

FINAL VERSION: 10TH OF JULY 2020
APPROVED WORD COUNT: 7039

DIGITAL LITERACY OF BABY BOOMERS IN THE NETHERLANDS

A CASE STUDY ON THE E-PRESCRIPTION AS A SMART MEASURE.

TABEA RADEMACHER – S3439429
BACHELOR PROJECT – SUPERVISOR: PROF. DR. C. YAMU
SPATIAL PLANNING AND DESIGN – FACULTY OF SPATIAL SCIENCES
UNIVERSITY OF GRONINGEN

SUMMARY

Dutch cities increasingly adopt technology to improve efficiency, effectiveness, and the overall quality of life for its inhabitants (D'Auria et al., 2018; Rocha et al., 2019). This technology is referred to as smart measures, which are adopted across various policy sectors (Marston & van Hoof, 2019). For the adoption of smart measures in cities, it is important to include all age groups to ensure advantages for all members of society. This inclusion of all age groups is criticized since most smart measures are not evaluated from the standpoint of older individuals (Mitzner et al., 2010; Neves et al., 2013; Marsten & van Hoof, 2019). The focus for this thesis lies on the investigation of the electronic prescription as a smart measure of smart and age-friendly cities concerning Baby Boomers and their degree of digital literacy. Little research has been conducted on the digitization of the healthcare sector, which is especially pressured by the increasing chronic illnesses among older individuals (Wilson et al., 2013). Baby Boomers are an under-researched subject, especially when it comes to the digitization of the healthcare sector. This research gap motivates the thesis by using a mixed methods approach. The results of these mixed methods show that there is, largely, no issue in the adoption of the electronic prescription among Baby Boomers, but that the execution of the electronic prescription is fragmented. The adoption of the electronic prescription is supported by the convenience the online services of the electronic prescription offer. Contrarily, this convenience factor is criticized by a small number of study participants and previous research as disabling in terms of physical activity and social interactions (van Hoof et al. 2019). Further fragmentation is found at the pick-up in the pharmacy of prescriptions. The pick-up strikes as system-centered and consumer-unfriendly because of poor working structures in the pharmacy itself, which prolongs the visit to pick-up medication. The link between the digital and the physical world appears to be two-folded in terms of the convenience of electronic healthcare services, but long waiting times at the pharmacy.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	4
1.1 BACKGROUND	4
1.2 RESEARCH PROBLEM AND GAP	5
1.3 SOCIETAL RELEVANCE	6
1.4 STRUCTURE	6
CHAPTER 2: THEORETICAL FRAMEWORK	7
2.1 THE POSITIONALITY OF THE E-PRESCRIPTION IN SMART AND AGE-FRIENDLY CITIES	7
2.2 CONCEPTUAL MODEL	8
2.3 HYPOTHESES	10
CHAPTER 3: METHODOLOGY	11
3.1 QUANTITATIVE RESEARCH	11
3.2 QUALITATIVE RESEARCH	12
3.3 ETHICS	12
3.4 COVID-19 IMPACT	13
CHAPTER 4: RESULTS	14
4.1 QUANTITATIVE FINDINGS	14
4.2 QUALITATIVE FINDINGS	16
4.2.1 INTERVIEWEE CHARACTERISTICS	16
4.2.2 INTERVIEWEES AND THEIR PERCEPTION ON THE E-PRESCRIPTION	17
4.3 DISCUSSION	19
4.3.1 AGE AND THE POSSIBLE DETACHMENT FROM THE E-PRESCRIPTION	19
4.3.2 CONCERNS TOWARDS THE PRESCRIPTION AS AN E-SOLUTION	19
4.3.3 THE CONVENIENCE FACTOR OF THE E-PRESCRIPTION	20
4.3.4 INTEGRATION OF BABY BOOMERS IN SMART AGE-FRIENDLY CITIES	21
CHAPTER 5: CONCLUSION	22
REFERENCES	23
ACKNOWLEDGMENTS	25
APPENDIX	26
APPENDIX I: DATA ANALYSIS SCHEME	26
APPENDIX II: SURVEY QUESTIONS	26
APPENDIX III: INTERVIEW GUIDE	27
APPENDIX IV: CODE TREE	29

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

In Europe, many citizens have been reaching higher ages and therefore live longer, and healthier compared to past generations. The Organization for Economic Co-operation and Development (OECD) (2015) stated that 25.1% of the adults will be over the age of 65 by 2050 in OECD member states. In 2019, half of the adult population in the Netherlands (6.9 out of 13.7 million adults) was above 50 years old (Statistics Netherlands, 2014). The changing of the population and ageing of large birth cohorts, such as the Baby Boomers (born between 1946-1964 (PEW Research Center, 2019)), has already reached an advanced state. The Dutch adults born in 1946 were eligible for old-age pension in 2011 (IamExpat, 2012). Though, the ageing of the older population is a positive phenomenon it comes with its challenges in a more urbanized and globalized world marked by increasing technological advancements.

With higher ages, also the risk of chronic illnesses increases. Around 75% of older people are diagnosed with at least one chronic illness (Wilson et al., 2013). The treatment for chronic illnesses puts pressure on the healthcare system causing overcrowded doctors and increasing the demand in pharmaceutical companies and pharmacies. Most chronic illnesses require repeat prescriptions (Wilson et al., 2013). These repeat prescriptions require an increased commute between doctors and pharmacies, resulting in a large loss of time for patients and doctors (Klimczuk & Tomczyk, 2016).

In the Netherlands, the step of visiting the doctor to pick up the prescription was eliminated through the development of the electronic prescription (e-prescription) in 1998 (van Dijk et al., 2011). The electronic system transfers prescriptions directly from the doctor to a pharmacy of choice. This makes cheaper medication possible and aims at increasing the output of doctors and pharmacies (van Dijk et al., 2011; Kierkegaards, 2013). In 2002, the e-prescription and the Electronic Health Care Record (EHCR) were implemented by the National IT Institute for Healthcare in the Netherlands. This approach is considered to be “smart” as it facilitates easy communication between doctors and other health providers about patient records. Ten years later, in 2012, the EHCR system was changed by law which required prescriptions to be processed digitally. More than 90% of the General Practitioners adopted the EHCR and its e-prescription feature (van Dijk et al., 2011; Kierkegaards, 2013).

The implementation of the e-prescription is mainly a measure and contribution towards a smarter environment. In the Netherlands, the nation-wide implementation of the EHCR network encourages cities and towns to become more convenient. But is this digital prescription system, which is frequently used by senior citizens also inclusive? Is the e-prescription technology also an age-friendly technology?

1.2 RESEARCH PROBLEM AND GAP

Smart technologies aim to simplify the processes and maximize outputs. But with that comes the question if these smart technologies also act inclusively. The increased employment of technology in Dutch cities can be categorized as smart city measures. Next to implementing technology in Dutch cities, the Netherlands also put great effort towards making cities more age-friendly (Age-friendly Nederland, n.d.). This is done by implementing innovative infrastructure concepts for seniors and emphasizing healthy ageing measures (van Hoof, 2018; van Hoof & Kazak, 2018; Phillips, 2018). (The concepts smart city and age-friendly city are extensively discussed in chapter 2). An increase of smart measures across cities in the Netherlands is strived for, but also an inclusion of all age groups is attempted (Age-friendly Nederland, n.d.; Klimczuk & Tomczyk, 2016). For further developments, the relation between ageing and technology needs to be questioned.

The aspect of population ageing in relation to smart cities has been discussed by multiple scholars, especially the implementation of digital systems that can support the ageing population in their daily lives (Niehaves & Plattfaut, 2014; Klimczuk & Tomczyk, 2016; van Hoof et al., 2018; Rocha et al., 2019; Marsten & van Hoof, 2019). In contrast to the literature, the age-friendly city framework and checklist developed by the World Health Organization (WHO) (2007) does not mention the active involvement of technology, even though it promotes multisectoral innovative action (Marston & van Hoof, 2019). This is also criticized by scholars, who have raised the issue of population ageing and digitization. Particularly reluctance and difficulties of technology usage (low digital literacy) and the perceived incompetence of older generations is highlighted (Mitzner et al., 2010; Neves et al., 2013; Niehaves & Plattfaut, 2014; Marsten & van Hoof, 2019, Mannheim et al., 2019). Less focus has been on the adoption of specific smart measures and their impact on the older generations.

The scientific realm brought attention to the disparities between the adoption of technology in senior citizens. As a response, the WHO (2018) started to introduce the importance of technologies in age-friendly environments for promoting and maintaining health by striving to “enable people” through technology, physical movement, and social interactions in their “The Global networks for age-friendly Cities and Communities” report in 2018. Despite the raised awareness, no updates have been made to the age-friendly city framework and checklist (WHO, 2007; WHO, 2018). The same applies to the Interreg Europe (n.d.) initiative, in which the technological development gap in senior citizens is named and the importance of bringing together smart cities and ageing is mentioned. Nevertheless, neither initiative presents solutions. In the Netherlands, the initiative Age-friendly Nederland (n.d.) is calling for action by taking the age-friendly city framework by the WHO (2007) and adapting the Dutch cities to this approach. Yet, technology is also not introduced. The discussion of digital literacy (e-literacy) in seniors in healthcare technologies is neither discussed in scientific research nor in the WHO age-friendly city guidelines.

The lack of information on how to unite smart and age-friendly cities on behalf of older individuals’ low e-literacy represents the research gap. The research question: **“How well is the Baby Boomer generation integrated into smart age-friendly cities in light of acceptance**

and usage of the e-prescription in the Netherlands?” aims to investigate how the Baby Boomers respond to the increased technology in the health care sector. It also aims to shed light on the findings of other scholars that state that low e-literacy is a common phenomenon among older people (Mitzner et al., 2010; Neves et al., 2013; Niehaves & Plattfaut, 2014; Marsten & van Hoof, 2019) because of the increasing implementation of smart measures.

Hence, the motivation is to understand how Baby Boomers feel about the implementation of increased technology in the health care sector and if these technologies act inclusively to older birth cohorts. This will be investigated with **“To what extent is the e-prescription accessible and used by Baby Boomers?”** covering the quantitative research and **“How well is the e-prescription accepted by Baby Boomers?”** covering the qualitative research.

1.3 SOCIETAL RELEVANCE

Population ageing and technological advancements are the two developments that are intensely linked to the research questions while focusing on the implications of the e-prescription. Ageing is an issue that humanity has faced in the past and will continue to face in the future. Particularly the rapid technological advancements regarding the current ageing of Baby Boomers are relevant. The Baby Boomers are the generation who have not grown up with technology but have experienced the technological development in their late twenties. Compared to Millennials (born between 1980-1996 (PEW Research Center, 2019)) many Baby Boomers have experienced the technological implications in everyday life to a lesser extent and are thus oftentimes seen as less knowledgeable in technology (Neves et al., 2007; Neves et al., 2013). Much policymaking and innovations are made towards Millennials and even younger generations and less towards Baby Boomers and older generations. Since technology is so important for many developments in cities, it is necessary to investigate possible complications, while simultaneously striving for an all-inclusive approach, which is increasingly neglected.

1.4 STRUCTURE

This thesis is structured by explaining the important theories of *smart cities*, *age-friendly cities*, *acceptance*, and *e-literacy* concerning the e-prescription in chapter two, that together form the conceptual framework and hypotheses. In the third chapter, the data collection methods are laid out. Next, the fourth chapter presents the results and findings of this study together with a discussion, which reflects on the hypotheses and literature. In the fifth and last chapter, the conclusion rounds up this thesis. Lastly, references and appendices follow.

CHAPTER 2: THEORETICAL FRAMEWORK

2.1 THE POSITIONALITY OF THE E-PRESCRIPTION IN SMART AND AGE-FRIENDLY CITIES

Technology and ageing are two concepts that do not seem to fit together at first sight. Both terms have been kept rather separately, even though they could be interrelated to each other through the smart city and the age-city framework.

The age-friendly city is a framework and checklist published by the WHO (2007). Eight *age-friendly city* determinants have been established (Figure 1): (1) Social participation; (2) Communication and information; (3) Civic participation and employment; (4) Housing; (5) Transportation; (6) Community support and health services; (7) Outdoor spaces and buildings and (8) Respect and social inclusion. On a European level, a covenant named “Age-friendly Europe” (Age-friendly Europe, n.d.) and on the national level, Age-friendly Nederland (n.d.) address the importance of building age-friendly cities and communities based on the age-friendly city framework by the WHO. An age-friendly city aims to be friendly to all age groups and should facilitate active movement and social inclusion. Moreover, also solutions for those less mobile and competent need to be installed, which includes the older generation to a large extent (Klimczuk & Tomczyk, 2016; van Hoof, 2018a; Marston & van Hoof, 2019).

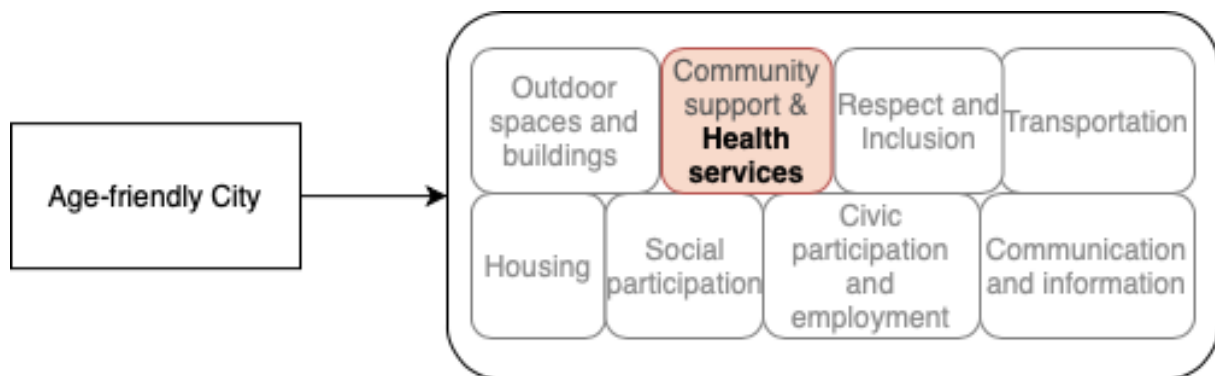


Figure 1: Age-friendly city framework (source: adjusted by author from WHO, 2007).

In contrast, the smart city is not only a technological involved city but also takes over pieces of the digital city concept, by integrating more human features. Also, the “Triple Bottom Line model” (economy, society, environment) from the sustainable city is integrated. Smart cities should mainly increase efficiency and effectiveness through technologies, which then appear time-saving to inhabitants (Klimczuk & Tomczyk, 2016). The most widely used smart city concept has been developed by Giffinger et al. (2007) (Figure 2), which also reflects the “Triple Bottom Line model” and further extends it in its six leading themes: (i) smart mobility, (ii) smart economy, (iii) smart people, (iv) smart governance, (v) smart environment and (vi) smart living. Smart mobility is related to the accessibility of cities concerning transport and the design, as well as the usage of ICT infrastructure networks. Smart economy describes the competitiveness of a city, while smart people are the social and human capital that resides in the city. Smart governance covers the participation of all involved stakeholders. Smart

environment covers the preservation of the environment in light of pollution and lastly, smart living defines the quality of life (QoL) based on the environment.

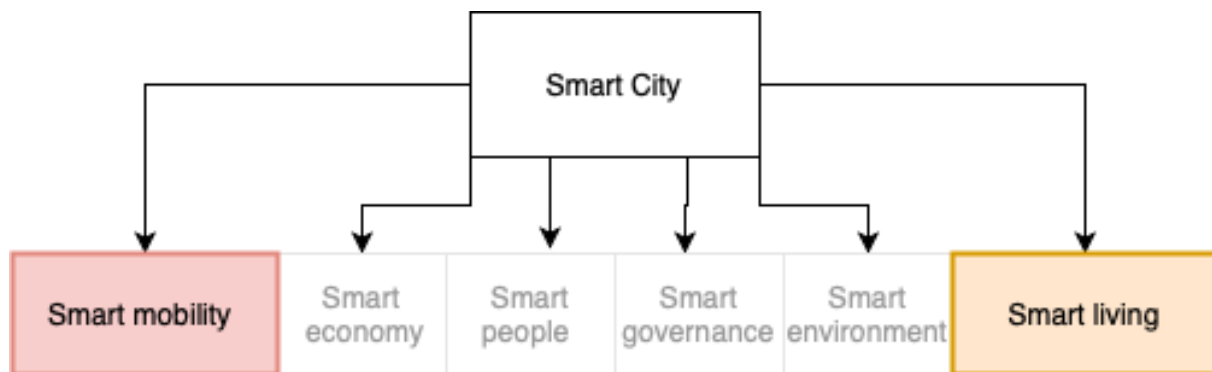


Figure 2: Smart city framework (based on Giffinger et al., 2007).

D’Auria et al. (2018) and Rocha et al. (2019) both mention the importance of technology to monitor and manage a smart city while respecting ageing. An example of active smart ageing (Rocha et al., 2019) includes new visions for smart mobility and living for older adults, such as home ambient living assistants and the e-prescription. Home ambient living assistants use activity recognition and fall detection for faster emergency responses to household incidents. A smaller application, such as the e-prescription system can greatly improve the service in efficiency and effectiveness as well as the output of doctors and pharmacies (van Dijk et al., 2011; Kierkegaards, 2013).

The implementation of e-prescriptions can be located in the (vi) smart living theme of smart cities, which highlights the QoL of society, individuals, and electronic healthcare (e-healthcare) related strategies. Equally important is (i) smart mobility since the ICT infrastructure is identified in this theme (Rocha et al., 2019). In age-friendly cities, the e-prescription belongs to (6) Community support and health services. Therefore, the e-prescription is a measure of smart and age-friendly cities on a nation-wide scale in the Netherlands.

2.2 CONCEPTUAL MODEL

Since the e-prescription can be embedded into the *smart and age-friendly cities*, this thesis is led by the combination of the two concepts that focus on the e-healthcare. A similar smart age-friendly model has been drawn up by Marston & van Hoof (2019) calling for smart age-friendly ecosystems, which aims at increasing technology in age-friendly cities, rather than forming a coherent concept of both frameworks. The conceptual model leading the thesis focuses on the combination of smart living, smart mobility, and community support and health services to achieve an integrative and embedded smart and age-friendly city framework with the focus on e-prescriptions (Figure 3).

This integration is challenged by the ability of Baby Boomers to use technology. *E-literacy* is used to describe the phenomenon that concerns the skills of an individual to use digital services (Neves et al., 2017). Low *e-literacy* can pose an issue in Europe and with many

seniors being de-touched from the increasing technological innovations. This gap becomes difficult to close due to increasing technological complexity (Vancea & Solé-Casals, 2015; van Hoof et al., 2019), which might imply difficulty in using the e-prescription system for older individuals.

Moreover, the e-prescription might play a major part in the life of seniors with chronic illnesses and their corresponding medication. Thus, they must accept to give data via online systems to pharmacies and doctors. *Acceptance* is a sensitive topic, especially among groups where the trust towards technology is smaller (Neves et al., 2013). An acceptance model has been introduced by Davis (1991) and his Technology Acceptance Model (TAM). Through the design features of a particular system, individuals get stimulated on Perceived Usefulness (PU) and Perceived Ease of Use (PEU). PU stands for “the degree to which an individual believes that using a particular system would enhance his or her job performance” (Davis, 1991, p.477) and PEU for “the degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1991, p.477). The belief of the PEU has a direct influence on the PU. Both PU and PEU influence the attitude towards using and the actual use. The focus of this research will mainly be on PU aspects with PEU as a supporting task.

The frame for this thesis are formed by the smart city and age-friendly city concept, whereas acceptance, accessibility & usage and e-literacy of Baby Boomers form the core around which the research and its questions are focused (Figure 3).

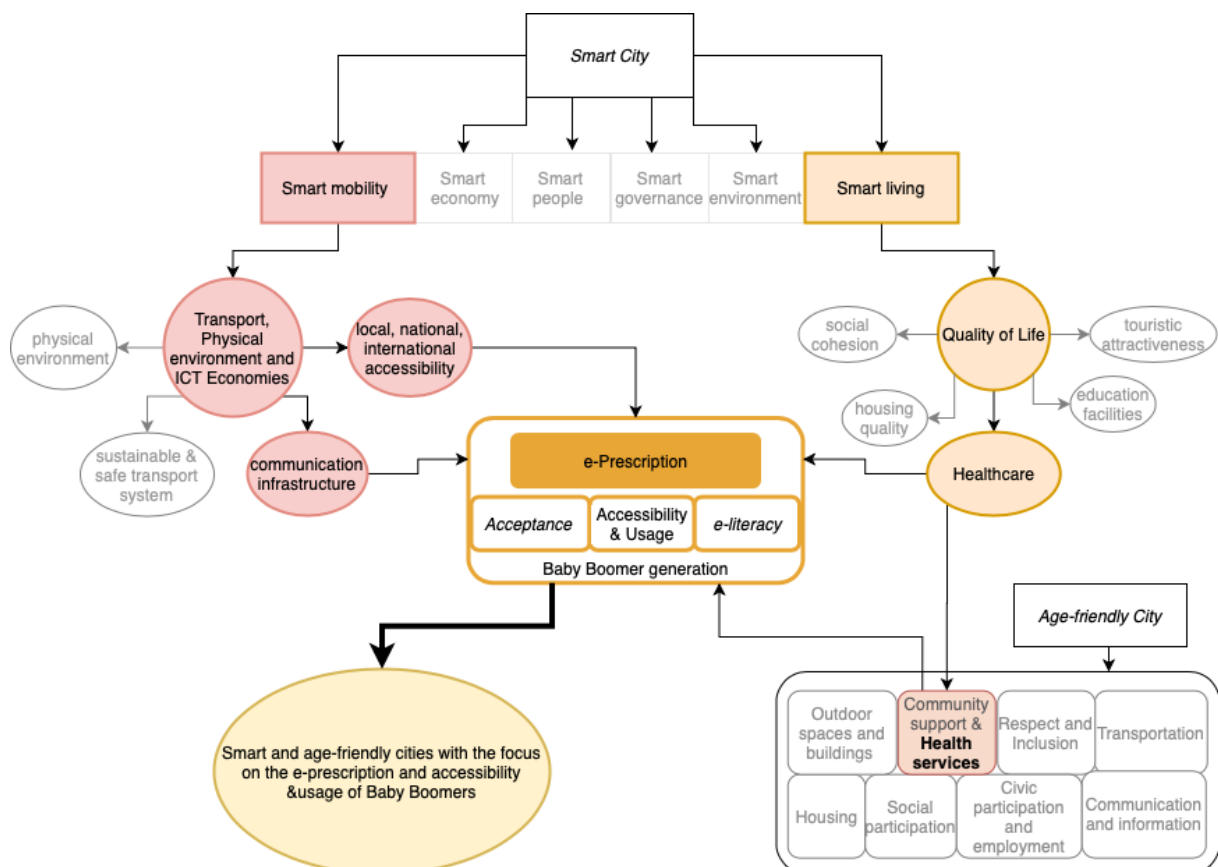


Figure 3: Conceptual framework for this research.

2.3 HYPOTHESES

Three hypotheses that are based on existing literature and their results are formulated. These will be related to data, that is aggregated through the survey and the interviews and linked to the conceptual framework in the discussion.

1. Because of their age, Baby Boomers are less in touch with digital services, such as the e-prescription.
2. The increased technology sparks fear of mistakes in terms of receiving the wrong medication or lack of data security.
3. The e-prescription is a widely accepted smart measure and acts in a convenient and time-saving way for its users.

CHAPTER 3: METHODOLOGY

The research about **“How well is the Baby Boomer generation integrated into smart age-friendly cities in light of acceptance and usage of the e-prescription in the Netherlands?”** is approached with mixed methods (Appendix I). The quantitative data collection through surveys intends to trace the trends of the Baby Boomer’s e-prescription usage (Appendix II). The qualitative data collection through interviews (Appendix III) attempts to complement the quantitative data. Hence, the interviews should give an in-depth insight into trends identified in the survey by exploring the individual story and perception of the e-prescription regarding the users’ experiences.

3.1 QUANTITATIVE RESEARCH

The quantitative research is led by the question: **“To what extent is the e-prescription accessible and used by Baby Boomers?”**. The data was collected through the online survey tool on Qualtrics and distributed through an existing social network and social media. This is a result of the COVID-19 impacts and the restriction measures to visit older individuals and risk groups (see section 3.4 COVID-19 Impact for a detailed reflection). The convenience sample and online survey have been the only feasible strategy, even though an online platform does not seem the most effective because of possible issues concerning e-literacy. Through this, a total of 59 individuals with valid answers have been reached with the survey, to achieve a representative sample (Burt et al., 2009).

The target sample is the Baby Boomer generation (1946-1964) in the Netherlands. According to the WHO (2007), older individuals are recognized as 60 years and older, but most likely starting at 65 years, with differences between countries and their life expectancies. Roebuck (1979) specifies a minimum age as 60 as well with the explanation of pensions, which start in industrial countries from 60 on. In the Netherlands, the age to receive pension is 65 years, but to also capture the difference in retirement age, the ages of 56 to 74 (Baby Boomer generation (PW Research Center, 2019)) are considered for the sample.

The survey is a synthesis of open and closed questions and will provide the analysis with categorical and binary data, including 5-point Likert scale statements, and a commentary section (Appendix II). The aim, of especially the statements, is to gain insight into the perception of Baby Boomers regarding e-healthcare services and the e-prescription.

The data is analyzed through descriptive statistics with the main focus on the evaluation of the statements in the form of frequencies to identify patterns within those (Appendix I). Additionally, a keyword frequency diagram was added during the research process to code the commentary and identify repetition.

3.2 QUALITATIVE RESEARCH

The qualitative research is done through semi-structured interviews. This strategy is used to ensure enough similarity between the interviews for a comparison. In total 3 interviews were conducted in English to explore the individual perspective through the sub-question **“How well is the e-prescription accepted by Baby Boomers?”**. The interviewees were recruited through the surveys, in which respondents could leave their email addresses. The five people who included their email were contacted out of which three were willing to participate via a phone interview (see section 3.4 COVID-19 Impact for a detailed reflection).

The interviews started with an introduction about the research and information about confidentiality, which is discussed further in section 3.3 Ethics. Followed by that were introductory questions about the interviewee to establish a base on getting to know the individual questioned (Appendix III). After that, the questions were centered around the interviewee’s prescription and an explanation of their prescription process. Finally, the participant was free to mention any further thoughts on the topic that were not covered in the questions beforehand.

For the analysis of the interviews, a code tree with deductive and inductive coding was drawn up (Appendix IV). The majority of the codes are based on the published literature, which reflects on the e-prescription system and concepts of smart and age-friendly cities. Additional codes were added since the interviews provided new insights. Next to the code tree, a keyword frequency diagram was included. This diagram gives a broad overview of the most important aspects that were discussed during the interviews.

3.3 ETHICS

Since this thesis is written within the University of Groningen at the Faculty of Spatial Sciences, ethics and the Code of Conduct are important to consider while doing research (RUG, 2019). Only the researcher and the supervisor of the thesis will have access to the information gained from the survey and interviews.

For the interviews, the (1) informed consent of participation, (2) recording of interviews, (3) voluntary participation and withdrawal at any time, as well as (4) the exclusion of personal information of the interview that may identify the individual (unless this is stated otherwise by the interviewee) in this thesis will be handled accordingly. The consent questions will verbally inform about these four parts before the interview starts and additionally about the goals and purpose of this research. In order to refer to the interviews in the written text, personal information will be coded accordingly to assure anonymity (Clifford et al. 2016).

For the survey, the participants will also be informed with an introductory text about the: (1) consent of participation, (2) voluntary base of participation with the option to withdraw any time, as well as (3) exclusion of personal information of the participating individual and (4) usage of data for this thesis. By proceeding with the survey the participant agrees to these terms.

3.4 COVID-19 IMPACT

Due to COVID-19 measures that started to impact studying at the University of Groningen from March on, it has also impacted the research for this thesis. The data collection was restricted until the beginning of April and consequently, the recruitment of participants for the quantitative and qualitative research became difficult. Additionally, my departure from Groningen also impacted the data collection. This led to the decision to not only recruit Baby Boomers from the municipality of Groningen but from all over the Netherlands. Hence, recruiting participants was done online without the geographical restriction on Groningen. This decision is also supported by the argument that the e-prescription is a nation-wide system and not only implemented in Groningen.

The participants were therefore mainly recruited through convenience samples and the snowball effect over friends and friends' families. Furthermore, the survey was also distributed in the Facebook groups "Oproepjes voor Groningers" and "Expats in the Netherlands". With this method, 59 people have been reached.

As mentioned in section 3.2 Qualitative research, the recruitment for the interviews was based on participants for the survey. The interviews took place via phone calls, which ended up being difficult due to the language barrier between Dutch and English. In some cases, this has led to misunderstandings and difficulties which hindered extensive explanations without seeing facial expressions and gestures. Furthermore, it was also difficult to establish familiarity and trust over the phone.

Overall, it was possible to reach 59 participants for the survey and 3 interview participants. The interviews being conducted over the phone nevertheless caused difficulties and thus limited the depth of the information provided.

CHAPTER 4: RESULTS

4.1 QUANTITATIVE FINDINGS

The descriptive statistics concerning the survey (Appendix II) are based on 59 responses of which all respondents identify with the Baby Boomer generation (born between 1946-1964). Slightly more males participated (Table 1, Q1). Out of these 59 respondents, 93.2% make use of the Internet (Table 1, Q6) and 86.4% like that health services are also being digitalized (Figure 4, Q7).

Q1: Gender	Female					Male			
	49.2% (29)					50.8% (30)			
Q6: make use of the internet	Yes		Undecided			No			
	93.2% (55)		3.4% (2)			3.4% (2)			
Q4: Repeat medication	Yes					No			
	52.5% (31)					47.5% (28)			
Q4a&b: Pick-up frequency of repeat medication	Daily	Weekly	Every 2 weeks	Monthly	Every 2 months	Quarterly	Half-yearly	Irregular Intervals	
	0	1	1	9	2	14	1	3	
Q5: Use of e-prescription regularly	Yes					No			
	54.2% (32)					45.8% (27)			
Q13: see e-prescription that pharmacy	Strongly agree		Agree		Undecided		Disagree		Strongly disagree
	10.2% (6)		44.1% (26)		23.7% (14)		16.9% (10)		5.1% (3)
Q14: Data is stored safely	Strongly agree		Agree			Undecided		Disagree	
	11.9% (7)		59.3% (35)			13.6% (8)		15.2% (9)	

Table 1: Excerpt of answers from the survey of Question 1, Question 6, Question 4, Question 4a&b, Question 5, Question 13, and Question 14 (notes: Question is abbreviated with Q followed by the question number. The number in brackets indicates the frequency) (see Appendix II for the complete survey questions).

The e-prescription is regularly used by approximately half of the respondents (Table 1, Q5). The same counts for the number of respondents who get repeat medications in monthly and quarterly intervals (Table 1, Q4&b). Furthermore, the majority finds e-health services favorable (Q7) and understands the e-prescription (Q8). Contrarily, half of the respondents that strongly disagree with liking the e-health services (Q7), also do not understand the e-prescription (Figure 4, Q8). Overall 11.9% do not understand the e-prescription (Q8) and 15.3% are unsure about it, making it almost one third who are doubting their knowledge. One survey comment mentions that the e-prescription is difficult to understand and no change from a written prescription to the e-prescription is desired (Figure 6).

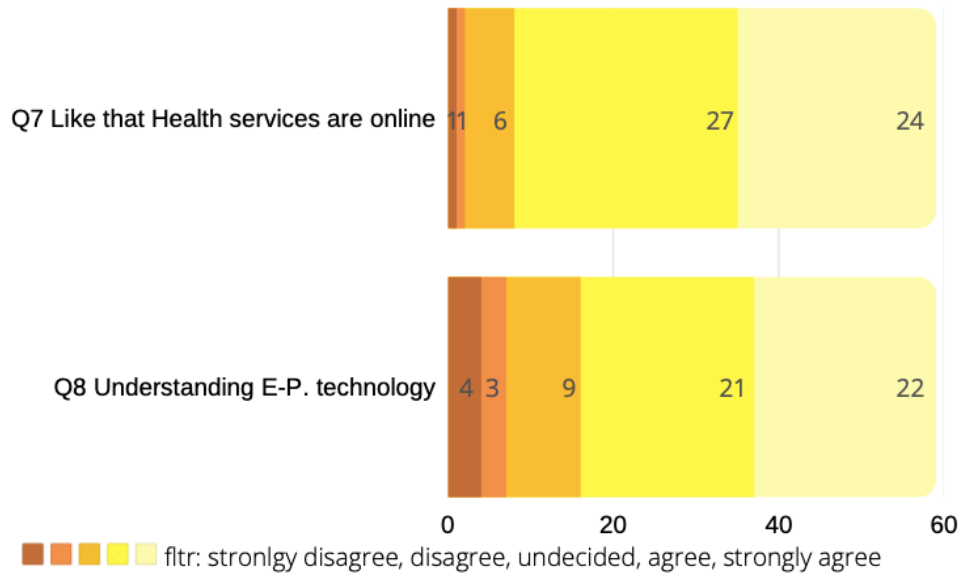


Figure 4: Answer frequencies Question 7 and Question 8, including the number of responses per answer choice.

The automatic transmission of e-prescriptions is seen positively, especially when considering the time-saving aspect. This automatic transmission implies a time-saving for 91.5% (54) of the respondents (Figure 5, Q9), which is also reflected in the commentary (Figure 6). Nevertheless, the majority prefers to see the e-prescription at the pharmacy (Table 1, Q13). Nine out of 59 respondents have experienced problems with the e-prescription before (Q16), with eight out of nine identifying the problem of receiving the wrong medication (Q17) (Figure 5). Further concerns about the e-prescriptions are expressed. Some comments mention the loss of control and precision over the prescribed medication. Also the concern for human error, because of previous medication mistakes is present. Furthermore, the loss of face-to-face contact with doctors and pharmacies is addressed (Figure 6).

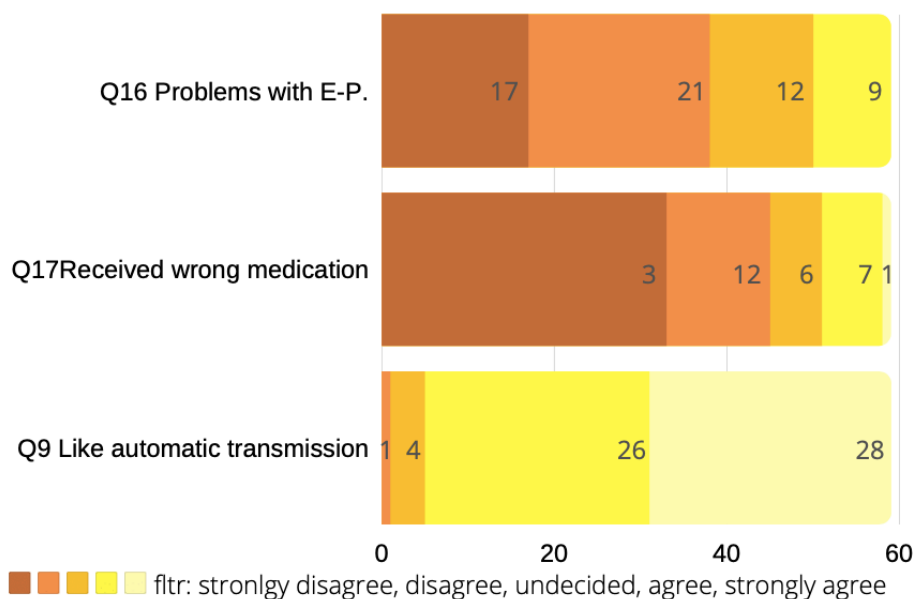


Figure 5: Answer frequencies Question 16, Question 17, and Question 9, including the number of responses per answer choice.

Another hesitation is in the data transmission and storage of personal information (Q14). 15.2% disagree and 13.6% are undecided on the safety of their data (Table 1, Q14). This concern is also mentioned in the commentary section of the survey (Figure 6).

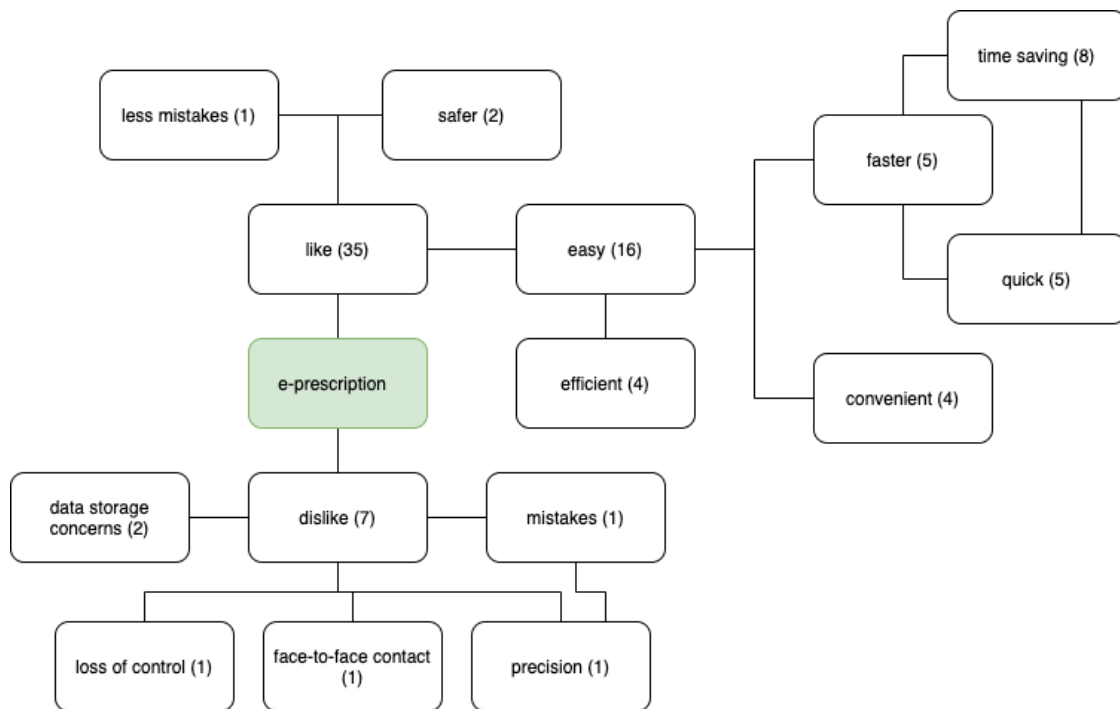


Figure 6: Network of keyword frequencies of the survey commentary (note: the number in brackets indicates the frequency).

4.2 QUALITATIVE FINDINGS

4.2.1 INTERVIEWEE CHARACTERISTICS

In total, three interviews were conducted via the phone with individuals of the Baby Boomer generation (Table 2). The Interviews include two males and one female participant. The participants' residences are the municipality of Haaksbergen, Groningen, and Lelystad. While Interviewee 1 and 3 are working, Interviewee 2 is already retired since 2016.

All interviewees describe their lifestyle as active and the bike as an important mode of transport for commuting. With the COVID-19 situation, Interviewee 3 describes his daily activity as mainly sitting on the kitchen table and a little less active. As for Interviewee 2, who is retired, daily activity still plays a role in terms of walking the dog and biking. Furthermore, all interviewees have a chronic illness and are dependent on at least one type of repeat medication that has to be picked up quarterly.

	Interviewee 1	Interviewee 2	Interviewee 3
Gender	Male	Female	Male
Age	62	62	64
Residence	Haaksbergen	Groningen	Lelystad
Work Status	Working	Retired	Working
Activity	Very active	Active	Active, but at the moment moderately active
Prescription	Quarterly prescription	Quarterly prescription	Quarterly prescription

Table 2: Interviewee characteristics.

4.2.2 INTERVIEWEES AND THEIR PERCEPTION ON THE E-PRESCRIPTION

Interviewee 1 and 3 both make use of the e-prescription and online services their doctor and pharmacy offer. For Interviewee 1, prescriptions are automatically transmitted in quarterly intervals. He receives an email when the medication is ready to be picked up. Interviewee 3 describes that he has to go to the website of the pharmacy to request new medication and can then pick it up the subsequent day.

“You sit on the sofa late at night and then you think: ‘oh the medicine is almost finished so let’s ask for it [the medicine] on the website’.” – Interviewee 3 about his experience of ordering a new prescription online.

Instead of going completely online, Interviewee 2 goes to the doctor and then to the pharmacy instead of making use of the automatic e-prescription transmission. This however does not imply that she does not use the other online services provided by her pharmacy. She receives a pick-up notification via SMS, as well as the medication instructions via email (Figure 7). She likes the precision of taking care of her prescription herself, because of the four medications she receives. With all her concerns, she nevertheless has not had a negative experience of receiving the wrong medication in the past.

“I have to be very attentive [...] I use medicine that is very complicated, so I have to be prepared for them making faults [...] also because it is about my health.” – Interviewee 2 on the concern about mistakes.

Interviewee 1 and 3 do not report any concern about mistakes. Interviewee 1 even explains that he has less experience with mistakes, because of the improved documentation online. The convenience for Interviewee 1 and 3 is the superior argument for the e-prescription. What is however mentioned by Interviewee 2 is, that the pharmacists are very slow at preparing and serving customers at the pharmacy (Figure 7). This is also described by Interviewee 3. According to him, it acts time-saving since he does not have to visit the doctor anymore to receive his prescription. Yet, he criticizes that long rows are not uncommon and consumer-oriented service is scarce at the pharmacy.

“If there are 10 people [waiting] and [...] three people working behind the scenes, they're not coming to the desk to help people, [they are] just doing what they are busy with. [...] It seems not very oriented to the consumer, so you would think that if they see a line, they are just going to open a new desk and they don't do that.” – Interviewee 3 describing his thoughts about the organization of the pharmacists’ way of working.

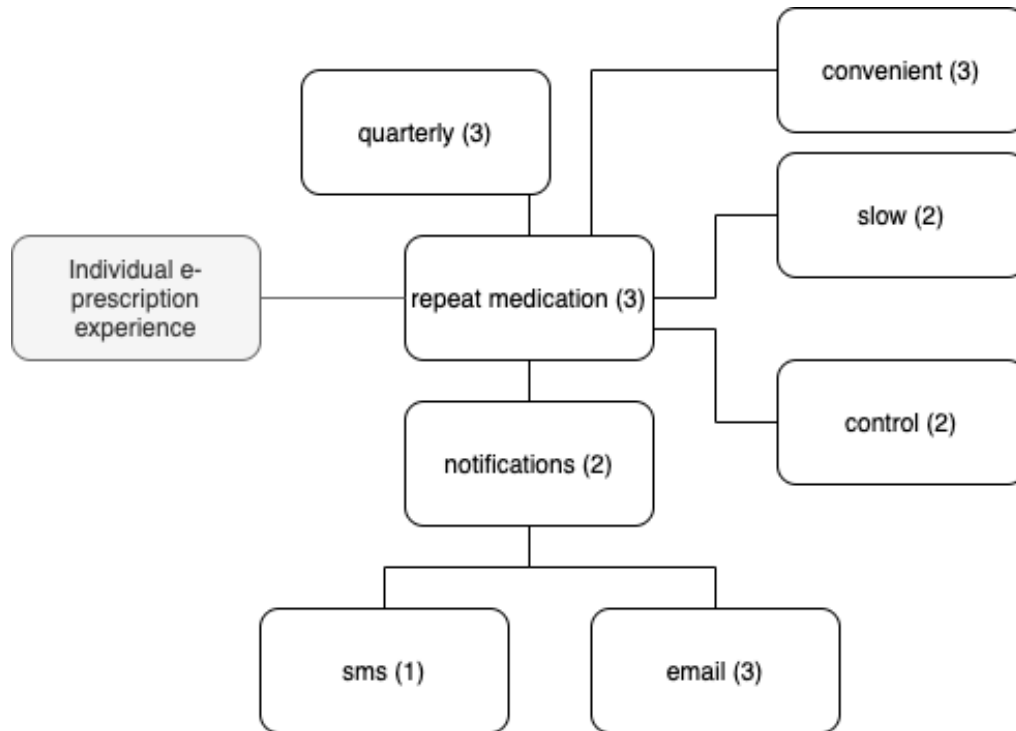


Figure 7: Network of keyword frequencies of the interviews (note: the number in brackets indicates the frequency).

All interviewees were happy with the way they receive their medication and enjoy the online services and the e-prescription to the extent they make use of it. No difficulties for themselves are described. The data security of e-healthcare services also does not impose a problem. However, one topic that came forward during the interviews was the low e-literacy of even older people. Interviewee 2 mentions that an older lady had difficulty understanding how she gets notified when her medicine is ready for pick up and how she receives her instruction leaflet without access to the internet.

“I have everything on my phone and digital, I like it, but for older people, it's not nice.” – Interviewee 2 expressing her thoughts on the digitalization for generations older than the Baby Boomers.

4.3 DISCUSSION

Smart cities were said to improve the QoL of inhabitants of a city, through adopting technology that can increase efficiency and effectiveness across age groups. Nevertheless, the age-friendly city framework by the WHO (2007) has left out largely the proper adoption of technology. Furthermore, the ability to use technology across Baby Boomers, who have not grown up with technology, has been left out in the smart city discussion. The following section links the findings to the hypotheses and existing literature.

4.3.1 AGE AND THE POSSIBLE DETACHMENT FROM THE E-PRESCRIPTION

The findings, particularly those from the survey, show that there is little difficulty concerning the degree of e-literacy among Baby Boomers, which came as an unexpected finding. Multiple scholars (Vancea & Solé-Casals, 2015; van Hoof et al., 2019) and the European Commission (n.d.) mention, that the technological development gap between young adults and older people is rather large. This gap is mainly because older individuals are increasingly reluctant to adopt technology, particularly because they have not grown up with it (Niehaves & Plattfaut, 2014). The first hypothesis *“Because of their age, Baby Boomers are less in touch with digital services, such as the e-prescription.”* can be rejected based on the quantitative and qualitative findings. The positive attitude that is identified towards the e-prescription in the research could be based on the early adoption of the e-healthcare services in the Netherlands. Many people have been using it for a long period. Though, the answers might also reflect a large familiarity with the online services and the e-prescription because of the way respondents were recruited, which has mainly been over social networking and social media. Consequently, many people who are already more familiar with digital services might have been reached, excluding the ones that are not (as) active in the digital world (e-world).

4.3.2 CONCERNS TOWARDS THE PRESCRIPTION AS AN E-SOLUTION

It is important to recognize that there are individuals who do not like the e-prescription or have difficulties understanding it, even though they are active on the Internet. The survey has shown that one third of the respondents have doubted their understanding of the e-prescription and nine respondents have encountered problems before. One interview even gave insight into not having experienced any problems but still fearing mistakes. Consequently, the e-prescription is not used because of fear and the preference for precision and control. Instead, the prescription is picked up at the doctor and brought to the pharmacy manually. Furthermore, one survey participant has raised his concern for data protection and feels insecure about his health information being stored online. Contradictory to that is that most survey and interview participants do not see it as a problem.

The hypothesis *“The increased technology sparks fear of mistakes in terms of receiving the wrong medication or lack of data security.”* can be partially accepted. The results are scattered and different for each individual. The medication mistakes seem more concerning

than the data security aspect. Data security has not been an issue for the interviewees. Only a few survey respondents see the data storage as not safe and are concerned about it.

Rocha et al. (2019) explained that technical solutions should respond to individual needs. Although the e-prescription supports the majority of individuals positively, it does not seem to fit all individuals' needs and expectations. For a few, it rather acts as an imposition instead of a solution for and with them.

4.3.3 THE CONVENIENCE FACTOR OF THE E-PRESCRIPTION

The e-prescription is mainly described as a convenient solution, which is highlighted by the majority positively. Convenience and time-savings are the most mentioned arguments in the survey and interviews for the preference of the e-prescription (Figure 6 & 7). Further description includes the eliminated commuting time to the doctor. Thus it saves the patient's and doctor's time, as it is also illustrated as a goal of the e-prescription in previous research (van Dijk et al., 2011; Kierkegaards, 2013). This is an argument that speaks for the e-prescription from the consumer's perspective. By combining these findings with acceptance and the PU, it shows that for the majority of the users the e-prescription system would positively enrich their life through a low mental effort. It could be described as low because the process of "prescription to pharmacy" is handled in the background and gives room to pick up the medicine whenever it is suitable. However, this convenience of having it handled in the background can be contrasted to the claim made by the WHO (2007). Age-friendly cities should facilitate active ageing and increase social interactions with growing age, by moving around frequently and having social opportunities. Through the e-prescription's technical and automated solutions both WHO goals are overlooked. This is described by van Hoof et al. (2019) as a non-enabling technology. Non-enabling technology, therefore, hinders the goal of the age-friendly city for residents to actively grow older by taking away movement and socializing opportunities, which is what the e-prescription does to a small extent.

Nevertheless, the convenience and efficiency factor appears to be valued higher by the users than the missing physical and social interactions. In contrast to the majority, two interviewees introduce the slow process of handing out the medication at the pharmacy, resulting in long waiting times because of the poor organization behind the pharmacy counter. This shows that the e-prescription performs very system centered and consumer-unfriendly creating a two-folded issue.

The hypothesis *"The e-prescription is a widely accepted smart measure and acts in a convenient and time-saving way for its users."* can be mainly confirmed when looking at the comments and reflections survey respondents and interview participants gave. Regardless, it is important to reflect the system rationally by describing it as fragmented in light of the e-world and the physical world because of its two-fold.

4.3.4 INTEGRATION OF BABY BOOMERS IN SMART AGE-FRIENDLY CITIES

Returning to the quantitative research question: **“To what extent is the e-prescription accessible and used by Baby Boomers?”** the findings show that Baby Boomers make use of the e-prescription system and that it is the preferred method among the 59 participants. Even though the handling, issuing, and ordering of the e-prescription are mainly online, this only poses little problems. Only a few exceptions have been found, which is mainly because of the fear of mistakes and the lack of knowledge about how the e-prescription works. The most mentioned argument has been the convenience and the time-saving aspect, which overweighs the concerns of data storage and the fear of mistakes for the majority.

For a deeper understanding, three participants of the survey have been interviewed with the leading question: **“How well is the e-prescription accepted by Baby Boomers?”**. The interviews have manifested the quantitative findings through the statements of easy usage and further insight into the time-saving aspect. The e-prescription system appears to be a two-folded issue, in which it acts efficiently at renewing the prescription online and inefficiently at pick-up in the pharmacy.

With the previous presentation and interpretation of the results and sub-research questions, the main research question of: **“How well is the Baby Boomer generation integrated into smart age-friendly cities in light of acceptance and usage of the e-prescription in the Netherlands?”** can be answered. The overall integration of Baby Boomers into smart age-friendly cities in light of the e-prescription shows that the degree of e-literacy in the sample is high. The sample of Baby Boomers appears to be e-literate. The e-prescription is a smart measure of the themes “smart living” and “smart mobility” and “community support and health services” and acts as a convenient improvement in the life of the Baby Boomer generation through efficiency and effectiveness.

While the integration of Baby Boomers into smart technologies does not appear to be the problem, the fragmentation of the e-prescription is. On one hand, it acts as a convenient measure for users. On the other hand, this convenience turns inefficient when switching from the e-world into the physical world. This is not only reflected in the system of the e-prescription but also in the decreased physical and social engagement which should be facilitated in age-friendly cities (WHO, 2007; van Hoof, 2018; van Hoof, 2019; Marsten & van Hoof, 2019). The technology through smart measures is used as a convenience, which translates unsuccessfully into the physical world.

CHAPTER 5: CONCLUSION

Increasing technology is oftentimes described as too difficult to understand by older individuals, making them more hesitant to adopt these. Nonetheless, the technology also contributes to the efficiency and convenience in life but also reduces social interactions and the movement to and around places. This research has studied the Baby Boomers using the e-prescription and the implication the e-prescription has in so-called smart age-friendly cities and shows the following results:

The majority of the Baby Boomers see clear advantages to the e-prescription since it eases the prescription processes through time savings and an easy online system. But it has also shown a fragmentation at the translation from e-world into the physical world in terms of the handling of e-prescriptions at pharmacies. This fragmentation also translates into the spatial and social environment of smart and age-friendly cities, making the e-prescription a non-enabling technology to a small extent. In the broader context, it is important to view smart solutions in cities as an aid and not as a replacement of actions. While technology can ease the life of some individuals, technology might take away physical activity and social interactions of others. This increasingly depends on the individuals' circumstances. When thinking of technology as an aid, all age groups and various views on the topic should be considered. Technological solutions also show, that it can fragment the way of working, which is visible at the final step of the e-prescription: the pharmacy. Thus, the importance of a consumer-oriented approach in smart measures should not be disregarded.

Inevitably, the implementation of a smart measure in the Netherlands should not only be evaluated on the aspects that concern the measure directly but should also be evaluated on all aspects of smart cities. Meanwhile, it is also important to include the age-friendly city framework, since it is an active strategy of Dutch cities. Therefore, an overarching smart age-friendly city framework that considers both concepts needs to be developed.

Since these results are drawn upon the investigation of one smart measure of smart and age-friendly cities, it implies that similar research needs to be carried out on various other smart measures. The sample that has been worked with is relatively small and the interview age distribution is not diversified. The resources available for the Bachelor Project are restricted and the current COVID-19 situation that has brought the recruitment of participants to its limits might accounts for that (for a detailed statement see section 3.4 COVID-19 Impacts). Consequently, larger studies on different smart measures need to be carried out to establish a repertoire of findings to develop viable strategies for the smart age-friendly city improvement.

REFERENCES

- Age-friendly Europe (n.d.). The Covenant on Demographic Change. Retrieved from <https://www.agefriendlyeurope.org/about/objectives> on June 9th, 2020.
- Age-friendly Nederland. (n.d.) Age-friendly Nederland. Retrieved from <http://agefriendlynederland.nl> on June 9th, 2020.
- Annear, M., Keeling, S., Wilkinson, T., Crushman, G., Gildow, B., Hopkins, H. (2014). Environmental influences on healthy and active ageing: a systematic review. *Ageing & Society*, 34, 590-622.
- Burt, J.E., Barber, G.M., Rigby, D.L. (2009). *Elementary Statistics for Geographers*. Third Edition. Guilford Press: New York, NY, USA.
- Clifford, N., Cope, M., Gillespie, T., French, S. (2016). *Key Methods in Geography. Third edition. London: Sage*.
- D’Auria, A., Treguna, M., Vellejo-Martos, M.C. (2018). Modern Conceptions of Cities as Smart and Sustainable and Their Commonalities. *Sustainability*, 10, 1-18.
- Davis, F.D. (1991). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *Int. J. Man –Machine Studies*, 38, 475-487.
- Dijk, L.V. van, Vries, de, H., Bell, D.S. (2011). Electronic Prescribing in the United Kingdom and in the Netherlands. *AHRQ*.
- European Commission. (n.d.) Action Group B3: Replicating and tutoring integrated care for chronic diseases. Retrieved from https://ec.europa.eu/eip/ageing/actiongroup/index/b3_en on June 6th, 2020.
- Giffinger, R., Fertner, C., Kramar, H., Kalasek, R.; Pichler-Milanović, N.; Meijers, E. (2007). *Smart Cities: Ranking of European Medium-Sized Cities*; Centre of Regional Science (SRF), Vienna: Vienna University of Technology.
- Hoof, J. van, Beneken, D.M., de Vlugt, E., de Vries, S.I.(2019). Quality of Life: The Interplay between Human Behaviour, Technology and the Environment. *Environmental Research and Public Health*, 16.
- Hoof, J. van, Kazak, J.K., Perek-Bialas, J.M., Peek, S.T.M. (2018) The Challenges of Urban Ageing: Making cities age-friendly in Europe. . *International Journal of Environmental Research and Public Health*, 15, 5106.
- Iamexpat. (2012). Dutch population ageing rapidly. Retrieved from <https://www.iamexpat.nl/expat-info/dutch-expat-news/dutch-population-aging-rapidly> on March 5th, 2020.
- Interreg Europe. (n.d.). Europe Enabling Smart Healthy age-friendly environments. Retrieved from <https://www.interregeurope.eu/eushafe/> on June 7th, 2020.
- Kierkegaard P. (2013). E-prescription across Europe. *Health Technology*, 3, 205-2019.
- Klimczuk, A., Tomczyk, L. (2016). Smart, Age-friendly Cities and Communities: the Emergence of Socio-technological Solutions in the Central and Eastern Europe. *Active and Assisted Living: Technologies and Applications*, pp. 335-359, London: The Institution of Engineering and Technology.
- Marston, R. H. & Hoof, J. van (2019). “Who Doesn’t Think about Technology When Designing Urban Environments for Older People?” A Case Study Approach to a Proposed Extension of the WHO’s Age-Friendly Cities Model. *International Journal of Environmental Research and Public Health*, 16, 3525.
- Mannheim, I., Schwartz, E., Xi, W., Buttigieg, S.C., McDonnell-Naughton, M., Wouters, E.J.M., van Zaalén, Y. (2019). Inclusion of older adults in research and design of digital technology. . *International Journal of Environmental Research and Public Health*, 16, 3718.
- Mitzner, T.L., Boron, J.B., Fausset, C.B., Adams, A.E., Charness, N., Czaja, S.J., Dijkstra, K., Fisk, A.D., Rogers, W.A., Sharit, J. (2010). Older adults talk technology: Technology usage and attitudes. *Computers in Human Behavior*, 26, 1710-1721.

- Neves, B.B., Amaro, F., Fonseca, J.R.S. (2013). Coming of (Old) Age in the Digital Age: ICT Usage and Non-Usage among Older Adults. *Sociological Research Online*, 18 (2).
- Neves, B.B., Franz, R.L., Munteanu, C., Baecker, R. (2017). Adoption and feasibility of a communication app to enhance social connectedness amongst frail institutionalized oldest old: an embedded case study. *Information, Communication & Society*.
- Niehaves, B. & Plattfaut, R. (2014). Internet adoption by the elderly: employing technology acceptance theories for understanding the age-related digital divide. *European Journal of Information Systems*, 23, 708-726.
- OECD. (2015). Ageing in cities. Retrieved from <https://www.oecd.org/regional/ageing-in-cities-9789264231160-en.htm> on May 30th, 2020.
- PEW Research Center. (2019). Defining generations: Where Millennials end and Generation Z begins. Retrieved from <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/> on July 2nd, 2020.
- Phillips, J.E., Skinner, M.W., Andrews, G.J., Cutchin, M.P. (2018). Planning and design of ageing communities (pp. 68–79). *Geographical Gerontology. Perspectives, Concepts, Approaches*. London, UK: Routledge.
- Rocha, N.P., Dias, A.; Santinha, G., Rodrigues, M.; Queirós, A., Rodrigues, C. (2019). Smart Cities and Healthcare: A Systematic Review. *Technologies*, 7, 1-16.
- Roebock, J. (1979). When does „Old age begin?“. The evolution of the English definition. *Journal of Social History*, 416-428.
- RUG, (2019). *Onderzoeksethiek*. Retrieved from <https://www.rug.nl/about-us/where-do-we-stand/quality-works/research-ethics/> on February 22nd, 2020.
- Silva, B.N., Khan, M., Han, K. (2018). Towards sustainable cities: A review of trends, architectures, components, and open challenges. *Sustainable cities and Society*, 38, 697-713.
- Statistics Netherlands. (2014) *Half of Dutch adults will be over 50 in 2019*. Retrieved from <https://www.cbs.nl/en-gb/news/2014/38/half-of-dutch-adults-will-be-over-50-in-2019> on February 27th, 2020.
- Vancea, M. & Solé-Casals, J. (2016). Population Ageing in the European Information Societies: Towards a Comprehensive Research Agenda in eHealth Innovations for Elderly. *Aging and Disease*, 7(4), 526-539.
- WHO. (2007). Global Age-friendly cities: A guide. *WHO Library Cataloguing-in-Publication Data*. Geneva, Switzerland: World Health Organization. Retrieved from [https://www.who.int/ageing/publications/Global age friendly cities Guide English.pdf](https://www.who.int/ageing/publications/Global%20age%20friendly%20cities%20Guide%20English.pdf) on June 29th, 2020.
- WHO. (2018). The Global network for age-friendly cities and communities: looking back over the last decade, looking forward to the next. Geneva, Switzerland: World Health Organization. Retrieved from <https://apps.who.int/iris/bitstream/handle/10665/278979/WHO-FWC-ALC-18.4-eng.pdf?sequence=1> on June 10th, 2020.
- Wilson, P.M., Kataria, N., McNeilly, E. (2013). Patient and career experience of obtaining regular prescribed medication for chronic diseases in the English National Health Service: a qualitative study. *BMC Health Serv Res*, 13.

ACKNOWLEDGMENTS

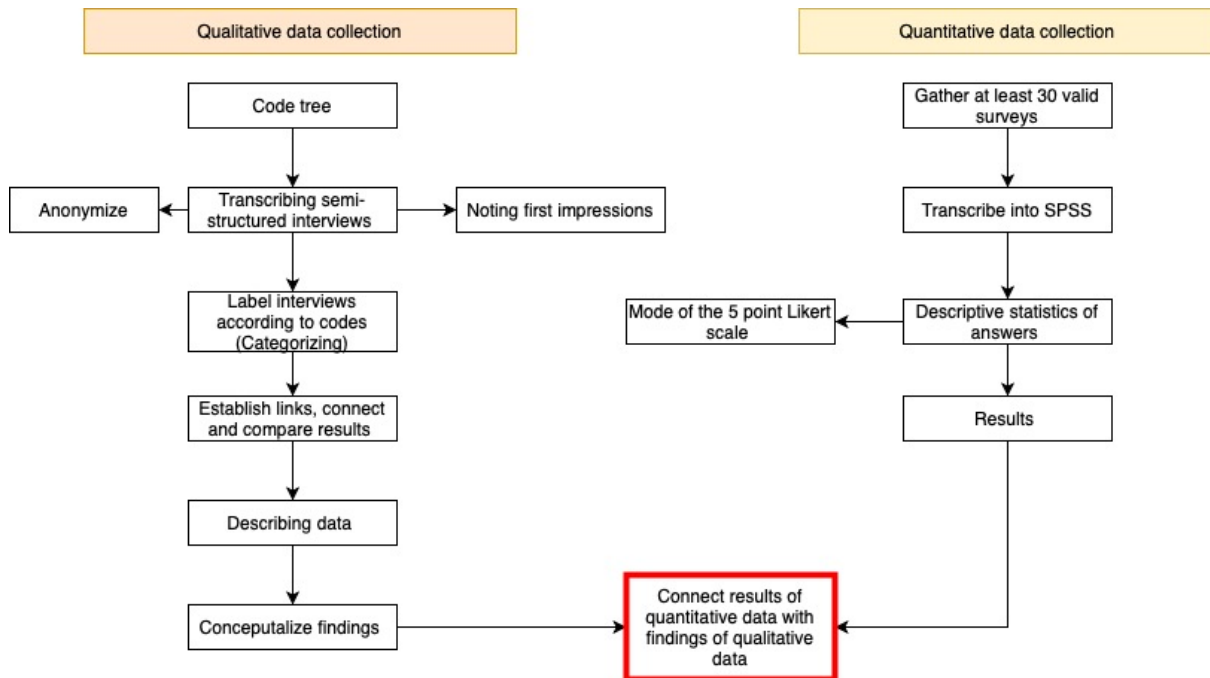
Firstly, I would like to thank my supervisor prof. dr. C. Yamu for overseeing my Bachelor Project. I have learned a lot with the help of her guidance throughout the, somewhat, different research process. The few in person and most online supervision moments as well as the feedback I have received are highly appreciated.

In the time of COVID-19, it has become increasingly difficult to find participants. Therefore, my sincere thanks also go to all survey and interview participants. Additionally, I would also like to thank my friends, who have helped me to recruit participants, through their families and friends.

Lastly, a thank you to my family and all my friends who were willing to proofread my thesis and who have supported me throughout this process.

APPENDIX

APPENDIX I: DATA ANALYSIS SCHEME



APPENDIX II: SURVEY QUESTIONS

GENERAL QUESTIONS

Q1 What is your gender? (categorical)	Male	Female	Other
Q2 Which generation do you identify with? (categorical)	Silent Generation (1928 to 1945)	Baby Boomer (1946 to 1964)	Generation X (1965 to 1980) After 1980
Q4 Do you receive repeat medication? (binary)	Yes	No	
Q4a If yes: How often do you have to pick up your new prescription? (categorical)	Daily	Weekly	Bi-weekly Monthly
Q4b Other than listed above. (nominal, but changed into categorial value)			
Q5 Do you use the electronic transfer of prescriptions regularly? (E-prescription) (binary)	Yes	No	

STATEMENTS (Likert scale)

Usage of Technology

Q6 I make use of the Internet and its services. (For example: E-mail, Google search, Whatsapp, Facebook,...).

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q7 I like that health services are being digitalized.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q8 I understand the e-prescription technology.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

E-prescription**Q9 I think it is convenient that the prescription gets sent directly to my pharmacy of choice.**

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q10 It saves me time to have my prescription sent to my pharmacy of choice.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q11 I prefer e-prescription over a paper prescription.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q12 If you have changed pharmacies before: The change of pharmacies was easy and did not cause any problems. (examples: prescription got sent to the wrong pharmacy/ No prescription was received by the new pharmacy/...)

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Possible Issue with E-prescriptions**Q13 I would like to see the e-prescription before the pharmacist hands out my medication.**

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q14 I think that the transmission of e-prescriptions is safe and my data is being handled with care.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q15 I would rather like to pick up my own prescription and bring it to the pharmacy.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q16 I have experienced problems before with the e-prescription.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Q17 I have received wrong medication before with the e-prescription.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
-------------------	----------	-----------	-------	----------------

Open Question

If you overall like the e-prescription, why?

If you overall dislike the e-prescription, why?

APPENDIX III: INTERVIEW GUIDE

Intro	First, I would like to thank you for taking part in my research and this interview.
Introduce myself & Topic	I am a third year Spatial and Design student at the RUG. I am currently writing my bachelor thesis about smart age-friendly cities.
The goal of the research	For understanding the acceptance, usage and inclusion of elderly of the e-prescription system in the Netherlands I am surveying and interviewing elderly to get (in-depth) information about their perspective on the topic.

Anonymity	I would like to emphasize that this information will stay anonymous, and not your personal data will be used so that this information is not traceable back. Names and other personal data will be anonymized and blacked out. This collected data (like the transcript) will also only be used for this research project and not be made available to other people. It might be that I need to share specific issues with my supervisor, which you will be informed about if that will be the case.
Stopping + not answering	This interview is voluntary. If you wish to stop you during the interview you can inform me about that. In case you want to not answer a question, the question can be skipped. Furthermore you can withdraw your choice in participation also after the interview and your data will be removed. Also you take your time when answering.
Length of the interview	The interview is intended to stay short. So I would like to account 25min of your time, unless you wish to stop earlier.
Recording	The interview will be recorded as this gives me the chance to listen to you answers afterwards and concentrate during the interview on my questions and possible follow up questions. For this I will also take notes during the interview. The law requires me to ask your permission of being recorded. I will turn on the recorder and will ask if you grant me permission to record our conversation. PUT ON RECORDER Do you give me the permission to record this conversation?
Introducing questions	
1	What is your name and birthdate? In which city do you live? Do you work or are you retired?
	How would you describe your daily activity level? (In a way of daily activity such as walking or cycling or sportive activity) (moderate, intense) Do you think your town/city is accessible for all age groups? (bus service, bike lanes, sidewalks which are lowered)
2	Do you have a history of choric illnesses? Do they involve the prescription of repeat medication? How often do you have to pick it up from the pharmacy?
In-depth questions	
3	Do you use the e-prescription or a written prescription? <ul style="list-style-type: none"> • Why do you choose to use one or the other? • What are the advantages you think your preferred way of prescriptions has? • What is important to you when picking up the e-prescription or written prescription?
4	Have you ever had problems with the type of prescription you use? <ul style="list-style-type: none"> • If yes, which problem(s) did you have?
5	How do you think about data storage and protection concerning the e-prescription?
Closing questions	
	Are there any other remarks you have about the topic of e-prescriptions? What did you think about the interview?

	TURN RECORDER OFF
End remarks	
What happens next?	This interview will be typed out to compare responses of interviewees to each other and to my survey that you have also filled out. This will be incorporated into my bachelor thesis to draw conclusions based on the information from the interviews.
Thanking	I would like to thank you for your time and participation in the interview. I hope you felt comfortable answering these questions.
Contact Information	
If you would like to contact me later I can give out my email to you in case of any further questions. If you are interested in the final version of my bachelor thesis, then you can leave me your email and I can forward it to you once the thesis is finished.	

APPENDIX IV: CODE TREE

Note: The code tree has been adopted during the research process. The blue codes have been added after the interviews were transcribed. The grey codes were not used in the coding process.

