßenbahn oder Bus. Und dann hast du in der in der Gesellschaft ein gewisses Bild. Also ja so ist der ÖPNV und wenn man das ändern will, das Bedarf ein riesen Apparatus an Kommunikation und das muss ich sagen haben wir haben relativ viel. Also für mein Dafürhalten Ressourcen gehabt und zu kommunizieren. Aber ich würde sagen heute sind wahnsinnig viele Saarländer/innen in die keine Ahnung von mobisaar haben. Aber das hängt auch damit zusammen vielleicht, dass die nicht die Saarbrücken Zeitung lesen oder, die Saar Nachrichten nicht verfolgen. Und die fahren sehr viel Auto und schwierig, ja. Es ist genauso, wenn ich über Car Sharing nachdenke. Ich interessiere mich nicht so so sehr Carsharing, weil ich fahre Fahrrad und und ich habe zwar auch ein Auto, weil ich die mir damals gedacht habe ich brauch ein Auto und das will ich habenund ich habe mich nicht so richtig bemüht. Die ganze Konzepte zu hinter Carsharing, weil es gibt so viele und das zu kommunizieren und verständlich zu machen und vor allem für ältere Menschen	Yes, awareness is one thing, because if you say that things have always been like that for a hundred years, and public transport has always been like that, it was either tram or bus. And then you have a certain image in society. So yes, that's how public transport is and if you want to change that, you need a huge amount of communication and I have to say we have a lot of that. So for my part, we have had resources to communicate. But I would say that today there are a lot of Saarlanders who have no idea about mobisaar. But maybe that has something to do with the fact that they don't read the Saarbrücken newspaper or don't follow the Saar news. And they drive a lot of cars and it's difficult, yes. It's the same when I think about car sharing. I'm not that interested in car sharing because I ride a bike and I have a car, but I thought I needed a car and I wanted one and I didn't really try. The whole concept behind car sharing, because there are so many and to communicate that and to make it understandable and especially for older people who have always bought their Ford, Ford, Focus or Taunus 11 or whatever, we have a Ford car workshop here in Saarlouis, that was always such an own car you bought, was decent, so it stands	+Strategy

		die immer ihren Ford gekauft haben, Ford, Focus oder Taunus 11 oder was auch immer, wir haben ja hier eine Ford Werkstatt in Saarlouis, das war immer so ne eigene Autos hat man gekauft, war anständig, so steht da in der Garage und so und dann hat man das geputzt, dann ist man los getuckert so und das war ja irgendwie das Verständnis und dann dieses Kommunikation irgendwas ändert sich hier. Das ist nicht mehr mein Autos und ich muss den Scheiß vielleicht nochmal teilen und ich kann meine Nachbarn nicht ausstehen. Und es gibt massenhaft so Schwierigkeiten die man glaube ich, zunächst mal nicht versteht, weil man auch die gedachte Zielgruppe nicht involviert hat, von vorne. Also das ist ein total wichtiger integraler Bestandteil solcher Projekte, das sollte ich vielleicht auch sagen. Ein ganz wichtiger Erfolgsfaktor war die die komplett Einbindung der Fahrgäste. Wir haben jeden Monat in dem ersten Projekt Mobia sogenannte Stammtische gehabt, dann wurden diejenigen, die Lust hatten und die Interesse an diesem Projekt hatten, die wurden eingeladen und da haben wir uns einmal im Monat getroffen, Kaffee getrunken und da gibt es in Saarbrücken ein café, café, Lolo und Kaffee Lolo macht, die die geilsten Butterkuchen der Welt. Und da haben wir Butterkuchen gekauft, Kaffee und die Leute kamen bei uns gut drauf und dann haben wir dann das Projekt besprochen und die Ideen und was funktioniert und was funktioniert nicht? Da war ein Busfahrer dabei, da war nutzen dabei, und da waren Fahrgäste dabei.	there in the garage and so and then you cleaned it, then you chugged off so and that was somehow the understanding and then this communication something changes here. It's not my car anymore and I might have to share the shit again and I can't stand my neighbours. And there are a lot of difficulties that I don't think you understand at first when you don’t involve the intended target group from the beginning. So that is a totally important integral part of such projects, I should perhaps also say. A very important success factor was the complete involvement of the passengers. In the first Mobia project we had so-called regulars' tables every month. Then those who wanted to and were interested in the project were invited and we met once a month, drank coffee and there is a café. Café, Lolo in Saarbrücken that makes the coolest butter cakes in the world. And we bought butter cakes, coffee and people had a good time with us and then we discussed the project and the ideas and what works and what doesn't work. There was a bus driver there, there were passengers, of course we of the project were there and then we have this interdisciplinary and stakeholders of different perspectives and to simply gain understanding. I think we had a budget with *MOBIA (Mobil bis ins Alter)* over three years of, let's say, three million, three and a half million approximately. So I don't want that at all. That means we had a lot of money and enough staff to keep the various project partners going, and that was very important.	DP-UR DP-UR DP-UR DP-UR +Strategy +Strategy

		Mhm natürlich wir im Projekt waren dabei und dann haben wir diese interdisziplinäre und Stakeholder unterschiedlicher Sichtweise und um einfach das Verständnis zu gewinnen. Ich glaube, wir hatten mit *MOBIA (Mobil bis ins Alter)* über 3 Jahre ein Budget von, sagen wir, 3 Millionen sag mal 3 dreieinhalb Millionen ungefähr. Also das will ich gar nicht so. Das heißt, Wir hatten relativ viel Knete und genügend Personal bei den verschiedenen Projektpartnern so zu halten und das war ganz wichtig.		
7	Researcher	Und wurde so auch entschieden, dass man die Lotsen nicht nur über die App, sondern auch über Telefon und E-Mail buchen kann?	And is this also how it was decided that mobility guides can be booked not only via the app, but also by phone and email?	
8	R7: Jan Alexandersson	Ja, selbstverständlich. Ich weiß nicht, ob dir die lustigen Fernsehen Berichte über Impfen im Fernsehen in Deutschland verfolgt habt, aber dann werden Impftermine über Apps zur Verfügung gestellt und dann kommen SMS an die Leute, wenn sie Glück haben haben Sie überhaupt ein Handy und dann kommt irgendwie auf so eine altes Klapphandy ein SMS mit HTML. Also das ist fantastisch also viele junge, innovative und so denkende Menschen, die haben vergessen, es gibt, es gibt andere Lebensweise als was haben wir dann hier iphone irgendwas sowas was wir benutzen? Und das lässt sich relativ gut erfassen, indem eine eine Benutzerzentrierte Entwicklungs Methodologie zugrunde gelegt wird.	Yes, of course. I don't know if you've been following the funny TV reports about vaccination on TV in Germany, but then vaccination dates are made available via apps and then text messages are sent to people, if they're lucky enough to have a mobile phone at all, and then somehow an SMS with HTML is sent to an old flip phone. So that's fantastic, so many young, innovative and so thinking people who have forgotten, there are, there are other ways of life than what do we have here then iphone something something something that we use? And that can be captured relatively well by using a user-centred development methodology.	DP-TEAM
9	Researcher	Wie interessant. Weil wir haben tatsächlich auch jedes	How interesting. Because we actually asked every company you	

		Unternehmen, was du bisher interviewt haben, auch direkt gefragt habt ihr User Stories, habt ihr Personas vielleicht spezifisch für ältere Leute? Und die meisten, die wir befragt haben, haben zwar gesagt, das ist ein extrem interessantes Thema, weil es auch extrem interessanter Markt ist auch perspektivisch, also auch ökonomisch relativ interessant, aber die sehen dann auch den Aufwand für die User Research also genau das, was ihr eben auch gemacht hat, dass man sich theoretisch wirklich viel auch mit dem Nutzer zusammensetzen kann. Es ist nicht so einfach, direkt Feedback zu bekommen durch die App Benutzung, bei dem Zweifel ja gar nicht die App benutzen und dementsprechend wäre ganz interessant, vielleicht von euch zu hören, ob ihr denkt, dass das wirklich nur ein Weg ist, der perspektivisch von öffentlichen Kommunen oder von öffentlichen Playern gemacht werden kann oder ob das wirklich auch ein privates Unternehmen auch lukrative sein könnte?	have interviewed so far directly: do you have user stories, do you have personas specifically for older people? And most of the people we interviewed said that this is an extremely interesting topic, because it is also an extremely interesting market, also from a perspective, i.e. relatively interesting from an economic point of view, but they also see the effort for user research, i.e. exactly what you have just done, that theoretically you can really sit down with the user a lot. It's not so easy to get direct feedback through the use of the app, where doubts don't even use the app, and so it would be very interesting to hear from you whether you think that this is really only a path that can be taken by public municipalities or public players, or whether it could also be lucrative for a private company?	
10	R7: Jan Alexandersson	Also Moritz und ich, wir haben jetzt gemeinsam hier ein bisschen an diesem Buch geschrieben und eine Sache, die wir sehr prominent platzieren, ist immer die Erfahrung im Bereich AAL Forschung, Ambient Assisted Living. Da wurde wahnsinnig viel Geld auf diese Forschungs und Entwicklungs Community geworfen, also hunderte von Millionen Euro und dann sind alle losgetuckert und haben irgendwelche technische Artefakte erfunden und die waren Schweinegeil, phantastische Lösungen und da gibt es Demonstrationen und dann hat man sich getroffen, zu Tagungen und das war groß wir waren ich weiß nicht, wie oft wir in Berlin waren, dann ist das	Moritz and I have written a bit of this book together and one thing that we place very prominently is always the experience in the area of AAL research, Ambient Assisted Living. An insane amount of money was thrown at this research and development community, hundreds of millions of euros, and then everyone chugged away and invented some kind of technical artefact, and they were awesome, fantastic solutions, and there were demonstrations and then people met for conferences and that was big, we were I don't know how many times we were in Berlin, then it moved. Then there was *AAL Europe*, there were also meetings and stakeholders and	

		umgezogen. Dann gab es *AAL Europe*, da hat man sich auch getroffen und Stakeholders und Operation und bla bla bla buzzword und Bullshit Bingo bis obenhin. Und dann stellt sich heraus, dass diese wunderbare Lösungen keine reale Probleme beantwortet haben. Das waren einfach wunderbare Lösungen, die entweder kein Schwein benutzt sie, weil sie werden nicht benötigt, also Fehler Nummer Eins. Zweo viel zu teuer. Oder wie soll man das überhaupt einbauen, also zum Beispiel ein ein riesen Problem bei älteren Menschen ist tatsächlich, dass die unfallen zu Hause. Die kippen um und bleiben liegen, weil sie einen Oberschenkelhalsbruch oder sowas haben. So ganz traurige Geschichte, aber leider passiert es häufig und dann wie kann man das lösen? Ja, machen wir einen Boden, der erkennt ob Leute auf dem Boden liegen, ja wunderbar, da haben wir technische Lösungen dafür. Dann stellt sich heraus dann kostet der Boden 3000€ pro Quadratmeter. Ok tja, Mama. Rentner Mama du, wir müssen jetzt dein Haus der 120 Quadratmeter etwas pimpen. Es kostet etwa 120 Quadratmeter mal dreieinhalb 1000€. Nee, das zahle ich nicht und kein Vermieter bezahlt das auch nicht, weil die Mieter werden das auch nicht bezahlen. Es ist einfach zu teuer und alle diese Aspekte, da hätte man sich so viel sparen können und viel Investitionen. Und eins solltet ihr wissen. AAL ist in Deutschland tot. Es gibt keine AAL, Förderung mehr. Deutschland ist aus dem AAl Europa ausgestiegen. Alle AAL Projekte auf	operations and blah blah blah buzzword and bullshit bingo up to the top. And then it turns out that all these wonderful solutions didn't answer any real problems. They were just wonderful solutions that either no one uses them because they're not needed, so mistake number one. Two, way too expensive. Or how can they be installed at all, so for example a huge problem with older people is actually that they fall at home. They fall over and stay down because they have a fracture of the neck of the femur or something. It's such a sad story, but unfortunately it happens a lot and then how can we solve it? Yes, let's make a floor that recognises whether people are lying on the floor, yes wonderful, we have technical solutions for that. Then it turns out that the floor costs 3000€ per square metre. Ok, well, mum. Pensioner Mum, we have to pimp your house of 120 square metres a bit. It costs about 120 square metres times three and a half 1000€. No, I won't pay that and no landlord will pay that either, because the tenants won't pay that either. It's just too expensive and all these aspects, so much could have been saved and so much investment. And you should know one thing. AAL is dead in Germany. There is no more AAL funding. Germany has dropped out of AAL Europe. All AAL projects at the European level happen without German participation. Yes, because so far almost no business model has come about. Mobisaar is one of the few. But that also works, because public transport is tax-financed anyway, so the whole business model, which you certainly know if you've done your homework. That is, taxes are levied and then invested in public transport, which can be cushioned a bit	+Strategy LES +Strategy DP-S

		europäischer Ebene geschehen ohne Beteiligung von Deutsch. Ja, weil bisher kamen so gut wie kein Geschäftsmodell zustande. Mobisaar ist einer der wenigen. Aber das funktioniert wiederum auch, weil ÖPNV is sowieso steuerfinanziert, also das ganze Geschäftsmodell, das kennt ihr ja sicherlich auch, wenn ihr eure Hausaufgaben gemacht habt. Das ist ja, es wird ja Steuer erhoben und das wird dann investiert in ein ÖPNV und so ein bisschen kann man das abfedern mit Ticket Einkünfte, Werbung usw. Im Grunde genommen ist das steuerfinanziert. Es ist total fundamental wichtig zu gucken wie kommt Knete rein und was ihr gelernt habt auch durch die Interviews, die gedachten Nutzer eng mit zu integrieren, das ist ist umständlich und es kann nicht alle und es ist keine Wasserfall oder agile, Entwicklungs Methoden ist scheißegal, wenn die, wenn die Personas, wenn die Szenarien, und so weiter und sofort, wenn die nicht dabei sind, dann floppt das gerne.	with ticket revenues, advertising, etc. Basically, it's tax-financed. Basically, it's tax-financed. It's totally fundamentally important to see how the money comes in and what you've learned from the interviews, to closely integrate the intended users, that's awkward and it can't be done by everyone and it's not a waterfall or agile, development methods, it doesn't matter if they, if the personas, if the scenarios, and so on and immediately, if they're not there, then it tends to flop.	DP-S
11	Researcher	Wie viele verschiedene Personas hat man ungefähr erstellt? Kann man das so sagen?	Approximately how many different personas have you created? Can you say that?	
12	R7: Jan Alexandersson	Also in Mobia hatten wir ich glaube 3 positive und eine negative also es war immer Personen. Wir hatten eine Persona, damit können wir nichts anbieten und das wird nicht funktionieren. Das ist einfach zu schwierig. Und das ist auch ganz, ganz wichtiger Aspekt.	So in Mobia we had I think 3 positives and one negative so it was always persons. If we has one persona, we can't offer anything with that and it won't work. It's just too difficult. And that is also a very, very important aspect.	DP-UR
13	R8: Moritz Wolf	Ich glaube da hatten wir 5.	I think we had five.	DP-UR

14	R7: Jan Alexandersson	Zu viele Emails über das erste Buch ja haben wir das alles aufgeschrieben? Ne, wir haben 3 sogar also so. Aktiv, passiv und negativ so hatten wir das genannt. Und dann? Dann gab es so, ist vielleicht nicht so wichtig, aber was wir sehr schnell erkannt haben, es geht nicht nur um ältere Menschen, es geht um mobilitätsbehinderte Menschen und deswegen ist der Dienst nicht für Ältere. Es ist für diejenigen, die den ÖPNV aus welchen Gründen auch immer nicht nutzen können.	Too many emails about the first book yes did we write all that down? No, we even have three, so like this. Active, passive and negative that's what we called it. And then? Then there was so, maybe it's not so important but what we realised very quickly, it's not just about older people, it's about mobility impaired people and that's why the service is not for older people. It is for those who cannot use public transport for whatever reason.	DP-UR TD-AF
15	R8: Moritz Wolf	Auch Blinde und in irgendeiner Weise Geh-Eingeschränkte Menschen, also es wurde relativ schnell ausgeweitet.	Also blind people and people with some kind of walking disability, so it was expanded relatively quickly.	
16	R7: Jan Alexandersson	Was heißt das alles? Diese Zugänge, die müssen bei diesem möglichst barrierearm sein. Sag mal so, weil barrierefrei gibt es ja nicht.	What does that all mean? These entrances have to be as barrier-free as possible. Put it this way, because there is no such thing as barrier-free.	
17	Researcher	Und in eurer Lösung gab es dann die App, die Website und die Callcenter. Habt ihr schon Daten, womit hauptsächlich die Fahrten oder die Lotsen wirklich gebucht werden? Gibt es da einen Trend was am beliebtesten ist? Hat sich das vielleicht auch verändert in den letzten paar Jahren oder in den Zeiten, als ihr gelaunched habt bis jetzt?	And in your solution there was the app, the website and the call centres. Do you already have data on how the trips or the mobility guides are actually booked? Is there a trend of what is most popular? Has that also changed in the last few years or in the times when you launched until now?	
18	R7: Jan Alexandersson	Das war die ganze Zeit das Telefon. Jetzt immer noch. Und ältere Leute wollen ein eine Person haben. Die wollen kein scheiß, digitales irgendwas. Das ist einfach so. Aber ich bin auch so ein bisschen altmodisch, weil wenn ich meine Bank anrufe, dann warte ich, bis ich endlich durchgestellt werde zu einer	That was the phone all along. Still is now. And older people want to have one person. They don't want a fucking digital anything. That's just the way it is. But I'm also a bit old-fashioned, because when I call my bank, I wait until I'm finally put through to a person. For example, Moritz and I are developing voice-controlled	TD-AF SPA

		Person. Zum Beispiel Moritz und ich wir entwickeln sprachgesteuerte automatische Dialogsysteme, aber ich will damit nicht interagieren will die sind blöd.	automatic dialogue systems, but I don't want to interact with them, they're stupid.	
19	R8: Moritz Wolf	Ja, wir haben die ja auch nicht entwickelt.	Yes, but we also did not develop them	
20	R7: Jan Alexandersson	Da hast du recht.	You're right about that.	
21	Researcher	Von der Entwicklungsseite, was waren denn da so die Haupther-ausforderungen in dem Projekt? Waren das tatsächlich die verschiedenen Persona-Gruppen oder die tatsächlichen anderen Bedürfnisse oder gab es da vielleicht doch nochmal Guidelines, die dann in Betracht gezogen wurden?	From the development side, what were the main challenges in the project? Were they actually the different persona groups or the actual other needs or were there perhaps guidelines that were then taken into consideration?	
22	R8: Moritz Wolf	Also um da auch nochmal darauf einzugehen. Für die Entwicklung der App hatten wir nochmal abgesehen von den Persona und Szenarien auch nochmal extra Stammtische mit um die 10 Personen. Die wurden immer mal wieder ausgewechselt. Personen, die dann die App benutzt haben und mit denen zusammen wurde diese App entwickelt. Die waren größtenteils sehr unterschiedlich, manche technikaffin und manche auch eher nicht. Leute mit Sehschwäche, Leute mit Gehbehinderungen. Das war wild gemixt und die App wurde dann zusammen mit diesen Leuten in Workshops erstellt. Also das Design, wurde mit denen besprochen. Wie wollen die diese App haben, damit sie die gut benutzen können?	So to also go into that. For the development of the app, apart from the personas and scenarios, we also had extra regulars' tables with around 10 people. They were changed from time to time. People who then used the app and with whom this app was developed. For the most part, they were very different, some tech-savvy and some not so much. People with visual impairments, people with walking disabilities. It was a wild mix and the app was then created together with these people in workshops. So the design was discussed with them. How do they want this app so that they can use it well?	DP-UR DP-T DP-UR DP-T
23	R7: Jan Alexandersson	Das Stichwort ist Co-Creation auch. Das ist eine Art und Weise, also, was wir hier hatten, war ja eine fertige oder funktionierende	The keyword is co-creation. It's a way of, well, what we had here was a finished or functioning functional app and we then improved it or, I think, pimped it	DP-S

		Funktionale App und die haben wir dann darüber verbessert oder gibt neudeutsch, glaube ich gepimpt nach der Vorstellungen der anderen.	according to the ideas of the others.	
24	R8: Moritz Wolf	Genau das, heißt es gab eine fertige App nach Mobia, und für mobisaar wurde das sozusagen neu aufgezogen mit den Wünschen der Fahrgäste, die eben in diesen Workshops waren.	Exactly that, i.e. there was a ready-made app according to Mobia, and for mobisaar it was, so to speak, rebuilt with the wishes of the passengers who were in these workshops.	
25	R7: Jan Alexandersson	Aber das muss man auch sagen, wir sind ja als *DFKI (Deutsches Forschungsinstitut für Künstliche Intelligenz)* oder in im Rahmen dieses Projektes sind wir nicht in derselben Situation wie zum Beispiel eine Firma, die jetzt ein Carsharing Geschäftsmodell versucht aufzuziehen, sondern wir sind ja tatsächlich immer noch in einem Forschungskontext. Und das DFKI verkauft keine Produkte. Unser Produkt ist Forschung. Katalysatorische Aktivitäten, um irgendwelche Firmen oder einen Forschungsverbund zu unterstützen mit Theologie, Forschung, KI. Wie kann man KI überhaupt reinstecken in irgendwas. Und da wir uns erlauben können, auch solche abgefahrene Ideen wie soziotechnische Systeme als Idee zu haben. Das ist ein bisschen anders als diese reine, so wir müssen jetzt ein Auto in beliebig viele Shares und das soll funktioniert Geschäft und Geld und so schnell. Und ich habe ein Investor, der hat mir jetzt 750.000€ investiert und damit kann ich ok mal schauen, weil hier hab ich meine meine Belegschaft, die kann ich dann 2 Jahre bezahlen aber dann muss Geld reinkommen. Und das klingt so unterschiedlich. Wie man da reinkommt und, bis das überhaupt funktioniert im Saarland, das hat 10 Jahre gedauert. Muss man sich vorstellen	But we also have to say that as the *DFKI (German Research Institute for Artificial Intelligence)* or in the context of this project, we are not in the same situation as, for example, a company that is now trying to set up a carsharing business model, but we are actually still in a research context. And the DFKI does not sell products. Our product is research. Catalytic activities to support any company or research association with theology, research, AI. How can you put AI into anything at all. And since we can allow ourselves to also have such whacky ideas like socio-technical systems as an idea. That's a bit different from this pure, so we now have to put a car into any number of shares and that's supposed to work business and money and so fast. And I have an investor who has now invested €750,000 in me and with that I can look ok, because here I have my staff, I can pay them for two years but then money has to come in. And that sounds so different. It took 10 years to get there and for it to work at all in Saarland. You have to imagine that it wasn't 3 years, it was 10 years. To change such firmly manifested activities in society and to make them simple and understandable and to communicate them to society. That is what it is all about. It really takes time and ambition. I and Daniel wrote this motion	+Strategy DP-S +Strategy SPA

		das war nicht 3 das waren 10 Jahre. Um solche fest manifestierten Aktivitäten in der Gesellschaft zu verändern und so einfach und verständlich zu machen und so in die Gesellschaft zu kommunizieren. Darum geht es. Bedarf es wirklich Zeit und Ehrgeizig. Ich und Daniel, wir haben ja diesen Antrag geschrieben damals. Wir wollen ja was ändern. Ist ein bisschen Herzens Sache gewesen, ist es immer noch übrigens. Das is ja so ein Basis demokratischer Sichtweise auf einen Teil der Gesellschaft. Das ÖPNV soll ja nicht nur für manche da sein, das sollte ja für alle da sein oder? Zumindest für den größten Teil, das kann ja nicht sein, dass nur weil ich humple, kann ich nicht mehr mit dem ÖPNV fahren. Was soll denn der Scheiße, es soll doch für alle sein also nicht nur für manche .und das war so ein bisschen dieser Treibfehler, den wir gehabt haben.	back then. We want to change something. It was a matter of the heart, it still is, by the way. It's a basic democratic way of looking at a part of society. Public transport should not only be there for some, it should be there for all, shouldn't it? At least for the majority, it can't be that just because I limp, I can't use public transport any more. What the fuck, it's supposed to be for everyone, not just for some, and that was a bit of a driving error that we had.	+Strategy
26	Researcher	Ja, wir haben jetzt auch ein paar Mal schon gehört, wenn wir auch mit öffentlichen Verkehrsunternehmen gesprochen haben, dass die in der Regel Transportsysteme erstellen für die Massen. Aber jetzt gerade wenn man eben auf ältere oder so Nischen-Gruppen geht, was ja nicht mal unbedingt Nischen sind, weil sie wirklich auch eine große Masse am Markt ist, dann muss man da einen deutlich anderen Ansatz haben, wie man wirklich die Produkte auch entwickelt. Da wurde uns auch schon gesagt, dass das relativ viele auch abschreckt, vor allem auch private Unternehmen, da sie halt schneller auch wirklich Geld machen müssen. Von eurer Erfahrung, würdet ihr sagen, diese 10 Jahre, die es bei euch im Projekt gebracht hat, vielleicht auch notwendig waren,	Yes, we have already heard a few times when we have spoken with public transport companies that they usually create transport systems for the masses. But now, especially when you go for older or niche groups, which are not necessarily niches because they are really a large mass on the market, then you have to have a clearly different approach to how you really develop the products. We have already been told that many people are put off by this, especially private companies, because they have to make money more quickly. From your experience, would you say that these 10 years that it took you in the project were perhaps also necessary because we are talking about a customer group or user group that is a bit older? Do you think it would be	

		weil wir hier von einer Kundengruppe oder User Gruppe sprechen, die nochmal ein bisschen älter ist? Denkt ihr das wäre vielleicht schneller, wenn es eine jüngere Gruppe ist?	quicker if it was a younger group?	
27	R7: Jan Alexandersson	Kann sein, das kommt ein bisschen darauf an. Aber viel Zeit musste investiert werden, um die neuen Gemeinden zu engagieren. Weil es ist so, dass diese Lotsen die werden ausgebildet von Arbeits-, also so Jobtrainings-Firmen, AWO, VDK oder wie die heißen. Und die müssen zunächst mal vor Ort in verschiedenen strategisch gewählten Städte im Saarland gewonnen und engagiert werden können und die müssen auch ein Commitment geben. Ok wir machen das. Und dazu brauchst du die Gemeinde, die Politik muss ja eingeweiht werden. Da ist ganz viel. In Deutschland ist ja, ich weiß nicht, wie tief ihr da in Schweden reingekommen seid, aber Deutschland hat verdammt viele klein Päpste und die haben wahnsinnig wichtige Sachen zu entscheiden und wenn die nicht an die richtig aufgeklärt werden, dann machen die nicht mit, weil das ist ja ne, ich durfte ja nicht entscheiden. Ganz viele so blöde Anfragen. Also ich kann das zum Beispiel nicht, ich bin nicht von hier und das machen die Leute, die Ahnung haben, wie man mit den Saarländern in diesem Fall umgeht. Deswegen hat das so lange gedauert. Die Technik, die wir haben die ist wirklich einfach. Das ist im Grunde ein Nationen System, das ist eine Datenbank, da pflegst du die Lotsen ein, da pflegst du Fahrgäste ein, dann rufen Sie an und dann gibt es auch die Busse und die Bahn und alles. Und dann berechnet man Routen von A nach B und dann wird eine Route gewählt und	Maybe, it depends a bit. But a lot of time had to be invested to engage the new communities. Because these mobility guides are trained by job training companies, AWO, VDK or whatever they are called. And they first have to be recruited and engaged locally in various strategically chosen towns in the Saarland, and they also have to make a commitment. Okay, we'll do it. And for that you need the municipality, the politicians have to be involved. There is a lot. In Germany, I don't know how deep you got into it in Sweden, but Germany has a hell of a lot of little popes and they have incredibly important things to decide and if they aren't properly informed, then they won't go along with it, because that's, no, I wasn't allowed to decide. There are so many stupid requests. For example, I can't do it, I'm not from here and the people who know how to deal with the Saarlanders in this case do it. That's why it took so long. The technology we have is really simple. It's basically a national system, it's a database, you enter the mobility guides, you enter the passengers, then you call them and then there are also the buses and the trains and everything. And then you calculate routes from A to B and then a route is chosen and then you drive and then this coordination system looks that the mobility guide actually arrives at the right place. So you have to learn how that works and that the system is able to calculate the travel time to the customers and calculate it correctly and that takes a bit of	+Strategy

		dann fährt man und dann schaut dieses Koordinationssystem, dass der Lotse tatsächlich am richtigen Orten ankommen. Da muss man lernen, wie das funktioniert und, dass das System in der Lage ist, die Reisezeit zu den Kunden zu berechnen und korrekt zu berechnen und das braucht ein bisschen Anpassung weil Straßen und die ganze Umgebung ist ein bisschen unterschiedlich. Wenn du zum Beispiel auf dem Land wohnst, da kann es sein, dass nur 4 mal am Tag ein Bus geht und dann musst du mit einem dieser Busse kommen oder sogar vorher da sein. Das heißt kann sein, dass du mit dem vorherigen Bus hinfährst als Lotse und dann nach 2 Stunden Wartezeit gehst du zur Tür. Also das sind die Schwierigkeiten. Natürlich kann man sich Fragen, ist ÖPNV richtig aufgestellt? Müssen unbedingt diese großen Busse viermal am Tag fahren, könnte man nicht ein bisschen mehr on-demand haben. Darum haben wir uns nicht kümmern können, weil das ist ein Abenteuer für sich.	adaptation because roads and the whole environment is a bit different. For example, if you live in the countryside, there might be only 4 buses a day and then you have to come with one of those buses or even be there before. That means you might go there with the previous bus as a mobility guide and then after 2 hours of waiting you go to the door. So these are the difficulties. Of course, one can ask oneself, is public transport set up correctly? Do these big buses have to run four times a day? Couldn't we have a bit more on-demand? We haven't been able to take care of that, because that's an adventure in itself.	
28	Researcher	Ja, das finde ich ganz interessant wir hatten nämlich auch mit einer Wissenschaftlerin aus den USA gesprochen, die auch meinte, dass gerade, wenn von den Älteren spricht, man auch häufig über „Resistence to Change“ spricht. Also die wollen sich nicht unbedingt direkt so ändern oder sind auch nicht so adaptiv wie zum Beispiel Jüngere	Yes, I find that very interesting, because we also spoke with a scientist from the USA who also said that when we talk about older people, we often talk about "resistance to change". So they don't necessarily want to change directly or are not as adaptive as younger people, for example.	
29	R7: Jan Alexandersson	Ja, aber das ist die Menschheit. Veränderung kostet klar Energie und wenn ich einmal jede Woche meinen Stammtisch mittwochs besuchen darf und dann	Yes, but that's humanity. Change clearly costs energy and if I can visit my regulars' table once a week on Wednesdays and then I go bowling on Sundays and then	

		gehe ich sonnerstags ein bisschen Kegeln und dann am Dienstag hab ich meinen Männerchor und mir gehts gut und ich kriege mein Bierchen, wieso sollte ich mich ändern, das ist anstrengend wie Sau.	on Tuesdays I have my men's choir and I'm fine and I get my beer, why should I change, it's exhausting as hell.	
30	Researcher	Total. Wir hatten nämlich auch mit einem Pilotprojekt aus Norwegen gesprochen. Das war auch eines der Projekts, das Sophia angesprochen hatte, das auch on demand Transport ausprobiert hatte, auch gerade gezielt für ältere Personen. Das wird ja häufig auch wirklich als eine der Innovation in der Mobilitätsbranche gesehen, was älteren sehr stark helfen könnte. Und das wurde nach kurzer Zeit schon wieder eingestampft, weil man gemerkt hatte, die haben sich nicht schnell genug adaptiert, also man hat nicht schnell genug Erfolge gesehen. Man hat das zwar technisch relativ große aufgebaut, aber zum Schluss ist man dann doch wieder zum klassischen Bus, der zweimal am Tag fährt, rüber gegangen.	Totally. We had also spoken to a pilot project from Norway. This was also one of the projects that Sophia had mentioned, which had also tried out on-demand transport, especially for older people. This is often seen as one of the innovations in the mobility sector that could greatly help older people. But after a short time it was abandoned again because it was noticed that they didn't adapt quickly enough, that they didn't see success quickly enough. They built up a relatively large technical system, but in the end they went back to the classic bus that runs twice a day.	
31	R7: Jan Alexandersson	Ja, aber ich, ich wette, das hat man nicht 2 Jahre versucht, das hat man 3 Monate versucht. Weißt du das ist das, was ich sage wenn du sowas fundamentales ändern willst, dann brauchst du Zeit. Wir müssen die Leute mitnehmen und die müssen auch integriert werden in diesen Veränderungsprozess und das ist total wichtig und wenn das nicht passiert dann scheitert das gerne und das ist vermutlich das, was in Norwegen passiert ist. Ich bin der Meinung, das kann zum Laufen gebracht werden aber das braucht das Involvement, der Fahrgäste, der Bevölkerung in einer Art und	Yeah, but I bet you didn't try that for two years, you tried that for three months. You know, that's what I say, if you want to change something fundamental, you need time. We have to take the people with us and they have to be integrated into this process of change and that is totally important and if that doesn't happen then it likes to fail and that's probably what happened in Norway. I think it can be made to work but it needs the involvement of the passengers, of the population in a way and time. We just need time. Changeover is so difficult I must say.	DP-S DP-UR +Strategy

		Weise und Zeit. Wir brauchen einfach Zeit. Umstellung ist so schwierig muss ich sagen. Ich werde um 05:00 Uhr abgeben, aber den Moritz gerne weitermachen. Weil ich habe um 3 noch ein Meeting. Ihr seid ja jetzt in Schweden. Guckt euch bitte mal die Gesetzgebung in Schweden an, was ÖPNV angeht, das ist ganz wichtig. Weil das schwedische ÖPNV funktioniert anders. Es beinhaltet nicht nur die Busse, sondern auch Spezialbusse und bis hin zu Taxi. Aber das ist immer noch ÖPNV. Und das ist ein total genialer Streich der Gesetzgeber in Schweden. Da hat man ein plötzlich eine ganz anderes Fundament, also Gesetz Fundament, auf dem man ÖPNV baut. Das ist ein Tipp für euch. Geht zur Stadt, zum Rathaus da in Lund und spricht mit jemandem, der Ahnung hat, von der Gesetzgebung. Das ist sehr interessant und vergleicht das mit Deutschland. Weil das sind unterschiedliche Sachen. Hier in Deutschland ist alles, du hast Taxiunternehmen und wehe du fängst an ÖPNV mit Taxi in Verbindung zu setzen. Das geht gar nicht. Dann hast du Rotes Kreuz und alle anderen mit diesen Spezial Bussen. Das sind eigene Geschäftsmodelle. Mein Vater war lange Jahre krank. Und er ist ÖPNV gefahren und wenn es nicht geklappt hat mit dem Bus, dann kam so ein Spezialbus. Und waren die ausgebucht, dann kam ein Taxi, hat ihn abgeholt. Aber es war immer noch ÖPNV. Und so ist das ein ganz anderer Ansatz und das hängt damit zusammen, dass Deutschland sehr Geschäftsmodell getrieben ist. Hier geht es	I'm going to hand in at 5:00, but I'm happy to keep the Moritz going. Because I have another meeting at 3. You are in Sweden now. Please have a look at the legislation in Sweden concerning public transport, that's very important. Because the Swedish public transport system works differently. It includes not only buses, but also special buses and even taxis. But it's still public transport. And that is a totally ingenious trick by the legislators in Sweden. Suddenly you have a completely different foundation, a legal foundation, on which to build public transport. This is a tip for you. Go to the city, to the city hall there in Lund and talk to someone who knows about the legislation. It's very interesting and compare it with Germany. Because they are different things. Here in Germany everything is, you have taxi companies and don't you dare start to connect public transport with taxi. That's not possible at all. Then you have Red Cross and all the others with these special buses. Those are their own business models. My father was ill for many years. And he used public transport and if it didn't work out with the bus, then one of these special buses came. And if they were fully booked, a taxi came to pick him up. But it was still public transport. And so it's a completely different approach and that's connected to the fact that Germany is very business model driven. Here it's about moolah, moolah and moolah and oh so yes, the people yes the. Yes, almost so yes, okay more questions.	

		um Knete, Knete und Knete und Ach so ja, die Menschen ja die. Ja, fast so ja, okay weitere Fragen.		
32	Researcher	Perfekt vielleicht dann so als Abschluss Frage für für dich? Vielleicht können wir danach noch kurz und Moritz so ein bisschen über die Entwicklung tatsächlich sprechen? Wir haben so ein bisschen als Überschrift gerade „Too old for Future Mobility“. So ein bisschen als Teeser, ist noch nicht fix, aber von eurer Erfahrung bisher meint ihr, man kann gegebenenfalls zu alt sein, um von neuen Mobilitätstrends zu profitieren oder braucht es wirklich einfach nur Zeit und man kann davon auf jeden Fall profitieren? Selbst als älterer Mensch?	Perfect maybe then as a final question for you? Maybe we can talk a little bit about the development afterwards with Moritz? We have a bit of a headline right now: "Too old for Future Mobility". A bit of a teaser, it's not fixed yet, but from your experience so far, do you think you can be too old to benefit from new mobility trends or does it really just take time and you can definitely benefit from it? Even as an older person?	
33	R7: Jan Alexandersson	Das ist ne sehr genetische Frage und wenn du eine generische Antwort haben willst: Im Prinzip geht alles. Und ich ich könnte mir vorstellen, dass auch ältere Menschen sich in ein selbstfahrendes Auto setzen würden. Das holt dich ab an der Tür und du steigst ein und das fährt los und fertig. Ins Kino oder zum Kaffee, um deine Freundin oder deinen Freund zu treffen. Das wird funktionieren, glaub ich, aber es braucht Zeit. Und das braucht auch die, wie ich sage du brauchst diese engagierten und enthusiastischen Menschen, die darüber berichten. Also so Multiplayers, alle möglichen Kommunikation, da wo es vermutlich scheitert oder gelingt. Sowas in der Art. Also, wie gesagt ich weiß nicht, wie viele von unseren Papern ihr gelesen habt? Aber es gibt so einige. Wir	This is a very genetic question and if you want a generic answer: In principle, anything goes. And I could imagine that older people would also get into a self-driving car. It picks you up at the door and you get in and it drives off and that's it. To the cinema or to a coffee to meet your girlfriend or boyfriend. That will work, I think, but it takes time. And it also needs the, like I say you need these dedicated and enthusiastic people to report on it. So multiplayers, all kinds of communication, where it probably fails or succeeds. Something like that. So, like I said, I don't know how many of our papers you have read? But there are quite a few. We've made an effort to knock out every year and paper or. It's about methodology and it discusses, is co-creation better than standardised or previous development methodologies and so on and immediately.	SPA TD-G

		haben uns bemüht, jedes Jahres und Papier oder rauszuhauen. Da geht es um Methodologie und es wird diskutiert, ist Co-Creation besser als standardisierte oder bisherige Entwicklungsmethodologien und so weiter und sofort. Was ich auch noch sagen will, da kann Moritz auch sehr sehr gut erklären, wie das funktioniert. Es ist nämlich so. Von der Denke her versuchen wir wegzukommen von einem technikgesteuerten System. Die Technik soll sich anpassen an die Bedürfnisse und Ängste und Wünsche der Fahrgäste. Und was ein fundamentales Bedürfnis vieler Menschen ist, ist Eigenverantwortung, selber entscheiden können und nicht bevormundet zu werden. Und das bedeutet im Kontext von diesem soziotechnischen System, dass wenn ich mir vorstelle, ich sollte jetzt ein Mobilitätslotsen engagieren, dann möchte ich diesen Lotsen so wenig wie möglich haben, sofern es mir gut. Also heute regnet es wie blöd und heute bin ich müde. Heute würde ich gerne unterstützt werden. Ich möchte gerne, dass jemand mich an die Hand nimmt von der Haustür bis zum Hausarzt, weil ich geh heute zu meiner Impfung. Aber nächste Woche Dienstag, da scheint die Sonne, es hat 20 Grad und mir geht es jetzt verdammt gut und dann möchte ich, weil ich mich auskenne, hier im Dorf, wo ich wohne. Ich gehe selber zu Haltestelle und ich fahre mit dem Bus an den Hauptbahnhof und da finde ich das ein bisschen unheimlich und dann möchte ich gerne, dass ein Lotse mich abholt und den Übergang zur Straßenbahn unterstützt. Und um diese Entscheidung treffen	What I also want to say is that Moritz can also explain very well how this works. It's like this. In terms of thinking, we are trying to get away from a technology-driven system. The technology should adapt to the needs and fears and wishes of the passengers. And what many people fundamentally need is personal responsibility, to be able to decide for themselves and not to be patronised. And that means in the context of this socio-technical system that if I imagine that I should now hire a mobility guide, then I would like to have this guide as little as possible, as long as it is good for me. So today it's raining like hell and today I'm tired. Today I would like to be supported. I'd like someone to take me by the hand from the front door to the GP because I'm going for my vaccination today. But next week, Tuesday, the sun is shining, it's 20 degrees and I'm feeling damn good now and then I would like, because I know my way around, here in the village where I live. I go to the bus stop myself and I take the bus to the main station and there I find it a bit scary and then I would like a mobility guide to pick me up and support the transition to the tram. And in order to be able to make this decision, as a passenger I need to know what the public transport system looks like today, what is the weather like? What are the stops like, what kind of bus is coming? Can I find out? These are circumstances that can be mastered by me within the scope of my current possibilities. And that is why we have started to understand the whole public transport system. So we get photos and videos to integrate the stops. To digitise that, so that when I plan my journey, I get the	TD-AF +TD-AF

		zu können, muss ich als Fahrgast wissen wie sieht der ÖPNV heute, wie ist das Wetter? Wie sind die Haltestellen, was für ein Bus kommt? Kann ich das erfahren? Sind das Gegebenheiten, die im Rahmen meiner heutigen Möglichkeit auch von mir gemeistert werden können. Und deswegen haben wir angefangen, die das ganze ÖPNV zu kapieren. Also wir holen uns Fotos und Videos zur Integration der Haltestellen. Um das zu digitalisieren, sodass wenn ich meine Reise plane, dann kriege ich die Information. Dann kann ich sagen, okay scheiße, diese Haltestelle ist ja wegen eines Umbaus umgezogen und ist woanders und deshalb sieht es nicht gut aus, ne da brauche ich Unterstützung. So ganz wichtiger Aspekt. Und daran arbeiten wir jetzt und da stecken wir auch ein bisschen KI rein, Da kann Moritz auch ein bisschen erzählen. Und diese Denkweise ist praktisch nie vorhanden. Weil technische Systeme sehen Menschen als Objekte. Und Objekte kann man manipulieren. Und das ist meiner Meinung nach eine total menschenfeindliche Vorangehensweise. Wir müssen Menschen in Vordergang setzen. KI für den Menschen oder das soziotechnisches System für die Fahrgäste. Jetzt kann ich nicht mehr. Vielen Dank für die Einladung. Am Ende dieser Arbeit, wenn ihr das transkribiert habt und ihr habt irgendwas nicht verstanden, oder habt vielleicht noch Fragen dann meldet euch, ja?	information. Then I can say, OK, shit, this stop has been moved because of a reconstruction and is somewhere else and that's why it doesn't look good, so I need support. That's a very important aspect. And that's what we're working on now and we're also putting a bit of AI into it, so Moritz can also tell a bit. And this way of thinking is practically never present. Because technical systems see people as objects. And objects can be manipulated. And that, in my opinion, is a totally anti-human approach. We have to put people first. AI for humans or the sociotechnical system for passengers. Now I can't do it any more. Thank you very much for the invitation. At the end of this work, if you have transcribed this and you haven't understood anything, or maybe you still have questions, then get in touch, yes?	
34	Researcher	Vielen Dank. Vielen Dank für die Teilnahme.	Thank you very much. Thank you very much for participating.	

		Klasse perfekt dürfen wir dir denn noch ein paar Fragen stellen oder musst du auch gleich los?	Great, perfect, can we ask you a few more questions or do you have to leave right away?	
35	R8: Moritz Wolf	Klar, ich habe noch Zeit. Ich bin allerdings nicht so ne Quasselstrippe wie Jan also bei mir müsst ihr ein bisschen mehr Fragen stellen.	Sure, I still have time. But I'm not a chatterbox like Jan, so you'll have to ask me a bit more questions.	
36	Researcher	Optimal. Alles gut. Vielleicht einmal am Anfang eine Frage. Also ihr hattet ja dann wahrscheinlich relativ viel mit diesem Co-Creation gearbeitet und habt das daraus dann immer wieder abgeleitet. Habt ihr zusätzlich dazu auch Guidelines verwendet? Wie zum Beispiel die WCAG Guidelines?	Perfect, all good. Perhaps a question at the beginning. So you probably worked quite a lot with this co-creation and derived it from that again and again. Did you also use guidelines in addition? Like the WCAG guidelines, for example?	
37	R8: Moritz Wolf	Also wir haben für den grundsätzlichen Entwurf der App auf die Guidelines zurückgegriffen, aber dann, sobald das Grundgerüst quasi fertig war, haben wir das rein mit CO-Creation gemacht. Das war dann so ein iterativer Prozess. Das heißt, man hat Entwürfe gemacht. Wie stellen wir uns vor wie das aussehen soll? Dann haben wir den Teilnehmern das gezeigt. Die haben dann entweder aus mehreren Entwürfen ausgewählt oder gesagt was verändert werden soll. Zum Beispiel die Button Platzierung. Und das das war insofern, so ein iterativer Prozess, der dann, nachdem das Grundgerüst da war, stattgefunden hat. Das wurde dann natürlich auch nochmal umgeworfen. Weil wenn man das Ganze nach seinen eigenen Vorstellungen nochmal neu bauen möchte, dann passen bei diesen Vorlagen manche Sachen nie.	So we used the guidelines for the basic design of the app, but then, as soon as the basic framework was more or less finished, we did it purely with CO-Creation. It was an iterative process. That is, we made drafts. How do we imagine it should look? Then we showed it to the participants. They then either chose from several drafts or said what should be changed. For example, the button placement. And that was an iterative process that took place after the basic framework was there. Of course, this was then overturned again. Because if you want to rebuild the whole thing according to your own ideas, then some things never fit with these templates.	TD-G DP-S DP-UR

38	Researcher	Kann mir gut vorstellen. Wie war denn euer Entwicklerteam grob aus. Also wie groß war euer Team und was war ungefähr das Durchschnittsalter?	I can well imagine. What was your development team roughly like? So how big was your team and what was the average age?	
39	R8: Moritz Wolf	Das hat über die Jahre auch hin und wieder mal gewechselt, über die 5 Jahre. Das Durchschnittsalter wahr wahrscheinlich so 28.	That has changed from time to time over the years, over the 5 years. The average age was probably around 28.	DP-TEAM
40	Researcher	Wir haben nämlich auch schon durch unsere Interviews teilweise gesehen, dass gerade Leute aus dem Research oder Leute, die ein bisschen mehr Erfahrung haben, sagen, dass ein häufiges Problem ist, dass Leute in der Produktentwicklung wie auch in der Softwareentwicklung häufig nicht unbedingt Bezug zu der Altersgruppe haben. Geschweigedenn zur Altersgruppe gehören und, dass das gegebenenfalls auch ein Faktor ist. Habt ihr das Problem nicht gehabt dadurch, dass ihr so viel Co-Creation gemacht habt?	We have already seen in some of our interviews that people from research or people who have a bit more experience say that a frequent problem is that people in product development as well as in software development often do not necessarily relate to the age group. Let alone belong to the age group and that that is also a factor where appropriate. Did you not have that problem by doing so much co-creation?	
41	R8: Moritz Wolf	Also als ich angefangen habe, hier an dem Projekt zu arbeiten, bin ich da dran gegangen, wie man eben normalerweise Software entwickelt. Nämlich so, dass man die selber benutzen könnte. So wie man sich eben selbst vorstellt, wie man so eine App nutzen will. Aber dass da noch ein paar Zwischenschritte passieren müssen, die bei älteren Menschen dann wichtig sind, das ist einem dann nicht klar. Und das wird einem dann aber nach einer Zeit klar. Je mehr man mit diesen Leuten redet und dann eben erfährt, was noch angepasst werden muss. Und je weiter das Projekt fortschreitet, desto mehr kann man sich in	So when I started working on the project here, I approached it the way you normally develop software. Namely, in such a way that you could use it yourself. The way you imagine how you want to use an app like this. But you don't realise that there are still a few intermediate steps that are important for older people. And that becomes clear after a while. The more you talk to these people and find out what still needs to be adapted. And the more the project progresses, the more you can think yourself into these people. Personas and scenarios help here, of course. For the development process itself, i.e. the programming process, it's better to really develop	DP-TEAM DP-UR DP-S

		diese Personen rein denken. Da helfen natürlich Persona und Szenarien aber. Für den Entwicklungsprozess selbst, also den Programmierprozess, ist es besser, wirklich das mit Co-Creation und mit den betroffenen Personen selbst zu entwickeln, auf jeden Fall.	it with co-creation and with the involved people, by all means.	DP-S
42	Reseacher	Und wie wurden die Personen für das Co-Creation ausgewählt?	And how were the people selected for the co-creation?	
43	R8: Moritz Wolf	Das waren im Prinzip interessierte Menschen. Wenn ich also, ich muss ehrlich sagen ich war bei dem Prozess nicht dabei, deshalb weiß ich das ehrlich gesagt nicht so genau. Ja, aber im Prinzip hat man glaube ich am Anfang verschiedene Interessenvertreter eingeladen, die die Menschendann besorgt haben. Also bei behinderten Vereinen usw. Aber nagelt mich da nicht drauf fest, das weiß ich ehrlich gesagt nicht.	They were basically interested people. So when I, I have to say honestly, I was not present at the process, so I honestly don't know that exactly. Yes, but in principle I think at the beginning various stakeholders were invited, who then got the people involved. So with disabled associations and so on. But don't pin me down on that, I honestly don't know.	
44	Reseacher	Okay, wir haben beispielsweise auch im Forschungsbereich zumindest oder der Research wird häufig auch gesagt, dass ein großer Unterschied von Usability im App Bereich auch häufig, dann auch nochmal dieser Lernmechanismus oder diese Hilfestellung noch ein bisschen größer sein muss. Also spricht, dass man immer wieder erklärt wofür ist der Schritt? Schritte müssen auch kleinschrittiger generell sein. War das bei euch beispielsweise auch ein Teil der dann umgeändert wurde im Zweifel oder wie die abgebaut wurde?	Okay, we have, for example, also in the research area at least or the research is often also said that a big difference of usability in the app area also often, then also again this learning mechanism or this assistance must be a bit bigger. In other words, it is always explained what the step is for. Steps must also be more small-step in general. For example, was that also a part that was then changed in doubt or how it was dismantled?	
45	R8: Moritz Wolf	Genau also gerade diese Kleinschrittigkeit ist genau das, was ich eben gemeint habe. Das ist erst mit der Zeit klar geworden, dass man da einzelne, also Prozesse, die man normalerweise	So it is precisely this small-step approach that I was referring to. It has only become clear over time that individual processes that should normally be hidden somewhere in submenus via	LES TD-AF

		zum Beispiel über Auswahloptionen irgendwo in Untermenüs verstecken sollte, müssen einfach klar gezeigt werden, damit ältere Menschen das wissen, dass das überhaupt geht.	selection options, for example, simply have to be clearly shown so that older people know that this is possible at all.	
46	Researcher	Meinst du, man kann theoretisch eure Erkenntnisse auch aus eurem Co-Creation zum Beispiel nehmen und theoretisch dann als Standard verfassen, womit andere auch arbeiten könnten, so dass sie nicht mehr diesen umfangreichen Co-Creation und User Research Teil machen müssten oder würdest du sagen, das ist schon perspektivisch für jede App wichtig, weil auch jede App nochmal ein anderes Ziel hat?	Do you think it is theoretically possible to take your findings from your co-creation, for example, and then theoretically write them as a standard that others could also work with, so that they no longer have to do this extensive co-creation and user research part, or would you say that this is already important for every app in perspective, because every app also has a different goal?	
47	R8: Moritz Wolf	Mhm ja, das ist abhängig davon, ob man bestimmte Gruppen als Ziel hat oder ob man zum Beispiel möglichst alle erwischen möchte und das möglichst komfortabel für die meisten machen möchte oder ob man es möglichst so gestalten möchte, das alle ist überhaupt benutzen können. Also ich würde zum Beispiel sagen, dass die meisten normalen Fahrplan Apps sind für viele ältere Menschen überhaupt nicht benutzbar.	Mhm yes, it depends on whether you have certain groups as a target or whether you want to catch everyone if possible and make it as comfortable as possible for most of them or whether you want to design it in such a way that everyone can use it at all. So I would say, for example, that most normal timetable apps are not usable at all for many older people.	SPA
48	Reseacher	Aus welchen Gründen, was würdest du sagen?	For what reasons, what would you say?	
49	R8: Moritz Wolf	Entweder zu einfach so dass man nicht genau weiß, wo man eigentlich was eingeben muss oder zu kompliziert, zu überladen. Man kriegt dann zu viel Informationen oder zu wenig, das ist ganz unterschiedlich, je nachdem, welche App man benutzt.	Either too simple, so that you don't know exactly where you have to enter what, or too complicated, too overloaded. You get too much information or too little, depending on which app you use.	
50	Researcher	Würdest du sagen die Guidelines, die ja auch angewendet wurden bringen ein bisschen was	Would you say that the guidelines, which have also been applied, are of some help or are they not really helpful?	

		oder sind die nicht so wirklich hilfreich?		
51	R8: Moritz Wolf	Die bringen bis zu einem bestimmten Punkt was aber dann muss man Leute fragen. Wenn man bestimmte Zielgruppen hat, wie zum Beispiel ältere Menschen dann muss man die Fragen. Und das ist auch ein wirklich langer Prozess. Ich hab das eben auch schon mal angesprochen, überhaupt ältere Menschen dazu zu bringen, das zu benutzen und zu erklären wozu braucht man das überhaupt und wie geht das? Wir hatten uns auch bei einigen Workshops eingeschleust, in denen allgemein ältere Menschen an das Konzept „wie benutzt man Tablets“ herangefühlt wurden. Das ist tippen, das ist sliden usw wie geht das? Wie bedient man das überhaupt? Und das ist manchmal ein wirklich langer Kampf auch nur zu erklären, dass wenn man bei einem Tablet oder Handy irgendwo was tippt, ist es ein untersdchied ob man den Finger 3 Sekunden drauf lässt oder den direkt hochhebt. Das erste, was die meisten dort gemacht haben, war der lange Klick und das sind auch solche Augenöffner, sag ich jetzt mal, die, wenn man als als junger Softwareentwickler da einsteigt, nicht auf dem Schirm hat. Das merkt man erst, wenn man mit den Leuten redet. Und wir haben uns, wie gesagt, bei mehreren solcher Workshops eingeschleust und dann nochmal kleinteilig dort erklärt, wie die App funktioniert und das ist ein harter Kampf.	They are useful up to a certain point, but then you have to ask people. If you have certain target groups, such as older people, then you have to ask them. And that is also a really long process. I've already mentioned this before, getting older people to use it and explaining what it's for and how it works. We had also sneaked in some workshops where generally older people were introduced to the concept of "how to use tablets". This is typing, this is sliding etc how does it work? How do you even operate that? And that's sometimes a really long struggle to even explain that when you're typing something on a tablet or mobile phone, it's different whether you keep your finger on it for 3 seconds or lift it straight up. The first thing most people did there was the long click, and these are also eye-openers, I'll say now, that you don't have on your radar when you start out as a young software developer. You only notice that when you talk to people. And we have, as I said, sneaked into several such workshops and then explained in detail how the app works, and that's an uphill battle.	TD-G DP-UR LES LES
52	Researcher	Aber ist denn aus diesen Workshops die Erfahrung so, dass die	But is the experience from these workshops such that the willingness is there to learn anyway?	

		Bereitschaft trotzdem da ist, das zu lernen?		
53	R8: Moritz Wolf	Ja also es kommt drauf an. Es gibt Leute, die verschließen sich da völlig, die haben da kein Interesse dran und die wollen weiter anrufen, wenn Sie die Option haben. Und die Option sollte man ihnen geben, sonst verliert man eine riesige Personengruppe. Oder sie sind interessiert und offen dem gegenüber. Diese Workshops waren ein guter Einstiegs Punkt weil das waren Leute, die allgemein schon Interesse daran hatten, zum Beispiel zu lernen, wie Tablets funktionieren, das ist ja schon mal ein Anfang. Und da war dann die Bereitschaft auch grösser, aber sonst ist das schwierig.	Well, it depends. There are people who are completely closed to it, who have no interest in it and who want to keep calling if they have the option. And you should give them the option, otherwise you lose a huge group of people. Or they are interested and open to it. These workshops were a good starting point because these were people who were already generally interested in learning how tablets work, for example, which is already a start. And then the willingness was also greater, but otherwise it's difficult.	+ Strategy LES SPA
54	Researcher	Meinst du aus deiner Erfahrung, dass es sich in den nächsten Jahren oder Jahrzehnten sich noch ändern wird? Dadurch, dass einfach mehr Leute jetzt alt werden, die dann doch ein bisschen mehr von der Digitalisierung mitbekommen haben?	Do you think from your experience that it will change in the next few years or decades? By the fact that more people are now getting old and have experienced a bit more of digitalisation?	
55	R8: Moritz Wolf	Ja, ich bin mir ganz sicher.	Yes, I am quite sure.	LES
56	Researcher	Also wird das jetzt mehr so eine Art Übergangslösung sein für die Leute, die man wirklich digital nicht mehr so richtig fassen kann, dass man den beispielsweise nach diese Callcenter Möglichkeit gibt?	So will this now be more of a kind of transitional solution for the people who you really can't really grasp digitally any more, that you give them this call centre option, for example?	
57	R8: Moritz Wolf	Ich weiß es nicht, ich ich finde es in dem Fall wirklich die beste Lösung so viele Modalitäten wie nur geht zur Verfügung zu stellen. Und dafür hat es am Ende nicht mehr gereicht. Aber wenn es nach mir gegangen wäre, hätte ich auch noch Sprachsteuerung eingerichtet. Prototypen dafür gibt’s, das hatten nur am Ende nicht mehr so richtig geklappt. Mit dem man dann Lotsen	I don't know, I really think that the best solution in this case is to provide as many modalities as possible. And in the end it wasn't enough for that. But if it had been up to me, I would have set up voice control as well. There are prototypes for this, but in the end it didn't really work out. You could then use it to book mobility guides who would then go via the app, for example. That's one	TD-AF

		buchen könnte, die dann über die App zum Beispiel gegangen wären. Das ist nochmal eine Barriere weniger, wenn man die App auf macht auf einen Knopf drückt und sagt ich will von da nach da dann und dann, ruf mir einen Lotsen. Das ist eine kleinere Barriere für Leute, die noch nicht so genau wissen, wie man mit solchen Geräten schon umgeht das dann zu benutzen. Und ein Callcenter ist die einfachere Variante gerade für ältere Menschen, weil sie noch jemanden an der Leitung haben, der sie dann versteht und auch Sonderwünsche leichter bewältigen kann, als wenn man das selbst machen müsste. Also es gibt da durchaus Vorteile, zum Beispiel von so einem Callcenter und das wirklich von Menschen steuern zu lassen nochmal. Oder ein anderer Punkt von sprachgesteuerten Systemen. Ältere Menschen sind auch meistens nicht die Zielgruppe für sprachgesteuerte Systeme, weil ältere Menschen meistens, da lehne ich mich jetzt weit aus dem Fenster, aber nicht so deutlich sprechen. Zum Beispiel aufgrund von Dialekt. Das sind alles Punkte, die einfach schnell Sprachsysteme zum Erliegen bringen, aber Menschen meistens nicht. Und egal welche technische Lösung man sonst ja finden will, gerade bei älteren Menschen ist ein Callcenter eine gute Möglichkeit.	less barrier when you open the app, press a button and say I want to go from there to there and then call me a mobility guide. That's a smaller barrier for people who don't yet know exactly how to use such devices. And a call centre is the easier option, especially for older people, because they still have someone on the line who understands them and can handle special requests more easily than if they had to do it themselves. So there are definitely advantages, for example, of such a call centre and having it really controlled by people. Or another point about voice-controlled systems. Older people are usually not the target group for voice-controlled systems, because older people usually, and I'm going out on a limb here, don't speak so clearly. For example, because of dialect. These are all points that simply bring speech systems to a standstill quickly, but people usually do not. And no matter what other technical solution you want to find, a call centre is a good option, especially for older people.	SPA DP-UR SPA SPA TD-AF
58	Researcher	Spannend ja, Sprachsteuerung kam bei uns auch schon zweimal auf bei unseren Diskussionen, weil wir uns dachten klar, diese Haptik ist nochmal was anderes, wenn man wirklich zum Beispiel dieses Sliden und das tatsächliche Drücken zum Beispiel gar	Exciting, yes, voice control came up twice in our discussions, because we thought, clearly, this haptic is something else, if you really don't understand this sliding and the actual pressing, for example, it's more intuitive, just use the language. What was the	

		nicht richtig versteht, das ist schon intuitiver, einfach die Sprache nutzen. Woran hat es bei euch dann gescheitert, dass ihr das nicht weiter gemacht habt, weil das Projekt einfach dann zu Ende gegangen ist, oder was war da genau der Grund?	reason that you didn't continue with the project, because it simply came to an end, or what exactly was the reason?	
59	R8: Moritz Wolf	Also, die Anbindung ans Backend hat nicht funktioniert also es hat alles funktioniert, nur das Zusammenspiel zwischen App und Server hat am Ende nicht richtig funktioniert also.	So, the connection to the backend didn't work, so everything worked, only the interaction between the app and the server didn't work properly in the end.	
60	Researcher	Okay, schade wäre aber auch spannend gewesen.	Okay, that's a pity, but it would also have been exciting.	
61	R8: Moritz Wolf	Es ist durchaus möglich, dass sich das in den nächsten paar Monaten noch ändert, auch jetzt, nach Projektende noch, weil wie gesagt, das ist programmiert. Es muss nur quasi von der Firma, die weiter daran arbeitet, wie gesagt, das Projekt wird ja jetzt durch durch das Land weitergeführt. Und der Betreiber des Servers ist weiter dabei. Und wenn die das anwenden wollen, dann wird das noch passieren und dann gibt es das in Zukunft schon auch noch. Ich kann da jetzt nur nicht weiter irgendwas zu sagen wie Leute das benutzen..	It is quite possible that this will change in the next few months, even now, after the end of the project, because as I said, it is programmed. It just has to be done by the company that continues to work on it, as I said, the project is now being continued by the state. And the operator of the server is still involved. And if they want to use it, then that will happen and it will also exist in the future. I can't say anything more about how people are using it.	
62	Researcher	Super ich glaub ich hab tatsächlich keine Frage mehr, haben wir noch fragen?	Great, I don't think I have any more questions, do we still have questions?	
63	Researcher	Von mir auch nicht nein. Vielen Dank für die Zeit. Das war sehr interessant.	Not from me either. Thank you very much for your time. It was very interesting.	
64	R8: Moritz Wolf	Kein Problem. Wenn es noch irgendetwas gibt einfach melden.	No problem. If there is anything else, just let me know.	

65	Researcher	Perfekt, vielen Dank und viel Erfolg noch bei deiner Master Thesis.	Perfect, thank you and good luck with your Master's thesis.	

Appendix 7 – Interview 7 (R9)

Participants: Alexander Seifert, Theresa Elbert, Sophia Schimpgen
Company: FHNW (University of Applied Sciences Northwestern Switzerland)
Date: May 7th 2021
Interview Length: 59 minutes
Language: German

Row	Person	Transcription (Original Text German)	Transcription (English Translation)	Code
1	Researcher	Perfekt, dann sheen Sie wahrscheinlich gerade ein Pop up Fenster bekommen.	Perfect, then you probably just got pop up windows.	
2	Alexander Seifert	Mhm	Mhm	
3	Researcher	Super, wenn wir jetzt einfach mal starten, vielleicht am besten ganz am Anfang würden wir Sie bitten, dass Sie sich einmal kurz vorstellen. Und vor allem auch darauf eingehen, worin sie gerade forschen und was ihre Motivation ist für ihren Forschungsbereich	Great, then we can just start now. Perhaps, at the very beginning, we would ask you to introduce yourself briefly. And above all, tell us what you are currently researching and what your motivation for your research area is.	
4	Alexander Seifert	Mein Name ist Alexander Seifert, Ich bin vom Hause aus Sozialpädagoge, in Erstausbildung und, Soziologe im Zweitausbildung und habe dort den Doktortitel in der Soziologie. Seit 2008 beschäftige ich mich innerhalb der Soziologie mit der Alterssoziologie oder eben Gerontologie, also Altersforschung. Und immer aus sozial wissenschaftlicher Perspektive und unter anderem eben mit dem Thema der Digitalisierung im Alter, im Alltag älterer Menschen. Also aus dieser Perspektive. Was ich mir zum Beispiel anschaue ist, wie ist die Internetnutzung oder was sind die Hemmnisse und die Gründe für die nicht Nutzung von Technik, zum Beispiel Smartphone oder Tablet und Internet. Aber auch was ist das soziale Umfeld davon	My name is Alexander Seifert, I am a social pedagogue by training and a sociologist in secondary education, where I have a doctorate in sociology. Since 2008, I have been working within sociology on the sociology of ageing or gerontology, i.e. research on ageing. And always from a social science perspective and, among other things, with the topic of digitalisation in old age, in the everyday lives of older people. So from this perspective. What I look at, for example, is how people use the internet or what are the obstacles and reasons for not using technology, for example smartphones or tablets and the internet. But also what is the social environment of it and to what	

		und inwieweit ist das Gefühl ausgeschlossen zu sein. Und in Bezug auf ihre Masterarbeit ist es eben so, dass ich mich zum Beispiel beschäftige mit der App Benutzung, aber auch mit Fragen generell: Wie können Produkte besser entwickelt werden oder mit Personen. Und interessanterweise hatte ich gerade eine Masterarbeit aus einer anderen Fachhochschule zu betreuen, die so eine ähnliche Fragestellung wie sie hat. Eigentlich von einem On Demand Angebot, also von daher weiß ich so ein bisschen was die Schwierigkeiten da sind.	extent is the feeling of being excluded. And in relation to your Master's thesis, I am dealing with app use, for example, but also with questions in general: how can products be developed better or with people. And interestingly enough, I just had to supervise a master's thesis from another university of applied sciences that had a similar question to hers. It was actually about an on-demand service, so I know a bit about the difficulties there.	
5	Researcher	Spannend, spannend wie kamen sie denn dazu, dass sie also gerade auch die Motivation beispielsweise in den Bereich zu gehen?	Exciting, exciting how did you come to this and how were you motivated to go into this field?	
6	Alexander Seifert	Also für mich ist es so, dass ich quasi dadurch, dass ich mich in der Gerontologie also in der Altersforschung so ein bisschen etabliert habe, hab ich mich dann auch nochmal spezialisiert auf die Digitalisierung. Das war eben 2008 da war das wirklich auch noch was Neues im Leben. Also die Internetnutzung war da noch nicht so stark vertreten. Gerade in der älteren Bevölkerung, wie das heute der Fall ist. Also es gab wirklich auch noch grundsätzliche Fragen, die dort zu klären waren. Und letztendlich ist es ja so. Technik begleitet uns ja immer und hat uns schon seit langen Zeiten begleitet. Wir haben immer versucht, uns mit Technik oder mit Handwerkzeug zu verbessern und unseren Alltag zu verbessern. Aber letztendlich ist immer die Frage dann, inwieweit	So for me, it's like this: by establishing myself a little bit in gerontology, in age research, I also specialised in digitalisation. That was in 2008, when it was really something new in life. Internet use was not yet so widespread. Especially among the older population, as is the case today. So there were still fundamental questions that needed to be clarified. And at the end of the day, that's the way it is. Technology has always been with us and has been with us for a long time. We have always tried to improve ourselves with technology or hand tools and to improve our everyday life. But at the end of the day, the question is always to what extent certain people	+Strategy SPA

		Personen bestimmte Personen da zurückbleiben, die vielleicht mit Technik nicht groß geworden sind und mit der aktuellen Technologie nicht groß geworden sind.	are left behind, who perhaps did not grow up with technology and did not grow up with the current technology.	+Strategy
7	Researcher	Wenn wir jetzt auf diese Spaltung eingehen, die sie auch teilweise beschreiben, in Ihren Studien. Gerade diese Spaltung durch der digitalen Gesellschaft, das gerade auch Ältere einfach zurückbleiben. Haben sie da schon tatsächliche Faktoren? Warum das so ist, die sie beispielsweise näher beschreiben könnten?	If we now go into this division, which you also describe in part in your studies. Especially this division in the digital society, that older people are simply left behind. Do you already have actual factors? Why this is so, which you could describe in more detail, for example?	
8	Alexander Seifert	Wir haben hier in der Schweiz mehrere Studien durchgeführt, also die 3 nationalen Studien, die wurden 2010, 2015 und 2020 veröffentlicht. In denen wir gesamthaft Personen ab 65 Jahren befragt haben zur Internetnutzung. Und da ist es so, dass wir natürlich verschiedene Gründe sehen, warum das nicht genutzt wird. Das eine ist sozusagen der Aspekt der Sozialisation also, wie bin ich groß geworden? Mit welcher Technik bin ich groß geworden? Dadurch sind bestehende heutige Technologien neu und damit muss man wie neu erlernen und in eine Phase, in der man einerseits vielleicht auch mehr Schwierigkeiten hat, neue Dinge zu erlernen. Auf der anderen Seite aber auch die Freiheit hat, gerade beim Renteneintritt, selber zu entscheiden was lerne ich noch oder was erlerne ich nicht? Also das ist jetzt nicht mehr dieser berufliche Druck, der dort vorhanden ist, immer das neueste zu können. Also von daher ist es eine ganz klare Nutzenabwägung. Also das ist ja das,	We have conducted several studies here in Switzerland, i.e. the 3 national studies, which were published in 2010, 2015 and 2020. In these studies, we surveyed people aged 65 and over about their use of the internet. And of course we see various reasons why it is not used. One is, so to speak, the aspect of socialisation, i.e. how did I grow up? What technology did I grow up with? As a result, today's existing technologies are new and you have to learn them new and enter a phase in which, on the one hand, you may have more difficulties learning new things. On the other hand, you have the freedom, especially when you retire, to decide for yourself what you want to learn and what you don't want to learn. So there is no longer this professional pressure to always be able to learn the latest things. So from that point of view it's a very clear weighing of benefits.	DP-UR LES +Strategy LES

		was auch immer wieder im Technik- Akzeptanz Modell vorkommt. Das sind ja die beiden Aspekte Nutzen- und Bedienungsleichtigkeit. Und diese Bedienungsleichtigkeit ist das eine, was sozusagen immer aus der Technik angeschaut wird also das es einfach zu bedienen ist zum Beispiel ein Smartphone. Aber was außerordentlich viel relevanter ist, ist eben diese Nutzeneinschätzung. Was bringt das mir überhaupt jetzt umzusteigen? Vom Ticketautomaten oder vom Schalter bei der Bahn zu einer App. Also was ist sozusagen der Mehrwert und lohnt es sich, das zu erlenen, um diesen Mehrwert zu nutzen. Und von daher ist es jetzt weniger erklärbar, also Alter ist jetzt nicht die Erklärung. Es ist halt so, dass Personen, die mit dieser Technik nicht groß geworden sind, diese auch seltener nutzen. Aber man kann nicht alles mit dem Alter erklären. Also es ist nicht linear, das nur mit zunehmenden Alter, dass man dann weniger Technik nutzt, sondern es ist einfach die Situation, wie man groß geworden ist. Welche Bedeutung das hat und eben auch, wenn man nicht mehr im Berufsleben ist und gar nicht mehr die neueste Technik nutzen muss. Also von daher sehen wir das Interessante in den Studien auch so, dass zum Beispiel das Geschlecht in der Schweiz gar keine Rolle mehr spielt. Das ist ein mit europäischen Daten auch schwedischen. Dann sieht man das zum Teil, dass ältere Personen ab 50 Jahren, Männer häufiger das Internet nutzen als Frauen. Aber das sieht man zum Beispiel in der Schweiz dann nicht mehr. Auch die Stadt-Land Unterschiede, die man in Deutschland noch sehr	That is what is always found in the technology acceptance model. These are the two aspects of ease of use and ease of operation. And this ease of use is the one thing that is always considered from a technical point of view, so that it is easy to use a smartphone, for example. But what is extraordinarily much more relevant is this assessment of benefits. What is the benefit for me of changing over now? From the ticket vending machine or from the counter at the train station to an app. So what is the added value, so to speak, and is it worthwhile to learn how to use this added value. And that's why it's less explainable now, so age is not the explanation. It's just that people who haven't grown up with this technology use it less often. But you can't explain everything with age. So it's not linear, that only with increasing age you use less technology, but it's simply the situation of how you grew up. What significance it has and also when you are no longer working and no longer have to use the latest technology. That's why we see the interesting thing in the studies that, for example, gender no longer plays a role in Switzerland. This is also the case in Sweden with European data. Then we see that older people over the age of 50, men, use the internet more often than women. But that is no longer the case in Switzerland, for example. The urban-rural differences that are still very much in evidence in Germany are	LES LES DP-UR DP-UR

		stark sieht, sind nicht mehr so da. Von daher ist es alles sehr dynamisch und fließend und letztendlich ist bei diesem digitale Graben immer wichtig zu sagen es ist nicht eine statische Sache. Also es ist nicht, dass wenn man einmal diesen Graben überwunden hat, dann gehört man immer zu den online oder zu den Technikaffinen. Es ist so, dass sich immer wieder neue Spaltungen ergeben. Mit jedem neuen Produkt gibt es hier neue Herausforderungen und dann immer dieselbe Frage. Also man kann das quasi immer wieder fortführen. Und letztendlich ist auch immer die Entscheidung, bei so einem Produkt was bringt es mir? Was ist der Vorteil und wie kann ich mir das Aneignen und, dazu werden wir vielleicht im Interview noch kommen, aber oft ist es so, dass aus der Technikseite die Idee ist, ja Alter ist Defizit, also alle älteren Personen haben diese Defizite, haben körperliche Anstrengung und so. So ist dem gar nicht. Also aus der Gerontologie wissen wir, dass das extrem heterogen ist. Das bedeutet, dass die Altersgruppen sehr, sehr unterschiedlich sind. Also wir haben Personen, die sehr fit sind. Wir haben aber auch Personen, die eher fragil sind. Von daher ist darf man das nicht immer als eine Gruppe betrachten. Ich glaub, das ist sehr wichtig für die Einführung der Masterarbeit. Dass das nicht heißt, die große Gruppe, also wenn wir eine 60 jährige Person gefragt haben, haben wir dadurch alle sechzigjährigen Personen befragt. Und das andere ist, letztendlich dadurch, dass es jetzt so dynamisch ist, ist es eben auch so, dass Techniksachen sich immer wieder mit einer neuen Technik	also no longer there. So it's all very dynamic and fluid, and in the end it's always important to say that this digital divide is not a static thing. So it's not the case that once you've overcome this divide, you're always one of the online or tech-savvy. It's that there are always new divisions emerging. With every new product there are new challenges here and then always the same question. So you can continue this over and over again, so to speak. And at the end of the day, the decision is always, with a product like this, what is the benefit for me? What is the advantage and how can I acquire it and, perhaps we will come to that in the interview, but it is often the case that from the technology side the idea is that yes, age is a deficit, so all older people have these deficits, have physical exertion and so on. That's not the case at all. We know from gerontology that it is extremely heterogeneous. That means that the age groups are very, very different. So we have people who are very fit. But we also have people who are rather fragile. So you can't always look at them as one group. I think that is very important for the introduction of the Master's thesis. That it doesn't mean the large group, so when we asked a 60-year-old person, we thereby asked all sixty-year-old people. And the other thing is that, ultimately, because it is so dynamic now, it is also the case that technical things	DP-UR +Strategy DP-UR SPA DP-UR

		herausstellen. Also, zum Beispiel es geht um App Nutzung, aber vielleicht ist es dann nicht mehr die klassische App Nutzung, sondern es geht dann über Sprachbefehle über Siri oder so. Und dann wird es wieder kompliziert, also von daher ist das eher ein Prozess, anstatt das man diesen Graben nur einmal überwinden muss.	always emerge with a new technology. So, for example, it's about app use, but maybe it's no longer the classic app use, but it's about voice commands via Siri or something. And then it gets complicated again, so from that point of view it's more of a process instead of having to cross that divide just once.	+Strategy +Strategy
9	Researcher	Spannend. Das wäre auch die nächste Frage gewesen. Wie schon gesagt haben wir schon mehrere Interviews geführt mit Unternehmen aus dem Mobilitätsbereich. Und die meisten haben entweder gar keine Persona oder Nutzertypen für ältere Leute oder maximal 1-2. Vielleicht aus Ihrer Perspektive, wie wichtig ist das denn und aus ihren Erfahrungen aus dem Studien, können sie grob abschätzen, wie viele Nutzer Typen es geben kann?	Exciting. That would also have been the next question. As I said, we have already conducted several interviews. With companies from the mobility sector. And most of them either don't have any persona or user types for older people or 1-2 at the most. Maybe from your perspective, from your experience from the studies, can you roughly estimate how many user types there can be?	
10	Alexander Seifert	Ich bin nicht so der Fan von diesen Personas. Deshalb bin ich da ein bisschen anders vielleicht eingestellt. Ich weiß, dass das aus der Informatik und Technik sehr wichtig ist, um diese Sensibilisierung zu bekommen. Weil letztendlich ist es so, dass die Disziplinen der Sozialarbeit oder Sozialforschung eine andere Sprache spricht als die der Informatik und andersrum. Von daher braucht es immer eine gewisse Vermittlerposition und eine gewisse Vermittlung und deshalb kann man diese Personas nutzen, so als eine Möglichkeit. Und ja, ich würde sagen es gibt natürlich viel mehr Personas, vielmehr Gruppen innerhalb	I'm not a fan of these personas. That's why I have a slightly different attitude. I know that it's very important from computer science and technology to get this sensitisation. Because at the end of the day, the disciplines of social work or social research speak a different language than those of computer science and vice versa. Therefore, there is always a need for a certain mediating position and a certain mediation, and that's why you can use these personas as a possibility. And yes, I would say that there are of course many more personas, rather	DP-UR

		der großen Gruppe der über 65 jährigen. Also ich sage jetzt immer über 65 Jahren, weil das ist der Renteneintritt in der Schweiz. Ich weiß, dass das in Schweden ein bisschen anders ist, oder es variiert ja immer. Aber letztendlich bedeutet das, dass man jetzt eben die Vielfältigkeit des Alters berücksichtigen sollte und das auch in Form von Personas, aber auch in Form von überhaupt Personen involvieren in die Entwicklung. Und die andere Frage ist ja so ein bisschen, wer ist denn eigentlich die Zielgruppe? Und da gebe ich Ihnen recht, dass oft gerade bei Mobilitätssachen erstmal an die Gesamtbevölkerung gedacht wird. Aber eigentlich an eine eingeschränkte Sicht der Gesamtbevölkerung. Also an so eine Bevölkerung, die im Berufsleben ist, von der man denk, dass sie das Mobilitätsangebot viel nutzt. Dabei vergisst man eben das auch ältere bis hin zu eben auch Kinder und so, die vielleicht auch manchmal vergessen werden, sehr viel öffentliche Verkehrsmittel nutzen. Deshalb ist es manchmal schwierig, von so einem Musterbeispiel immer auf andere zu schließen. Ich finde das wichtig, die einzubeziehen. Und letztendlich geht man eigentlich immer von diesem Universal Design aus. Ein Design sollte für alle sein. Was sozusagen die Idealvorstellung ist. Aber ich glaube, das ist vielleicht auch so ein bisschen eine Idee. Als Beispiel, es gibt in Zürich so eine Niederflur Tram, also Straßenbahn, die quasi ebenerdig ist. Die musste gemacht werden aus dem Behindertenrecht, damit	groups within the large group of over 65s. So I always say over 65 now, because that's the retirement age in Switzerland. I know that it's a bit different in Sweden, or it always varies. But ultimately this means that we should take into account the diversity of age and also involve people in the development in the form of personas, but also in the form of people at all. And the other question is a bit like, who is actually the target group? And I agree with you that people often think of the entire population first, especially when it comes to mobility issues. But actually it's a limited view of the population as a whole. In other words, a population that is in working life and that is thought to use the mobility services a lot. At the same time, one forgets that even older people, including children and so on, who are perhaps also sometimes forgotten, use public transport a lot. That's why it's sometimes difficult to always draw conclusions about others from such a prime example. I think it's important to include them. And at the end of the day, you always start from this universal design. A design should be for everyone. Which is the ideal, so to speak. But I think that's perhaps also a bit of an idea. For example, there is a low-floor tram in Zurich, a tram that is more or less at ground level. It had to be made in accordance with the law on the disabled so	DP-UR DP-S +Strategy DP-S TD-AF

		Rollstuhlfahrer dort ebenerdig reinfahren können. Dann hat man das gemacht und hat sich dann gewundert, Oh da gab es aber hinterher ganz viele, die gesagt haben, dass das super das ist, diese neue Bahn gibt. Das waren Eltern mit ihren Kinderwagen. Es waren auch Ältere mit Rollatoren. Es waren Personen, die einen Skiunfall hatten und froh sind, dass sie da jetzt nicht noch eine Stufe haben. Also das ist das, was ich versuche zu erklären. Manchmal ist es gar nicht immer so sinnvoll, nur in kleinen Zielgruppen zu denken, sondern einmal zu überlegen wer könnte denn noch davon profitieren. Und eine gut laufende App ist erstmal für alle sinnvoll also ohne, dass man erst einen Doktor machen muss, damit man die App versteht, wie man in der Schweiz so schön sagt. Damit man das versteht, egal welches Alter.	that wheelchair users could enter at ground level. Then they did it and were surprised, Oh, but afterwards there were a lot of people who said that it was great that there was this new tram. They were parents with their prams. There were also elderly people with walkers. There were people who had had a skiing accident and are glad that they don't have another step now. So that's what I'm trying to explain. Sometimes it doesn't always make sense to think only in terms of small target groups, but to consider who else could benefit from it. And a well-run app makes sense for everyone, so you don't have to do a doctorate first to understand the app, as they say in Switzerland. So that people understand it, no matter what age.	DP-S TD-AF DP-UR
11	Researcher	Wenn Sie dann perspektivisch sagen, dass man sich nicht unbedingt immer nur auf Personas, also auf bestimmte stereotypen Gruppen, spezialisieren sollte, sondern mehr so eine Art Co-Creation schaffen sollte, dass man permanent im Grunde mit allen zusammenarbeitet und immer wieder auch Feedback bekommt. Wäre das denn so eine Lösung, die sie als besser empfinden würden?	If you then say in perspective that one should not necessarily always specialise in personas, i.e. in certain stereotypical groups, but should create more of a kind of co-creation, that one basically works together with everyone on a permanent basis and always gets feedback. Would that be a solution that you would find better?	
12	Alexander Seifert	Ja, ich finde es wichtig das Feedback nicht nur einmal abzuholen, im Sinne von wir haben jetzt einen tollen Prototyp, von dem wir total überzeugt sind. Und wir testen das. Da ist der Klassiker dann halt, dass viele ältere Personen sagen ja,	Yes, I think it's important to collect feedback not just once, in the sense that we now have a great prototype that we are totally convinced of. And we test it. The classic thing is that many older people say yes,	DP-T

		das ist doch nett. Und wenn man sie fragt, ob sie es auch nutzen würden sagen sie, ja vielleicht. Aber dann nutzen sie es vielleicht tatsächlich gar nicht und da ist immer auch eine riesen Lücke zwischen Einstellung und wirklichem Verhalten. Und es hat auch damit zu tun, dass viele ältere Menschen sagen ja, für Ältere wäre das auch was, sich selbst aber nicht als alt sehen. Von daher sind das 2 Dinge. Das erste ist der Einbezug wichtig, aber eben nicht nur am Schluss oder beim Prototypen, sondern eigentlich schon am Anfang. Also eigentlich schon, wenn es darum geht wie die Mobilitätsapp aussehen soll. Also, dass man in den normalen Forschungsprozessen schon frühzeitig Personen mit einbezieht. Und es geht eigentlich darum, immer sein eigenes, vielleicht eingeschränktes Bild zu reflektieren. Und das funktioniert bei allen Disziplinen so. Also man sollte quasi nicht immer nur davon ausgehen, dass man jetzt eine App für seine Großmutter macht, sondern dass man dieses formale Bild, das man vom Alter hat, ein bisschen aufbricht, indem ich das immer wieder ein bisschen zurückspiegle. Und das zweite ist sozusagen das man das öfter macht und, dass man vielleicht nicht davon ausgeht, dass man Produkte für ältere Personen entwickelt. Also das war eine Zeit lang, oder gibt es immer noch, die Seniorenhandys und man hat sich immer gewundert warum werden diese Seniorenhandys nicht so stark verkauft. Weil es ein Stigmata erzeugt. Weil viele sagen, ich möchte doch	that's nice. And when you ask them if they would also use it, they say, yes, maybe. But then they might not actually use it at all, and there is always a huge gap between attitude and actual behaviour. And it also has to do with the fact that many older people say yes, it would be something for older people, but they don't see themselves as old. So there are two things. The first is that inclusion is important, but not only at the end or in the prototype, but actually already at the beginning. So actually already when it comes to what the mobility app should look like. In other words, people need to be involved early on in the normal research process. And it's really about always reflecting on your own, perhaps limited, image. And that's how it works in all disciplines. So you shouldn't always just assume that you're making an app for your grandmother, but that you break up this formal image that you have of old age a bit by always reflecting it back a bit. And the second thing is to do that more often, so to speak, and maybe not to assume that products are being developed for older people. For a while there were, or still are, mobile phones for senior citizens and people always wondered why these mobile phones for senior citizens were not sold so strongly. Because it creates a stigma. Because many people say, I don't want a senior citizen's	LES DP-S SPA SPA SPA

		nicht das Seniorenhandy, daran merkt man ja, dass ich alt bin. Ich möchte dasselbe Smartphone, ich möchte dasselbe Samsung oder iPhone, das mein Enkel hat. Aber es soll gut funktionieren. Und das ist sozusagen eine ganz andere Logik. Also, dass man eben immer wieder mit dem Nutzen argumentiert und nicht mit der Idee, ich habe etwas entwickelt, was doch für dich gut sein muss. Weil ich denke, ich weiß, was für dich gut ist. Nein, man muss sozusagen argumentieren der Nutzen, der Vorteil der App ist zum Beispiel, dass man ortsungebunden ist und von überall das Ticket lösen kann. Oder man hat bestimmte Vorteile, wie ein Sparticket oder so. Das sind, klare Vorteile, die man auch kommunizieren kann. Die auch für Ältere sinnvoll werden Das ist also ein anderes Denken, wie man daran geht.	mobile phone, that's how you can tell that I'm old. I want the same smartphone, I want the same Samsung or iPhone that my grandson has. But it should work well. And that is a completely different logic, so to speak. So that you always argue with the benefit and not with the idea that I have developed something that must be good for you. Because I think I know what is good for you. No, you have to argue the benefit, so to speak, the advantage of the app is, for example, that you are not tied to a specific location and can buy a ticket from anywhere. Or you have certain advantages, like a money-saving ticket or something. These are clear advantages that can also be communicated. That also makes sense for older people. So it's a different way of thinking about it.	LES SPA
13	Researcher	Spannend. Wir hatten tatsächlich auch schon mit ein paar Pilotprojekten gesprochen,. Die beispielsweise ein on Demand Transport gestartet hat. Und die Pilotprojekte liefen nur über eine relativ kurze Periode und nach ein paar Monaten wurde das Fazit gezogen, dass es nicht optimal ist und man ging zurück auf die initiale Bus Lösung, dass ein Bus zweimal am Tag zu einer bestimmten Zeit fährt. Perspektivisch wurde allerdings schon gesagt, dass gerade die Bedienungsfreundlichkeit eigentlich gegeben war, indem man beispielsweise Guidelines und Frameworks, wie TAM und STAM in der	Interesting. We had actually already spoken to a few pilot projects. Which, for example, started an on-demand transport. And the pilot projects only ran for a relatively short period and after a few months the conclusion was drawn that it was not optimal and they went back to the initial bus solution, that a bus runs twice a day at a certain time. In perspective, however, it has already been said that user-friendliness was actually a given, for example, by using guidelines and frameworks such as TAM	

		Produktentwicklung dazu gezogen wurden. Würden Sie sagen, dass Guidelines, Frameworks oder Modelle dann noch nicht perfekt anwendbar sind dadurch, dass der Markt noch nicht ganz genau erforscht wurde oder wie würden sie das perspektivisch begründen, dass sowas beispielsweise nicht erfolgreich war?	and STAM in the product development. Would you say that guidelines, frameworks or models are not yet perfectly applicable because the market has not yet been researched in detail, or how would you justify the fact that something like this was not successful?	
14	Alexander Seifert	Das ist ein gutes Beispiel. Es gibt vermutlich mehrere Gründe. Deswegen kann ich nur vermuten und man müsste quasi schauen, warum haben die Leute das jetzt nicht angenommen? Das TAM ist ja im Grunde kein Guideline. Es ist im Grunde ein theoretisches Modell, was die Akzeptanz also die Einstellung eine Technik zu nutzen, versucht zu erklären. Und das TAM und STAM, die werden ja immer größer. Und irgendwann erklärt man ja die Welt und dann hat man nicht mehr nur ein Modell. Und was aber immer gleich geblieben ist, sind ja diese 2 Komponenten der Nützlichkeit und der Bedienungsfreundlichkeit. Und alles andere sind dann sozusagen die Rahmenbedingungen. Und letztendlich ist es schon mal sehr wichtig das zu berücksichtigen. Jedoch ist dann die Gefahr, wenn man sich an anderen Guidelines zur alters gerechten Webseiten Gestaltung hält oder was auch immer, was sehr gut und sehr wichtig ist, dass man dann so ein bisschen weg ist vom Nutzerpool. Also weg von den potenziellen Personen, die man eigentlich erreichen möchte. Also es ist doch erst mal wichtig zu wissen was wollen die und das andere ist glaub ich, ein Punkt, der	That is a good example. There are probably several reasons. That's why I can only assume, and one would have to look at why people haven't accepted it now. The TAM is basically not a guideline. It is basically a theoretical model that tries to explain the acceptance, that is, the attitude towards using a technique. And the TAM and STAM are getting bigger and bigger. And at some point you explain the world and then you no longer have just one model. But what has always remained the same are these two components of usefulness and user-friendliness. And everything else is then the framework conditions, so to speak. And ultimately it is very important to take that into account. However, the danger is that if you follow other guidelines for age-appropriate website design or whatever, which is very good and very important, you are then a bit away from the user pool. In other words, away from the potential people you actually want to reach. So first of all it is important to know what they want and the other thing is, I think, a	TD-G

		oftmals vergessen wird 2 Dinge einerseits. Ich hatte mal ein Projekte in Deutschland, da hat man dann auch on demand Angebote gemacht. Und hat sich gewundert warum es nicht genutzt wird. Man hat in eine Webseite viel Geld reingesteckt und am Ende war dann das Problem, dass man eben nicht ein Taxi organisiert hat. Also dieses ganz pragmatische weshalb es dann doch nicht geklappt hat. Also man hatte die Website aber nicht das Angebot. Also das muss auch so ein bisschen funktionieren. Und was wichtig ist, glaube ich, dass die Leute erstmal erreicht werden müssen. Im Sinne von wirkliche Werbung machen und die Leute vom Nutzen überzeugen. Das kann man zum Beispiel machen, indem man zu den Leuten hin geht und das versucht zu erklären. Weil ein großer Punkt ist eben dieser fehlende Support auf den sie erst hören. .Warum sollte ich mit jetzt diese App installieren, wenn ich das auch klassisch mit Freunden am Telefon erledigen könnte. Also man muss durch ein relativ einfach und praktischen Erleben, den Nutzen erst mal selbst erleben. Das erkennt man auch bei den klassischen Sachen wie Skype oder Zoom. Wenn man erkennt aha, ich muss den ganzen Computer nicht verstehen, aber ich kann mit meiner Enkelin in Australien skypen, dann ist es ein ganz klaren Nutzenvorteil und wenn mir das ganz kurz erklärt wird, wie es funktioniert dann nutze ich es auch. Nicht den ganzen Computer aber diese	point that is often forgotten, 2 things on the one hand. I once had a project in Germany where they also made offers on demand. And they wondered why it wasn't being used. They put a lot of money into a website and in the end the problem was that they didn't organise a taxi. So this very pragmatic reason why it didn't work out. You had the website but not the offer. So that also has to work a bit. And what is important, I think, is that the people have to be reached first. In the sense of really advertising and convincing people of the benefits. You can do that, for example, by going to the people and trying to explain it. Because a big point is the lack of support that they first listen to. Why should I install this app now when I could also do it the classical way with friends on the phone? So you first have to experience the benefits yourself through a relatively simple and practical experience. You can also see that with classic things like Skype or Zoom. When you realise aha, I don't have to understand the whole computer, but I can Skype with my granddaughter in Australia, then it is a very clear benefit and when it is explained to me very briefly how it works, then I also use it. Not the whole computer but this application and then I am satisfied with it.	LES +Strategy LES LES LES

		Anwendung und dann bin ich damit zufrieden also. Deshalb würde ich sagen, es ist vielleicht oftmals das Problem von den Prototypen bis zu den Haushalten. Und das ist sozusagen manchmal die Schwierigkeit, weil es ist so dieselbe Idee, wenn jemand eine Webseite macht und sich wundert, warum niemand diese Website besucht. Ja, weil niemand kennt diese Website. Und das sage ich zum Beispiel auch Banken oder größeren Firmen, die Apps für Online Banking erneuern oder überhaupt erstellen. Da gibt es die ähnlichen Fragen. Und da ist es eben wichtig, diese Übergänge zu schaffen, dass man nicht nur die App gut macht, sondern dass man eigentlich auch so ein Angebot macht. Jeder kann zum Schalter kommen und sich erklären lassen wie die App funktioniert. Also ich kann mit meinem Smartphone hingehen. Und das gibt es meistens nicht weil sie sagen ja, dafür können wir uns nicht die Zeit nehmen. Aber genau das wäre eigentlich wichtig gewesen, dass man so eine Service Leistung hat, die wirklich vor Ort noch funktioniert und diese Ersthilfe zu schaffen. Um zu sagen ok, ich installiere die Ihnen diese App, zeige kurz, wie das funktioniert und nach 1-2 on demand Fahrten ist es eigentlich fast schon automatisiert. Also dann gibt es nur noch ein Paar, die man vielleicht noch mit einer Hotline abholen muss. Aber das ist sozusagen dieses Abholen der Person, was ein sehr wichtiger Aspekt hier ist.	That's why I would say it's perhaps often the problem from the prototypes to the households. And that's kind of the difficulty sometimes because it's kind of the same idea when somebody makes a website and wonders why nobody visits that website. Yes, because nobody knows this website. And that's what I say, for example, to banks or larger companies that renew or even create apps for online banking. There are similar questions. And it is important to create these transitions, not only to make the app good, but also to make an offer like this. Anyone can come to the counter and get an explanation of how the app works. I can go there with my smartphone. And that's usually not available because they say yes, we can't take the time for that. But that's exactly what would have been important, to have a service that really works on the spot and to create this first aid. To say ok, I'll install this app for you, briefly show you how it works and after 1-2 on-demand trips it is actually almost automated. So then there are only a couple that you might still have to pick up with a hotline. But this is, so to speak, this picking up of the person, which is a very important aspect here.	
15	Researcher	Ja, tatsächlich bei den Pilotprojekten sind sie relativ häufig doch nochmal zurück gegangen und haben dann nicht nur	Yes, actually, in the pilot projects they went back relatively often and offered	

		eine App angeboten, sondern beispielsweise auch Callcenter. Und das ist dann zumindest ein bisschen intuitiver. Weil so digital sind sie nicht, aber mit dem Telefon können Sie auf jeden Fall umgehen. Da sprechen sie auch nochmal direkt mit einer Person.	not only an app, but also call centres, for example. And that is at least a bit more intuitive. Because they are not that digital, but they can definitely handle the phone. They also speak directly with a person.	
16	Alexander Seifert	Ja, oder dass man es eben auch ergänzend sieht. Also das man nicht unbedingt sagt es gibt eine Lösung, sondern es gibt vielleicht 2 oder 3 Wege. Und man kann ja diese Hotline daneben versuchen zu nutzen, dass man sagt ja, wir können ja den Termin mal vereinbaren, dann kann ich ihnen das erklären. Also das ist natürlich erstmal mehr Aufwand und mehr Investment. Aber ich glaube, so kann man auch mal schneller überzeugen, dass man dann statt des Telefons auch mal die App nutzt.	Yes, or that it is also seen as complementary. So you don't necessarily say there is a solution, but maybe there are 2 or 3 ways. And you can also try to use this hotline to say yes, we can make an appointment, then I can explain it to you. So of course that's more effort and more investment. But I think it's a quicker way to convince people to use the app instead of the phone.	TD-AF LES
17	Researcher	Spannend, wir hatten vielen verschiedene Unternehmen angesprochen, im Privaten wie auch im öffentlichen Bereich. Und die Bereitschaft für Interviews war höher von Unternehmen im öffentlichen Bereich. Aber ich glaube, die sehen auch den Bedarf mehr, ein großes Produktportfolio anzubieten, was nicht nur die große Masse, sondern wirklich auch Nischen. Aus ihrer Perspektive, vielleicht haben Sie dazu eine Meinung, vielleicht nicht. Warum denken sie, ist es so, dass sich die Privaten Unternehmen wie zum Beispiel Uber oder MyTaxi oder ähnliches, sich aktuell nicht auf ältere Kundengruppen fokussieren? Warum	Very interesting. ,We had approached many different companies, in the private as well as in the public sector. And the willingness for interviews was higher among companies in the public sector. But I think they also see the need more to offer a large product portfolio, which is not only the big mass, but really also niches. From their perspective, maybe you have an opinion on that, maybe not. Why do you think it is that private companies like Uber or MyTaxi or the like are not currently focusing on older customer groups? Why is there currently no solution?	

		gibt es da aktuell noch keine Lösung?		
18	Alexander Seifert	Das ist eine sehr gute Frage. Wann kümmert sich eigentlich ein Unternehmen um seine Zielgruppen? Wenn das Unternehmen erkennt es ist eine zahlende Zielgruppe. Es geht immer darum, dass es sozusagen Potenzial hat. Und ich staune auch immer, dass eigentlich nicht erkannt wird, dass wenn wir von älteren Personen in der Rente sprechen, dann müssen wir nicht immer nur von Personen sprechen, die keine finanziellen Möglichkeiten haben. Große Menge von Personen, die eigentlich auch so Serviceleistungen wie On Demand Dienstleistung oder so sich leisten könnten. Und jetzt nicht unbedingt so eine geringe Rente haben. Daher habe ich den Eindruck, erstens, dass vielleicht viele Firmen das vernachlässigen, weil sie sagen na ja, wenn ich das für jemanden Erwachsenen 40 jährigen mache, dann ist es doch eben auch für jemanden, der 60 ist. Warum sollte sich das ändern? Diese Awareness, wie man so schön sagt, die Sensibilisierung für das Thema, ist teilweise nicht immer da. Und wie kommt das? Das kommt daher, wenn man ihnen erklärt, Ah, das ist ja eigentlich eine sehr, sehr interessante neue Zielgruppe. Und so kann man argumentieren der demografische Wandel wird ja dazu führen, dass wir immer mehr ältere Personen haben, also von daher wird rein statistisch gesehen auch die nächste große Personengruppe, die öffentlichen Verkehrsmittel oder andere Mobilitätsangebote nutzen. Von daher ist es eigentlich	That is a very good question. When does a company actually care about its target groups? When the company recognises that it is a paying target group. It's always about the fact that it has potential, so to speak. And I'm always amazed that people don't actually realise that when we talk about older people in retirement, we don't always have to talk about people who don't have any financial means. There are a large number of people who could actually afford services such as on-demand services. And now they don't necessarily have such a low pension. That's why I have the impression that, firstly, many companies are perhaps neglecting this because they say, well, if I'm doing this for someone who is 40 years old, then it's also for someone who is 60. Why should that change? This awareness, as they say, the sensitisation for the topic, is not always there. And how does that happen? It comes from explaining to them, Ah, this is actually a very, very interesting new target group. And so you can argue that demographic change will lead to more and more older people, so from a purely statistical point of view, the next large group of people will also use public transport or other mobility services. It is therefore actually negligent of the companies not to do so. But I also suspect, secondly, that the companies	+Strategy SPA SPA +Strategy

		fahrlässig, dass es die Firmen nicht machen. Ich vermute mal aber auch noch, zweitens, dass die Firmen sich immer nicht gerne in die Karten schauen lassen. Also wenn sie Input geben, dann lernen sie gerne. Aber sie geben nicht gerne breitwillig Auskunft zu ihrem strategischen Vorgehen. Und das ist sozusagen im Vergleich zu öffentlichen Einrichtungen natürlich anders, weil die Öffentlichkeit erstmal dazu verpflichtet sind Auskunft zu geben. Und zweitens natürlich, weil auch ein gewisser gesellschaftlicher Druck entsteht. Wir müssen ja alle Personen erreichen und alle Personen auch berücksichtigen, also diese Wahrnehmung der Diversität der Bevölkerung. Also man hat einen gesellschaftlichen Auftrag als, zum Beispiel Deutsche Bahn oder eben als örtlicher Anbieter, alle Personen abzuholen. Also man hat sozusagen einen anderen Druck als öffentliche Firmen. Es ist nicht alles durch finanzielle Aspekte zu begründen Deshalb würde ich sagen, verstehe ich diesen Unterschied und sehe die Hintergründe. Trotzdem würde ich mir da mehr Sensibilisierung wünschen für eben diese Anliegen.	don't like to be shown their cards. So if they give input, they are happy to learn. But they don't like to give broad information about their strategic approach. And that is different, so to speak, compared to public institutions, because the public is obliged to provide information. And secondly, of course, because there is also a certain social pressure. They have to reach all people and take all people into account, so this perception of the diversity of the population. So you have a social mandate as, for example, Deutsche Bahn or as a local provider, to pick up all people. So you have a different pressure than public companies, so to speak. Not everything can be justified by financial aspects, so I would say I understand this difference and see the background. Nevertheless, I would like to see more sensitisation for these concerns.	+Strategy
19	Researcher	Meinen Sie, die Forschung könnte da auch noch ein bisschen mehr theoretisch das Thema pushen in der Praxis?	Do you think research could push the topic a bit more theoretically in practice?	
20	Alexander Seifert	Man muss immer ein bisschen unterscheiden für was Forschung zuständig ist, für was die Praxis für was die Politik. Ich würde es immer ein bisschen gerne auseinanderhalten. Es ist ja so, dass die Praxis Forschungsfragen in die Forschung bringt und die	You always have to distinguish a bit between what research is responsible for and what practice is responsible for and what politics is responsible for. I would always like to keep it a bit apart. It is the case that practice brings research	

		Forschung Erkenntnisse in die Praxis zurückgibt. Das ist sozusagen ja das Zusammenspiel. Und natürlich können wir durch die Forschung Erkenntnisse dazu herstellen, versuchen, dass sozusagen so ein Bewusstsein zu erzeugen. Aber letztendlich ist es so, dass wir politisch nie Einfluss bei den Firmen haben. Also im Sinne von, dass wir strategisch etwas ändern könnten. Aber das ist sicherlich sehr, sehr wichtig, um das aufzuzeigen. Zum einen ist es wichtig zu sagen, dass Alter ist nicht nur Defizit. Sondern wir haben eine Vielzahl an Personen und eine Vielzahl an Lebensstilen. Und das andere ist wenn ihr als Firma diese Zielgruppe eigentlich gar nicht berücksichtigt, dann verpasst ihr ja eigentlich auch eine große. Zielgruppe eine große Personengruppe, die vielleicht sogar euer Angebot nutzen würde, wenn eben diese kleine Hürde genommen würde.	questions to research and research returns findings to practice. That is the interplay, so to speak. And of course, we can produce findings through research, try to create awareness, so to speak. But in the end politically, we never have any influence on the companies in the sense that we could change something strategically. But that is certainly very, very important to show that. For one thing, it is important to say that age is not only a deficit. But we have a variety of people and a variety of lifestyles. And the other thing is that if you as a company don't actually take this target group into account, then you are actually missing out on a large target group. You are missing out on a large target group, a large group of people who would perhaps even use your offer if this small hurdle were taken.	+Strategy +Strategy
21	Researcher	Ja, spannend. Sie hatten es jetzt gerade schon angesprochen. Auf politischer Ebene könnte man das im Zweifel dann bisschen mehr pushen. Haben Sie sich da schon eine Meinung dazu gemacht, ob sie sich da wünschen würden, dass das ein bisschen mehr noch gepusht wird auf politischer Ebene? Ob es nun auf kommunaler Ebene ist oder wo auch immer. Dass das ein stärkeres Diskussionsthema wird und, dass es vielleicht sogar auch zu Richtlinien führt? Für private Unternehmen beispielsweise.	Yes, exciting. You had just mentioned it. At the political level, one could push it a bit more in case of doubt. Have you already made up your mind whether you would like to see it pushed a bit more at the political level? Whether it is at the municipal level or wherever. That it becomes a stronger topic of discussion and that it perhaps even leads to guidelines? For private companies, for example.	
22	Alexander Seifert	Das ist eine gute Frage. Grundsätzlich ist es so, dass ich mir auch von der Politik wünsche, dass sie diese bestehenden gerontologischen Aspekte	That is a good question. Basically, I would also like politicians to take these existing gerontological aspects into account. For	+Strategy

		berücksichtigt. Zum Beispiel in ihren Altersstrategien oder überhaupt ihre Wahrnehmung von dieser Zielgruppe. Auf der anderen Seite ist die Frage wie kann man das erreichen? Es sollte ja nicht so sein, dass es eine Pflicht wird, weil dann entsteht so ein bisschen künstlicher Druck. Es sollte eher so sein, dass das eine Selbstverständlichkeit wird, weil man erkennt, dass die Zielgruppe zum Beispiel wirtschaftlich eine interessante Gruppe ist. Also ich sag mal so, das ist ja immer dieses „Designs for All“ was man sich ja vorstellt und was sehr schwierig ist. Die kürzesten Ideen sind immer am schwierigsten umzusetzen, aber ich plädiere immer noch dafür. Was heißt das eigentlich Design for all? Das bedeutet ja eigentlich, dass man die Diversität der ganzen Menschen berücksichtigt und irgendwie versucht einen gemeinsame Nenner zu finden. Und das eine ist ja diese Logik, entweder produziere ich Apps für jede einzelne Zielgruppe oder, und da bin ich ein Fan davon, dass man sagt, man produziert eine App, die für alle nutzbar ist und so selbsterklärend und so einfach zu nutzen ist, dass sie eben von Kindern bis zur ältere Person sinnvoll zu nutzen ist. Und alles andere sind dann sozusagen Serviceleistungen, die auf diese App aufbauen. Also das was ich erzählt habe. Das erklären, sich Zeit nehmen, vielleicht vor Ort das erklären und so. Das sind alles Zusätze und das ändert die App an sich erstmal nicht.	example, in their age strategies or their perception of this target group. On the other hand, the question is how can this be achieved? It shouldn't be made compulsory, because then there would be a bit of artificial pressure. It should rather be a matter of course, because it is recognised that the target group is an interesting group, for example, economically. I'll put it this way, it's always this "Designs for All" that one imagines and which is very difficult. The shortest ideas are always the most difficult to implement, but I still plead for it. What does that actually mean, Design for All? It actually means that you take into account the diversity of all people and somehow try to find a common denominator. And one thing is this logic: either I produce apps for each individual target group or, and I'm a fan of this, I say that you produce an app that can be used by everyone and is so self-explanatory and so easy to use that it can be used sensibly by children and older people. And everything else is then, so to speak, services that build on this app. So that's what I was talking about. Explaining, taking time, maybe explaining on site and so on. These are all add-ons and do not change the app itself. And I can give a good example with the ticket	+Strategy TD-AF TD-AF LES

		Und also ich kann ein gutes Beispiel nennen mit den Ticketautomaten in der Schweiz. So ein klassischer Ticketautomat, bei dem man noch viel eingeben konnte und wenn man sich dann mal die Schwierigkeit anschaut. Man denkt ja so ein Ticketautomat ist ja schon so eine ältere Technologie, das kann doch jeder. Man stellt aber immer wieder fest Nein, das ist total komplex. Das komplexe ist nicht das Gerät selber, sondern die Tarifstrukturen, die dahinter steht. Niemand versteht was für ein Ticket muss ich nehmen, wenn ich in Zonen von A nach B über C möchte. Also da sieht man immer sehr schön, dass es zwischen Hardware und Software große Unterschiede gibt. Jeder würde sagen, ein Ticketautomaten schafft jeder zu bedienen. Aber wenn die Software dann immer upgedatet wird und sich die Struktur dahinter ändert und der Content so kompliziert ist, dass man gar nicht mehr sieht, was für ein Ticket muss ich denn lösen, in welcher Tarifzone befinde ich mich denn? Dann ist die Anwendung sehr komplex. Und das ist das Spannende, was ich meinte mit dieser Idee, dass die App so gestaltet sein muss, dass sie so selbsterklärend ist, dass sie für alle nutzbar ist. Und dann ist es so, dass es eben nicht immer wieder zu Irritationen führt, auch für Jüngere. Dass so eine alte Technologie wie ein Ticketautomaten mal wieder kompliziert sein.	machines in Switzerland. It was a classic ticket vending machine where you could still enter a lot of data, and if you look at the difficulty. You think a ticket vending machine is an older technology, anyone can do it. But you always find out that no, it's totally complex. The complex thing is not the device itself, but the fare structures behind it. Nobody understands what kind of ticket I have to take if I want to travel from A to B via C in zones. So you can see very clearly that there are big differences between hardware and software. Everyone would say that anyone can operate a ticket vending machine. But when the software is constantly updated and the structure behind it changes and the content is so complicated that you can no longer see what kind of ticket I have to buy, what tariff zone I am in? Then the application is very complex. And that's the exciting thing I meant with this idea that the app has to be designed in such a way that it's so self-explanatory that everyone can use it. And then it's so that it doesn't cause irritation again and again, even for younger people. That an old technology like a ticket vending machine can be complicated again.	
23	Reseacher	Mhm, spannend. Wir hatten ja tatsächlich auch schon relativ viel mit Product Owner oder Projektmanager gesprochen. Und die meistens haben auch das Feedback gegeben, dass es oft die schwierigste Aufgabe sein kann, objektiv ein	Mhm, exciting. We have actually spoken quite a lot with product owners and project managers. And most of them have also given feedback that it can often be the most difficult task to objectively create a	

		einfaches Produkt zu erstellen. Es kann schwer sein objektiv zu bleiben, wenn man schon lange an einem Projekt arbeitet oder es könnte auch ein Problem sein, dass die meisten Produktentwickler oder Softwareentwickler oft ein Produkt erstellen, was sie selber gerne nutzen würden. Wie würden Sie denn zu der These stehen, dass das junge Durchschnittsalter in der Softwareentwicklung problematisch sein könnte oder würden sie sagen, wenn man beispielsweise einen Co-Creation Ansatz verwendet, dann ist das Alter eigentlich egal?	simple product. It can be difficult to remain objective when you've been working on a project for a long time, or it could also be a problem that most product developers or software developers often create a product that they themselves would like to use. What would you say about the thesis that the young average age in software development could be problematic or would you say that if you use a co-creation approach, for example, then age doesn't really matter?	
24	Alexander Seifert	Also im Grunde ist es ja erstmal egal, wie alt man selber ist. Natürlich gebe ich recht, dass man immer aus seiner eigenen Perspektive bestimmte Sachen bewertet und entscheidet. Deshalb ist es gar nicht so wichtig wie alt die Person ist, die jetzt diese App entwickelt, sondern dass diese Person sich einfach mit anderen austauscht und eben auch mit einem Co-Creation Ansatz reflektiert. Und es geht wirklich nur um gewisse Reflexionsschleifen. Und das bedeutet keiner von denen, die daran teilnehmen, weiß, wie die App eigentlich aussehen soll. Aber durch das ständige hin und her reflektieren kann man vielleicht einen Konsens finden oder kann man herausführen, wenn man diese Anwendung so macht, dann erreicht man vielleicht mehr Leute, wie wenn ich sie nur aus meiner Idee heraus baue und dann aber die wenigsten von diesen Leuten erreiche. Letztendlich erkennt man das dann	Basically, it doesn't matter how old you are. Of course, I agree that you always evaluate and decide on certain things from your own perspective. That's why it's not so important how old the person is who is now developing this app, but that this person simply exchanges ideas with others and also reflects with a co-creation approach. And it's really all about certain reflection loops. And that means none of those who participate in it knows what the app is actually supposed to look like. But by constantly reflecting back and forth, you might find a consensus or you might find out that if you make this app this way, you might reach more people than if I just build it out of my idea and then reach very few of those people. At the end of the day, you only realise when it's really on the market, which is also, I don't know the	DP-TEAM DP-S DP-TEAM DP-S DP-TEAM

		erst, wenn es dann wirklich im Markt ist, also das ist ja auch, ich weiß den offiziellen Namen nicht, aber diese Bananen-Logik. Das Produkt reift beim Kunden. Und ein gutes Beispiel dafür finde ich immer noch Tablets. Niemand wusste vorher, warum man eigentlich ein Tablet braucht. Und niemand brauchte eins. Und heute brauchen alle ein Tablet, Also es ist faszinierend Bedarfe entwickeln sich auch und das ist das, was ich meine mit der mit der App. Die App muss eigentlich erklären, was ist der Nutzen, was ist der Mehrwert. Deshalb, um die Frage zu beantworten ja, es ist viel besser eben von Anfang an dieses Partizipative, also dieses Einbeziehen von Personengruppen. Und unbedingt ja. Das ist sozusagen nicht vom Alter her zu betrachten, das ist auch Diversität in anderen Bereichen. Ein männlicher Entwickler würde vielleicht eine weibliche Perspektive vergessen oder wie auch immer. Also das sind ja ganz viele Aspekte, die da mitschwingen. Also von wie wird die Information dargestellt, welche Information wird dargestellt? Und letztendlich ist bei einer App der Content wichtig, die Darstellungsform und Navigation. Und das sind eigentlich so die Knackpunkte finde ich. Also wie viele Wege brauche ich, um an mein Ziel zu kommen, dieses klassische Denken. Und da wäre vielleicht so ein bisschen und das studiere ich selber noch, ob das jetzt die richtige Lösung ist. Aber man kann ja überlegen wir haben ja oft das Problem bei so einer App, die wollen alles	official name, but this banana logic. The product matures with the customer. And I still find tablets a good example of that. Nobody knew beforehand why they actually needed a tablet. And nobody needed one. And today everyone needs a tablet, so it's fascinating that needs also develop and that's what I mean with the app. The app actually has to explain what the benefit is, what the added value is. Therefore, to answer the question, yes, it is much better to have this participatory approach right from the start, i.e. to involve groups of people. And absolutely yes. This is not to be considered in terms of age, so to speak, it is also diversity in other areas. A male developer might forget a female perspective or whatever. So there are many aspects that go along with it. So how is the information presented, what information is presented? And ultimately, the content, the form of presentation and navigation are important for an app. And I think those are the key points. So how many ways do I need to get to my goal, this classical thinking. And maybe that would be a bit of a question, and I'm still studying that myself, whether that's the right solution. But you can think about it, we often have the problem with an app like this, they want to put everything in, because they want all the options. So this discussion between Android and Apple users. Many people don't use Android because they can display a	LES DP-UR DP-S TD-AF

		reinpacken, weil sie wollen alle Optionen. Also diese Diskussion zwischen Android und Apple Nutzer. Android nutzen viele nicht, weil sie sehr viele Optionen einen selber darstellen können und nochmal verändern können und so. Also dass es veränderbar ist, ist eigentlich, was sie wollen. Nutzer wollen meistens, dass es funktioniert und gar nicht viele Wege. Jetzt mal sehr plakativ gesprochen. Aber so eine App könnte ja eventuell als Einstieg eine simple Darstellung haben. Eine simple Funktion die dahintersteht ist das wichtigste und, dass ich ans Ziel komme. Ein gutes Beispiel dafür ist die Schweizer Bahn, also die SBB, die mal geschaut wie kompliziert ihre Webseite ist. Und die hat das jetzt so gemacht, dass sie eigentlich diese Google Logik hat. Sie haben am Anfang, wenn man es aufruft, nur noch dieses Suchfeld und dann geht es von A nach B. Und dann kommt erst das komplizierte mit 1000 Verbindungsmöglichkeiten, 1000 Tarif Möglichkeiten. Weil sie festgestellt haben was ist der Hauptnutzen, wenn jemand eine SBB Seite aufruft. Das trifft sozusagen bei 90% der Besucher der Webseite zu. Also muss man das in den Vordergrund stellen und dann könnte man sowas wie eine freigeschaltete optionale Ansicht für Leute, die noch mehr aus der App herausholen wollen. Ist für mich selber immer noch so eine Frage, ist das so derer Weg den man gehen könnte, also dass die App selber wie 2 Stufen hat und anpassbar ist. Oder ist sozusagen die Idee, nein, die App, die muss alles können, aber gut dargestellt sein. Das ist wirklich das schwierigere. Aber	lot of options themselves and change them again and so on. So the fact that it's changeable is actually what they want. Users mostly want it to work and not in many ways. That's a very striking way of putting it. But an app like this could possibly have a simple representation as a start. A simple function behind it is the most important thing and that I get to my destination. A good example of this is the Swiss railway, the SBB, which looked at how complicated its website is. And they have now made it so that it actually has this Google logic. At the beginning, when you call it up, they only have this search field and then it goes from A to B. And then there's the complicated thing with the search field. And then comes the complicated thing with 1000 connection possibilities, 1000 tariff possibilities. Because they have established what the main benefit is when someone calls up an SBB page. That applies to 90% of visitors to the website, so to speak. So you have to put that in the foreground and then you could have something like an unlocked optional view for people who want to get even more out of the app. It's still a question for myself, is that the way to go, that the app itself has like 2 levels and is customisable. Or is the idea, so to speak, no, the app has to be able to do everything, but it has to be well presented. That's really the more difficult thing. But maybe they already	DP-UR DP-UR TD-AF

		vielleicht haben sie ja schon mit ihren Gesprächen eine Idee in welche Richtung es gehen könnte.	have an idea in which direction it could go with their talks.	
25	Researcher	Tatsächlich schon ich glaube das A und O ist wirklich das relativ häufig mit diesen Apps, dann auf einmal der Fokus auf die Technologie gelegt wird, also dass der Fokus wirklich auf den Initialen Service gelegt wird, also sprich es geht darum, jemanden von A nach B zu kriegen. Und es geht nicht primär darum, ich muss jetzt eine App machen und ich glaube, darum geht es relativ häufig. Und dahin wird glaube ich auch der Markt oder in die Richtung denken gerade auch viele. Eine simple App zu bauen, bei der der Hauptservice im Mittelpunkt steht. Aber auch, dass bei Mobilität für ältere an Alternativen gedacht werden sollte, wie zum Beispiel Call centre. Deswegen kann es auch sein, dass wir perspektivisch zum Schluss das Fazit ziehen, dass Apps ausschließlich gar nicht die perfekte Lösung sind. Und da hatte ich tatsächlich noch eine Frage. Am Anfang hatten Sie glaube ich gesagt, dass als sie angefangen hatten zu forschen, die Digitalisierung unter älteren oder digitale Themen unter Älteren anders waren, als sie es heute ist. Sehen Sie da schon ein Trend, dass aktuell die Akzeptanz von Technologie deutlich besser geworden ist oder sehen Sie da einen gewissen Trend von ihren Forschungen?	In fact, I think the most important thing is that relatively often with these apps, the focus is suddenly placed on the technology, in other words, that the focus is really placed on the initial service, in other words, it's about getting someone from A to B. And it's not primarily about making an app, and I think that's what it's about relatively often. And it's not primarily about making an app, and I think that's what it's about relatively often. And I think that's where the market is going, or that's the direction many people are thinking. To build a simple app that focuses on the main service. But also, in the case of mobility for older people, alternatives should be considered, such as call centres. That's why it's also possible that we'll come to the conclusion that apps alone are not the perfect solution. And I actually had another question. At the beginning, I think you said that when you started your research, digitisation among older people or digital topics among older people were different than they are today. Do you already see a trend that the acceptance of technology has become much better or do you see a certain trend from your research?	
26	Alexander Seifert	Im Grunde ist es ja so, als ich angefangen habe, 2007 2008 mit diesem Thema, da war es für alle Personen noch neu.	Basically, when I started with this topic in 2007 2008, it was still new for everyone. There was no	

		Also da gab es ja noch kein iPhone oder ein Tablet. Von daher ist es so, dass wir alle in unseren Entwicklung sind. Natürlich ja wenn wir uns jetzt die Daten im Vergleich immer ansehen, dann ist es so, dass wir auch im Personenkreis der über 65 Jahren immer mehr Internetnutzer haben. Wir haben auch immer mehr Smartphone Nutzer und Tablet Nutzer. Natürlich, wenn man das jetzt so weiter führt, würde es immer mehr geben. Jedoch, und das ist sozusagen sehr entscheidend, ist es so, dass wir, weil die Frage wurde mir auch schon 2008 gestellt von einem Journalisten. Wird denn das Problem nicht wegsterben in 20 Jahren? Und damit meinte er sozusagen, dass die Personen ja dann nicht mehr da sind und jetzt eigentlich wir 50 jährigen oder so dann da sind und wir können ja alles. Aber es ist ja so, dass die Technik sich schneller entwickelt, als wir uns letztendlich entwickeln. Und das ist das, was ich meine. Ich denke, mein Thema wird auch in 20, 30 Jahren von Relevanz sein. Dann werden wir nicht mehr von der Internet- oder Smartphonenutzung sprechen. Sondern dann ist es sowas wie künstliche Intelligenz, Virtual Reality und solche Themen die dann neu sind. Und ich hatte jetzt gerade erst publiziert dazu. Die Einstellung zum Internet, das hat sich gar nicht so groß verändert, über die Jahre. Das ist eigentlich noch spannend, wenn man es benutzt, ist es so, dass man ja immer die Vor- und Nachteile sieht, also Thema Datenschutz, Sicherheitsbedenken, Fake News und sowas. Also die Technik ist ja	iPhone or tablet at that time. That's why we are all in the process of developing. Of course, if we now look at the data in comparison, it is the case that we have more and more Internet users in the over-65 age group. We also have more and more smartphone users and tablet users. Of course, if you carry on like this, there would be more and more. However, and this is, so to speak, very decisive, it is the case that we, because I was asked this question by a journalist back in 2008. Won't the problem die out in 20 years? And by that he meant, so to speak, that the people will no longer be there and we 50-year-olds or so will be there and we can do everything. But the fact is that technology is developing faster than we are developing. And that is what I mean. I think my topic will still be relevant in 20 or 30 years. Then we will no longer be talking about internet or smartphone use. But then it will be something like artificial intelligence, virtual reality and such topics that will be new. And I had just published on this. The attitude towards the internet has not changed that much over the years. It's actually still exciting when you use it, because you always see the advantages and disadvantages, i.e. data protection, security concerns, fake news and so on. So the technology is one thing, but the content of this application is another. And just because you make an app	DP-UR +Strategy

		das eine, aber der Inhalt dieser Anwendung ist das andere. Und nur weil man eine App macht heißt nicht, dass es eine gute App ist. Und weil es funktioniert, es eine gute Anwendung ist. Und das ist das, was ich denke, dass das Thema für Firmen, die jetzt Apps entwickeln, wird das auch in den nächsten Jahren wichtig sein. Und ich glaube das, was Sie meinen ist, eine gewisse Offenheit dafür zu haben. Welche Wege an den Kunden heranzukommen, halte ich mir offen and den Kunden heranzukommen. Entweder über diese Telefonhotline oder über diese App. Und ich würde eher sagen es ist momentan noch so ein bisschen, dass es nicht entweder oder sein muss, sondern dass es parallel sein muss. Und das wird sich dann sicherlich auch ändern, dass dann mehr die App nutzen. Aber es ist wichtig, die App erstmal zum Kunden zu bringen. Also nicht nur im App Store freizuschalten, sondern sie zum Kunden zu bringen. Also würde ich sagen nein, Ihre Masterarbeit sollte nicht das Fazit haben naja, das Thema sollte gar nicht berührt werden, weil sie werden es sowieso nicht lernen die älteren. Sondern eben genau andersrum, dass man sagt ja, das ist eine Zielgruppe, die in der Zukunft umso wichtiger wird und deshalb ist es wichtig, sie frühzeitig die einzubeziehen und das mit zu berücksichtigen. Und wie gesagt ich bin immer nicht so Fan von einer App für Ältere, sondern eine App für eine Funktion. Und die ist idealerweise von allen nutzbar. Natürlich ist es so rein theoretisch, dass diese on demand	doesn't mean it's a good app. And because it works, it's a good app. And that's what I think the issue is for companies that are developing apps now, that's going to be important in the next few years. And I think what you're talking about is having some openness to that. What ways to get to the customer, I keep open to get to the customer. Either through this telephone hotline or through this app. And I would rather say that at the moment it's still a bit like it doesn't have to be either or, but that it has to be parallel. And that will certainly change, so that more people will use the app. But it is important to bring the app to the customer first. So not only to activate it in the App Store, but to bring it to the customer. So I would say no, your master's thesis should not have the conclusion, well, the topic should not be touched at all, because the older ones won't learn it anyway. But rather the other way round, that you say yes, this is a target group that will become even more important in the future and that's why it's important to include them early on and to take that into account. And as I said, I'm not always a fan of an app for older people, but an app for a function. And ideally it can be used by everyone. Of course, it is purely theoretical that these on-demand services, which are specifically designed for older people, cannot be used by younger people most of the time. But one must not forget that such an	DP-UR LES DP-UR +Strategy

		Dienste, die spezifisch für Ältere konzipiert worden sind, natürlich jetzt nicht von Jüngeren benutzt werden meistens. Aber man darf ja auch nicht vergessen so eine App wird ja teilweise auch von den Angehörigen genutzt. Also bei unseren Studie sind 40% der nicht Nutzer, die eigentlich ein Proxy Nutzer sind. Das bedeutet, dass andere für sie Inhalte aus dem Internet abrufen. Also sie können eigentlich das Internet nutzen, indem Sie sagen, lieber Partnerin druck mir doch mal das SBB Ticket aus mit der Verbindung und zu dieser Uhrzeit und dann haben sie eigentlich dieselbe Nutzung. Von daher man muss ja nicht immer nur an die Kernzielgruppe denken, sondern wer sind eigentlich die, die das mitnutzen.	app is also used by some of the relatives. In our study, 40% of the non-users are actually proxy users. That means that others retrieve content from the internet for them. So they can actually use the internet by saying, dear partner, print me out the SBB ticket with this connection and at this time and then they actually have the same use. So you don't always have to think only about the core target group, but who are the people who also use it?	
27	Researcher	Absolut ja, in diese Richtung wird wahrscheinlich auch unsere Diskussion gehen. Ich glaube, ich hab tatsächlich keine Fragen mehr. Vielen dank für die spannenden Einblicke. Wäre es für Sie in Ordnung, dass wir Sie kontaktieren bezüglich möglicher Rückfragen?	Absolutely yes, this is probably the direction our discussion will take. I don't think I have any more questions. Thank you very much for the fascinating insights. Would it be okay for us to contact you regarding possible queries?	
28	Alexander Seifert	Selbstverständlich.	Of course.	
29	Researcher	Perfekt klasse, vielen Dank und schönen Tag wünsche ich ihnen dann noch.	Perfectly great, thank you very much and have a nice day.	

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