A ten-year development of accessibility in the outdoor environment

Municipal challenges and older people's perception

Hallgrimsdottir, Berglind

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LUNDS UNIVERSITET

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The overall aim of this thesis is to explore how the societal challenge of removing environmental barriers in the outdoor environment has been met in Sweden and how removing environmental barriers can affect the user perception of the outdoor environment. The thesis comprises two studies, the Municipality Study and the User Study. The Municipality Study explores implementation of accessibility policy in municipal transport planning. The implementation process is explored through the eyes of municipal transport planners, with a mixed-method approach. The process of implementation of accessibility policy is explored in a longitudinal perspective. The user perception of the outdoor environment, the User Study, is explored through the eyes of older people. The study is based on a previously executed study, where an intervention was carried out in one neighbourhood in a middle-sized town in Sweden. The User Study explores impact of an intervention on older people perception of the outdoor environment in a cross-sectional and longitudinal perspective. Results indicate that interventions in the outdoor environment facilitate walking for older people, even as they age. However, results also indicate that some municipalities are not working as actively as they should towards accessible outdoor environment. Some municipalities reduce their efforts as they perceive they have met the requirements of accessibility policy. Municipalities have reduced cooperation with interest organisations, which can only be considered as a regression in implementation of accessibility policy. This especially applies in light of results from the User Study. The user involvement in the User Study resulted in improved perception of the outdoor environment, even in a longitudinal perspective. Therefore, municipalities should cooperate with interest organisation in order to implement successful accessibility measures. Furthermore, municipal employees and politicians should understand that accessible outdoor environment will not be achieved with selective measures. Accessibility measures have to have good maintenance and be evaluated on regular basis. In conclusion, an environment designed to facilitate walking for people who are fragile, is an environment that is accessible for all. A person carrying luggage, a person with a pram, a person who is temporarily experiencing disability, but more importantly people who are experiencing long-term disability and limitations, all benefit from an accessible outdoor environment.

Key words: Accessibility, intervention, environmental barriers, implementation, ageing, planners view

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List of terminology

Accessibility:	An objective concept relating to norms and legislation , it describes the relationship between the person's functional capacity and the demands from the environment (Iwarsson and Ståhl 2003).
Accessibility advisor:	An expert in accessibility issues and needs of people with different requirements regarding accessibility.
Activity:	Execution of a task or action performed by a person (World Health Organization 2001).
Age and Ageing:	Age is usually defined as the number of years from one's birth. Ageing, however, is the gradual physical and cognitive changes that occur in a person's bodily functions. People can age differently, and therefore ageing does not depend on age (Baltes and Smith 2003).
Disability:	Result of an interaction of a person's impairments or functional limitations and the environment that hinders them from performing activities and participating in society (World Health Organization 2015).
Environment:	The condition of what surrounds a person. Environment can have different meanings, depending on the context. In this thesis, however, the focus is on outdoor environment or the physical outdoor environment, which denotes the natural and built environments (Lawton 1980).
Environmental barrier:	A perceived or actual physical object in the outdoor environment that prevents movement or makes movement from one place to another difficult.
Fear of falling:	Reoccurring concerns of falling that may lead to people avoiding activities they might otherwise be able to perform (Tinetti and Powell 1993).

Fourth age:	Can be defined as population and person-based. The population based definition refers to the fourth age as the age when 50 % of one's birth cohort no longer is alive. The person-based definition would be the age when a person starts to experience more functional and cognitive limitations (Baltes and Smith 2003).
Frequency of walking:	How often a person goes out and walks whether walking is for transport or other activities (see also *walking*).
Functional limitation:	Restrictions that a person experiences in performing physical and cognitive actions, used in daily life by one's gender and age group (Verbrugge and Jette 1994).
Impairment:	Abnormalities in bodily functions or structure (Jette 2006, ICF 2001).
Mobility:	In this thesis, mobility refers both to movement from one place to another to gain access to places and people, and to a person's potentials of movement from one place to another, whether the movement will be made or not (Metz 2000).
Mobility device:	An assistive device used to facilitate mobility, such as rollator, cane, wheelchair etc. (see also *rollator*)
Older people:	In this thesis, older people are considered to be people who have reached the age of 65 (see also *age and ageing*).
Pedestrian:	A person who uses walking as a mode of transport whether the person uses mobility devices or not (see also *walking* and *mobility device*).
Physical activity:	Physical activity refers to an activity involving movement of the body, produced by skeletal muscles, and which results in energy expenditure (Shephard and Balady 1999); in this thesis physical activity refers to walking (see also *activity*).
Rollator:	A wheeled walker (see also *mobility device*)
Social exclusion:	In this thesis, social exclusion refers only to the social dimension of exclusion, which includes person's potentials

of access to public goods and services, labour market and social participation (Bhalla and Lapeyre 1997).

Usability: This is subjective in nature and refers to the relationship between a person's functional capacity and the demands from the environment while performing an activity (Iwarsson and Ståhl 2003). In this thesis, the activity factor is walking (see also *accessibility*).

Walking: A mode of transport, a social activity and a physical activity. In this thesis, this applies to a person that goes by foot or mobility device, from one location to another, using a pavement (see also *mobility device*).

List of papers

Paper 1

Hallgrimsdottir, B., Wennberg, H., Svensson, H., Ståhl, A. (2015). Implementation of accessibility policy in municipal transport planning – progression and regression in Sweden between 2004–2014. (Under second revision)

Paper 2

Hallgrimsdottir, B., Wennberg, H., Svensson, H., Ståhl, A. (2015). Towards an accessible outdoor environment - development and implemented accessibility policy from the perspective of transport planners in some Swedish municipalities (Submitted)

Paper 3

Hallgrimsdottir, B., Svensson, H., Ståhl, A. (2014) Long-term effects of an intervention in the outdoor environment—a comparison of older people's perception in two residential areas, in one of which accessibility improvements were introduced. Journal of Transport Geography, 42.pp.90-97. DOI: 10.1016/j.jtrangeo.2014.11.006

Paper 4

Hallgrimsdottir, B., Ståhl, A. (2015) A longitudinal study of an intervention in the outdoor environment on an ageing population. (Under second revision)

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Sammanfattning på svenska

Denna avhandling undersöker utvecklingen av en tio års engagemang av tillgänglighet i utemiljön. Denna undersöks från två perspektiv; samhällets utmaning och användarens uppfattning.

Äldre personer och personer med funktionshinder ska ha lika möjligheter att använda transportsystemet som andra människor. Deras tillgång till transportsystemet är dock ofta begränsad på grund av fysiska hinder i utemiljön. Hindarna begränsar personer med funktionshinder möjligheter att vistas ute och att gå. Detta kan påverka deras möjligheter att använda transportmedel som kollektivtrafik och att gå.

Äldre personer är en grupp som går ganska mycket. Det gör de för att uppehålla en aktiv livsstil och därmed minska möjligheterna av att utveckla funktionella och kognitiva begränsningar. Funktionella och kognitiva begränsningar är något som alla kommer att känna av när de åldras. De medför att personer har svårare med att utföra vissa aktiviteter som andra tar för givet; som att ta på sig kläder, gå i trappor och gå till fots längre sträckor. Människor kan födas med begränsningar och andra kan uppleva tillfälliga begränsningar (såsom brutet ben). I viss mån kan de känna att det inte påverkar deras möjligheter att vistas ute och gå, men för vissa kan en komplex miljö kännas oöverstiglig. När en person med begränsningar känner att utformningen av deras miljö gör det svårt för dem att utföra aktiviteter (som att gå) då börjar man diskutera disabilitet. Däremot kan disabilitet undvikas genom att utforma miljön på ett sätt som stödjer alla, oavsett deras funktionella kapacitet.

Människor med disabilitet och äldre människor ofta upplever svårigheter med att köra bil och har därför inte lika stor möjligheten att ta sig med bil till fysiska och sociala aktiviteter, affären, arbetet eller söka vård. Därför är vissa äldre och andra funktionshindrade ganska beroende av att gå för att kunna delta i samhället och fortsätta vara självständiga. Därmed är det viktigt att utemiljön är utformad så att den tar hänsyn till deras behov och deras möjligheter till ett självständigt och aktivt liv vidhålls.

År 1999 förklarade Svenska regeringen med sin proposition 1999/2000:79 ”Från patient till medborgare” att all hinder för funktionshindrade rätt till att delta i samhället skulle undanröjas. Detta ansvar skulle ligga hos kommunerna i Sverige. I samband med

det publicerade Boverket föreskrifter om hur alla enkelt avhjälpta hinder i utemiljön skulle undanröjas i befintlig allmän utemiljö och avhjälpas vid nybyggnad av allmän utemiljö. I Sverige har ansvaret för att röja undan alla hinder i utemiljön legat hos kommunerna. Kommunerna har gjort vissa framsteg, men på senare tid finns det lite kunskap om utvecklingen av implementering av tillgänglighetspolicy bland kommunerna. En kunskap av den sorten skulle ge kommunerna en inblick i vilka faktorer har bidragit till framgångsrik implementering och var det saknas stöd.

Första steget i implementering av en tillgänglighets policy borde vara att samla ihop information om brukarna (i detta fall människor med funktionella begränsningar) och vilka hinder de upplever i utemiljön. Kunskap av den sorten skulle användas för att utveckla direktiv om vilka hinder i utemiljön skall undanröjas. Direktiven borde introduceras för planerare som sedan skulle använda dem för att röja undan hindren. En utvärdering av åtgärderna skulle sedan ge kunskap om hur det gynnar brukarna som i sin tur skulle användas för att uppdatera direktiven. Därför är det viktigt att utvärdera hur undanröjandet av hinder i utemiljön påverkar och hjälper brukarna. Kunskap av den sorten är dock liten.

Denna avhandling bygger på två studier; Kommun Studien och Brukar Studien. Studierna undersöker hur progressen varit kring implementering av tillgänglighetspolicy och om undanröjandet av enkelt avhjälpta hinder kan hjälpa äldre människor att vistas i utemiljön som fotgängare.

Kommun studien undersökte hur implementeringen av tillgänglighets policy har utvecklats inom Sveriges kommuner. Studien bygger på en enkät undersökning som gjordes år 2004 och undersökte implementering av tillgänglighetspolicy. År 2014 skickades samma enkät till alla 290 kommuner i Sverige där man tillfrågades bland annat om vilka strategiska bestämmelser gjorts i kommunen för att implementera tillgänglighetspolicy. Av de 290 kommuner som fick enkäten var det 118 som svarade både år 2004 (T1) och 2014 (T2). Utifrån vissa frågor i enkäten, bildades indikatorer för att kunna ge implementeringen av tillgänglighetspolicy ett värde. Kommunerna dividerades i två grupper; de som hade ökat respektive minskat sitt tillgänglighetsvärde från T1 till T2. För att förstå de resultat som studien visade gjordes intervjuer i 7 kommuner, där fyra hade minskat sin tillgänglighets värde och tre som hade ökat sitt värde. Totalt intervjuades 10 personer. Brukar studien undersökte hur äldre människor upplever sin utemiljö och hur/om deras aktivitetsgrad som fotgängare ändras när man gör tillgänglighets inventeringar i utemiljön. Studien började år 2002 när alla människor 65 år och äldre i ett område i Kristianstad i Sverige fick en enkät där man bland annat frågade hur ofta man går ute och vilka hinder de upplever i utemiljön när de går. Utifrån resultaten och genom hjälp av äldre bosatta i området bestämde kommunen vilka hinder som skulle röjas undan. Över en fyra års period sänkte man

kantstenar, satte in bänkar, separerade fotgängare och cyklister, fixade till ojämna trottoarer, gjorde vissa gator till enkelriktade och drog hastigheten ner till 30km/h i vissa gator. Efter att implementeringen var genomförd (år 2006) skickades samma enkät ut till alla 65 år och äldre i området igen. Enkäten inkluderade även några frågor som rörde själva implementeringen och hur nöjda invånarna var. År 2011 skickades samma enkät som 2002 och 2006 till alla invånare 65 år och äldre till samma område (Studie Området (SO)) men även till ett annat område Referens Område (RO). RO valdes utifrån de kriterier att det var ganska nära SO, hade liknande proportion av äldre invånare och där hade inga/små ändringar gjorts i utemiljön. Två delstudier genomfördes; tvärsnittsstudie och longitudinell studie. I tvärsnittsstudien jämfördes upplevelse och aktivitetsgrad (som fotgängare men även i aktiviteter utanför hemmet) mellan invånarna i SO och RO. I longitudinella studien ingick alla äldre invånare i SO som svarade studien år 2002, 2006 och 2011; 113 individer. I studien kontrollerades hur äldre upplever sin utemiljö över tio års perspektiv och om ändringar i utemiljön kan ha positiva effekter på deras upplevelse och aktivitetsgrad när de går från att vara relativt friska människor till att vara mer skörda.

Resultat från kommunstudien visade att det fanns en ganska stor skillnad mellan kommunerna i hur långt de har kommit med implementering av tillgänglighets policy. Den visade även att en stor del av de kommuner som hade börjat ganska kraftigt redan år 2004 med implementering av tillgänglighets policy hade minskat sina insatser. Däremot, kommuner som inte hade börjat med att implementera tillgänglighetspolicy år 2004 hade ökat sin insats till stor del år 2014. Intervjuerna gav intrycket att i vissa kommuner tror man att utemiljön är tillgänglig, så fort alla krav som ställs på kommunerna är uppfyllda. Intervjuerna också visade att även om tillgänglighet har blivit mer accepterad som trafik fråga bland transportplanerare som arbetar i kommuner, verkar det som att tillgänglighet är beroende av att det finns eldsjälar som arbetar i kommunerna och som ser till att tillgänglighet inte glöms bort. Resultat från brukar studien visade att när tillgänglighet inte glöms bort, kan det till en viss del ha positiv påverkan på äldres uppfattning av utemiljön. Jämförelsen mellan SO och RO visade att äldre invånarna i SO, där tillgänglighets inventering gjorts, gick mer och deltog i fler aktiviteter. Det var även så att äldre invånare i SO som upplevde sin hälsa som dålig deltog oftare i aktiviteter än invånare i RO som även upplevde sin hälsa som dålig. Däremot upplevde invånarna i SO fler hinder än invånarna i RO. Resultat från longitudinella studien visade dock att äldre invånare som varit bosatta i SO sedan 2002 upplevde färre hinder i sin utemiljö efter interventionen (år 2006). Några år senare, år 2011, upplevde de fler hinder än vad de gjorde år 2006, dock färre än vad de hade upplevt år 2002. Resultaten tyder på att interventionen inte haft tillräckligt bra underhåll sedan den blev implementerad. Åldrandet har också haft en viss inverkan på

dem, eftersom de går och deltar i aktiviteter mer sällan år 2011 än vad de gjorde år 2006 och 2002. Resultaten pekar på att kommuner arbetar till viss del med att göra utemiljön tillgänglig men att de verkar göra det för att uppfylla de krav som ställs på dem, och inte med brukarna i åtanke. Syftet med tillgänglighetspolicy är att inkludera alla människor i samhället och därför bör det inte behandlas som ett tekniskt problem som måste lösas. Tillgänglighetsåtgärder bör inriktas på användarnas behov, såsom där de har tillgång till hälso- och sjukvård, livsmedel och aktiviteter. Tillgänglighets åtgärder bör vidtas med hänsyn till geografisk tillgänglighet också, eftersom om avståndet till de livsmedel eller aktiviteter är för lång, kommer äldre och personer med funktionshinder inte kunna gå till sin destination. Äldre vill gå och de kan gå om deras område är utformad så att det tar hänsyn till deras behov. Ännu viktigare, är att inse att de som inte har tillgång till en bil, eller socialt kontaktnätverk som hjälper dem att hålla sig oberoende, kan ställas inför minskad delaktighet i samhället och aktiviteter. Därför måste kommunerna inse att deras utmaning handlar om att implementera tillgänglighetsåtgärder inte bara om att uppfylla krav på tillgänglighet politik, utan för att öka människors chanser på ett självständigt liv och öka deras livskvalitet. Resultaten antyder att för att se till att tillgänglighet inte glöms bort i kommunal planering så måste det ställas krav på att det behandlas mer systematiskt så att det inte glöms bort. Ett mer systematiskt sätt att hantera tillgänglighet skulle se till att tillgänglighetsåtgärder skulle underhållas och utvärderas regelbundet, och att tillgängligheten blir mer integrerat i det dagliga transportarbetet.

Samhällen måste vara utrustade för att kunna hantera den växande äldre befolkning som måste förlita sig på att gå för att kunna delta i aktiviteter och ha tillgång till nödvändiga tjänster. Resultaten i denna avhandling visar att, i ett längre perspektiv, ökade interventionen inte gång frekvensen hos äldre invånarna. Men deras uppfattning av utemiljön var mer positiv efter interventionen. Det är dock möjligt att frekvensen av promenader skulle ha minskat ännu mer om ingen intervention skulle ha genomförts. Därför är det svårt att säga att insatsen inte påverkade gångfrekvensen, även om interventionen inte öka den. När det gäller tillgänglighet har det skett en positiv förändring i person miljö relation; de svarande rapporterade färre miljöhinder vid andra uppföljningen än vid baslinjen. Men på grund av andra faktorer, dålig hälsa, ökad funktionella begränsningar etc. har äldre minskat sin gång frekvens. Således bör interventioner i utemiljön inte genomföras med det enda syftet att öka äldres gångfrekvens. Det är inte den faktiska gångfrekvensen som räknas. Det viktiga är att äldre vet att de har möjlighet att gå ut på en promenad vara självständiga och socialt aktiva. En miljö som underlättar för dem som är mest sårbara, är en miljö som är tillgänglig för alla. En person som bagage, en person med en barnvagn, en person som tillfälligt upplever funktionshinder, men ännu viktigare människor som upplever

långsiktiga funktionshinder och begränsningar, alla dra nytta av en tillgänglig utemiljö. Men även om tillgänglighetsfrågorna har blivit mer erkänd, finns det fortfarande ett behov av att höja medvetenheten bland transportplanerare och bland alla aktörer som är involverade i tillgänglighetsarbetet. Det är viktigt att alla aktörer är medvetna om varför tillgänglighetsåtgärder genomförs och hur de ska utföras, för att säkerställa att den slutgiltiga åtgärden ger bästa resultatet.

Summary in English

In an inaccessible outdoor environment, older people and people with disabilities can experience environmental barriers. The environmental barriers can restrict them and their abilities to walk. Environmental barriers can be avoided by designing the outdoor environment to meet the needs of older people and people with disabilities. This thesis focuses on accessibility in Sweden from two perspectives; societal challenges and user perception. It explores how the societal challenge of removing environmental barriers has been met and how removing environmental barriers can affect user perception of the outdoor environment.

In Sweden, accessibility has been subjected to laws and regulations since the late fifties. In 1999 accessibility issues received increased attention through an action plan for disability policy. The implementation process has been somewhat monitored, showing that there are considerable differences in level of implemented accessibility policy in the municipalities.

Studies exploring the impact of intervention in the outdoor environment are scarce. Such studies have, in most cases, focused on older people and the impact of interventions on their perception of the outdoor environment and frequency of walking. However, it is difficult to establish causal links in intervention studies with older people. During the implementation phase and until the after-study, older people age and ageing can have considerable impact on their perception of the environment. It is difficult to know whether changes in perception can be attributed to ageing or changes in the outdoor environment. Therefore, we need of studies that explore intervention studies over a long period.

In this thesis, the societal challenge of removing environmental barriers (the Municipality Study), explores implementation of accessibility policy in municipal transport planning. The implementation process is explored through the eyes of municipal transport planners, with a mixed-method approach. The Municipality Study is based on a previously executed study. Therefore, the process of implementation of accessibility policy was explored in a longitudinal perspective. The level of implemented accessibility policy was quantified with indices. Then, municipalities were split into two groups, those that have increased their level of implemented accessibility policy ("I-

TOT") and those that have increased their level of implemented accessibility policy ("D-TOT").

The user perception of the outdoor environment (the User Study), was explored through the eyes of older people, using a questionnaire. The User Study is based on a previously executed study, where an intervention was carried out in one neighbourhood (Study Area (SA)) in a middle-sized town in Sweden. The User Study explores the impact of an intervention by comparing perception of the outdoor environment with another area, reference area (RA) where no accessibility measures had been introduced. Furthermore, the User Study explores the impact of an intervention on older people's perceptions of the outdoor environment in a longitudinal perspective. That is, while controlling for ageing.

Results from the Municipality Study showed that there are considerable differences between municipalities regarding the implementation process of accessibility policy. "D-TOT" started early on implementing accessibility policy, only to reduce the efforts. "I-TOT" municipalities seem to have had later implementation starts. More municipalities have established accessibility plans and more have hired accessibility advisors. On the other hand, fewer municipalities cooperate with interest organisations, have a program for handicap polices and have implemented measures. The interviews indicated that reduced budget and staff time were among the factors restricting implementation of accessibility policy. On the other hand, employee enthusiasm for and interest in accessibility issues are among the main reasons that some municipalities progress and others regress in the implementation process. Interviews indicate that representatives from interest organisations are too focused on their own restrictions and do not represent the whole group's perspective. This may be a reason why some municipalities have reduced cooperation with interest organisations. The interviews also indicated that some municipalities do not "suit actions to words". That is, they establish accessibility plans and hire accessibility advisors, but do not utilise them. Some accessibility advisors are placed in the building department and do not have any influence in the transport department.

Results from the User Study showed that interventions in the outdoor environment could have positive effects on older people's perception. Respondents living in SA were more active in terms of frequency of participating in activities outside the home and frequency of walking. Furthermore, compared to respondents in RA, respondents in SA with poor perception of health were more likely to participate in activities than did their counterparts in RA. Respondents in SA and RA evaluated their outdoor environments in a similar manner. Still, the results also showed that respondents in SA reported more environmental barriers than did respondents in RA. Controlling for ageing, the results showed that intervention in the outdoor environment does not

increase frequency of walking. However, intervention in the outdoor environment seems to have positive effects on older people's perceptions of the outdoor environment. The respondents reported fewer environmental barriers in the outdoor environment nine years after an intervention in the outdoor environment than they did before the intervention. Furthermore, older people using mobility devices were more likely to be frequent walkers after the intervention.

A more systematic approach is needed to fully implement accessibility in transport planning. Accessibility should not have to depend on the single employee who is enthusiastic and interested in accessibility. Accessibility should not be sensitive to employee turnover. Furthermore, results from the User Study showed that user perception of the outdoor environment could improve when barriers are removed. Therefore, municipalities should be implementing measures to improve accessibility. However, such measures should not be implemented simply to fulfil requirements of accessibility policy. Implementing measures in the outdoor environment should focus on the users and their needs. Municipalities should be cooperating with interest organisations. Meanwhile, representatives from the interest organisations should become more professional and represent the needs of all people with disabilities and not just their own needs. On the societal level, the results from this thesis give an indication that accessibility measures benefit people who are in need of further support from the environment. An environment designed to facilitate walking for people who are fragile is an environment that is accessible to all. A person carrying luggage, a person with a pram, a person who is temporarily experiencing disability, but more importantly people who are experiencing long-term disability and limitations, all benefit from an accessible outdoor environment. Even though accessibility issues are increasingly acknowledged in transport planning, there is still a need to raise awareness among transport planners and all actors involved in the accessibility work. It is important that all actors are aware of why accessibility measures are executed and how they should be executed, to ensure that the finalised measure gives the best result.

Introduction

Older people and people with disabilities should have the same opportunities as other people to access the transport system. However, their access is often restricted by barriers in the outdoor environment. The outdoor environment, or pedestrian environment, serves as the primary link in the transport system, because all trips start and end with walking. An outdoor environment designed to take the needs of older peoples and people with disabilities into account, is an environment that may facilitate walking for all people. This thesis focuses on the societal challenge of removing environmental barriers and impact of removing environmental barriers on older people's perception of the environment and frequency of walking.

All modes of transport and all user groups should be equally emphasised in transport planning. Until recent decades, the focus of transport planning revolved to a large extent around facilitating motorised transport. As a result, shops and other services moved further away from the consumers making it more difficult to reach services without a car. Consequently, social exclusion of people, who have neither the means nor the ability to drive a car, increased (Lucas 2004). For some, not owning a car is a choice, a way of living, but not to all. Some people do not have access to a car nor have a driver's license, simply because they are not able to drive or do not have the economic resources to own a car. In particular, people with physical and cognitive disabilities and older people often lack access to a car and do not hold a driver's licence (Casas 2007; Hjorthol et al. 2010; Hjorthol 2012; Taylor and Józefowicz 2012). Consequently, people with disabilities and older people have to rely more heavily on walking and public transport to stay socially active and independent. Whatever the preferred mode of transport, all trips start and end with walking. Good walking infrastructure is therefore essential for older people and people with disabilities to be able to access service and participate in social life and other activities that have close links with independent living (Schwanen et al. 2012) and quality of life (Metz 2000). Until recent decades, emphasis on good walking infrastructure was scarce in transport planning. However, due to developments regarding environmental issues arising from cars, emphasis in transport planning has been changing and efforts have been taken to increase frequency of walking, cycling and public transport (see for example Sustainable cities 2014; CIVITAS 2014). Nevertheless, the walking infrastructure is often designed

by taking the needs of the majority into account. Hence, people with disabilities and older people may experience difficulties accessing the transport system, which may lead to physical exclusion from the transport system (Church et al. 2000) and decreased opportunities for independent living .

It is important to bear in mind that disability is not a personal characteristic. A person only has a disability when the environment (physical, attitudinal, etc.) hinders them from executing an activity (such as walking) or restricts their participation in society (Verbrugge and Jette 1994; World Health Organization 2001). Therefore, disability is avoidable, because by reducing the demands of the environment, it can be meliorated (Verbrugge and Jette, 1994). People may have limitations, diseases or certain health problems that might make it difficult to perform an activity (such as walking). However, an environment designed to consider people with limitations, is an environment that facilitates activities. Consequently, designing an environment that facilitates walking for all people is a societal issue, which should be addressed as such. Therefore, societies should take actions to eliminate barriers to the transport environment. Elimination of environmental barriers should be addressed collectively and be subjected to appropriate policies and plans.

International and national accessibility policies

International policies

A transport system accessible to all is an important part in equalisation of people with disabilities and has been the concern in a number of treaties and policy documents. In 1982, the United Nations (UN) formulated their World Program of Action Concerning Disabled Persons (United Nations 1982). Equalisation of people with disabilities in social participation is emphasised in that programme. From that point forward there has been steady progress in the work of equalisation for people with disabilities from the UN, the World Health Organization (WHO) and the European Commission/Union (EC, EU), amongst other (United Nations 1993, 2006; World Health Organization 2001, 2014; European Commission 2010; European Union 2000, 2012). In 2006, the UN adopted a human rights treaty, "Convention on the Rights of Persons with Disabilities", which became open for signatures in 2007 and was ratified in 2008. The treaty has the highest number of signatures on opening day (United Nations 2006) and it was the first human rights treaty to be ratified by the EU as a whole (European Commission 2011). As a result, a number of countries have issued

plans to meet the requirements of the UN Convention on the Rights of Persons with Disabilities (Minister for Disability Issues 2001; European Commission 2010; United States Department of Justice 2010; Council of Australian Governments 2011; Irish National Disability Strategy Implementation Group 2013). In these treaties, it is emphasised that it is a societal responsibility to provide people with equal opportunities to access the transport system.

From a societal perspective, some might suggest that there are few people with disabilities and, therefore there is no need for accessibility actions. However, according to The World Health Organisation (WHO) (2011) the proportion of people with disabilities in our societies is approximately 15%. According to the UN, the proportion of older people[1] is increasing and is expected to reach 21% of the world's population in 2050. Furthermore, the oldest old are the most rapidly growing group, expected to reach 19% of the older people population in 2050. In Europe alone, the proportion of older people is expected to increase to 28% of the population in 2060, whereof people older than 80 years are expected to reach 12% of the European population (European Commission 2015). As the world's population grows older, the number of people with disabilities increase (United Nations 2013). This is true because as people age, they start to experience more difficulties performing activities such as walking, bathing, dressing etc., which can result in disability (Verbrugge and Jette 1994). Even so, older people do not all have disabilities, because disability only arises when environmental or personal factors restrict a person from participating in society or performing activities. In an accessible environment, the prevalence of disability should not rise (Schneidert et al. 2003). If living in a supportive environment, some older people have the ability to live an independent, healthy and socially active life. That is why the WHO, the UN and the EU have all stressed the need for societies to take actions to ensure participation of older people in society through better health, well-being, and supportive environments (World Health Organization 2002; United Nations 2008; European Union 2012b).

The identified trend in population ageing has been a concern for some time. In 1999, The European Commission identified number of challenges that Europe will face as the population ages. Their policy conclusion was for member states to take actions to ensure, amongst other things, healthy and active ageing so that people will be able to live independently as long as they wish (European Commission 1999). The UN has also taken actions to ensure active ageing and in 2002, they held the second Assembly on Ageing. The meeting resulted in the UN issuing the "Madrid International Plan of Action on Ageing" and the WHO to issue "Active Ageing: A policy framework"

[1] In that report the UN considers older people to be those 60 years and older

(United Nations 2002, WHO 2002). The main objective in both of these plans was to enable governmental and non-governmental organisations to ensure health, well-being and supportive environments for older people (United Nations 2002; World Health Organization 2002). Later, the WHO issued a guide aimed at encouraging cities to take actions to ensure supportive environments for older people, where transport was one of the main topics (Kalache and Plouffe 2007; World Health Organization 2007). Similarly, the UN issued a guiding framework to support countries to take actions to create policies and programmes for active ageing (United Nations 2008). As a result, a number of cities and communities have taken actions to ensure age-friendly cities (Buffel et al. 2014; Fitzgerald and Caro 2014; Glicksman et al. 2014; Lehning 2014; Menec et al. 2014).

National policies

Accessibility has been included in transport policies in Sweden since 1988 (Prop. 2008/09:93). The transport policy proposition of 2009 concluded that accessibility should be emphasised. Therefore, one of the objectives of Swedish transport policy is to provide a transport system accessible to and usable by all and with equal opportunities to use different modes of transport (Prop. 2008/09:93 2009). Accessibility has also been included in building regulations and laws in Sweden since 1959 (SFS 1959:612). In 1999, accessibility issues received the worthy attention with the adoption of an action plan in Sweden, which aimed at ensuring equal participation in society for all people, of all ages and with all kinds of disabilities (Prop. 1999/2000:79). The aim of the action plan was to remove barriers to participation in society before the year 2010, assigning much of the responsibility to the municipalities. Before the year 2010, barriers in the outdoor environment that restrict people from entering and using public buildings and spaces were to be eliminated. For that reason, requirements were linked to the Planning and Building Act and regulations and guidelines on how to eliminate easily removable barriers in existing public buildings and places were issued in 2003 (BFS 2003:19 HIN1). Guidelines on how to ensure accessibility in new public buildings and places followed in 2004 (BFS 2004: 15 ALM1). HIN and ALM state that to ensure an accessible outdoor environment, barriers such as uneven pavements, high curbs, and lack of balance support should be removed. Municipalities were obligated to establish accessibility plans, including objectives and measures to achieve accessible transport system. Municipalities were to seek the advised of and cooperate with interest organisations, to ensure that they were focusing on right issues to achieve their aims (Prop. 1999/2000:79). To ensure best use of resources, municipalities were obligated to coordinate the accessibility work. Accordingly, some

of the municipalities hired people specialised in the issue, or accessibility advisors, to coordinate the accessibility work.

The National Action Plan for Disability (Prop. 1999/2000:79) has been closely monitored and in the last follow up, the Swedish Government made it clear that it's focus and objectives should remain intact (Skr. 2009/10:166). They concluded that there has been positive progress within accessibility work in Sweden, but some work remains and the accessibility work has to become more effective. In relation to that, the Swedish Government set out a strategy for further implementation of disability policy between 2011 and 2016 (Ministry of Social Affairs 2011). Furthermore, a Planning and Building Act (PBL) issued in May 2011 (SFS 2010:900) included improved terms and conditions for how accessibility issues should be handled and how the municipalities should monitor their accessibility work (Ministry of Social Affairs 2011). An appointed committee was to ensure that municipalities, regions and other governmental agencies would implement the legislation (The State's Public Inquiries 2011). Between 2011 and 2012, the committee organized and held seminars for municipalities, regions and administrators, introducing the most important changes to the new PBL. In relation to the new PBL guidelines for accessibility in all new and existing public spaces have been updated (BFS 2011:5 ALM2; BFS 2011:13 HIN2; BFS 2013:9 HIN3).

Nevertheless, implementation of policies and plans is not an easy task, as there are many actors involved in the process from political decisions to execution of measures. Therefore, monitoring progress and examining to what extent it is employed is important. Implementation of accessibility policy in Sweden is widespread and efforts made to monitor and push the work even further have been successful to some extent. Nevertheless, it is important to continually follow the progress and ensure that the issue does not lose its momentum. It is also important to guarantee successful implementation of accessibility in the daily transport planning, considering elimination of environmental barriers in all projects. On the other hand, the user's needs and well-being should always remain in focus in every project, because there is no guarantee that eliminating environmental barriers in order to fulfil requirements results in people actually experiencing that their situation has improved (Curl et al. 2011).

Hence, it is important to explore and evaluate implementation of accessibility in transport planning from different perspectives; societal challenges and user perception. From the perspective of societal challenges, it is imperative to explore how society has been adjusting the environment to the needs of people with disabilities by exploring implementation of accessibility policy on macro level, or national level. From the user perspective, it is essential to know what impact implementation of accessibility policy in municipal transport planning can have on the user perceptions of the environment.

Therefore, in this thesis the focus lies on exploring one user group, older people, and their activity as pedestrians.

Theoretical framework

Older people and people with disabilities

Verbrugge and Jette (1994) explained the path from diagnosis of disease/injure to disability. At the stage of pathology, diagnosis of a disease or injury happens. The disease or injury can be permanent/long term, such as Alzheimer's disease, or short term such as a broken leg. An impairment is a manifestation of the pathology (World Health Organization 2001) and refers to a problem in the bodily functions (such as muscle function) or body structure (leg) (Verbrugge and Jette 1994). Impairments are not static in the body or its functions. For example, a broken foot can result in decreased muscle function in the leg. Impairment may be mild, not causing difficulties for the person in executing activities, such as walking. Functional limitations, on the other hand, refer to the person. Functional limitations describe whether impairment leads to people experiencing difficulties executing any physical or mental activity used in daily life by one's age- and gender (Verbrugge and Jette 1994). However, diagnosis of a disease or injury does not have to be present in order to cause functional limitations. Disability only arises when the environment hinders people with functional limitation from performing activities or participating in society (World Health Organization 2001). Thus, people with different functional limitations have different needs (Jette 2006).

People can be born with impairment, and impairments can occur due to an accident or due to poor lifestyle (such as diabetes type II). As people grow older they start to experience a gradual loss of functions, which can lead to functional limitations. Therefore, older people represent a quite large group of people with functional limitations and disabilities. In this thesis, implementation of accessibility policy is explored from the broader perspective of people with disabilities, while the impact of interventions in the outdoor environment is explored through the perspective of older people and older people as they age.

Older people and ageing

In this thesis, older people are referred to as people who have reached the age of 65 years and older, as that is the common retirement age in Sweden. Ageing, on the other

hand, refers to the gradual physical and cognitive changes that occur in a person's bodily functions. Ageing is therefore not dependent on age because people can age differently (Baltes and Smith 2003).

With higher age, health declines. Frailty, which is the age-related decline of the body (Clegg et al. 2013), has been shown to increase from 6.5 % at the age of 65 to 65 % in those aged 90 or older (Gale et al. 2014b). Consequently, it is common that as people get older they start to experience more diseases and loss of physical and cognitive abilities. As an example, people start to experience loss of hearing, sight, poorer balance, decreased muscle mass, decreased muscle strength, decreased grip strength, loss of stamina, and poorer cognitive functions (Hughes et al. 2001; Iwarsson 2005; Parker et al. 2005; Schrack et al. 2010; Cooper et al. 2011). As a result they often experience a decline in their abilities such as rising from chairs, walking fast (Cooper et al. 2011), walking long distances, climbing stairs (Gill et al. 2006), bending and kneeling (Iwarsson 2005). Dizziness, (Dehlin and Rundgren 2007), depression (Stålbrand et al. 2007) and pain also become more common with higher age, which in return effects older people's life satisfaction (Enkvist et al. 2012; Gibson and Lussier 2012). In due course, the combination of functional and cognitive limitations and their consequences decreases people's chances of performing daily activities, such as shopping, bathing, dressing and using transport (Iwarsson 2005). Studies have shown that cohorts of older people today are in better health than did previous cohorts (Parker et al. 2008). Unfortunately, other studies have shown that the period of living with diseases or functional/cognitive limitations is expending over a longer period (Smith 2001; Chatterji et al. 2014). This is a troubling development, as an increasing population of older people with numerous diseases and disabilities entails serious consequences for welfare systems (Hansson 2010).

On the more positive note, older people can postpone or decrease prevalence of functional and cognitive limitations by engaging in physical and social activities such as walking (DiPietro 2001; Spirduso and Cronin 2001; Bukov et al. 2002; Weuve et al. 2004; Simonsick et al. 2005; Lampinen et al. 2006; Levasseur et al. 2008; Takata et al. 2010; Erickson et al. 2011; Wåhlin-Larsson et al. 2014). Some of the benefits of engaging in physical activity are improved memory, reduced risk of depression, increased quality of life and increased chances of independent living (Strawbridge et al. 2002, Acree et al. 2006, Lexell et al. 2010, Erickson 2011). This also applies in the case of older people, who can experience the same health benefits as people in other age groups by engaging in physical activity (Lexell et al. 2010, Hamer et al. 2014). That is why older people are encouraged to walk (Katz 2000). They are also encouraged to walk because it can increase their well-being and chances of independent living (Acree et al. 2006; Lampinen et al. 2006; Tollen et al. 2008; Ekstrom et al. 2008, Nordbakke

2013, Stjernborg et al. 2014). Older people engage frequently in walking, especially after retirement, when they have more time to walk (Berg 2016). However, as Berg (2016) concluded, the car is still their most frequently used mode of transport. The use of a car as a transport mode has been increasing among older people for the last several decades probably due to the fact that, an increased proportion of older people have driver's license and have access to a car than previous cohorts (Hjorthol et al. 2010). Even so, some older people do not afford to have a car while living on a limited income, i.e. pension (Scharf et al. 2001), while others have to give up driving due to health problems (Hjorthol 2012). Thus, older people are more reliant on other means of transport to stay socially active (Casas 2007; Taylor and Józefowicz 2012). Regardless of which of these modes of transport they chose to use, their trip will always start and end with walking.

When walking in an outdoor environment, not designed to meet cognitive and functional decline of older people, they experience both accessibility and safety problems that can have serious consequences. To be more specific, walking is a task that requires both physical and cognitive effort and some studies show that as cognitive functioning declines, walking speed declines as well (Killane et al. 2013). Some have suggested that as people experience further cognitive limitation, the body shifts "energy" from the physical functions to compensate for decline in the cognitive function (Schrack et al. 2010). As a consequence of functional decline and decreased walking speed, older people increase their exposure on the road and, therefore increase their risk of being involved in an accident with a motorised vehicle (Oxley et al. 2005; Lobjois and Cavallo 2009; Gale et al. 2014a). If involved in an accident with a motorised vehicle, older people are in more danger than other age groups of sustaining serious injuries (Rolison et al. 2012; Kroyer 2015).

Still, the most common traffic accidents among older people are falls, where environmental barriers play a great role (Ståhl and Berntman 2007; Berntman 2015; Gyllencreutz et al. 2015). One possible explanation to this is that the environmental barriers force older people to carry out a cognitively challenging task of avoiding barriers while carrying out a physical task of walking (Mirelman et al. 2012). Consequently, some older people develop a fear of falling (Filiatrault et al. 2009) and avoid walking outdoors (Rantakokko et al. 2009; Delbaere et al. 2004). Those who stop walking, experience further functional decline (Delbaere et al. 2004), which, leads to more falls (Delbaere et al. 2010). To compensate for their functional decline and difficulties in performing activities of daily living, a common solution is to start to use mobility devices (Brandt et al. 2003, Samuelsson and Wressle 2008, Gale et al. 2014b). However, some older people find it difficult to acknowledge their need of mobility devices, as it is a constant reminder of their limitations (Hedberg-Kristensson et al.

2007; Lofqvist et al. 2009). Nevertheless, those who take action and start to use mobility devices, experience increased security, increased chances for outdoor activity and increased independence (Hedberg-Kristensson et al. 2007). Still, environmental barriers, such as high curbs or uneven pavements, can make it difficult for people with mobility devices to walk outdoors (Brandt et al. 2003).

Mobility devices do not always reduce the fear or anxiety that older people experience while walking, because fear of falling (or fear of crime or accidents) while walking outdoors does not necessarily involve the actual threat of falling, crime or accidents. Fear is a subjective evaluation of one's possibilities of being involved in such situations (Beaulieu et al. 2007) and when people are free from worries or fears they experience safety and security, whether the cause is actual or perceived (Zedner 2003). Therefore, fear is not always rational, which entails that safety and security is composed of emotional, cognitive and behavioural dimensions (Beaulieu et al. 2007). The emotional dimension concerns fear and anxiety of potentially being in a dangerous situation, the cognitive dimension concerns the perceived probability of being in a dangerous situation while the behavioural dimension includes behaviour of avoidance and protection. Thus, whether an older person is afraid of falling or afraid of being a victim of a crime, Beaulieu's behaviour of avoidance suggests that if older people do not feel safe and secure, they are more likely to stop walking outdoors.

Feeling safe and secure is one of a human's five basic needs (Maslow 1970) and the feeling of being safe or secure often decreases with higher age (Mollenkopf et al. 2004). Older people tend to become more afraid of crimes while walking outside because they feel they are not able to defend themselves to the same extent as when they were younger (Greve 1998). They also become more afraid of falling because falls can have serious consequences for a more fragile body (Gyllencreutz 2015). Research suggests that environmental and personal factors are equally to blame for fear of falling (Filiatrault et al. 2009). That is why older people stress the need of a safe and secure local environment (Amann et al. 2006). This is especially important for older people for whom the local environment and the home become more important as they age. Knowing where things are, knowing the neighbours and the values in the local environment creates a sense of security and safety, of being at home, for older people (Wiles et al. 2012). Therefore, older people wish to age in a place they are familiar with and live there as long as they can (Peace et al. 2011, Wiles et al. 2012). This stresses the need for local authorities to ensure a barrier free local environment for older people.

Older people in Sweden

In Sweden, older people[2] constitute 20 % of the population (SCB 2016). Additionally, the proportion of very old people is expected to rise in Sweden (Bengtsson 2010). The increased number of very old people may have some considerable economic consequences. An increased number of people with diseases and disabilities might lead to a challenging burden for the health care system (Lindgren and Lyttens 2010). This especially applies to the very old people (80+), who account for over 70% of home help service and 80% of special housing provided in Sweden (Edelbak, 2010). According to Edelbak (2010), municipalities have been responsible for home care of older people since 1999. Therefore as the Swedish population ages, municipalities may be facing a rise in the number of older people in need of home-care or nursing. Bearing in mind that older people wish to stay independent and age in place, moving into a nursing home is not a fascinating option. However, living in an accessible outdoor environment, older people may be able to increase the time they live independent. Ignoring all other factors, municipalities should recognize the financial benefits of accessible outdoor environment.

People with disabilities

According to WHO (2011), people with disabilities represent approximately 15% of the world's population (people aged 18 years and older). As previously mentioned, disability is not a personal characteristic. People with disabilities can be of all ages, they can have different disabilities and people with the same functional limitations can have different experiences of disability. Therefore, people with different disabilities have different needs regarding the outdoor environment. Some impairments or functional limitations do not have direct implications for people to use the outdoor environment. Therefore, in this thesis the focus lies on representing people with limitations or disabilities that can restrict them from walking. The Housing Enabler instrument (Iwarsson and Slaugh 2010), which is used to assess and analyse accessibility problems in housing was used to determine the number which disabilities and limitations should be included. Accordingly, the disabilities addressed in this thesis are (Iwarsson and Slaugh 2010): people with difficulties interpreting information, people with total loss of sight or other sight deprivation, people with hearing deprivation or total loss of hearing, people with reduced movement in neck, arm, leg, back, people with difficulties handling/fingering and people that use mobility devices.

In most cases, in order to access education, employment, health care etc. people have to use some form of transport (Lucas 2004). However, people with disabilities often

[2] In Swedish perspective, older people are those who are 65 years or older

lack access to private transport, as they are less likely to have a driver's license and have access to a car (Casas 2007; Taylor and Józefowicz 2012). As a matter of fact, people with disabilities travel much less and have to rely more on taxi and STS than their peers do (Trafikanalys 2015). One reason for why they do not use public transportation to more extent than they do can be that the diverse difficulties they experience when using public transport (Rosenkvist et al. 2009; Nordbakke 2011). Consequently, some people with disabilities experience decreased opportunities of staying mobile and active in society (Rosenkvist et al. 2010).

Lawton's Ecological Model of Ageing

In 1968, Lawton and Simon explained with their Environmental Docility Hypothesis, that people with lower competence receive greater pressure from the environment (Lawton and Simon 1968). Later, Lawton and Nahemow (1973) illustrated the outcome of a person and environment interaction as behaviour and affect (Figure 1). The Ecological Model of Ageing (Figure 1) explains the outcome when a person with a given competence enters an environment with certain demands. The area to the far left is the area where the environmental pressure is too low and maladaptive behaviour is present. For example, an older person who only uses a car to shop for groceries might in the end start to experience a decline in his or her physical abilities. There is no pressure/demand on the person, which leads to maladaptive behaviour. On the other hand, the area of maximum comfort and performance potential represents a positive outcome of the person- environment interaction. This is the zone where people can enter an environment that complements their level of competence. As can be seen in the figure, the level of maximum comfort is quite narrow for a person with low competence and wide for a person with high competence. As people age, their competence decreases. Even though the environment does not change, the environmental pressure increases as competence decreases. Therefore, at some point people reach the maximum performance potential and enter the level of maladaptive behaviour again. For example, a person who lives in an environment with uneven pavements might stop going out for a walk as he or she is afraid of falling while walking. The environmental pressure is too high for the person with that level of competence and maladaptive behaviour appears. This implies that small changes, such as eliminating uneven pavements, can have considerable positive effects for people with low competence and increase their chances of walking and staying active.

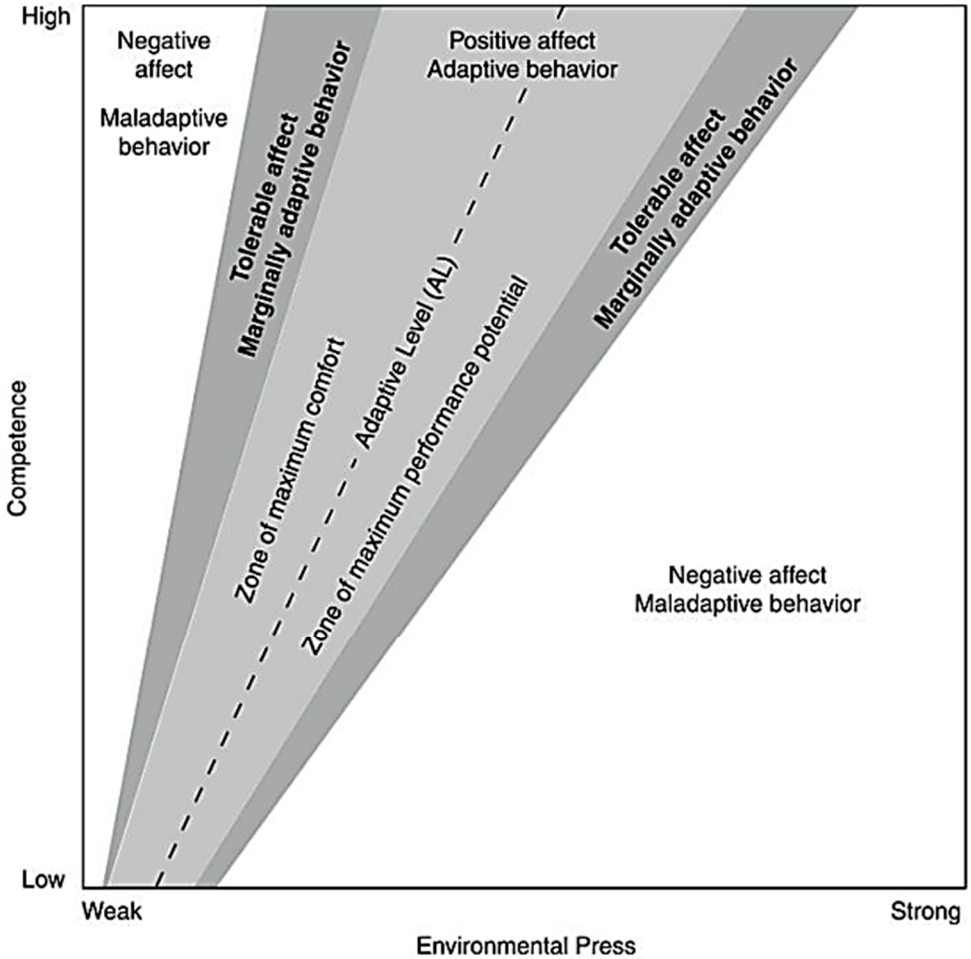

Figure 1: Ecological Model of Ageing (Lawton and Nahemow 1973)

Accessibility

There are a number of different approaches to the concept of accessibility as well as means of evaluating and measuring it. According to Geurs and van Wee (2004), accessibility has four interrelated components: the land-use component, the transport component, the temporal component and the personal component.

The definition of accessibility used in this thesis, is the *personal component* of accessibility as conceptualised by Iwarsson and Ståhl's (2003). They conceptualised the term according to Lawton's Ecological Model of Ageing (1973). According to Iwarsson

and Ståhl (2003), accessibility is the encounter between a person's functional limitations and the demands the environment makes on that person. Accessibility includes both a personal and an environmental component. This implies that information is required about both components being able to analyse accessibility and accessibility problems. Accessibility is of objective nature and refers to compliances to official norms and requirements. The environmental component refers to barriers in the given environment and compliances with laws and official norms, such as plans to remove environmental barriers. The definition of accessibility implies that all users are included. However, two people with different functional limitations can experience the person-environment interaction of certain barriers differently. That is to say, a person with hearing deprivation might not consider an uneven pavement to be an accessibility problem while a person with reduced movement in legs would perceive that as a barrier difficult to overcome. Therefore, measures aiming at enhancing accessibility must consider numerous functional limitations. Accordingly, the personal component of accessibility refers to description of functional limitations at group level. Thus, it is important to consider homogenous groups of people with a disability, to represent the personal component on group level.

Usability

Usability is another term introduced by Iwarsson and Ståhl (2003). Usability refers to the user's perception of accessibility in the outdoor environment, implying that it is of subjective nature. That is to say, an environment can be accessible according to all standards and norms but not be perceived usable by all people. For example, a bench covered in snow is unusable for a person that is in need of a rest. The bench may be accessible according to all standards, but it is not usable. For that reason, usability refers to the environmental, personal and *the activity component* (Iwarsson and Ståhl 2003). That is, usability takes into account whether a person with a specific competence is able to perform activities in a specific environment. The activity component is an important part of the concept of usability because, the bench covered in snow in the previous example does not impose problems for a person that does not have to rest. Due to the subjective nature of the concept, usability can be achieved by designing with the users and their limitations in mind (Frid et al. 2000). Accordingly, usability is measured by collecting information about environmental demands, experience of functional limitations, health etc. and description of activities.

In the context of this thesis, usability refers to people with disabilities and their abilities to walk in the outdoor environment. Thus, usability is achieved if a person can walk in the outdoor environment in a way that is satisfactory to the person.

Activity

Activity is execution of a task or action (World Health Organization, 2001). In other words, it can be a leisure activity, social activity, physical activity, activities of daily living etc. In this thesis, the activity component of usability denotes both social and physical activity.

Social activities include any activity or task a person executes outside the home, such as visiting cafés, shopping, seeking medical care, etc. Participating in social activities is positive for all people and it has a strong connection with quality of life (Banister and Bowling 2004). Places outside the home, such as banks, grocery stores, post offices, gyms and recreation centres are important for older people's social activity and older people wish to have such places close to the home (Chaudhury et al. 2012). Among the most preferred and frequently visited places among older people are department stores and grocery stores (Valdemarsson et al. 2005, Krogstad et al. 2015). The grocery store serve not just as a place to seek service for older people it is also a place where they can interact in social relations (Krogstad et al. 2015). However, to be able to engage in social activity a person has to be mobile. One way of being mobile is walking, which in return is also a physical activity.

Physical activity refers to an activity in the form of movement of the body, produced by skeletal muscles and resulting in energy expenditure (Shephard and Balady 1999). In this thesis, physical activity only refers to walking, where walking is a mode of transport describing a person that goes by foot from one location to another, whether or not the person may require a wheelchair or other mobility device to walk. Most people know that it is important for their health to engage in physical activity. Therefore, the relationship between health and physical activity among older people has been gaining increased interest, particularly the relationship between the outdoor environment and physical activity among older people (such as walking). Older people wish to be active and engage regularly in physical activity (Leionen et al. 2007), but fear of moving outdoors and environmental barriers restrict them (Rantakokko et al. 2010). Therefore, a vast literature has explored the relationship between the environment and physical activity, in order to identify features in the environment that can encourage older people to walk more. Such literature has revealed that aesthetics, convenience of facilities, location of shops and other services, good connection with public transport alongside the social environment are some of the features that contribute to higher frequency of walking (Owen et al. 2004; Valdemarsson et al. 2005; Michael et al. 2006, Mendes et al. 2009, Carlson et al. 2012). Such information could be relevant and help to encourage older people to be more active in terms of physical and social activity.

International Classification of Functioning (ICF)

The International Classification of Functioning, Disability and Health (ICF) is a framework describing the relationship between a person's functional capacity and the environment while accounting for the activity factor as well (World Health Organization, 2001). The ICF describes disability as the result of the relationship

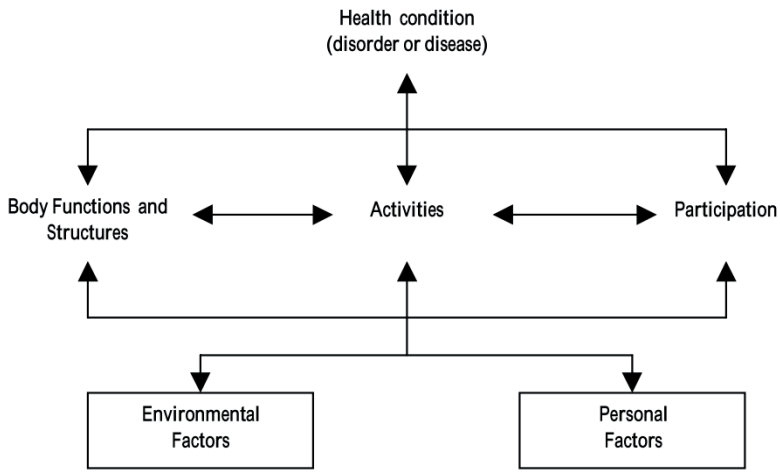

Figure 2: Interactions between the components in ICF model by WHO 2003. "International Classification of Functioning, disability and health". Geneva. World Health Organisation

between a person's health condition and personal factors, and the external factors (see Figure 2). Therefore, the ICF has two components, functioning and disability, and contextual factors. The ICF's personal factors describe health and health-related state, participation in activities and restrictions while the contextual factors describe both personal and environmental factors (physical, social, attitudinal). Thus, the ICF describes how activity and health are interrelated and how both environmental and personal factors affect activity (such as walking) and health. Hence, the ICF model acknowledges that environmental and personal factors affect activity and participation. In Figure 2, bodily functions describe physiological functions of the body system, such as muscle functions, mental functions and sensory functions while bodily structure describes the anatomical parts of the body such as leg, heart and ear. Activities in Figure 2 describe an execution of a task or action by a person, while participation is involvement in a life situation (World Health Organization 2001). Environmental factors listed in the ICF are numerous elements that can affect activity and participation (such as food, temperature and physical barriers). On the other hand, personal factors are complex due to their subjective nature and are not listed in the ICF. The ICF

classifies the environment into five different factors: products and technology, natural and human made changes to environment, support and relationships, attitudes and services, systems and policies.

Primarily, the ICF serves as a unified and international language to describe health and health related outcomes (World Health Organization 2001). Therefore, ICF often serves as an instrument in research studies, to classify disabilities among respondents. However, the ICF is also useful for identifying the relationship between activity, the person and the environment. For example, Clarke et al. (2011) utilised the ICF in their research on the relationship between the urban environment and participation among people with disabilities. They found that heavy traffic was an environmental factor associated with reduced chances of seeking health care among people with visual impairments. They also found that good street conditions were an important facilitator for people with disabilities and their opportunities to participate in political life, e.g. to vote. Levasseur et al. (2008) also utilised the ICF when exploring the connection between older people's participation, environment and quality of life. Amongst other findings, they concluded that there is a need for social support and governmental policies to advocate for environmental support for older people.

Selection Optimisation and Compensation

Baltes and Baltes developed the model of Selection Optimisation and Compensation (SOC model) (Baltes and Baltes 1990). They explained that throughout the lifespan, people come to select certain personal goals, which direct how they live their life. One thing that becomes quite important to people as they age is to be independent from others and keeping their sense of oneself (Michael et al. 2006; Tollen et al. 2008; Schwanen et al. 2012; Nordbakke 2013, Lloyd et al. 2014). They find it important to continue to participate in activities and especially to continue to perform activities they are familiar with (Hovbrandt et al. 2007; Tollen et al. 2008). The SOC model shows that such personal goals become redefined in accordance with what people are able to achieve, as they start to grow older and experience more functional and cognitive limitations. As a result, older people compensate by selecting other goals they feel they can accomplish. That is, they have coping strategies, which enable them to continue to participate in those activities, such as choosing locations where there is good accessibility (Tollen et al. 2008; Nordbakke 2013).

However, older people are not a homogeneous group, because decline of functional and cognitive functions varies among people. Therefore, Baltes and Smith (2003)

distinguished between the different stages of ageing, or the third and fourth age. As they state, there are two ways to define the third and the fourth ages, population based and person based. The first definition states that people reach the fourth age when 50% of their birth cohort has passed away. The person-based definition is somewhat more problematic, as it denotes that a person reaches the fourth age when they start to experience ageing changes that lead to death and dying. Thus, the fourth age is the age when it becomes difficult to sustain or improve life quality.

The environment also plays a part in the SOC model. Because, in an environment they are familiar with, older people can employ coping strategies such as SOC to maintain their independence and functionality. In the environment they have aged in, they have a sense of familiarity. They know where they can shop, get medical care, where it is safe and convenient for them to walk - and it enables them to continue to perform activities without too much physical and cognitive pressure (Golant 2011). For example, in a familiar environment older people can choose to walk where they know they will not encounter environmental barriers (Shumway-Cook et al. 2003, Nordbakke 2013). However, when the environment is not supportive enough, older people are forced to relocate (Oswald et al. 2002). Therefore, in order to continue to live an independent life and continue to perform activities important for them as they age, older people will have a stronger need for a supportive environment (Baltes and Smith 1997).

Fourth age

Baltes and Smith (2003) claimed that ageing has its limits and as people start to experience more functional limitations and loss of social contacts increases, people start to transcend what has been called the fourth age. People living into their fourth age experience a great deal of functional, cognitive and social loss (Baltes and Smith 2003). In return, performing activities of daily living is difficult and requires extensive physical, mental and emotional determination (Lloyd et al. 2014). The fourth age is the age when selective compensation with optimisation becomes difficult and when support from the environment becomes less efficient (Baltes and Smith 2003).

State of the Art

Ideally, implementation of accessibility policy in the outdoor environment would be achieved through an iterative process which includes planning, implementing and monitoring (Øvstedal et al. 2008, Methorst 2010). First, planning implies that relevant information is gathered regarding user needs. Such information should be collected and issued in guidelines and requirements and introduced in transport planning. Through introduction of such guidelines and requirements, plans for removal of barriers should

be developed. Next, accessibility measures would be executed. Finally, monitoring of executed measures is used to give further information about user needs, which is used to update the guidelines and so forth.

Extensive literature has focused on gathering information about user needs. Such literature has identified barriers and facilitators in the outdoor environment that can prevent or facilitate walking for older people and people with disability. Barriers identified include long distances, uneven pavements, few benches/seating options, bicyclists on sidewalks, stairs, no handrails on stairs, high curbs, uneven pavement, snow/ice or slippery surfaces, crowded streets, furniture in streets, shared space, lack of toilets, too brief green time allowed for crossing streets, lack of crossing facilities, heavy traffic, fast traffic, poor lighting, poor design of benches, inconsiderate car drivers/lack of attention among car drivers, fear of crime, fear of falls and lack of information (Shumway-Cook et al. 2003; Li et al. 2005; Li et al. 2005b; Valdemarsson et al. 2005; Michael et al. 2006; Ståhl et al. 2008; Wennberg et al. 2009b; Risser et al. 2010; Clarke et al. 2011; Kerr et al. 2012; Hjorthol 2013; Nordbakke 2013; Phillips et al. 2013; Rosenberg et al. 2013; Eronen et al. 2014).

To ensure an efficient and effective implementation of transport policies and measures, information about user needs has been gathered and issued in national directives and recommendations (such as BFS 2011:5 ALM2; BFS 2011:13 HIN2; BFS 2013:9 HIN3). Such guidelines should be introduced in relation to implementation of accessibility policy. However, that does not guarantee that transport planners are aware of and use such guidelines and implement accessibility measures. For example in a study conducted in Norway, Tennøy et al. (2013) found that transport planners were aware of and used national guidelines. However, they also found that the planners were seeking information elsewhere. They concluded that while it is important that planners seek relevant information and good solutions, it can result in inconsistency in design. Additionally, Gudmundsson et al. (2012) also found that sustainable transport solutions were not being implemented, despite transport planners' having guidelines that should help them to implement measures. Introduction of guidelines and recommendations should provide planners with adequate information to be able to deal with removal of environmental barriers. However, studies have found that transport plans, whatever their focus, do not always include clear objectives, which makes it difficult to evaluate their success (Manaugh et al. 2015). Evaluating the success of implemented measures is an important aspect of the implementation process, because good practice can be used to improve the guidelines.

As shown above, there is extensive literature on what barriers older people experience in the outdoor environment that can make walking difficult for them. The role of environmental barriers on quality of life, participation in activities outside the home

and confidence in walking has also been established (Mollenkopf et al. 2004; Rantakokko et al. 2009; Rantakokko et al. 2010b; Nordbakke and Schwanen 2014). However, few studies have taken on the challenge of evaluating the success of interventions. Ståhl et al. (2008) conducted a study where older people and local authorities in one area in a Swedish town were involved in the decision about which environmental barriers should be removed to increase accessibility and safety of older pedestrians. In a follow-up, they found that frequency of walking had not increased, but experience of environmental barriers had decreased (Ståhl et al. 2013). Ståhl et al. (2013) also found that those who appreciated such measures the most were people who use mobility devices. Similarly, Wennberg et al. (2010) conducted a study of measures taken with the aim of increasing older people's accessibility and safety as pedestrians in a year-round perspective. In a follow-up, Wennberg et al. (2010) found that older people appreciated the measures taken; however, their frequency of walking decreased. Furthermore, Ward-Thompson et al. (2012) studied the effects of an intervention on older people's perceptions on walkability and overall activity as pedestrians. In a follow-up, they found that the older people appreciated the changes, but that their activity level as pedestrians had decreased (Curl et al. 2015). What these studies have in common is exploring the impact of an intervention on a population of older people that aged 2-5 years during the study. However, it is difficult to be certain whether the changes in perception of the environment were related to the environment or to ageing. Applying vocabulary from Lawton's Ecological Model of Ageing (Figure 1), it was expected that the intervention would lead to a decrease in the environmental pressures. However, in the years between the studies, the respondents' competence decreased as well, thus narrowing the zone of maximum comfort and maximum performance level. It is possible that results from these studies would have been different if it had been possible to control for ageing while investigating the impact of the interventions. Therefore, we need studies that account for ageing while exploring the impact of an intervention. Such knowledge could clarify what factors can be attributed to the change in the outdoor environment and what factors can be attributed to ageing.

In relation to policy, knowledge about effects of interventions in the outdoor environment could be used to update guidelines and evaluate accessibility work. Therefore, it has been stressed how important it is to monitor the policy processes. Banister (1996) emphasised that transport policy implementation has to be closely monitored, because the implementation process "*is not an event, it is a continuum*" (Banister 1996, p. 13). However, implementation success of a transport policy is somewhat dependent on level of engagement in the organisation. Fleming (1999) adopted a model for describing organisational engagement in safety issues. Later, this model was adapted to walking by Methorst (2010). According to that model, there are

several stages of level of engagement in an organisation (Sauter and Tight 2010). First, there is "complete ignorance", which would describe an organisation, or municipality in the case of Sweden, which stands in the way of progress. Second, there is the "pathological" organisation that has minimum awareness of the user needs. Third, there is the "reactive" organisation that only adheres to obvious problems and received complaints. Fourth, there is the "calculative" organisation that implements measures but does not evaluate their success and considers every instance as an isolated problem. Fifth, there is the "proactive" organisation that works coherently and monitors and evaluates the success of their efforts on a regular basis. Last but not least, there is the "generative" organisation that works actively to fulfil their goals, seeks new ideas and integrates them.

Similarly, Manley (1996) discussed the role of local authorities in England to ensure a more accessible outdoor environment, and categorised them in terms of their engagement into "outsider", "administrative" and "rights- based". "Outsider municipalities" are less likely to utilise much of their time for accessibility issues, do not have accessibility advisors or accessibility plans and have no/few intentions to improve accessibility in the outdoor environment. "Administrative" municipalities comply with all requirements of accessibility in buildings, but no more than that. If they have an accessibility advisor, they are placed in the building department, have no intentions to cooperate with interest organisations and have little or no objectives in their local plans concerning accessibility. Conversely, "rights-based" municipalities are more likely to have accessibility advisors working in the municipality and have equal emphasis on removing barriers in buildings as in the outdoor environment. Moreover, Manley also said that rural municipalities, even those with high numbers of older people, are less likely to have a rights-based approach. Manley did not discuss reasons for the occurrence of these differences, but it is possible to posit that they are in line with Grönvall's (2004) findings.

In Sweden, Grönvall explored reasons for implementation of accessibility policy not resulting in accessibility being employed in municipal transport planning. Implementation of accessibility policy in transport has largely been placed in the hands of municipalities in Sweden. Therefore, the municipalities are to ensure that accessibility is included in transport plans and take measures aiming at a more accessible transport system. Inspired by the theory of symbolic interactionism (Charon and Cahill 1992), Grönvall conducted a study on organisational level in Sweden to identify why differences in implemented accessibility policy occur between municipalities. Put in this context, the theory of symbolic interactionism states that the environment and social interactions with other people shape people's beliefs on what is important to them, and people act in accordance with what is important to them (Blumer 1986). In

an ideal world, implementation of accessibility policy should affect people within an organisation and their beliefs about what is important. Eventually, daily transport planning should always consider accessibility. However, Grönvall found that conflicts of interest occur within organisations in Sweden that affect the level of implemented accessibility policy in municipal transport planning. More specifically, he found that conflicts of interest occur on three levels: within an individual, between individuals and between individuals and the society. Consequently, Grönvall found that implementation of accessibility policy in municipal transport planning was not always successful, and that there were great differences between municipalities. In relation to Grönvall's findings, an example of conflict of interest within an individual is a transport planner who is aware of what needs to be done to achieve an accessible outdoor environment, but does not take the necessary actions because of a possible conflict with the planner's preconceived ideas. An example of conflict of interest between individuals within an organisation is a transport planner who is aware of what is needed to achieve an accessible outdoor environment and is willing to take all actions to do so, but is restricted by other planners and their opinions. An example of conflict of interest between an individual and society is a transport planner who is restricted by societal norms. Grönvall identified conflicts of interest within individuals, between individuals and between individual and society within eight constricting factors: weak lobbyism, lack of knowledge, economic restrictions, aesthetics and other technical issues, engagement, time and formulation of legislation. For example, weak lobbyism results in accessibility issues not receiving the attention deserved while economic restrictions would imply that accessibility issues do not receive the necessary amount of budget. Grönvall concluded by suggesting that the accessibility work was in need of increasing efforts in all of the restricting factors, and that the accessibility work was in need of further engagement by all relevant actors in order to push it in the right direction.

Later, Wennberg et al. (2009) conducted a study to investigate how accessibility was treated and implemented in municipal transport planning in Sweden. They found that there were large variations among municipalities in the level of how they treated and had implemented accessibility in transport planning. Similarly, a report from the Swedish Association of Local Authorities and Regions (SALAR) showed that there was still large variation between municipalities. Results from the report showed that even though most municipalities had implemented measures to ensure accessible pedestrian environments, not all of them would be able to reach the goal of removing all barriers before the year 2010 (SALAR 2008). In addition, the report showed that about 60 % of the municipalities had a budget for easily removable barriers in 2008, and that most municipalities had an accessibility plan and cooperated with interest organisations. Furthermore, when exploring implementation of accessibility policy in transport

planning among municipalities in southern Sweden, Wennberg (2012) found that awareness of and knowledge about accessibility issues had increased. Nevertheless, only half of the 71 municipalities had completed their inventories and removal of easily removed barriers. These results suggest that implementation of accessibility policy was not as successful as hoped. They also show that the municipalities did not manage to remove all easily removable barriers before the year 2010. Reasons for the progress have not been established, and there is limited knowledge on implementation of transport policies in a longitudinal perspective. Knowledge of that kind could point to what factors contribute to successful implementation and reveal where there is need for further effort.

In conclusion, the aim of Swedish accessibility policy is to reduce discrimination against people with disabilities and to create an environment that enables them to be independent (Ministry of Social Affairs 2011). Therefore, accessibility policy has two implications, the societal level and the personal level. On the societal level, accessibility policy states that municipalities should adhere to requirements of an accessible outdoor environment. That is, municipalities should remove barriers in the outdoor environment. Theoretically, removing barriers in the outdoor environment should improve user perceptions of the environment. Therefore, removal of environmental barriers should affect the personal level, which relates to the users and their perceptions of the environment. However, knowledge is lacking regarding the impact of accessibility policy on societal and personal levels. More specifically, knowledge is lacking about the progress of implementation of accessibility policy in Sweden since the year 2010. In addition, knowledge is lacking on user perception of removing environmental barriers in the outdoor environment in a long-term perspective. Thus, the focus of this thesis is on accessibility in the outdoor environment, its relation to societal challenges and user perception. Figure 3 shows a framework describing the focus of and scope of the thesis. The framework describes how the work starts with implementation of accessibility policy to ensure an accessible outdoor environment. Implementation of accessibility policy relates to the concept of accessibility, i.e. describes the relation between an environmental and personal component on the societal level.

The concept of accessibility relates to compliances to official norms and requirements. In this thesis, accessibility is investigated by exploring implementation of accessibility policy in municipal transport planning. The personal level relates to the concept of usability and includes the environmental, personal and activity components. In this thesis, the concept of usability is explored through the eyes of the users by exploring older people's perceptions of the outdoor environment in a long-term perspective when barriers are removed in a neighbourhood.

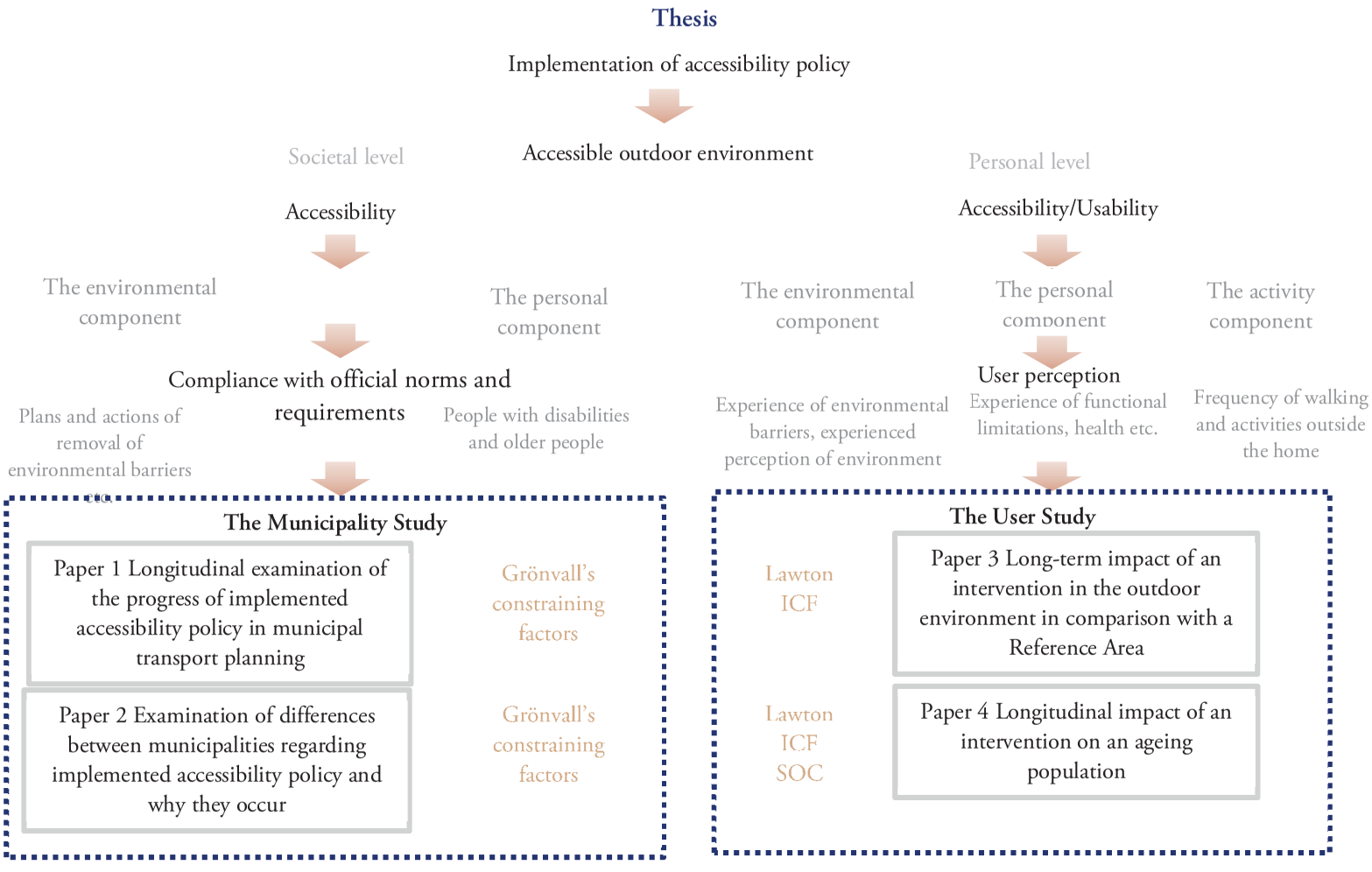

Figure 3: Framework describing focus of the thesis and associated papers

Aim

The overall aim of this thesis is to explore the development of a ten-year commitment to accessibility in the outdoor environment. The thesis builds upon the concepts of accessibility and usability focusing on societal challenges and users perceptions. Therefore, it comprises two sub aims:

1. To explore how society has met the challenge of removing environmental barriers to ensure an accessible outdoor environment for older people and people with disabilities
2. To explore the impact of removing environmental barriers on user perception of the outdoor environment and possibilities to participate in activities and in society.

a) A longitudinal evaluation of implementation of accessibility policy in municipal transport planning explores the challenges society has to meet. The research question is based on the concept of accessibility focusing on compliances with laws and regulations. The findings are bases on Grönvall's constraining factors and his observation of conflicts of interest within organisations. The more specific research questions explore:

i. Progress of implementation of accessibility policy in municipal transport planning from a longitudinal perspective

ii. Why differences are found among municipalities regarding level of implemented accessibility policy in transport planning

b) A longitudinal evaluation of an intervention in a neighbourhood on an ageing population explores the user's perception. The research questions are based on the concept of usability focusing on the environmental, personal and activity components. The findings are based on Lawton's Ecological Model of Ageing, the ICF framework and Baltes SOC model. The specific research questions explore:

i. What impact can interventions in the outdoor environment have on older people's perception, in a comparison with another area where no changes have

been made? More specifically, what implications does an intervention in the outdoor environment have on frequency of walking, activity, number of reported environmental barriers and evaluation of the outdoor environment?

ii. What impact can interventions in the outdoor environment have in a longitudinal perspective? More specifically, while controlling for ageing, what implications does an intervention in the outdoor environment have on frequency of walking, number of reported environmental barriers and evaluation of the outdoor environment?

Method

Study design

The thesis is based on two studies: the Municipality Study (Study 1) and the User Study (Study 2) (see Figure 3, Table 1 and Table 2). The aim of Study 1 was to explore the societal implications of accessibility policy while the aim of Study 2 was to explore the individual implications of accessibility policy. Four different papers present findings from the studies (papers 1-4). The two studies have different aims and their approaches differ accordingly.

The aim of the Municipality Study was to examine the progress of implementation of accessibility policy in the outdoor environment in municipal transport planning between 2004 and 2014. The study is based upon an existing database, used as baseline data T1 (Wennberg et al. 2009). In the study by Wennberg et al. (2009a), all 290 municipalities in Sweden received a questionnaire in 2004. The questionnaire aimed to explore implementation of accessibility policy in municipal transport planning. Access to that data made it possible to explore the process of accessibility work in the outdoor environment in a ten-year perspective by a repeated questionnaire to all municipalities in Sweden 2014, T2.

In this thesis data from the Municipality Study are used in two papers. Paper 1 includes a quantitative longitudinal design and Paper 2 includes a qualitative in-depth design. In Paper 1, indices were constructed and calculated for each municipality on both occasions to identify level of implemented accessibility policy. This enabled internal examination of progression and regression in level of implemented accessibility policy among the municipalities. In Paper 2, in-depth interviews were executed to explore why some municipalities had progressed while other had regressed in their level of implemented accessibility policy. The approach taken was mixed-method with embedded design. Embedded design is a mixed method design where one dataset guides the project and receives support from another dataset (Creswell and Plano Clark 2007, Creswell et al. 2003). In Paper 2, interviewees were selected using quantitative data from Paper 3. During the analysis phase, the quantitative data served as the secondary dataset and gave support to data from the interviews, or the primary dataset.

The aim of the User Study was to explore the impact of removing environmental barriers on user perception of the outdoor environment. The User Study was based on an existing dataset (Ståhl et al. 2008, Ståhl et al 2013). That study, "Let's go for a walk", aimed at identifying easily implemented measures that can increase accessibility and safety/security of older people as pedestrians. The study was conducted in one area in a middle-sized Swedish city, Kristianstad (population ~ 40.000). Criteria for choosing the Study Area (SA) were the high proportion of older people living in the area (20 %), structure, and distance to the city centre (Ståhl et al. 2008). SA is 0.82 km2 with 2480 inhabitants, has service such as a grocery shop located within its vicinity and health care in a nearby area. Distance from the middle of SA to the city centre is approximately 1 km, where a variety of shops, cafés and restaurants are located. The baseline for the User Study was in 2002 (T1) when a postal questionnaire was sent out to all older people (65+) living in SA. The aim of the questionnaire was to identify environmental barriers in SA outdoor environment experienced by the older people living there. Based on the results from the questionnaire, the older residents in SA, the local authorities and researchers, formed a research circle and prioritized environmental barriers for improvement. The improvements were mostly in accordance with the Swedish regulations on easily removed barriers (BFS 2003:19 HIN1; BFS 2011:13 HIN2; BFS 2013:9 HIN3). Between 2003 and 2006 the intervention in the outdoor environment was carried out as follows: the number of benches was increased, a clearer separation was made between cyclists and pedestrians, curbs were lowered and pavements that had been poorly maintained were made more even, some streets in the neighbourhood were changed into one-way streets and at the same time the sidewalks on those streets were made wider, and finally speed limits were lowered to 30km/h in parts of SA. The intervention was completed in 2006 and shortly after (T2), the same postal questionnaire was sent out to all older people living in SA (Ståhl et al. 2013). The aim was to evaluate the short-term impact of the intervention. The questionnaire included the same questions as in T1, with additional questions that aimed at evaluating the improvements. Access to this data made it possible to explore impact of an intervention in the outdoor environment on older people in a longitudinal perspective of ten years. This was acquired in 2011 (T3) by mailing out a second follow up, using a similar question as at T1 and T2. To the author's knowledge, no other studies have explored impact of intervention in the outdoor environment in such a long-term perspective. The data from the User Study were used in two papers in this thesis, both quantitative. In Paper 3, the design is cross-sectional and in Paper 4, the design is longitudinal. Paper 3, explores long-term impact of an intervention in the outdoor environment on older people by comparing them with older people living in an area where no changes had been made to the outdoor environment. Paper 4 explores the impact an intervention in the outdoor environment has on ageing population by the means of a panel study.

Table 1 and Table 2 present the two studies and associated papers.

Table 1: An overview of the Municipality Study, focus, design, methods used and associated papers

The Municipality Study

Paper		Paper 1		Paper 2	
Focus		Implementation of accessibility policy		Understand differences between municipalities regarding implemented accessibility policy	
Design		Longitudinal		In-depth	
Mixed method approach				Quantitative-Qualitative embedded design	
Data Collection	Year	2004 (T1)	2014 (T2)	2004 (T1)	2014 (T2)
	Quantitative	Questionnaire		Questionnaire	
	Qualitative			In-depth interviews	
Participants	Quantitative	Municipalities N = 118		Municipalities N = 118	
	Qualitative			Municipal employees N = 10	
Data analysis Quantitative	Analyses	Frequencies		Frequencies	
		Differences between related groups			
	Variables	Categorical		Categorical	
		Nominal		Nominal	
	Statistical methods	Wilcoxon signed rank test			
		Logistic regression models with random effects			
		Factor analysis			
Data analysis Qualitative				Verbatim transcription	
				Inductive coding	

Table 2: An overview of the User Study, focus, design, methods used and associated papers

The User Study

Papers			Paper 3	Paper 4		
Focus			Impact of an intervention, in comparison with an reference area	Impact of an intervention on an ageing population		
Design			Cross-sectional	Longitudinal		
Data collection	Quantitative	Year	2011	2002 (T1)	2006 (T2)	2011 (T3)
			Questionnaire	Questionnaire		
Participants		Study Area	Older people N = 358	Older people N =113		
		Reference Area	Older people N = 288			
Data analysis Quantitative	Analyses		Frequencies	Frequencies		
			Differences between independent groups	Differences between related groups		
	Variables		Categorical	Categorical		
			Ordinal	Ordinal		
	Statistical methods		Mann-Whitney U test	Wilcoxon signed rank test		
			Binary logistic regression models	Binary logistic regression models		
			Ordinal Logistic regression			
Data analysis Qualitative						

The Municipality Study

The aim of the Municipality Study was to explore development of implementation of accessibility policy in municipal transport planning in Sweden. The Municipality Study includes two papers, Paper 1 with a longitudinal design and Paper 2 with an in-depth design.

In 2014 (T2), all municipalities in Sweden (N=290) received the same questionnaire as was sent out in the previous study (T1) by Wennberg et al. (2009). This enabled long-term investigation of implemented accessibility policy in municipal transport planning. Before sending out the questionnaire, a pre-investigation identified the person working in the municipality who was responsible for accessibility issues in the outdoor environment. The pre-investigation, included an email sent to all municipalities. The e-mail explained the aim of the study and asked for the appropriate person email and postal address. In total, 258 municipalities returned information on the appropriate person in T1, and 221 municipalities in T2. E-mail and postal address information of the appropriate affiliation was acquired from the municipalities' homepage for the remaining municipalities. Questionnaires were personally addressed postal questionnaires in T1. In T2, the questionnaire was web-based and sent out to the appropriate person's email address.

Response rate

The response rate in T1 was 65 % (N = 188) and in T2 it was 58 % (N = 168). However, it became clear that not all of the respondents had properly filled in the web-based questionnaire in T2. Therefore, the actual response rate in T2 was 39% (N = 114). As a result, municipalities who remained to answer and those who had not properly filled in the questionnaire received a postal-questionnaire some weeks later.

Considerable effort was required to receive answers from municipal transport planners and required several reminders. Some of the planners replied with suggestions that they were not interested in taking part in the study. The most cited reasons were time constraints and remarks about the questionnaire only focusing on the needs of older people. Another reply concerned the size of the municipality. That is, some of the smaller municipalities replied with remarks that they did not have the resources to consider accessibility, or answering the questionnaire.

After some weeks and a number of reminders the response rate for T2 was 58% (N = 169). Out of the 169 municipalities that answered the questionnaire in T2, 118 had also answered it in T1. Therefore, the longitudinal data sample consisted of 118 municipalities (N = 118, response rate 62% for original sample in T1).

Data measurement

The questionnaire included 20 questions (see Appendix A), whereof one question included 21 statements. The questions were reorganised and reduced to quantify the level of implemented accessibility policy by the means of three indices on predefined categories (Wennberg et al. 2009): SF-index, DR-index and OFIP-index.

SF-index (Static Factors): The SF-index included five questions, or components. These components represent actions and decisions taken on a strategic level in the municipality. Hence, the SF-index gives an indication of how committed the municipality is towards accessibility issues. Positive answers for each component were summed up to form an added SF-index. Therefore, the highest possible score for SF-index was five. Table 3 displays questions included in the SF-index, answer alternatives and what constitutes a positive answer.

Table 3: Indicators and associated questions included in the SF-index what constituted a negative and positive answer is also displayed.

Indicator	Associated questions for each component in the SF-index	Negative answers	Positive answers
SF1	Whether or not the municipality has an accessibility plan.	No	Yes
SF2	Whether or not the municipality has a program for handicap policies.	No	Yes
SF3	Whether or not they have an accessibility advisor working in the municipality or can consult an accessibility advisor.	No	Yes, fulltime; Yes part time; Yes as a consultant.
SF4	Whether or not they cooperate with interest organisations.	No; No, but have intention to	Yes always; yes often; yes sometimes
SF5	Whether or not the municipality has implemented measures taken specifically to enhance accessibility and safety of older people as pedestrians.	No	Yes

DR-index (Directives and Recommendations): The DR-index included five questions (components) exploring the use and awareness of Swedish directives and recommendations. Municipal transport planners should consider and use these directives when planning and designing the outdoor environment with respect to accessibility. The questionnaire in T2 included new directives and recommendations, issued in the years between T1 and T2. However, only directives (components) that could be analysed in a long-term perspective were included in the DR-index. Positive answers for each of the components were summed up to form an added DR-index. Therefore, the highest possible score for added DR-index was five. Table 4 displays the five components included in the DR-index and associated positive answers.

Table 4: Indicators included in the DR-index DR1-DR5 and associated negative and positive answers. Directives and recommendations DR6-DR10 not analysed in long-term perspective are also displayed. DR6-10 had the same negative and positive answers as DR 1-5.

Indicator	Associated directive/recommendation for each component included in the DR-index	Negative answers	Positive answers
DR1	"Easily removed barriers" (BFS 2013:9 HIN3)	Know of ,but do not use; No	Yes, know of and use
DR2:	"Accessible city" (SALAR 2004)		
DR3:	"Streets for everybody" (SALAR 1994)		
DR4:	"Building away handicap"(Svensson 2012).		
DR5:	"Traffic for an attractive city" (SALAR et al. 2007).		
DR6:	"Accessibility in public places" (BFS 2011:5 ALM2)		
DR7:	"Swedish Board of Housing Building and Planning Regulations" (BFS 2011:6 BBR 22)		
DR8:	"Design of roads and streets" (SALAR and Swedish National Transport Administration 2012)		
DR9:	"Handbook of Walking, Cycling and Moped" (Lindberg and Wärnhjelm 2010)		
DR10:	"Easier without barriers" (Swedish Board of Housing Building and Planning 2005)		

OFIP-index (Older people Focus In Planning): The questionnaire included 21 statements that addressed how accessibility issues for older people as pedestrians are being addressed by the municipal transport planners and politicians in the municipality. The municipal transport planners were asked to agree or disagree with the statements on a four-point scale. Not all statements included in the questionnaire gave definite positive or negative answers. As it was necessary to classify positive answers, such questions were not included in the OFIP-index. Therefore, only twelve

statements (twelve components) were included in the OFIP-index. Positive answers for each of the twelve statements were added to form the added OFIP-index, so the highest possible score for OFIP-index was 12. One of the statements, (OFIP14) had a negative formulation and therefore, a disagreement was considered as a positive answer from the respondent. Table 5 displays the twelve components and associated positive and negative answers.

Table 5: Indicators included in the OFIP-index and associated negative and positive answers.

Indicator	Associated statement for each component included in the OFIP-index	Negative answers	Positive answers
OFIP1	"Extensive and purposeful work is carried out in our municipality in order to improve accessibility for older users."	Completely disagree; Agree partly	Agree almost completely; Agree completely
OFIP2	"Aspects concerning older people are part of the daily traffic safety work."		
OFIP3	"Aspects concerning older people are part of the daily accessibility work."		
OFIP4	"Projects concerning accessibility and older road users receive attention from the municipal politicians."		
OFIP5	"Efforts concerning accessibility and older road users are receiving sufficient funding in comparison with other issues."		
OFIP6	"As a planner, I feel that I can carry out projects concerning accessibility and older road users to a sufficient extent and of satisfactory quality."		
OFIP7	"My colleagues pay attention to me when it comes to issues concerning older road user. "		
OFIP8	"I get attention from my boss when it comes to issues concerning older road users."		
OFIP9	"I often cooperate with other employees in order to carry out projects concerning accessibility and older road users."		
OFIP14R	"It is difficult for the employee to know who is responsible for accessibility issues."	Agree almost completely; Agree completely	Completely disagree; Agree partly
OFIP17	"Issues concerning older road users are considered in the political agenda of the municipality"		
OFIP18	"There is discussion between employees about issues concerning accessibility and older road users"		

Next, the SF, DR and OFIP indices formed a TOT-index (Total accessibility index) as follows: SF-index + DR-index + OFIP-index = TOT-index. Therefore, the highest possible score for TOT-index was: TOT_{max} = 5 (SF) + 5 (DR) + 11 (OFIP) = 21.

Paper 1 – Longitudinal design

The approach taken for Paper 1 was longitudinal. This means that only those municipalities that had answered the questionnaire on both occasions (in T1 and T2) were included in the analysis.

Sample and Response

The longitudinal data sample consisted of 118 municipalities (N = 118).

Data measurements and analysis

The TOT-index for each municipality in T1 and T2 was calculated. Then, two groups were formed

3. "I-TOT" municipalities with increased TOT-index between T1 and T2
4. "D-TOT" municipalities with decreased TOT-index between T1 and T2

The "I-TOT" group consisted of 56 municipalities and the "D-TOT" group consisted of 58 municipalities. Four municipalities had the same TOT-index between T1 and T2. These four municipalities are not included in the analysis where "I-TOT" and "D-TOT" municipalities are compared.

Descriptive statistics explored differences between groups and measurements. Wilcoxon signed rank test checked whether differences were statistically significant, with statistical significance criteria $P \leq 0.05$. All statistical analysis was performed with the statistical software SPSS version 22.

Ideally, implementation of accessibility policy should affect politicians and planners beliefs about what is important for older people. As a result, politicians and planners should acknowledge accessibility as a transport related issue. One would expect that the more decisions and actions are taken on strategic level, the more the politicians and planners acknowledge accessibility as a transport related issues. The statements included in the questionnaire were to give an indication of the level of acknowledgement accessibility has in transport planning in among the politicians in the municipality. Therefore, one hypothesis was that there might be a relation between the statements and the SF-components. This procedure included several steps.

First, all 21 statements in the questionnaire were analysed with a factor analysis (Varimax with Eigenvalue >1 and reliability analysis with Cronbach alfa). The analysis was carried out for each data collection (T1 and T2) separately. The factor analysis between T1 and T2 gave similar results. Therefore, results from factor analysis in T2 were used to form Statement categories ("Sc"). After reliability analysis, four factor categories were applicable:

"Sc1": Implementation, discussion and attention

"Sc2": Perceived level of knowledge

"Sc3": Pressure from citizens

"Sc4": Conflicts of interest

Second, to represent their factor value, a variable, Statement category ("Sc"), was constructed that included the mean value of the statements included in the associated category and could contain a value between 1 and 4 (since the answers for each statements were on a four point scale). Table 6 displays the statements and their associated "Sc".

The statistical software SPSS version 22 was used for all analysis.

Table 6: The 21 statements included in the questionnaire and associated category from factor analysis.

Statement number	Statement	Associated category from factor analysis
1*	"Extensive and purposeful work is carried out in our municipality in order to improve accessibility for older users."	Sc1
2	"Aspects concerning older people are part of the daily traffic safety work."	Sc1
3	"Aspects concerning older people are part of the daily accessibility work."	Sc1
4*	"Projects concerning accessibility and older road users receive attention from the municipal politicians."	Sc1
5*	"Efforts concerning accessibility and older road users are receiving sufficient funding in comparison with other issues."	Sc1
6*	"As a planner, I feel that I can carry out projects concerning accessibility and older road users to a sufficient extent and of satisfactory quality."	Sc1
7*	"My colleagues pay attention to me when it comes to issues concerning older road user. "	Sc1
8*	"I get attention from my boss when it comes to issues concerning older road users."	Sc1

Table 6 continues on next page

Statement number	Statement	Associated category from factor analysis
9*	"I often cooperate with other employees in order to carry out projects concerning accessibility and older road users."	Sc1
10*	"Older people bring considerable pressure through the municipal handicap council (or similar) regarding accessibility issues for older road users".	Sc3
11	"The pressure group of older people get attention of their opinions (if such pressure exists)"	Sc3
12*	"Citizens (individuals, older people, relatives or care givers) bring considerable pressure regarding accessibility issues for older road users"	Sc3
13	"The pressure groups of citizens get attention of their opinions (if such pressure exists)"	Sc3
14+	"It is difficult for the employee to know who is responsible for accessibility issues."	
15*	"Efforts for older road users often lead to conflicts with the wishes of other road users"	Sc4
16*	"Efforts for older road users often lead to conflicts between employees (or between departments) in the municipality"	Sc4
17*	"Issues concerning older road users are considered in the political agenda of the municipality"	Sc1
18*	"There is discussion between employees about issues concerning accessibility and older road users"	Sc1
19*	"There is need for improved knowledge among the municipal politicians regarding accessibility issues and older road users"	Sc2
20*	"There is need for improved knowledge among the employees of the municipality regarding accessibility issues and older road users"	Sc2
21*	"There is need for improved knowledge among the citizens of the municipality regarding accessibility issues and older road users"	Sc2

*Older road user indicates older vulnerable road users
+ Note, results from the reliability analysis excluded statement 14, which therefore, does not belong to any of the "SC"

Third, logistic regression with random effects, relating to municipalities, was analysed in order to see whether there were relationships between SF components and the OFIP statements. The models comprised dependent variables:

5. SF1
6. SF2

7. SF3
8. SF4
9. SF5

All models were analysed with the same independent variables, the factor categories:

1. "Sc1"
2. "Sc2"
3. "Sc3" and
4. "Sc4"

Additionally, all models included an interaction between the Statement categories ("Sc") and a dichotomy variable called "T". The variable "T" represented both data collections, with the value 0 for T1 and value 1 for T2. The interaction term was included to see whether the "Sc" had same/smaller/greater impact on decisions taken on strategic level in T1 than in T2.

The models were analysed using the statistical software R version 3.1.2, with statistical significance criteria $P \leq 0.05$.

Paper 2 – in-depth design

In Paper 2, municipal transport planners working in "I-TOT" or "D-TOT" municipalities were interviewed. The interviews aimed at supporting and interpreting findings from the questionnaires.

Sample

For the analyses in Paper 2 the quantitative data in the Municipality Study were supplemented with qualitative data. The following inclusion criteria for this sample was used to identify municipalities participating in the interviews:

5. Type of municipality. Wennberg (2009) divided the municipalities in accordance to Swedish Administration of Local Authorities and Regions (SALAR) criteria in 1999 (SALAR 2011). Therefore, to validate results from the two studies, the same criteria were used in Paper 2. Thus, municipalities with large to middle-sized urban areas were included.
6. Climate. There are some appreciable differences in climate between northern and southern Sweden. Snow/ice conditions result in more restrictions for older

people and people with disabilities. Therefore, municipalities in northern Sweden may have to distribute their resources differently than municipalities in southern Sweden. That is why the municipalities were to represent north, south and central Sweden.

7. TOT-index. The TOT-index had to have either increased or decreased between T1 and T2.

Originally, eight municipalities were included in this sample, four "D-TOT" and four "I-TOT". However, despite continued efforts, one of the municipalities remained unresponsive. Therefore, only seven municipalities were included in the final sample. However, interviewees in three municipalities believed that more than one person shared responsibility for accessibility in the outdoor environment, thus requiring two people to be interviewed. Consequently, ten people were interviewed. Table 7 displays characteristics of the ten interviewees and the seven municipalities they represented.

Table 7: Characteristics of interviewed municipal transport planners and the municipality they work in.

Municipality	Number of inhabitants	Location in Sweden	Type of municipality	Positions of the interviewees	Years working in the municipality	Gender
A	94 000	South	A large municip.	Transport engineer	15	Male
B	37 000	Middle	A middle-sized municip.	Accessibility advisor	4	Male
C	50 000	South	A large municip.	Transport engineer	2	Male
D	29 000	South	A middle-sized municip.	Transport engineer	7	Male
				Supervisor for road and pavement maintenence	20	Male
E	41 000	North	A middle-sized municip.	Accessibility advisor	2	Female
				Transport engineer	6	Male
F	97 000	Middle	A large municip.	Transport engineer	7	Female
				Head of department	27	Female
G	60 000	South	A large municip.	Detailed planning work	24	Male

Procedure and data analysis

Respondents from the questionnaire were contacted and asked to participate in in-depth interviews. The interviews were held at the municipal transport planners' respective municipalities lasted between 30-60 minutes and were recorded using a voice recorder. The interviews were conducted using a semi-structured interview guide, consisting of the following themes:

- Background information on the interviewed person, such as education, assigned work task, age, how long they have worked in the municipality etc.
- The municipalities most designated work in respect to transport planning, and their perception of how far the municipality has come regarding accessibility issues in the outdoor environment.
- Pressure from governmental agencies, other employees, interest organisations or citizens regarding accessibility issues.
- Experience of conflicts between/with other co-workers, departments and interest organisation regarding accessibility issues in the outdoor environment.
- Perception of changes regarding how accessibility has been addressed in municipal transport planning during the past decade.

The interviews were transcribed and the transcriptions were divided into two groups, "I-TOT" and "D-TOT" (see Table 8). Next, the interviews were read, re-read and coded inductively using comparative methods (Charmaz 2006). Then, codes and themes were sorted according to whether they contributed information on why differences in implemented accessibility policy occur.

The quantitative dataset collected for the Municipality Study was used as secondary data in this study. Analyses included addition to form an added index scores as well as calculating the added index score for all indices on group level. That is, adding the index scores for respective municipalities together (see Table 8).

Table 8: "Characteristics" of the municipalities included in the in-depth part of the Municipality Study. The characteristics comprise results from the questionnaires in T1 and T2 Displayed are the added SF-index, DR-index, OFIP-index and TOT-index scores as well as individual scores for each of the factors for associated municipalities. The table also includes "I-TOT" and "D-TOT" added index scores for all indices.

	"D-TOT"								"D-TOT" Added Index Scores		"I-TOT"						"I-TOT" Added Index Scores	
Municipality	A	A	B	B	C	C	D	D			E	E	F	F	G	G		
Study	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
SF1: Accessibility plan	0	0	1	0	1	0	1	1			0	1	0	0	0	1		
SF2: Program for disability policy	1	1	0	1	0	0	1	1			0	0	1	0	1	0		
SF3: Has accessibility advisor	1	1	1	1	1	1	1	0			0	1	0	1	0	0		
SF4: Cooperates with interest organisations	0	1	1	1	1	1	1	0			1	0	1	1	1	1		
SF5: Implemented measures	1	0	0	0	0	0	0	0			1	1	0	1	1	0		
Added SF-index	**3**	**3**	**3**	**3**	**3**	**2**	**4**	**2**	**13**	**10**	**2**	**3**	**2**	**3**	**3**	**2**	**7**	**8**
DR1: HIN3 –elimination of easily removed barriers	1	1	1	1	1	0	1	1			0	1	0	0	1	1		
DR2: Accessible city	1	0	0	0	1	0	1	1			1	0	1	1	1	1		
DR3: Streets for everybody	0	0	0	0	1	1	1	0			1	0	1	0	0	1		
DR4: Building away handicap	0	0	1	1	1	0	1	1			1	1	0	0	1	1		
DR5: Transport for an attractive city	0	0	0	0	1	1	0	0			1	0	1	1	1	1		
Added DR-index	**2**	**1**	**2**	**2**	**5**	**2**	**4**	**3**	**13**	**8**	**4**	**2**	**3**	**2**	**4**	**5**	**11**	**9**
OFIP1	0	0	1	0	1	0	1	0			0	1	1	1	0	0		
OFIP2	0	0	1	0	1	0	1	0			0	1	0	1	0	0		
OFIP3	1	1	1	0	1	0	1	0			0	1	0	1	0	1		
OFIP4	0	0	0	0	1	1	0	1			0	0	0	1	0	1		

Table 8 continues on next page

	"D-TOT"								"D-TOT" Added Index Scores		"I-TOT"						"I-TOT" Added Index Scores	
OFIP5	0	0	0	0	0	0	0	0			0	0	0	1	0	0		
OFIP6	0	0	0	0	0	1	1	0			0	1	0	1	0	0		
OFIP7	1	1	1	0	1	1	1	1			0	1	0	1	0	0		
OFIP8	1	0	1	0	1	1	1	1			0	1	0	1	1	0		
OFIP9	0	1	1	0	1	0	1	0			0	0	0	1	0	1		
OFIP10	1	1	0	1	1	1	1	0			0	1	0	0	1	1		
OFIP11	1	0	0	0	1	1	0	0			0	0	0	0	0	0		
OFIP12	1	1	1	0	1	1	1	0			0	1	0	1	0	0		
Added OFIP-index	6	5	7	1	10	7	9	3	32	16	0	8	1	10	2	4	3	22
Added TOT-index	11	9	12	6	18	11	17	8	58	34	6	13	6	15	9	11	11	29

The User Study

The aim of the User Study was to explore the impact of removing environmental barriers in the outdoor environment on older people and ageing people. The study is based on previously conducted research and is presented in two papers, Paper 3 with a cross-sectional design and Paper 4 with a longitudinal design. Paper 4 from the User Study, utilises data collected from questionnaires sent out in 2002 (T1) and 2006 (T2). In order to collect longitudinal data, the same questionnaire was utilised for a new follow-up and sent out in 2011. However, before sending out the questionnaire, a pilot study was conducted with ten people aged 69-75 years. To be certain that people older than 75 could read and understand the questionnaire, another pilot study, in a senior centre in the city of Lund, was conducted. The Ethical Review Board at Lund University approved this study.

Sample and response

First, names and addresses of all residents 65 years and older living in The Study Area (SA) were obtained with help from the municipality of Kristianstad. Next, the questionnaire, containing an information letter, was sent out in May 2011 to all individuals 65 years and older living in the SA (N = 543). After a reminder three weeks later the response rate was 66 % (N = 358).

Data measurement

The questionnaire included 39 questions plus 1 open-ended question (see Appendix B). The information collected concerned individual characteristics, frequency of activity, perceptions of the outdoor environment and older people's experience of walking in the transport environment. Information selected and used from the questionnaire in the User Study is in accordance with Lawton and ICF (see Figure 1 and Figure 2).

Information regarding age, gender and number of people living in the household was collected in the questionnaire. These personal factors can affect frequency of activity (Iwarsson et al. 2013) and they were collected to account for personal compoments. Variables were constructed from the collected information (see Table 9). Information regarding age was constructed into a continuous variable and gender was collected and

constructed as a dichotomy variable. Number of people living in the household was collected as a continuous variable. The information was constructed into a dichotomy variable "number of people living in household". The variable consisted of people "living alone in the household" and "one or more person living in the household".

The questionnaire included information regarding health and health related problems that can affect frequency of activity among older people (see Table 9). This information accounts for bodily function/structure (ICF) and competence (Lawton). Information from the questionnaire regarding health, functional limitations, use of mobility device and walking difficulties was constructed into variables. The respondents were asked to subjectively rate their health on a scale from 1 – 7, where one was poor and seven was excellent. This information was constructed into a dichotomy variable comprising people who have "poor perception of health" (<=4) and people who have "good perception of health" (>=5). The respondents were also asked to subjectively rate the number of functional limitations they experience. The nature of functional limitations is based on The Housing Enabler instrument (Iwarsson and Slaug 2010), which includes 11 different functional limitations. In accordance with previous literature (Hovbrandt et al. 2007b), functional limitation consisted of four groups:

- "Movement related only"
- "Both movement and cognition/perception related"
- "Cognition/perception related only"
- "No or only cognition/perception related functional limitation".

However, one of the groups (cognition/perception related only) contained quite a few people. Hovbrandt et al. (2007) suggested that the frequency of activity among people having cognition/perception related functional limitation only, does not differ from people with no functional limitation. Therefore, those two groups were combined. Accordingly, the four groups became three (see Table 9)

- "Movement related only"
- "Both movement and cognition/perception related"
- "No or only cognition/perception related functional limitation".

The questionnaire included information regarding use of mobility devices. The respondents could report from four fixed alternatives (cane/crutch, rollator (walker), wheelchair and powered wheelchair). The respondents could also choose from an open-ended alternative. The respondents were allowed to report none or as many devices they wished (see Table 9). A dichotomy variable "use of mobility devices" was

constructed from this information. The variable consisted of two groups “uses mobility devices” and “does not use mobility devices”

Information from the questionnaire was used to account for people having walking difficulties. Respondents having difficulties walking in stairs and walking more than one kilometre were considered as “have walking difficulties”.

Information was collected from the respondents regarding their reliance on different modes of transport. Respondents were identified as being “dependent on walking as a transport mode” if they did not have access to a car nor were entitled Special Transport Service (STS) (see Table 9). If the respondents had access to either a car or STS, they were perceived as “not dependent on walking”.

Table 9: Variables constructed from questionnaire in the User Study. The variables were to account for individual characteristics that can affect frequency of activity from ICF and variables related to competence from Lawton's Ecological Model of Ageing. The table displays how the variables were collected, and how some of them were categorised or changed and used in analysis.

Variable	Categories	Description	Collected	Used
Age			Continuous	Mean, categorical
Gender	Man Woman		Categorical	Categorical
Number of people in household	Lives alone	Living alone in the household	Continuous	Dichotomy
	2 or more people living in household	One or more person living in the household		
Health	Poor perception of their health	Perceives is at 4≤ on seven point Likert scale	Ordinal	Dichotomy, ordinal
	Good perception of their health	Perceives is at ≥5 on seven point Likert scale		
Functional limitations	Movement limitation only	Poor balance, reduced stamina, reduced movement in neck, reduced arm movement, difficulties handling/fingering, reduced back/leg movement, overweight	Dichotomy	Dichotomy
	No or only cognition/perception related	Difficulties interpreting information, total loss of sight, other sight deprivation, hearing deprivation		
	Both movement and cognition/perception limitation	Poor balance, reduced stamina, reduced movement in neck, reduced arm movement, difficulties handling/fingering, reduced back/leg movement, overweight, difficulties interpreting information, total loss of sight, other sight deprivation, hearing deprivation		

Table 9 continues on next page

Variable	Categories	Description	Collected	Used
Use of mobility devices	Uses mobility devices	Cane/crutch, rollator (walker), wheelchair, powered wheelchair	Dichotomy	Dichotomy
	Does not use mobility devices			
Walking difficulties	Have walking difficulties	Has problem walking in stairs and walking more than one km	Dichotomy/ Categorical	Dichotomy
	Does not have walking difficulties	Does not have problem walking in stairs or walking one km		
Reliance on walking	Dependent on walking	Does not have access to car nor STS	Categorical	Dichotomy
	Not dependent on walking	Either has access to car or STS, or both		

Information was collected from the respondents regarding their out of home activities to account for activity (see Table 10). Information regarding the respondents' "frequency of walking" and "frequency of activities" was collected by asking how often the respondents go out for a walk (with or without a mobility device) and how often they participate in activities outside the home. The respondents were able to choose from seven different response rates: 5-7 times/week, 3-4 times/week, 1-2 times/week, 3-4times/month, 1-2 times/month, 3-4times/year and 3times or less/year (see Table 10). The variables "frequency of walking" and "frequency of activity" were constructed into dichotomy variables, each comprising two categories: people having "low frequency of walking" and "low frequency of activity" (walking/participating in activities 1-2 times/week or less) and people having "high frequency of walking" and "high frequency of activity" (walking/participating in activities 3-4 times/week or more).

Table 10: Variables constructed from questionnaire in the User Study. The variables were to account for activity from ICF. The table displays how the variables were collected, how some of them were categorised or changed and used in analysis.

Variable	Categories	Description	Collected	Used
Frequency of walking	High frequency of walking	Goes out for a walk between 7 – 3 times/week	Ordinal	Dichotomy, ordinal
Frequency of activity	High frequency of activity	Participates in activities outside the home between 7 – 3 times/week	Ordinal	Dichotomy, ordinal

Two different questions were used to account for the environment. Respondents were asked how they would evaluate their outdoor environment on a seven point Likert scale, where one was poor and seven was excellent. This information was constructed into a dichotomy variable, "evaluation of the outdoor environment", comprising two categories; people having "high evaluation of the outdoor environment" (>=5) and people having "low evaluation of the outdoor environment" (<=4). The respondents were also asked whether they experience any environmental barriers when they go out for a walk in their neighbourhood. They could choose from 18 different barriers and they had the opportunity to write down other barriers not listed. The question was dichotomous, and the respondents were able to report none or as many as they thought were appropriate. The variable "environmental barriers" was categorised into three different categories; "infrastructure barriers", "traffic barriers" and "fear/anxiety barriers" as displayed in Table 11.

Table 11: Variables constructed from questionnaire in the User Study. The variables were to account for environment as explained in ICF and environmental pressure as explained in Lawton's Ecological Model of Ageing. The table displays how the variables were collected, how some of them were categorised or changed and used in analysis.

Variable	Category	Description	Collected	Used
Evaluation of the outdoor environment	High value of the outdoor environment	Values it as ≥5 on seven point Likert scale	Ordinal	Dichotomy, ordinal
Environmental barriers	Infrastructure barriers	High curbs, uneven pavement, few benches, hilly roads, poor snow removal and cyclists or mopeds on sidewalk	Dichotomy	Dichotomy
	Traffic barriers	Heavy traffic, fast traffic, problems crossing streets and too short green time while crossing the street		
	Fear/anxiety	General sense of insecurity, bad lighting, difficulties reading information signs, fear of falling, fear of being involved in a traffic accident and fear of robbery/assault		

Paper 3 – cross sectional design

The aim of Paper 3 was to identify long-term impact of an intervention in the outdoor environment on older people. This was executed by comparing older people living in a neighbourhood where intervention in the outdoor environment had been carried out, with older people living in a reference area, without intervention. No reference area was included in T1 or T2. Therefore, to be able to identify impacts ascribed to the intervention, a Reference Area (RA) was chosen that shares similar characteristics with the Study Area (SA). The RA has a similar proportion of older people (20%), it is near the SA, it is of similar size (0.72 km^2 with 2150 inhabitants), has similar composition of apartment houses and has services such as a retail park nearby (1.2 km from the centre of the area). The area was chosen in cooperation with Kristianstad municipality. According to the municipality, few or small changes had been executed in the outdoor environment in RA between year 2002 – 2011.

Sample and response

Before sending out the questionnaire, names and addresses of all people 65 years and older and living in SA and RA were acquired from the municipality of Kristianstad. The sample consisted of 543 individuals living in SA and 450 individuals living in RA. Thus, the municipality of Kristianstad provided information on 993 individuals.

The questionnaire, containing an information letter, was then sent out in May 2011 to all 993 individuals (N = 543 from SA and N = 450 from RA). After a reminder three weeks later the response rate for RA was 64 % (N = 288) and 66% for SA (N = 358).

Data measurements and analysis

Information regarding personal characteristics, frequency of activity and environment was collected and constructed into variables as displayed in Table 9 - Table 11. To avoid bias in data, it was decided to analyse all environmental barriers listed in the questionnaire. This was done because the outdoor environments in SA and RA are similar, but not identical. Therefore, it is possible that the outdoor environment in RA has different problems than that in SA. That is, respondents' in RA might not perceive the same environmental barriers to the same extent as the respondents' in SA. Therefore, all 18 barriers listed in the questionnaire were analysed, whether or not they were eliminated in SA during the intervention. Experiences of "fear/anxiety" were also included in the analysis because interventions in the outdoor environment should also consider its psychological benefits (Amann et al. 2006). Reporting one barrier in each category ("infrastructure", "traffic", "fear/anxiety") was sufficient to experience that kind of barrier.

Characteristics of the respondents in SA and RA (as displayed in Table 9), frequency of activity (as displayed in Table 10) and the environment (as displayed in Table 11) were analysed using descriptive statistics. Differences between the groups (SA and RA) were analysed using Mann Whitney U-test, with statistical significance criteria $P \leq 0.05$.

In Paper 3, differences between SA and RA regarding the person-environment relationship were analysed. I.e. it was analysed whether environmental perception and frequency of activity were different between the areas and whether that difference might be attributed to the intervention. Therefore, four logistic regression models were analysed to examine the association between characteristics (independent variables, see Table 9) and dependent variables

- "Frequency of walking"
- "Frequency of activity"
- "Experience of environmental barriers"
- "Evaluation of the outdoor environment"

Furthermore, it was of interesting to examine whether environmental barriers affect frequency of activity. Therefore, two logistic regression models were analysed to examine the association between "environmental barriers" (independent variables) and dependent variables

- "Frequency of walking"
- "Frequency of activity"

This procedure was conducted in several steps. First, the association between dependent variables (six different models) and independent variables was analysed in separate regression models, one for each area (total twelve models).

Second, independent variables with $P \leq 0.2$ in each model were identified. Third, a dichotomy variable called "area" was constructed comprising two categories. Each category represented respondents from SA (value 0) and respondents from RA (value 1). This variable was used as an interaction term.

Next, four logistic regression models were analysed using the entire dataset (that is respondents from SA and RA) for dependent variables

- "Frequency of walking"
- "Frequency of activity"
- "Experience of environmental barriers"

- "Evaluation of the outdoor environment"

The models included independent variables identified in the second step as main effects and interaction terms with the variable "area".

Ordinal logistic regression models were analysed with dependent variables "frequency of walking" and "evaluation of the outdoor environment". However, "frequency of activity" violated the test of parallel lines. Therefore, "frequency of activity" was analysed using Binary logistic regression (has high vs. low frequency of activity). Other regression models were analysed using Binary logistic regression.

Independent variables were categorical (dichotomous). Therefore, the variable "functional limitations" was constructed into a variable comprising two categories; "No or only cognition/perception related" and "functional limitation"

All models were analysed using the statistical software SPSS version 21 and variables were considered as statistically significant at $P \leq 0.05$.

Paper 4 - longitudinal design

The aim of this paper was to identify the longitudinal impact of an intervention in the outdoor environment on older people, by means of a panel study. That is, only including people that answered a questionnaire on all occasions to be able to track individual changes as well as changes in population.

Sample and response

The sample in this study consist of people who answered the questionnaire in 2002 (T1) or baseline, 2006 (T2) or first follow-up and from 2011 (T3) or second follow-up.

At T1, the sample consisted of 556 individuals, whereof 338 filled in and sent the questionnaire back (response rate 61%). At the first follow up, or T2, the sample had decreased to 251 individuals, whereof 195 answered and sent back the questionnaire (response rate 78% for T2 and 58% for the original sample). The most common reasons for dropout in T2 were death, relocation outside of SA, refusal to participate without giving a reason and health problems (Ståhl et al. 2013). At the second follow up, or T3, the sample consisted of 139 individuals, whereof 113 filled in and sent back the questionnaire (response rate of 81% for the sample in T3 and 33% for the original sample). The most common reasons for dropout in T3 were health problems (such as poor sight), death and relocation.

Data measurements and analysis

Information regarding personal characteristics, frequency of activity and environment was collected and constructed into variables as displayed in Table 9 - Table 11. Since Paper 4 includes a longitudinal design, it was decided to only include those barriers that were removed during the intervention phase 2002-2006 and had not been subjected to changes until the year 2011. Those were:

Infrastructure barriers: high curbs, uneven pavements, few benches, and cyclists on sidewalk

Traffic barriers: heavy traffic and fast traffic.

Characteristics of the respondents (as displayed in Table 9), frequency of activity (as displayed in Table 10) and perception of the environment (as displayed in Table 11) were analysed using descriptive statistics for each data collection. Differences between data collection T1 and T2 (short term analysis) and between T1 and T3 (long-term analysis) were analysed using Wilcoxon signed rank test, with a statistical significance criteria of $P \leq 0.05$.

The effects of the intervention on user perception of the environment while accounting for ageing were evaluated using logistic regression model. Dependent variables were:

- "frequency of walking"
- "experience of environmental barriers" and
- "evaluation of the outdoor environment"

Since this is a panel study, logistic regression models with random effects, relating to individuals, would have been the best option to use. However, due to complications it was not possible to evaluate a model with such dimensionality. Therefore, another method was chosen.

First, to limit the number of independent variables, regression models for each data collection were analysed to see which variables (in Table 9) affected the respondents' at each data collection. Independent variables selected were:

- "perception of health",
- "functional limitations" (dichotomy variable),
- "dependency on walking" and
- "use of mobility devices".

Second, a variable accounting for each data collection (T1 = 0, T2=1 and T3=2) was constructed. The variable, "T", was included as an interaction term with the independent variables identified in step one.

Next, the data were analysed using Binomial logistic regression models, without relating to individuals. That is, the sample consisted of 339 observations (113 individuals on three occasions 113x3 = 339). All models included the same independent variables. However, to limit the number of estimated parameters and due to restrictions in the data sample, the interaction terms were included one at a time. As an example, the dependent variable "frequency of walking" was run using four different models. The first model included independent variables: "perception of health", "functional limitations", "dependency on walking", "use of mobility devices" and the interaction between "T" and "perception of health". Therefore, the model consisted of five independent variables as main effects and one interaction term. The second model included the same main effects and the interaction between "functional limitation" and "T", and so forth.

Therefore, sixteen binary logistic regression models were analysed, four for each dependent variable. For all sixteen models, -2LogLikelihood was used as an estimate of the model fit with a statistical significance criterion of $P \leq 0.05$. The statistical software SPSS version 22 was used for all analysis.

Results

In this section, results from both the Municipality Study and the User Study will be presented. The section begins with introducing results from Paper 1 and Paper 2, concurrently. This is followed by findings from the User Study, where Paper 3 and Paper 4 are presented independently.

The Municipality Study

The results from the Municipality Study showed that there were noticeable differences between municipalities regarding the level of implemented accessibility policy.

Internal development of implementation of accessibility policy

From the **longitudinal** design of the study (Paper 1), it was possible to investigate the internal development of the implementation process for accessibility policy in each municipality. This was achieved by calculating and comparing the TOT-index for each municipality in T1 and T2. Note that differences in the TOT-index give an indication of internal development in the respective municipalities. Therefore, it was possible for a municipality in the "I-TOT" group (Increased Total Accessibility Index) to have a lower TOT-index than a municipality in the "D-TOT" group (Decreased Total Accessibility Index).

Figure 4displays internal development of SF, DR, OFIP and TOT-indices for the entire data sample, as well as within "I-TOT" and "D-TOT" groups. Interestingly, municipalities belonging in the "D-TOT" group seem to have started with wide-range efforts regarding accessibility policy in T1. Particularly, municipalities in the "D-TOT" group had high mean indices scores in T1, but lower mean indices scores in T2. This indicates that "D-TOT" municipalities decreased their efforts in T2. On the other hand, municipalities with few or small efforts to implement accessibility policy in T1 increased their efforts in T2 ("I-TOT" group).

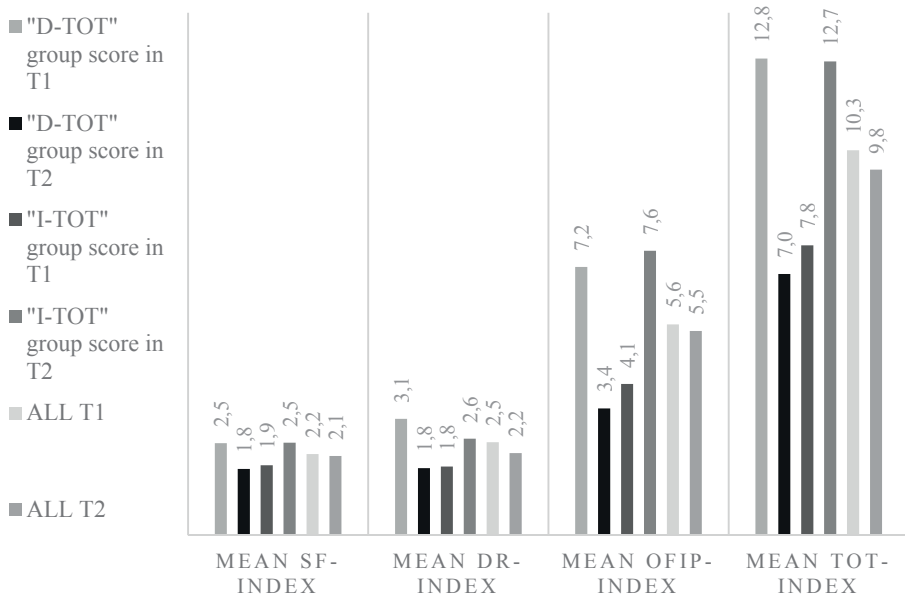

Figure 4: Mean added SF, DR, OFIP and TOT-indices displaying internal development on group level in T1 and T2. Groups presented are "D-TOT", "I-TOT" and ALL (which represents internal changes for the entire data set).

The ALL group, in Figure 4, shows the combined results of the entire data set, i.e., both the "D-TOT" and the "I-TOT" groups, regarding internal development of implementation of the accessibility policy. Figure 4 reveals that implementation of accessibility policy has not progressed. More importantly, the results indicate a slight regression.

The in-depth design of the Municipality Study (Paper 2) aimed to explore reasons behind identified trends between "I-TOT" and "D-TOT" municipalities. Findings from the interviews indicate that reasons for progression and regression were on both a personal and on an institutional level. Cited reasons mostly centred on budget and political will. One of the municipal transport planners in a "D-TOT" municipality was positive and indicated that politicians were paying more attention to accessibility

> *"We have got the politicians thinking, so they have allocated more money for accessibility…It is not much, but it is a lot compared to nothing" (B).*

Other interviewees indicated that a decreased budget might be a reason for regression. For example, a transport planner in a "D-TOT" municipality explained that previously, the transport department had allocated money or special budget for accessibility issues:

"*….because of the law, you see" (A).*

With "the law", the planner was referring to the initial goal of accessible Sweden in 2010 (Prop. 1999/2000:79). Therefore, the planner was indicating that since the year 2010 had passed, accessibility no longer received a special budget in the transport department. Nonetheless, he continued to explain that they try to include accessibility in new designs or when mending existing public outdoor environments.

In addition to budget issues, the interviewees indicated the importance of political will for accessibility issues. One interviewee in an "I-TOT" municipality was quite pleased with efforts and interest from the municipal politicians for accessibility. For example, the politicians in said municipality decided to appoint accessibility advisors in every department. In addition, the municipality took steps to hire people specialised in accessibility issues to do inventories in their city centre (E). Other interviewees expressed that there was need for further efforts towards completely implementing the accessibility policy in municipal transport planning.

"So that you do not have to think about it, it just comes automatically" (B).

One particularly interesting finding was the role of the single employee. The single employee initiative was identified in several municipalities and may be an important factor for progression and regression in implementation process for accessibility policy. For instance, an interviewee in a "D-TOT" municipality explained how the department used to be quite dedicated to accessibility issues

"This department had the privilege over many years to have a transport planner, which handled the accessibility issues…"(C).

This person had left the municipality. However, before leaving, that person left some guidelines for continued accessibility work and plans for removal of environmental barriers. However

"…no one has looked at those plans since then (the planner left the municipality)*….unfortunately"(C).*

Another interviewee in an "I-TOT" municipality expressed concerns regarding accessibility issues in the transport department. The interviewee explained that

"I can imagine that if I had not worked here, it (accessibility) *would not receive as much attention"…."but it should not depend on the individual or what you say. That kind of*

work (accessibility work) *should remain whether you have some employee that is passionate about the issues or not" (F).*

Accessibility advisors also exemplified the single employee initiative. The interviewee, working in an "I-TOT" municipality, described how accessibility advisors in each department in the municipality started a working group. In the working group, the accessibility advisors met and received feedback from one another. The accessibility advisors even started to meet with a similar group in a nearby municipality. However, as the interviewee explained

"We would like it to be more formal, because right now it is only due to our own initiative that we have these meetings" (E).

Actions and decisions taken (SF-index)

Static factors are indicators of the level of actions and decisions taken by municipal politician regarding accessibility issues in the outdoor environment. Therefore, from the longitudinal design of the study (Paper 1), the added SF-index gives an indication of development of the political will in the municipality to implement accessibility policy.

Table 12: Changes in each of the SF-index components, along with the mean and sum, on group level. These are displayed for the entire data set, as well as the I-TOT and D-TOT groups, individually

Indicator	Entire sample			”I-TOT”			“D-TOT”		
	T1 N(%)	T2 N(%)	P	T1 N(%)	T2 N(%)	P	T1 N(%)	T2 N(%)	P
SF1	23 (19%)	59 (50%)	***	7 (13%)	34 (61%)	***	16 (28%)	23 (40%)	**
SF2	36 (31%)	12 (10%)	***	14 (25%)	5 (9%)	**	19 (33%)	7 (12%)	**
SF3	24 (20%)	50 (42%)	***	5 (9%)	27 (48%)	***	19 (33%)	23 (40%)	
SF4	109 (92%)	84 (71%)	**	50 (89%)	45 (80%)		55 (95%)	36 (62%)	**
SF5	65 (55%)	43 (36%)		29 (52%)	28 (50%)		34 (59%)	14 (24%)	**
Added SF-index									
Mean (SD)	2.2 (1.0)	2.1 (1.0)		1.9 (1.0)	2.5 (0.9)		2.5 (0.9)	1.8 (1.1)	
Score on group level	257	248		105	139		143	103	

* P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

Table 12 displays results for individual SF-index components, and the mean SF-index for the entire data set and for the “I-TOT” and “D-TOT” groups, respectively. The bottom of the table provides the mean SF-index for T1 and T2, respectively, as well as the sum of all the SF-index components.

First, the results indicate that municipalities have reduced their efforts by taking fewer decisions that aim at implementing accessibility policy. More specifically, the mean SF-index declined between T1 and T2 for the entire dataset. The “D-TOT” group showed a similar trend, though displaying a more drastic regression. Results for the “I-TOT” group, on the other hand, showed that they had increased their efforts in implementing accessibility policy, with mean SF-index increasing from 1.9 in T1 to 2.5 in T2.

Interestingly, development for single SF components followed similar trends for the entire dataset, “I-TOT” and “D-TOT” groups. For example, fewer municipalities have programmes for handicap policies (SF2), cooperate with interest organisations (SF4) and have implemented accessibility measures (SF5, fulfilling statistical significance criteria in “D-TOT” group only) in T2 than in T1. On the other hand, more

municipalities have established accessibility plans (SF1) and have accessibility advisors working in the municipality (SF3) in T2 than in T1.

Logistic regression models were used to examine a possible relationship between statements regarding Older people Focus In Planning and decisions taken on strategic level in the municipalities. As regards the relationship between Statement categories (Sc) and SF-components, the results showed that Sc1 (implementation, discussion and attention) was positively associated with the municipalities having established accessibility plans in T1 (P = 0.012), but in T2 the effect was smaller (P = 0.007). This might indicate that accessibility is more established. It is no longer necessary to introduce the Older people Focus In Planning to establish accessibility plans.

Results for the SF-index indicated that some components were regressing while others were progressing. The in-depth design of the study (Paper 2) aimed at exploring reasons behind this development. Results from the interviews revealed that more municipalities have accessibility advisors working in the municipality. The findings indicated that accessibility advisors may not have any influence when it comes to transport related issues. One interviewee in a "D-TOT" municipality exemplified this, when discussing cooperation between the transport department and the appointed accessibility advisor. The interviewee explained that sometimes the planner and the accessibility advisor cooperate regarding accessibility solutions in public buildings. However, asked about cooperation in relation to the transport system:

"*….the accessibility advisor has nothing to do with that"(C).*

Conversely, an interviewee in an "I-TOT" municipality explained how employees in the transport department cooperated extensively with the accessibility advisor. This was especially true when it comes to accessibility solutions in the outdoor environment. Because, the accessibility advisor is more aware of needs of different users:

"*I think that it (*accessibility*) is a quite difficult issue, but also a very important one…. so we often consult the accessibility advisor regarding accessibility issues" (E).*

Another interviewee exemplified the importance of having accessibility advisors working in the municipality. At the time of the interview, no accessibility advisor was working in the municipality. The planners stressed that they had better overview regarding accessibility issues and got more feedback for accessibility planning and design when the accessibility advisor worked there.

The interviews shed some light on why municipal transport planners cooperate to a lesser extent with interest organisations. An interviewee from "I-TOT" municipality explained that while meeting with the interest organisation, some people were more determined than others were. Consequently, representatives from the interest

organisations pushed for the needs of only one-user group. As exemplified by the interviewee:

> "*I think I would more actively seek their view, if it wasn't that some individuals in the group are very determined and others sit silent" (F).*

Knowledge and use of Directives and Recommendation (DR-index)

The DR-index as presented in the longitudinal design of the study (Paper 1), is an indicator of awareness among municipal transport planners of different directives and recommendations associated with accessibility planning and design. A change in the DR-index is an indication of interest in accessibility issues among the municipal transport planners. More specifically, it displays the transport planners' own initiatives to seek relevant information on accessibility issues. Furthermore, it is an indication of the level of awareness that accessibility issues in the outdoor environment receive in the municipality.

Table 13 displays results for the individual DR-index components, both for the entire data set and for the "I-TOT" and "D-TOT" groups, respectively. The bottom of the table, provides the mean for T1 and T2, respectively as well as the sum of all the DR-index components.

Results for the entire dataset revealed that there was little or no progression between T1 and T2 regarding awareness of directives and recommendations. In fact, the mean value decreased between T1 and T2 (not fulfilling the statistical significance criterion $P<=0.05$). Interestingly, differences between "I-TOT" and "D-TOT" groups were more distinct for the DR-index than the SF-index. Awareness of most directives increased among the "I-TOT" municipalities while it decreased among the "D-TOT" municipalities.

Table 13: Changes in each of the DR-index components, along with the mean and sum, on group level. The table displays results for the entire data set, as well as the "I-TOT" and" D-TOT" groups, individually

	Entire sample			"I-TOT"			"D-TOT"		
	T1 N (%)	**T2** N (%)	**P**	**T1** N (%)	**T2** N (%)	**P**	**T1** N (%)	**T2** N (%)	**P**
DR1	72 (61%)	77 (65%)		25 (45%)	37 (66%)	**	45 (78%)	37 (64%)	*
DR2	63 (53%)	38 (32%)	**	21 (38%)	23 (41%)		41 (71%)	12 (22%)	***
DR3	54 (46%)	38 (32%)	**	22 (39%)	27 (48%)		31 (53%)	9 (16%)	***
DR4	50 (42%)	40 (34%)		16 (29%)	18 (32%)		33 (57%)	20 (35%)	*
DR5	51 (43%)	69 (58%)	**	19 (34%)	40 (71%)	***	31 (53%)	27 (47%)	
DR6+	-	85 (72%)							
DR7+	-	66 (56%)							
DR8+	-	116 (82%)							
DR9+	-	74 (63%)							
DR10+	-	38 (32%)							
Added DR-index									
Mean (Standard deviation)	2.5 (1.6)	2.2 (1.4)		1.8 (1.6)	2.6 (1.6)		3.1 (1.4)	1.8 (1.2)	
Sum on group level	290	262		103	145		181	106	

* P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

+Components only included in the questionnaire in T2

Results from the longitudinal design of the study revealed that the municipal transport planners are not as aware of or use DR1 (BFS 2013:9 HIN3) in T2 as in T1. The DR1, or HIN3, is a directive specifically issued in relation to accessibility policy. However, between T1 and T2 new directives were issued (DR6-DR10 in

Table 13) which may have replaced some older ones (DR1-DR5). For example, a quite large proportion of the transport planners were aware of DR8 (VGU, 82%).

Awareness of directives and recommendations was not specifically addressed in the in-depth design of the study. However, the interviewees discussed general awareness of accessibility issues in the municipalities. Those citations indicate why accessibility design may not always comply with standards.

One of the interviewees suggested that all actors (maintenance workers, planners, politicians) involved in accessibility work in the municipality, have to become more aware of the importance of accessibility issues as a transport-related issue. For example, winter maintenance staff should understand why it is important not to leave a heap of snow at pedestrian crossings

"*So that people with rollators or in wheel-chairs can cross a street" (E).*

One interviewee indicated that consultants needed to become more aware of accessibility issues. Consultants are contracted to carry out a considerable amount of transport design in the municipality. The interviewees mentioned that involvement of a number of consultants might lead to inconsistent planning and design. In addition, some consultants seem to forget about accessibility issues.

Focus on older people in daily planning (OFIP-index)

In the longitudinal design of the study (Paper 1), changes in the OFIP-index indicate changes in the municipality's awareness and acknowledgement of accessibility as a transport issue for older people.

Table 14 reveals results for the entire data sample, "I-TOT" and "D-TOT" groups. Results for the entire data sample showed that changes in OFIP-index were minor between T1 and T2. In most cases, respondents in T2 were less positive towards OFIP components than in T1. More importantly, the distinction was clear between "I-TOT" and "D-TOT" groups. Municipalities in the "I-TOT" group were more positive towards OFIP components in T2 than in T1, while "D-TOT" municipalities were more negative in T2 than in T1.

Table 14: Changes in OFIP-index, its mean and sum for each group and each OFIP component for the entire data sample as well as for "I-TOT" and "D-TOT" groups. Each OFIP-component is explained in Table 5 and Table 6

	Entire sample			"I-TOT"			"D-TOT"		
	T1 N(%)	**T2** N(%)	**P**	**T1** N(%)	**T2** N(%)	**P**	**T1** N(%)	**T2** N(%)	**P**
OFIP1*	60 (51%)	51 (43%)		17 (30%)	37 (66%)	***	41 (71%)	13 (22%)	***
OFIP2*	70 (59%)	52 (44%)		24 (43%)	37 (66%)	**	44 (76%)	13 (22%)	***
OFIP3*	71 (60%)	67 (57%)		22 (39%)	44 (79%)	***	47 (81%)	21 (36%)	***
OFIP4*	60 (51%)	60 (51%)		21 (38%)	39 (70%)	**	37 (64%)	19 (33%)	**
OFIP5*	23 (19%)	35 (30%)		8 (14%)	25 (45%)	**	14 (24%)	9 (16%)	
OFIP6*	25 (21%)	40 (34%)	**	9 (16%)	30 (54%)	***	15 (26%)	9 (16%)	
OFIP7*	68 (58%)	67 (57%)		26 (46%)	43 (77%)	**	40 (69%)	22 (38%)	**
OFIP8*	74 (63%)	79 (67%)		28 (50 %)	49 (89%)	***	42 (72%)	28 (43%)	
OFIP9*	62 (53%)	49 (42%)		22 (39%)	31 (55%)		38 (66%)	15 (26%)	***
OFIP14*	76 (64%)	69 (58%)		33 (59%)	36 (64%)		40 (69%)	30 (52%)	
OFIP17*	27 (23%)	36 (31%)		3 (5%)	27 (48%)	***	23 (40 %)	8 (14%)	*
OFIP18*	51 (43%)	40 (34%)		14 (25%)	29 (52%)	**	36 (62%)	10 (17%)	***
Added OFIP-index									
Mean (SD)	10.3 (4.6)	9.8 (4.7)		7.8 (4.1)	12.7 (4.1)		12.8 (3.5)	7.0 (3.3)	
Sum on group level	667	645		227	427		417	197	

* P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

Despite differences in TOT-index and results for the OFIP-index, there was a consensus among the interviewees in the in-depth part of the study regarding one element of accessibility policy. The interviewees discussed how there is a better

understanding of accessibility and its importance for all. The interviewees claimed that this understanding was also apparent among politicians and in society. One of the interviewee in an "I-TOT" municipality exemplified this when saying:

"Before the turn of the century, accessibility was thought to benefit a small group of people. That is, they thought it was a small group. But, now it is so obvious that when you do such an action (implement accessibility measures*) more people understand that you are not just doing it for a small group of people, it is a quite large group" (G).*

The User Study

The User Study contains results from two papers, one with cross-sectional design (Paper 3) and one with a longitudinal design (Paper 4).

Paper 3 displays differences in older people's perceptions of the outdoor environment between two areas.

Paper 4 displays older people's perceptions of the outdoor environment after an intervention in the outdoor environment, while controlling for ageing.

Paper 3 - Cross-sectional design

Person characteristics

Figure 5 displays characteristics of the respondents in SA (Study Area) and RA (Reference Area). The results showed that respondents in SA and RA shared similar characteristics. Mean age (77 in SA and 76 in RA), proportion of gender and perception of health were quite similar in both areas. Furthermore, respondents in SA and RA reported "use of mobility devices" to a similar extent. On the other hand, respondents in SA reported more "movement and cognition/perception related) functional limitation", "dependence on walking", and more were "living alone".

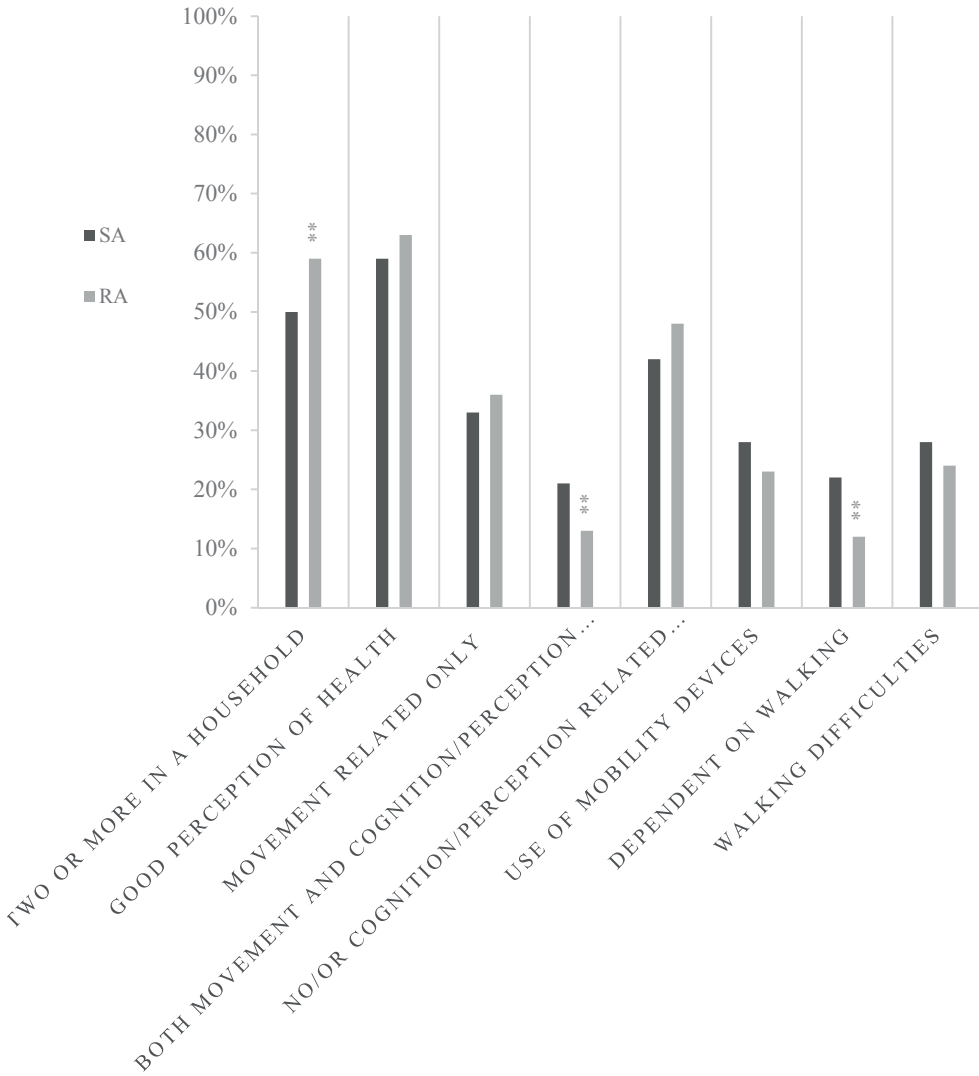

Figure 5: Proportion of different characteristics among respondents' in SA and RA and statistical differences between them. * P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

Impact on frequency of activity

Table 15 displays results for frequency of walking and frequency of activity for respondents from SA and RA. The table shows that despite the fact that respondents from SA experienced more "both movement and cognition/perception related

functional limitations", they were significantly more active in terms of walking and participating in activities than respondents from RA.

Logistic regression models were run to investigate the possible impact of the intervention on differences in frequency of activity. The results showed that compared to RA, respondents in SA having "poor perception of health" were more likely to participate often in activities (P=0.000). On the other hand, respondents in SA having access to either a car or STS ("not dependent on walking") were more likely to participate often in activities than their counterparts in RA (P = 0.000).

Another result showed that, in comparison with respondents from RA, respondents living in SA who experience infrastructure barriers were more likely to be frequent walkers (P = 0.034; OR = 2.87).

Impact on perception of the outdoor environment

Table 15 displays perception of the outdoor environment in SA and RA. The table shows that respondents from SA and RA had similar evaluations of their outdoor environment. However, compared to RA, respondents in SA experienced more "infrastructure" and "traffic barriers". On the other hand, experience of "fear/anxiety barriers" was similar in both areas (difference not fulfilling statistical criteria P <=0.05).

Table 15: The table displays differences in frequency of walking and activity, evaluation of the outdoor environment and experience of environmental barriers between respondents in the Study Area (SA) and the Reference Area (RA)

N (%)	SA	RA
High frequency of walking	287 (81%)	196 (69%) ***
High frequency of activity	232 (66%)	128 (45%)
High evaluation of the outdoor environment	263 (76%)	213 (76%)
Experiences infrastructure barriers	178 (50%)	83 (29%) ***
Experiences traffic barriers	93 (28%)	40 (15%) **
Anxiety and fear	67 (19%)	45 (16%)

* P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

Figure 6, Figure 7 and Figure 8 display experience of each barrier (within "infrastructure barriers", "traffic barriers" and "fear/anxiety barriers" groups). The figures show that respondents in SA and RA agreed, for the most part, what barriers are the most problematic, although respondents from SA reported them to higher degree than respondents in RA.

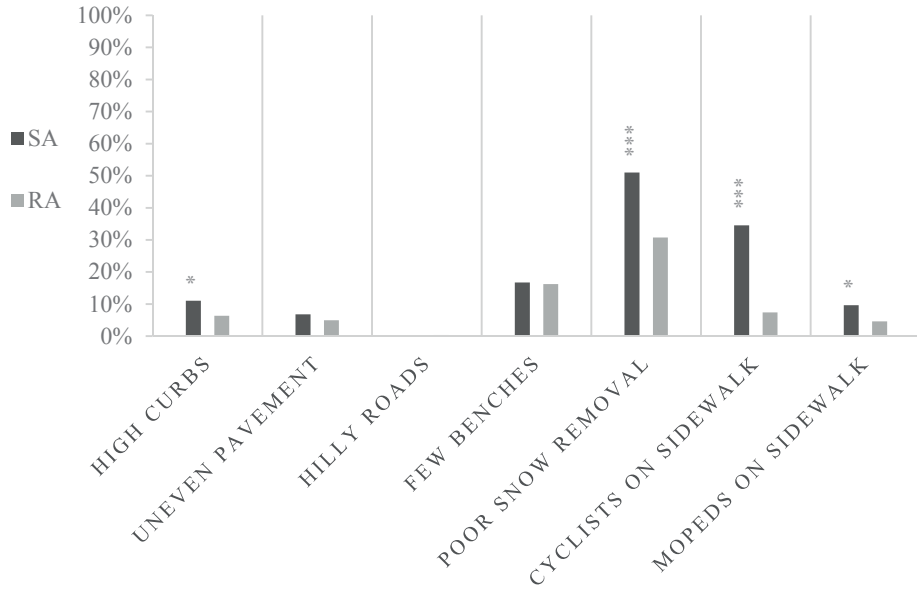

Figure 6: Experience of infrastructure barriers among respondents in SA and RA and statistical differences between the groups * P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001.

Both respondents in SA and RA perceived "poor snow removal" as the most problematic infrastructure barrier (see Figure 6). Still, experience of the barrier "poor snow removal" was significantly higher for the respondents in SA. Similarly, among respondents in SA and RA the most reported fear/anxiety barrier was "fear of falling" (see Figure 8). Respondents in SA perceived "short green time while crossing the street" as the most problematic traffic barrier, while respondents in RA perceived "heavy traffic" the most problematic (see Figure 7).

The logistic regression models gave little or no results. Still, the analysis revealed that, compared to RA, respondents living alone in SA were less likely to experience "fear and anxiety" (P = 0.003; OR = 2.04).

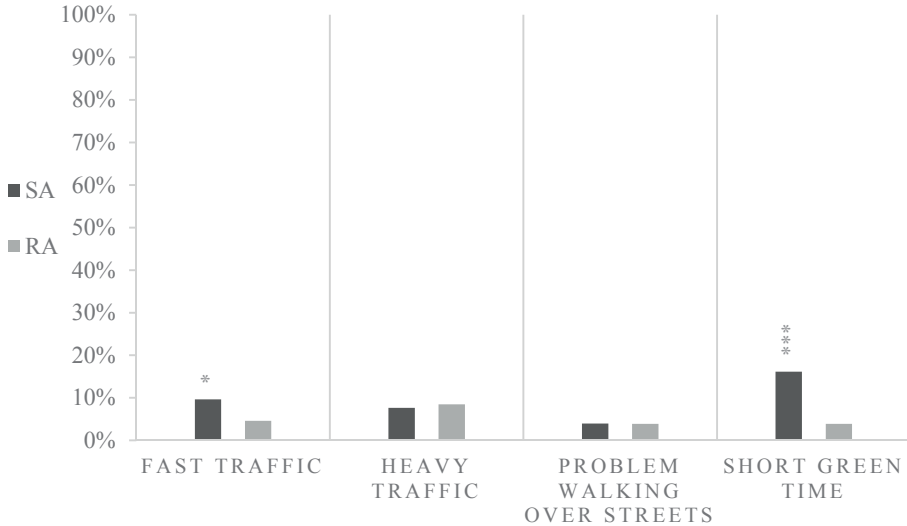

Figure 7: Experience of traffic barriers among respondents in SA and RA and statistical differences between the groups * P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001.

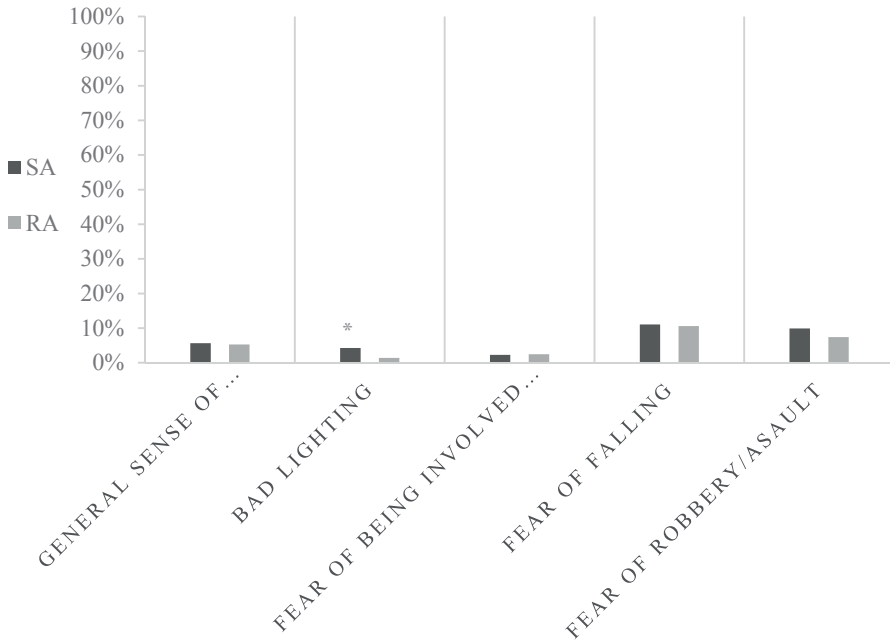

Figure 8: Experience of fear/anxiety barriers among respondents in SA and RA and statistical differences between the groups * P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

Paper 4 - Longitudinal design

Person characteristics

Figure 9 displays characteristics of the respondents in T1, T2 and T3. We see that most changes in person characteristics happened after T2. Consequently, from T2 to T3, more of the respondents started to reach the fourth age and experience difficulties associated with ageing. More specifically, fewer were sharing a household with someone in T3 than in T1, fewer had good perception of health in T3 than in T1, more were dependent on walking in T3 than in T1 and more had walking difficulties in T3 than in T1. Experience of functional limitations and use of mobility devices increased between T1 and T2 and, therefore, also between T1 and T3. Respondent mean age was 72 years in T1, 76 years in T2 and 81 years in T3.

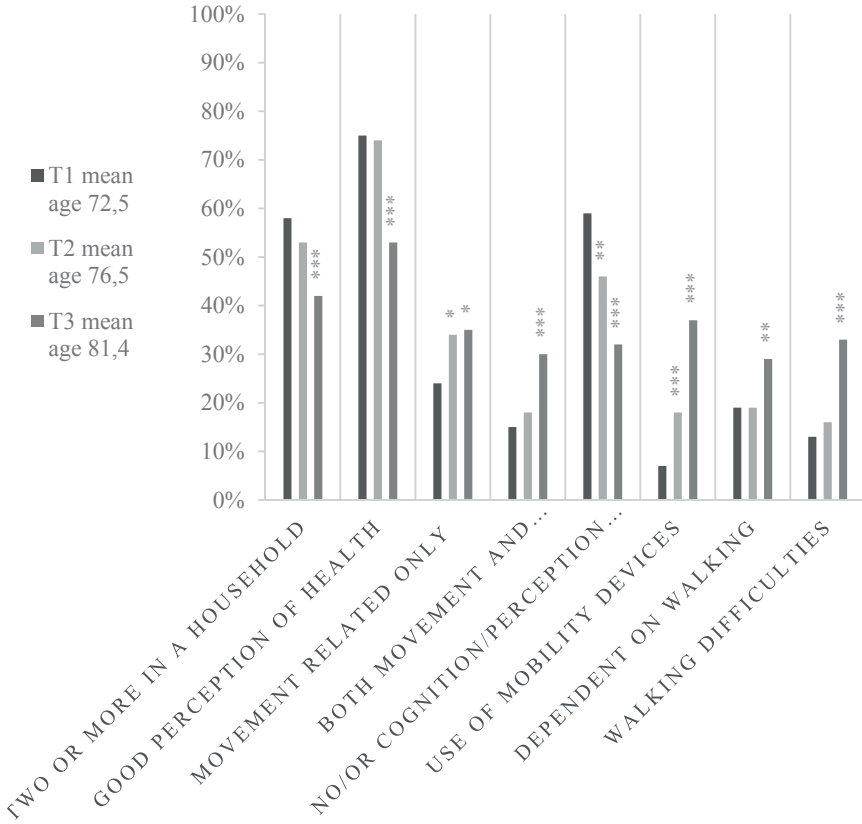

Figure 9: Characteristics of the respondents' from Paper 4 and statistical differences between data collections T1-T2 and T1-T3. * P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

Impact on frequency of walking

Table 16 displays frequency of walking in T1, T2 and T3. The results show that frequency of walking decreased considerably among the respondents from T2 to T3. This result may be in relation with Figure 9, showing increased experience of health-related difficulties that can affect walking.

Controlling for ageing, logistic regression models for frequency of walking showed that, compared to T1, respondents using mobility devices were more likely to be frequent walkers in T2 (P = 0.006) and T3 (P = 0.008).

Impact on perception of the outdoor environment

Table 16 shows that the respondents evaluated their outdoor environment higher after the intervention (T2) than before (T1). That difference did not fulfil the statistical criterion P<= 0.05. In T3, however, the respondents' evaluated the outdoor environment lower. The evaluation in T3 was lower than that in T1. The difference between T1 and T3 fulfilled the statistical significance criterion P<=0.05.

Table 16 also shows that experience of environmental barriers significantly decreased among the respondents between T1 and T2. However, between T2 and T3 it increased again. Still, experience of environmental barriers was lower in T3 than in T1 (fulfilling statistical significance criteria).

Table 16: The table displays differences in frequency of walking, evaluation of the outdoor environment and experience of infrastructure barriers between baseline (T1), first follow-up (T2) and second follow-up (T3)

N(%)	T1	T2	T3
High frequency of walking	104 (92%)	102 (90%)	86 (76%) ***
High evaluation of the outdoor environment	89 (79 %)	97 (86 %)	77 (68 %) *
Experiences infrastructure barriers	72 (64 %)	22 (20 %) ***	49 (43 %) **
Experiences traffic barriers	31 (27 %)	8 (7 %) ***	15 (13 %) **

* P≤ 0.05; ** P≤ 0.01 and *** P ≤ 0.001

The logistic regression models showed, to begin with, that respondents dependent on walking were more likely to experience traffic barriers in T2 than in T1 (P=0.038). The logistic regression models also revealed that respondents reporting a "good perception of health" were more likely to give high evaluation to the outdoor environment in T3 than in T1 (P=0.055). At the same time, respondents reporting "functional limitations" were less likely to give high evaluation to the outdoor environment in T3 than in T1 (P=0.060).

Further, the results showed that respondents with functional limitations were less likely to report traffic barriers in T3 than people without functional limitations did (P=0.029). Therefore, Table 17 displays the two groups, people with and people without functional limitations and reported traffic barriers in T1,T2 and T3. The table shows that in T1, respondents with functional limitations reported traffic barriers to a greater extent than did respondents without functional limitations. However, in T2 both groups were experiencing positive effects of the intervention and reported fewer traffic barriers. In T3, on the other hand, respondents without functional limitations were reporting traffic barriers similarly as they did in T1, while people with functional

limitations were still experiencing positive effects of the intervention and reported traffic barriers almost to the same extent in T2 and T3 (see Table 17).

Table 17: Experience of traffic barriers among people with and without functional limitations in T1 – T3

Experience of traffic barriers			
	T1	T2	T3
People without functional limitations	18%	2%	18%
People with functional limitations	41%	12%	14%

Discussion

An accessible outdoor environment is a prerequisite for a mobile life for older people and people with disabilities. However, in a worrying development, some municipalities seem to reduce their efforts after perceiving that they have fulfilled most requirements of accessibility policy. More importantly, results in this thesis show that it is necessary to raise municipalities' awareness of the fact that an accessible outdoor environment can enhance older people's possibilities to have an active life, even as they age. Positive results from the User Study should be an encouragement for all municipalities to ensure an accessible and usable outdoor environment for their citizens.

Accessibility refers to compliance with laws and regulations (Iwarsson and Ståhl 2003). Consequently, it should be in the hands of the society to ensure an accessible outdoor environment. For that reason, both the Planning and Building Act (2.chapter 3§ in SFS 2010:900) and the National Transport Policy Objectives (Prop. 2008/09:93) state that the transport system should be designed to meet *everyone's* needs. Through strict legislation, the responsibility of providing an accessible outdoor environment has been placed in the hands of the municipalities in Sweden. It is their responsibility to take strategic decisions, such as to establish accessibility plans with the aim of eliminating barriers. Therefore, municipalities must consider implementing accessibility measures that focus on broader needs of the users, such as where they have access to health care, groceries and activities (Rosenberg et al. 2013). This also includes geographical accessibility, to ensure that people with physical limitations may be able to walk to reach their destination (Mollenkopf et al. 1997, Shumway-Cook et al. 2003, Ståhl et al. 2008, Rantakokko et al. 2012, Nordbakke 2013, Berg et al. 2014, Stjernborg et al. 2014b, Berg et al. 2015). The results from the User Study in this thesis showed that accessibility interventions that focus on the user have a possibility to facilitate walking for older people, even as they age. Accessibility measures may increase older people's chances of an independent life and as a result increase their quality of life. Thus, it is important that the municipalities do not adhere to accessibility policy with an "administrative approach" (as explained by Manley (1996)). They should consider the users and their needs when they are implementing accessibility measures. Otherwise, the users may not actually experience that their situation has improved (Curl et al. 2011).

The most effective way of ensuring an accessible and usable outdoor environment for all is to involve the users in the planning process (Øvstedal et al. 2008, Risser et al. 2010, Wennberg et al. 2013). That is why it is emphasised both in The National Action Plan for Disability and the UN Convention of the Rights of Persons with Disabilities (Prop. 1999/2000/79; United Nations, 2006) that people with disabilities should be consulted and should take part in the planning processes. Results from this thesis showed that there has been a noticeable regression regarding cooperation between municipalities and interest organisations. A similar trend was found in one of the follow-ups on The National Action Plan for Disability in 2008 (Skr., 2009/10:166), but no explanations were given. Interviewees in this thesis indicated that the reason for this trend was poor representation from the interest organisations. According to the interviewees, a possible reason for this development was that representatives from interest organisations focus too much on their own restrictions when they should be representing the needs of the entire group. It is difficult to achieve an accessible outdoor environment that will consider all people, because people with different limitations have different needs, and sometimes they have conflicting needs (Carlsson et al. 2002). With that being said, decreased cooperation with interest organisations is not a positive development. Transport planners should cooperate with interest organisations to understand the needs of the users, especially because it seems that they do not share the same view of user needs (Amann et al. 2006). Results from the interviews emphasise the importance of representatives from the interest organisations becoming more professional. At the same time, the results also emphasise the importance of transport planners taking actions and cooperating with the interest organisations. This is especially important bearing in mind results from the User Study, which highlight that user involvement can lead to successful and positive impact on user perception of the outdoor environment; i.e. usability. Cooperation with the interest organisations can also be beneficial for transport planners, because it can provide them with greater understanding of the users and their needs (Engelbrektsson et al. 2004).

The older people living in the Study Area (SA) influenced where and what barriers were eliminated in their outdoor environment. It is likely that the user involvement in the project was the reason why older people in the Study Area had higher frequency of activities than their counterparts in the Reference Area (RA). The user involvement may also have facilitated participation in activities for people with poor perception of their health in the Study Area, who had higher frequency of activities outside the home than their counterparts in the Reference Area. Thus, the results from this study confirm that involving users in the design process can lead to improved usability (Frid et al. 2000, Bevan and Croucher 2011, Fitzgerald and Caro 2014, Krogstad et al. 2015). Of course, it is possible that there are other underlying factors influencing respondents in

the Study Area to participate in activities outside the home. One such factor is social cohesion in the neighbourhood, which can affect frequency of outdoor activities (Mendes de Leon et al. 2009). Nevertheless, the results indicate that interventions in the outdoor environment, that consider the users and their needs can assist older people to participate in activities outside the home. Considering that participation in activities outside the home is important for older people and their psychological health (Lampinen et al. 2006; Hovbrandt et al. 2007; Hjorthol 2012), this result serves as an encouragement for municipalities as a reminder of why they should continue to eliminate environmental barriers. Considering the aging population, this result is also important, because as people age they want to continue to participate in activities they are familiar with and that contribute to increased life satisfaction (Hovbrandt et al. 2007 Tollen et al. 2008, Mollenkopf et al. 2011). For those reasons, municipalities should eliminate environmental barriers and they should involve people with disabilities and older people in the process.

Results in this thesis emphasise the importance of eliminating environmental barriers in the outdoor environment to ensure participation in activities of older people who do not have access to a car nor are entitled to STS. More specifically, the older people in the User Study who had either access to a car or STS and were living in the Study Area were more likely to have high frequency of activities outside the home than their counterparts in the Reference Area. It has been emphasised that people have to be mobile in order to live an independent life and participate in activities outside the home, (Wessels et al. 2004; Lampinen et al. 2006; Michael et al. 2006; Hjorthol 2012; Iwarsson , Ståhl and Löfqvist 2013; Rosenberg et al. 2013; Nordbakke and Schwanen 2014). This does not imply that people have to have access to a car to be able to participate in activities. Indeed, the car facilitates, because it allows people to cover longer distances and, therefore, increases people's chances of finding activities they wish to participate in. However, at some point, older people will not be able to drive anymore, whether that is due to poor health (Hjorthol 2012) or restrictions placed on the car due to environmental issues (Sustainable cities 2014; CIVITAS 2014). Then and there, society must be prepared to handle the growing population of older people who need to rely on walking to access services and participate in activities. Nordbakke and Schwanen (2014) suggested that older people should be guaranteed access to a car, even as they get older. Certainly, that would help some older people, but not all. Therefore, we must also stress how important it is that older people are guaranteed access to the transport system, regardless of the means of transport. We must not forget that all journeys start and end with walking. Thus, an accessible outdoor environment plays a central role in older people's (and all people's) mobility (Stjernborg et al. 2014). Implications of an accessible outdoor environment for older people may not only help

them to stay mobile; it also provides them with opportunities of staying socially and physically active, which is equally as important to older people (Nordbakke and Schwannen 2014, Berg et al. 2015). It is in the interest of both older people and society to provide opportunities for a physically and socially active life. Therefore, a number of studies have focused on identifying environments that facilitate walking and encourage older people to walk (see Balfour and Kaplan 2002, Owen et al. 2004, Li et al. 2005, Michael et al. 2006, Dawson et al. 2007, Kerr et al. 2012, Rantakokko 2012, Eronen et al. 2014 amongst other). Such studies have suggested that identifying and implementing such features, may encourage older people to walk more. It has been proposed that such features could help older people to live an active, mobile and independent life and prevent them from developing walking difficulties. In view of that, the results in this thesis indicating that the interventionin the outdoor environment did not increase frequency of walking among older people may be interpreted as somewhat disappointing. However, that result is not surprising since similar results have been found in other intervention studies in the outdoor environment (Wennberg et al. 2010; Ward Thompson et al. 2012; Ståhl et al. 2013). It is important to emphasize that these studies all concluded that older peoples' perception of the outdoor environment was more positive after the interventions, which agrees with results presented in this thesis. A contributing factor to decreased frequency of walking may be that the respondents grew older. Such an interpretation is in line with Lawton's Ecological Model of Ageing (Figure 1). Referring to the Ecological Model of Ageing, the respondents' competence decreased between the studies. Simultaneously, the environmental pressure decreased, due to the intervention. The respondents reported more health-related problems while the environmental pressure decreased. Therefore, applying Lawton's vocabulary, the intervention extended the zone of maximum comfort and performance potential among the respondents. In light of this, it is safe to state that it is possible that frequency of walking would have decreased even more if there had been no intervention. Referring to the International Classification of Functioning and Disability (ICF), longitudinal results from the intervention show that both environmental and personal factors influence participation in activities (in this case, walking).

From the longitudinal design of the User Study, one thing is evident. The intervention in the outdoor environment was successful in terms of both accessibility and usability. From a societal perspective and in terms of accessibility, measures such as those presented in the Swedish governmental directives (BFS 2013:9 HIN3; BFS 2011:5 ALM2) facilitate walking for people who are more fragile. From the individual perspective, however, benefits of an intervention in the outdoor environment may not be as evident for people who are healthy or perceive that their health is good. Such an

interpretation is supported by findings regarding traffic barriers and people with functional limitations (see Table 17). The findings show that on first and second follow-up, people with functional limitations reported fewer environmental barriers than at base-line. Conversely, people without functional limitations reported fewer barriers on first follow-up but on second follow-up they reported traffic barriers to the same extent as at baseline. One interpretation of this result is that an impact of an intervention in the outdoor environment is not evident for people *without functional limitations*. This result can also be associated with the Hawthorne effect, which is a well-known phenomenon in longitudinal studies and describes how the awareness of being in a study can affect the respondents' answers (Amici et al. 2000). First follow-up was shortly after elimination of the environmental barriers in the outdoor environment. The study was current, and possibly, respondents *without functional limitations* were too aware of the intended impact, thus providing results that were more positive. On second follow-up, nine years after baseline, it is possible that the respondents' recollection of the intervention had declined. Consequently, the respondents provided fewer biased results. For respondents with functional limitations, the environmental pressure of the area decreased from baseline to first follow-up. On second follow-up, respondents with functional limitations continued to report few traffic barriers. One interpretation of this result is that the intervention facilitated walking for people with decreased competence. This interpretation is also supported by the results in this thesis showing that people who use mobility devices were more likely to be frequent walkers on first and second follow-up than at baseline. Furthermore, this result is in line with other cross-sectional and long-term studies, which have shown that those who benefit the most from accessibility intervention in the outdoor environment are people with decreased competence (Wennberg et al. 2010; Ståhl et al. 2013). However, what is novel about the results presented here is the revelation that such results are not a coincidence. There seems to be a cause and effect relationship between a removal of environmental barriers and positive benefits for people who have decreased competence. These results would agree with Lawton's Ecological Model of Ageing. The intervention in the outdoor environment has decreased the environmental pressure on people who are more fragile, even as their competence decreased (Lawton and Nahemow 1973). This is a promising result because other research has shown that barriers in the outdoor environment become even more difficult to overcome as people age (Lofqvist et al. 2009). Nevertheless, there might be another interpretation of this result, which relates to SOC theory. It is possible that the environmental pressure decreased among the respondents (the oldest old) because they are compensating for their physical and cognitive limitations by choosing to walk where they can and, therefore, not encountering as many environmental barriers (Shumway-Cook et al. 2003; Lofqvist et al. 2009; Nordbakke 2013). It is possible that the oldest old people

are so focused on their own restrictions that they do not notice restrictions in the outdoor environment. Therefore, the results might be demonstrating that experience of traffic barriers has decreased among the respondents with functional limitations because they choose to walk where they know they will not encounter traffic barriers. Unfortunately, since studies exploring interventions in the outdoor environment in such a longitudinal perspective are scarce, it is difficult to put the results in a broader perspective. On the other hand, it is possible that the results presented in this thesis adhere to results from longitudinal studies of interventions in the indoor environment, which display decreased environmental pressure (Wahl et al. 2009). However, such interventions have the possibility to remove barriers that are specifically challenging for the individual in question and do not have the same amount of dynamic barriers (such as snow, leaves, other people, pets, bicycles etc.) that affect usability as the outdoor environment. To sum up, the results presented in this thesis are promising, but they have to be interpreted cautiously. Having said that, interventions in the outdoor environment have to consider all groups, different needs and, sometimes, conflicting needs (Carlsson et al. 2002). Thus, the results stress how important it is that planners working with accessibility in the outdoor environment are aware of the needs of different groups and are able to consider them when planning and designing the environment. They also highlight the positive effects of accessibility measures, and should encourage municipalities to take further actions regarding removal of environmental barriers. Municipal politicians and transport planners must also understand that an accessible outdoor environment will not be achieved with selective measures; barriers and facilitators have to be monitored and evaluated on a regular basis.

Results from this thesis highlight that the outdoor environment will not become accessible to all if the organisational engagement in accessibility is not clear and if all employees in all departments, at all levels in the municipality are not aware of the significance of accessibility issues. All actors involved in accessibility work, from politicians to maintenance workers, should be aware of why accessibility measures are implemented. This is important because poor maintenance of the accessibility measures in the Study Area may have been the reason why respondents in the Study Area reported more environmental barriers than their counterparts in the Reference Area. That is, respondents in the Study Area reported more environmental barriers than did their counterparts in the Reference Area. However, respondents in the Study Area reported all barriers to a larger extent than respondents in the Reference Area. This was true even for poor snow removal, which should not differ between the areas. Actually, the municipality has not been able to maintain the same high accessibility standards as during the implementation phase. This suggests that differences between the areas may be ascribed to poor maintenance of the accessibility measures. Nevertheless, this result

is quite contradictory, bearing in mind previous statements regarding the positive longitudinal impact of the intervention. Still, it has to be highlighted that in the longitudinal design of the User Study, the respondents reported more barriers on second follow-up than they did on first follow-up. It is possible that the respondents in the longitudinal design of the User Study reported more barriers because their competence had decreased. Nevertheless, there is also a possibility that high frequency of outdoor activity among the respondents in the Study Area had something to do with this result. It is possible that respondents in the Study Area reported more barriers than did the respondents in the Reference Area, simply because they walk more. This is in line with result from the Cross-Sectional part of the User Study, showing that respondents in the Study Area who walk more, report more environmental barriers and also in line with other studies (Dawson et al., 2007b; Wahl et al., 2011; Carlson et al., 2012). A third possible explanation of this result could be that respondents in the Study Area reported more barriers because they had greater expectations for the outdoor environment due to the intervention. In fact, people living in the Study Area complained about the intervention not being evenly distributed (Ståhl et al. 2008). Nevertheless, the results highlight that an accessible outdoor environment will not be achieved with selective measures. Accessibility measures should be monitored and evaluated on a regular basis.

One possible reason behind the regression in implemented accessibility policy found in the Municipality Study might be somewhat related to what the interviewees indicated: accessibility issues are receiving restricted budgets. Restricted budgets are a known barrier for implementation of diverse transport policies (see for example Lucas 2012 and Hull 2008). Restricted budgets would explain differences in implemented accessibility policy between the municipalities and why municipalities seem to reduce their efforts when they perceive that they have fulfilled all mandated requirements of accessibility policy. Besides budget issues, Grönvall (2004) identified lack of engagement as a barrier for implementation of accessibility policy. Findings in this thesis indicate that engagement and the lack of engagement on organisational and personal levels may be a contributing factor for both regression and progression in the implementation process of accessibility policy. Concerning the organisational level, some of the municipalities in this thesis are acting with an "administrative approach" as described by Manley (1996). That is, some of the municipalities are taking actions to fulfil requirements but do not go beyond that; they use restricted resources (money, staff) as an excuse for regression or stagnation. Manley (1996) also mentioned that municipalities applying an "administrative approach" are more likely to have an accessibility advisor working in the municipality who is placed in the building department and has no communication or cooperation with the transport department.

A similar result was found in this thesis. At first glance, it was positive that results from the longitudinal design of the Municipality Study showed that more municipalities have accessibility advisors working in the municipality on the follow-up (T2). However, findings from the in-depth design of the Municipality Study indicated that in some municipalities, accessibility advisors are not consulted regarding the transport environment. Therefore, some municipalities seem to be taking an "administrative approach" towards accessibility. They comply with requirements, but the organisational engagement towards accessibility is too small. Accessibility advisors' roles in the municipality must be clear if they are to facilitate the accessibility work in all departments. On the individual level, the results are in line with Grönvall's (2004) findings regarding engagement. Municipal transport planners who are not willing to have conflicts with other employees to push accessibility issues forward are using restricted budgets, lack of time and staff as an excuse for not considering accessibility. The transport planners are not willing to come into conflict with other people because the issue of accessible outdoor environment is not important enough to them. On the other hand, employees who are passionate about accessibility issues push them forward and ensure that they are always considered. This can be regarded as single employee/politician initiatives, also identified in other research as (or suspected to be) an important factor for progression for implementation of transport policies (Ison and Rye 2005; Hull 2008; Gudmundsson et al. 21012; Kilby and Smith 2012; Wennberg and Hyllenius Mattisson 2013). Accessibility is an important issue among these employees who seem to be the driving force behind accessibility work and want to ensure that it is not overlooked in planning. These findings emphasize the importance of all municipalities having an employee who is passionate about accessibility issues. However, these findings are also worrying, because accessibility issues should not depend on a single employee pushing them forward. Another finding regarding the individual responsibility is the results showing that the municipal transport planners are not as aware of and use DR1 (BFS 2013:9 HIN3) in baseline (T1) as in follow-up (T2) of the Municipality Study. This is a worrying development, because DR1, or HIN3, is a directive specifically issued in relation to accessibility policy. It was first issued in 2003 (BFS 2003:19 HIN1), with changes in 2011 (BFS 2011:13 HIN2) and again in 2013 (BFS 2013:9 HIN3). In T2, one would expect more municipal transport planners to be aware of and use HIN, but that was not the case. There are two possible explanations for this result. First, the transport planners are simply not dedicated enough to accessibility to seek relevant information. Second, between baseline and follow-up new directives were issued (DR6-DR10 in Table 13). It is possible that some of the new directives replaced some older ones (DR1-DR5). Results from the questionnaire revealed that many respondents were aware of and used the new directives such as VGU (DR8), which is a directive that The Swedish National Transport

Association issued to try to gather most directives into one. Results from the questionnaire showed that most planners are aware of and use DR8. However, it is possible that the planners are aware of VGU because it covers most topics in road and traffic planning and, therefore, they are not using VGU specifically for accessibility. This means that there is no guarantee that they are employing VGU for accessibility planning. Regardless of the reason, accessibility should be integrated in municipal transport planning to the extent that it is always considered, despite employee changeover or new directives being issued. In terms of societal responsibility and possible measures to halt this regression, the results indicate that there is a need for a more systematic approach to accessibility planning. A more systematic approach would ensure that accessibility issues are not overlooked and would guarentee that (Øvstedal et al. 2008; Wennberg et al. 2013, Manaugh et al. 2015)

- Accessibility measures would be properly maintained and evaluated on a regular basis
- Accessibility would become more integrated into the daily transport planning
- Cooperation with interest organisations would become more professional
- Accessibility advisors would be employed in the municipality and they would be consulted regarding accessibility issues in the outdoor environment
- Appropriate directives would be used when planning and designing the environment
- Plans would be put into practice. Municipalities would establish an accessibility plan with concrete objectives, which makes it possible to measure the progress.
- Accessibility would be employed in all departments in the municipality and all employees would be aware of directives issued in relation to accessibility.

Municipalities have the tools to move the process of implemented accessibility policy forward and stop developments like those revealed in this thesis. Audit tools have been developed and issued in Europe specifically to ensure that accessibility is integrated in transport planning (Øvstedal et al. 2008; Wennberg et al. 2013). Unfortunately, they are still rarely used.

Methodological considerations

Studies conducted in this thesis are long-term. Exploring studies in a long-term perspective includes some challenges, which also means that the studies contain different strengths and weaknesses. The primary method applied in this thesis was quantitative. However, qualitative method was used in Paper 2 as part of a mixed-method approach.

The Municipality Study

It is important to establish means and tools to evaluate the implementation process of transport policies. Wennberg et al. (2009) established indicators to be able to evaluate the level of implementation of accessibility policy in Sweden. Without their indices, it would have been difficult to evaluate the level of implementation in such a long-term perspective. The Municipality Study was a follow-up study, where the implementation process was evaluated by comparing replies from transport planners' who answered the questionnaire after a ten year interval. Evaluating the implementation process in such a long-term perspective involves some methodological challenges. For example, personnel changeovers between 2004 and 2014 may have influenced the results. This especially applies for the OFIP-index, which is the respondents' subjective evaluation of how accessibility is treated in municipal transport planning. It is possible that planners who are more enthusiastic about accessibility issues perceived that the level of engagement in the municipality is insufficient. Nevertheless, the OFIP-index showed similar trends as the more measureable SF- and DR-indices, which strengthens the results regarding the OFIP-index.

Regarding statistical considerations, it might have served the logistic regression models better if the chosen model formulation had been reversed. I.e. it might have been possible to consider that strategic decisions and actions taken in the municipality can affect planners and politicians views of accessibility issues (or statements categories). However, there were few causal links in the data. Therefore, this indicates that there is something else, not included in the models that is affecting the way that accessibility is handled. For instance, possible changes in political landscape and employee changeovers may have influenced the implementation process of accessibility policy.

The in-depth design applied in the Municipality Study was successful in capturing why differences in implemented accessibility policy occur. The mixed-method design has several advantages and one of them is that it can either confirm or reject hypotheses acquired from another method (Creswell et al. 2003). Due to the nature and aim of

this study, an embedded variant of mixed-method design was chosen. The qualitative design of the Municipality Study involved seven municipalities, which originally were to be eight. It might have helped to have a more extensive interview data. However, the mixed-method approach helped to establish findings that would not have been achieved using only quantitative or only qualitative data. The qualitative and quantitative data complemented each other. In line with that, the strength of the mixed-method part of the study lies in the long-term perspective and its practical use.

The User Study

The User Study was based on quantitative methods, relying on subjective measurement of the outdoor environment. Such a procedure has both strengths and weaknesses. Some suggest that subjective measures of the outdoor environment do not have as strong relationship with walking as objective measures do (Lin and Moudon 2010). On the other hand, studies exploring the relationship between walking and environment among older people have suggested that perceived measures are more successful than objective ones because subjective and objective measures affect health differently (Yen et al. 2009). Another difficulty in using subjective measures is the possibility that respondents interpreted the questions differently. In this study for instance, when the older people living in the areas were asked how they perceive their outdoor environment it is possible that some of the respondents believed that the question applied to their nearest surroundings, such as their own garden, and not the whole neighbourhood. Another concern in this study is that postal questionnaires as a method may impose difficulties for the oldest old, people with cognitive limitations or vision impairments living in the area. They may have experienced difficulties sending, reading and understanding the postal questionnaire and, therefore, may be underrepresented in the study. This also applies to people with cognitive limitations and people with vision impairments. It became clear when the data was analysed that it would have helped to include a question controlling for how far the respondents walk, in addition to how often they walk. On the more positive side, the strength of the User Study lies in its long-term perspective of an intervention in the outdoor environment and its practical nature. This is true because the intervention presented in this study is easily adaptable by other practitioners and politicians in cities, regions and municipalities.

Regarding the cross-sectional design of the User Study, comparison studies are always difficult because it is almost impossible to find two areas in which the outdoor environment shares identical characteristics. For example, closeness to city centre, shops and other services (Owen et al. 2004; Nagel et al. 2008) as well as difference in social cohesion (Fisher et al. 2004) have been related to differences in frequency of walking

between areas. Not to mention finding an area with respondents who have identical characteristics. Even though characteristics of respondents in the Study Area and Reference Area did not differ much, there are no guarantees that their perceptions of competence are the same. Therefore, it is difficult to state that differences between the areas are solely due to the intervention. Instead, differences in frequency of walking between the Study Area and the Reference Area may possibly be related to the fact that the Study Area is somewhat closer to the city centre. There is also a possibility that social cohesion in the neighbourhoods played some part in differences in frequency of walking between the areas (Mendes de Leon 2009). Social cohesion was not controlled for in the User Study. Some suggest that research exploring the connection between environments and physical activity have to have a broader scope (Handy 2005). Nevertheless, the strength of the cross-sectional design of the User Study lies in its comparative nature and the long-term perspective of an intervention in the outdoor environment that is scarce in the scientific literature.

The longitudinal design of the User Study was used to try to predict causal relationships. Such methods use measurements from the same individuals on several occasions and, therefore, can better distinguish between coincidences and true causes (Field 2009). However, statistical methods for a panel study can be tricky, as individual propensity has to be taken into account. In this study, logistic regression with random effects would have been the best choice. That variant of regression models can relate to the individual and, therefore, account for the individual's changes. However, regression models using random effects are difficult to handle and they often fail to converge due to no obvious reason (Field 2009). In this study all models except for one failed to converge. In the end, it was concluded that the data did not allow estimation with that level of dimensionality and another method was chosen, which included 16 different regression models (see Method chapter). Results from the one random effects model that converged were then compared with the corresponding model to ensure that the results were valid. The comparison revealed that the two methods gave similar results (similar β factors for the interaction terms). This strengthens the assumption that the results presented in the longitudinal design of the User Study are relevant. Another consideration concerning the longitudinal design is that there is always the possibility of the Hawthorne effects, which denotes that people perform better (or answer differently) when they are aware that they are participating in a study (Amici et al. 2000). This applies in this study, as some of the residents in the Study Area were quite involved in the study. Possibly, this might have affected the respondents' answers. However, that would only apply to a certain extent, because there were only eight people who were involved in the process, discussion and decisions about what barriers should be removed (Ståhl et al. 2008). A final reflection on the User Study is that it

may have benefitted from a more mixed-method approach to gain further understanding of how the intervention facilitated walking for the older people. Having said that, it has to be mentioned that the strength of this part of the study is that, to my knowledge, this is the first study to explore the effects of an intervention in the outdoor environment in such a longitudinal perspective.

Implications for research and policy/planning

The results presented in this thesis are interesting and might suggest further research on both planning and policy level.

It has been established from this thesis that removing barriers in the outdoor environment facilitates walking for people with functional limitations and who use mobility devices. As it is, a number of studies have investigated which environmental barriers and facilitators older people and people with disabilities experience. Some studies have taken on the task of examining whether the experience of environmental barriers decreases as they are removed, and the effect they have on walking levels among older people and people with disabilities (Wennberg et al. 2010; Ståhl et al. 2013; Ward Thompson et al. 2012; Curl et al. 2015). Studies that have examined the impact of an intervention on older people's perception of the outdoor environment, while controlling for ageing, are scarce. However, it is difficult to derive implications of interventions in the outdoor environment from a single study. Therefore, more research investigating removal of environmental barriers in a longitudinal perspective is needed. Future researchers have a unique opportunity to examine such implications in collaboration with municipalities who are in need of removing environmental barriers and placing facilitators in their outdoor environment. Such projects are both interesting and relevant research projects, due to their length and complexity (Short and Kopp 2005).

It is important to acquire a holistic view of an intervention in the outdoor environment to ensure that it truly gives the desired results, i.e. to provide opportunities for an independent life and participation in society for people who otherwise might be in danger of social exclusion or institutionalisation. It is essential that measures in the outdoor environment are not executed merely to comply with standards, but that they are executed to provide a more socially inclusive life for people who are in need of it. The results presented in this thesis regarding the interventions and whether they had any impact on activities only scratched the surface of this important matter. Nevertheless, if an intervention in the outdoor environment is to be truly beneficial, it

has to be executed by taking the entire travel chain perspective into consideration, which includes taking into account all aspects of a trip from beginning to end, both indoors and outdoors and with all desired modes of transport (Ståhl 1997, Wretstrand and Ståhl 2008). Such a perspective involves several different actors and, therefore, their role in providing an accessible environment has to be clearly specified in legislation. Therefore, it would be interesting to investigate to what extent different actors cooperate to create an accessible travel chain. It would also be interesting to investigate whether the entire travel chain perspective should be secured through legislation and how.

Regarding policy, the results presented in this thesis show that there is a need to further explore accessibility policy within the field of transport planning. They showed that many of the municipalities were appointing accessibility advisors and issuing accessibility plans. However, the way such tools are utilised is not certain. Therefore, it would be interesting to investigate the extent and manner to which accessibility advisors cooperate and interact with the transport departments. Furthermore, it would be interesting to conduct a document analysis examining accessibility plans and whether there are differences in how municipalities ensure an accessible outdoor environment. While conducting the document analysis, it would be interesting to examine how well objectives are translated into actual measures and whether those measures are in line with recent research and the Swedish governmental directives on accessibility (BFS 2011:5 ALM2; BFS 2013:9 HIN3). Manaugh et al. (2015) performed a similar study where they examined transport plans in North America and how they addressed social equity. They concluded that in many cases, objectives were not translated into specific measures.

Additionally, it was interesting to see that municipalities that had started implementing accessibility policy early on in their transport planning seem to have decreased their effort. Possibly, they did so as they perceived that they had fulfilled all requirements and, therefore, could decrease their efforts. It would be interesting to investigate whether municipalities in the increased TOT-index group will follow the same trend as the municipalities belonging to the decreased TOT-index group. That is, whether they also will decrease their efforts when they perceive that they have fulfilled all requirements. If such a longitudinal approach to accessibility planning were conducted, it would be essential to combine it with a mixed-method approach to truly capture reasons for such development.

On the societal level, the results from this thesis indicate that accessibility measures benefit people who are in need of further support from the environment. An environment designed to make life easier for those who are most fragile is an environment that is accessible and usable for all. A person carrying luggage, a person

with a pram, a person who is temporarily experiencing disability, but more importantly people who are experiencing long-term disability and limitations, all benefit from an accessible outdoor environment. Even though results from this thesis indicate that accessibility issues are increasingly acknowledged, there is still a need to raise awareness among transport planners and all other actors involved in accessibility work. It is important that all actors are aware of why accessibility measures are executed and how they should be executed, to ensure that the finalised measure provides the best result.

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Appendix A: Municipality Study questionnaire

1.Name _____

2.Position and responsibilities _____

_____

3.Contact information

Telephone number _____

E-mail _____

4.Municipality

5.The municipalities demography

Total number of population _____

Total number of folder people (older than 65 years) _____

6.Largest city _____

7.Largest city demography

Total number of population _____

Total number of folder people (older than 65 years) _____

8.Does there exist an accessibility plan or similar in the municipality?

☐ Yes

☐ No

8b. If there exists an accessibility plan, what is the title and when is it dated?

Title _____

Date _____

8c. If there exists an accessibility plan, how is it used in the daily transport planning?

_____

_____

_____

_____

9.Which of the following guidelines and recommendations do you use in your daily transport planning work (please note in the bland field if you use an older version of the guideline/recommendation)

	No	Know of, but do not use	Know of and use
Easily removed barriers" (BFS 2013:9 HIN3)	☐	☐	☐
Accessibility in public places (BFS 2011:5 ALM2)	☐	☐	☐
Swedish Board of Housing Building and Planning Regulations	☐	☐	☐
Design of roads and streets	☐	☐	☐
Handbook of Walking, Cycling and Moped	☐	☐	☐
Accessible city	☐	☐	☐
Streets for everybody	☐	☐	☐
Traffic for an attractive city (TRAST)	☐	☐	☐
Building away handicap 2012 (Svensk byggtjänst)	☐	☐	☐
Easier without barriers (Boverket 2005)	☐	☐	☐

Other? _____

9b. **If you do not know any of the documents above, are there any other documents/versions you use? Which?**

_____

10.Are there any other policy documents and strategies, besides the accessibility plan, that are relevant for work with older transport users?

☐ Yes

☐ No

If No, continue to question no.11

10b. If there are any other document, when are they dated and what is their title?

1.Title _____

Date (YYYY-MM-DD) _____

Policy adopted? (yes/no) _____

2.Title _____

Date (YYYY-MM-DD) _____

Policy adopted? (yes/no) _____

3.Title _____

Date (YYYY-MM-DD) _____

Policy adopted? (yes/no) _____

4.Title _____

Date (YYYY-MM-DD) _____

Policy adopted? (yes/no) _____

5.Title _____

Date (YYYY-MM-DD) _____

Policy adopted? (yes/no) _____

10c. If there are any other documents, how are they used in the daily transport planning?

_____

_____

_____

_____

_____

11.Is there an accessibility advisor working in the municipality or can you consult an accessibility advisor?

☐ Yes, fulltime

☐ Yes, part time

☐ Yes, as a consultant

☐ No

11.b If your municipality does not have an accessibility advisor, then who is responsible for accessibility issues in your department?

_____
_____
_____
_____

12.How large proportion of the department's budget in average year, do you estimate are used for measures in the outdoor environment for older people in your municipality?

% of the budget for roads and streets _____

% of the budget for bicyclists and pedestrians_____

% of the budget for public transport _____

13.Has the municipality implemented measures taken specifically to enhance accessibility and safety of older people as pedestrians

☐ Yes

☐ No

If no, continue to question no. 14

13b. Please give an example

_____
_____
_____
_____
_____

13.c If yes, did the municipality evaluate the measure?

☐ Yes

☐ No

☐ Ongoing project

_____

_____

14.Do you cooperate with any other officials within or outside the department regarding older people accessibility, safety and security in traffic?

- ☐ Yes, always
- ☐ Yes, often
- ☐ Yes, sometimes
- ☐ No, never

If no, continue to question no. 15

14.b If yes, which do you cooperate with?

_____

_____

15.Please read the following statements and state to what degree you agree with them. After you have read the statement, please give your immediate reaction

	Completely disagree	Agree partly	Agree almost completely	Agree completely
Aspects concerning older people are part of the daily traffic safety work	☐	☐	☐	☐
Aspects concerning older people are part of the daily accessibility work	☐	☐	☐	☐
Projects concerning accessibility and older road users receive attention from the municipal politicians	☐	☐	☐	☐
Efforts concerning accessibility and older road users are receiving sufficient funding in comparison with other issues	☐	☐	☐	☐
As a planner, I feel that I can carry out projects concerning accessibility and older road users to a sufficient extent and of satisfactory quality	☐	☐	☐	☐
My colleagues pay attention to me when it comes to issues concerning older road user	☐	☐	☐	☐
I get attention from my boss when it comes to issues concerning older road users	☐	☐	☐	☐

	Completely disagree	Agree partly	Agree almost completely	Agree completely
I often cooperate with other employees in order to carry out projects concerning accessibility and older road users	☐	☐	☐	☐
Older people bring considerable pressure through the municipal handicap council (or similar) regarding accessibility issues for older road users	☐	☐	☐	☐
The pressure group of older people get attention of their opinions (if such pressure exists)	☐	☐	☐	☐
Citizens (individuals, older people, relatives or care givers) bring considerable pressure regarding accessibility issues for older road users	☐	☐	☐	☐
The pressure groups of citizens get attention of their opinions (if such pressure exists)	☐	☐	☐	☐
It is difficult for the employee to know who is responsible for accessibility issues	☐	☐	☐	☐
Efforts for older road users often lead to conflicts with the wishes of other road users	☐	☐	☐	☐
Efforts for older road users often lead to conflicts between employees (or between departments) in the municipality	☐	☐	☐	☐
Issues concerning older road users are considered in the political agenda of the municipality	☐	☐	☐	☐
There is discussion between employees about issues concerning accessibility and older road users	☐	☐	☐	☐
There is need for improved knowledge among the municipal politicians regarding accessibility issues and older road users	☐	☐	☐	☐

	Completely disagree	Agree partly	Agree almost completely	Agree completely
There is need for improved knowledge among the employees of the municipality regarding accessibility issues and older road users	☐	☐	☐	☐
There is need for improved knowledge among the citizens of the municipality regarding accessibility issues and older road users	☐	☐	☐	☐

Other, what? _____

16.Do you cooperate with interest organisations, for example pensioner groups, regarding projects that concern older peoples' accessibility, safety and security?

- ☐ Yes, always
- ☐ Yes, often
- ☐ Yes, sometimes
- ☐ No, never
- ☐ No, but have intention to
- ☐ No, no such projects have been executed

16.b If yes, which interest organisations do you contact?

_____
_____
_____
_____

17. Does your municipality cooperate with other municipalities regarding projects that concern older peoples' accessibility, safety and security in traffic?

- ☐ Yes, always
- ☐ Yes, often
- ☐ Yes, sometimes
- ☐ No, never
- ☐ No, but have intentions to
- ☐ No, no such projects have been executed

17.b If yes, which municipalities do you cooperate with?

_____

_____

_____

18. Do you perceive that the municipality could do more regarding older people and traffic?

☐ Yes

☐ No

18.b If yes, in which aspect?

_____

_____

19. Do you perceive that you could do more for older people in traffic?

☐ Yes

☐ No

19.b If yes, in which aspect?

_____

_____

20. If you perceive that there are other aspects regarding older people and traffic you are welcome to highlight what they are below.

_____

_____

Appendix B: User Study Questionnaire

1.How often are you outside in Kristianstad? (i.e. by car, walking, bus, bicycle)

(Please mark only one option)

- ☐ Daily (5-7 times/week)
- ☐ Repeatedly during a week (3-4 times/week)
- ☐ Sometimes during a week (1-2 times/week)
- ☐ Repeatedly during a month (3-4 times/month)
- ☐ Sometimes during a month (1-2 times/month)
- ☐ Sometimes during a year (3-4 times/year)
- ☐ Seldom or never (less than 3 times/year)

2. Do you have a car in the household? (Please mark only one option)

- ☐ Yes, I drive
- ☐ Yes, but I do not drive
- ☐ No

3. How do you usually get around while outside in Kristianstad…

a. during summer? ***(Please mark only one option)***

- ☐ Walking
- ☐ Bicycle
- ☐ Driving
- ☐ By car, as a passenger
- ☐ By bus
- ☐ Transportation service
- ☐ Moped

☐ Other, what ……

b. during winter? ***(Please mark only one option)***

☐ Walking

☐ Bicycle

☐ Driving

☐ By car, as a passenger

☐ By bus

☐ Transportation service

☐ Moped

☐ Other, what ……

4a. Are you entitled to a special transport service? ***(Please mark only one option)***

☐ Yes, by taxi

☐ Yes, by a specialised vehicle

☐ No *(continue to question 5)*

4b. If you have a special transport service – are you issued an escort?

☐ Yes

☐ No

5a. How often do you go out for a walk in your residential?

(with or without a mobility device and/or wheelchair) (Please mark only one option)

☐ Daily (5-7 times/week)

☐ Repeatedly during a week (3-4 times/week)

☐ Sometimes during a week (1-2 times/week)

☐ Repeatedly during a month (3-4 times/month)

☐ Sometimes during a month (1-2 times/month)

☐ Sometimes during a year (3-4 times/year)

☐ Seldom or never (less than 3 times/year)

5b. Do you walk as much in <u>your residential area</u> as you would like? *(number 1 = lowest possible valuation, number 7 = best possible valuation: Mark the <u>one</u> of circles which most accurately matches your perception)*

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

To small extent To large extent

6a. Do you experience difficulties as a <u>pedestrian in your residential area?</u>

(Please mark only one option)

☐ Yes

☐ No

6b. Do you experience any of the problems below as a <u>pedestrian in your residential area?</u> *(more than one option can be marked)*

☐ Yes, general sense of insecurity

☐ Yes, fast traffic

☐ Yes, heavy traffic

☐ Yes, problem crossing streets

☐ Yes, high curbs

☐ Yes, uneven pavements

☐ Yes, hilly roads

☐ Yes, bad lighting

- ☐ Yes, few benches
- ☐ Yes, too short time for green time while crossing the street
- ☐ Yes, poor snow removal and/or de-icing
- ☐ Yes, difficulties reading information signs
- ☐ Yes, fear of being involved in a traffic accident
- ☐ Yes, fear of falling
- ☐ Yes, bicyclists on sidewalks
- ☐ Yes, mopeds on sidewalks
- ☐ Yes, fear of robbery/assault
- ☐ Yes, other, please state which……..
- ☐ No, I do not experience any problems

7.Where do you usually cross roads while walking…

a in your residential area? ***(Please mark only one option)***

- ☐ At crossings with a signal (green guy)
- ☐ At crossings without a signal
- ☐ In a pedestrian tunnel/underpass
- ☐ Anywhere, independently of the presence of crossings
- ☐ Other, where…….....

b in Kristianstad? ***(Please mark only one option)***

- ☐ At crossings with a signal (green guy)
- ☐ At crossings without a signal
- ☐ In pedestrian a tunnel/underpass
- ☐ Anywhere, independently of the presence of crossings
- ☐ Other, where…….....

8. Do you find it difficult to cross roads….

(number 1 = lowest possible valuation, number 7 = best possible valuation: Mark the one of circles which most accurately matches your perception)

a) In your residential area

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

To small extent To large extent

b. In Kristianstad

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

To small extent To large extent

9. Which problem do you experience while crossing roads…

a. In your residential area?

☐ None

☐ Please specify ……...

……...

b. I Kristianstad?

☐ None

☐ Please specify ……...

……...

10. How do you perceive the number of <u>crossing</u> in…

(number 1 = lowest possible valuation, number 7 = best possible valuation: Mark the <u>one</u> of circles which most accurately matches your perception)

a. In your residential area?

1 2 3 4 5 6 7

Too few Sufficient

b. I Kristianstad?

1 2 3 4 5 6 7

Too few Sufficient

11. How do you feel about the number of <u>signalled crossing</u> in…

a. In your residential area?

1 2 3 4 5 6 7

Too few Sufficient

b. I Kristianstad?

1 2 3 4 5 6 7

Too few Sufficient

12. Have you at some point, during the last year, fallen while walking outside?

(more than one option can be marked)

- ☐ Yes, in my residential area
- ☐ Yes, in another area in Kristianstad
- ☐ No *(continue to question 13a)*

12b. What was the reason….

In your residential area?

……

……

……

In another area in Kristianstad?

……

13 a. Have you, at some time during the last year, been hit by any motorised vehicle (e.g., car, bus) while walking outside? *(more than one option can be marked)*

- ☐ Yes, in my residential area
- ☐ Yes, in another area in Kristianstad
- ☐ No *(continue to question 14a)*

13b. What was the reason…

In your residential area?

……

……

……

In another area in Kristianstad?

……

……

14a. Have you, at time during the last year, been hit by a cyclist while walking outside? *(more than one option can be marked)*

- ☐ Yes, in my residential area
- ☐ Yes, in another area in Kristianstad
- ☐ No *(continue to question 15)*

14b. What was the reason…

In your residential area?

……

……

……

In another area in Kristianstad?

……

……

……..

15. How do you evaluate

(number 1 = lowest possible valuation, number 7 = best possible valuation: Mark the one of circles which most accurately matches your perception)

a. The outdoor environment in your residential area:

○	○	○	○	○	○	○
1	2	3	4	5	6	7

Poor Excellent

b. The pedestrian environment in your residential area:

○	○	○	○	○	○	○
1	2	3	4	5	6	7

Poor Excellent

16a.How often are you outside in Kristianstad <u>as a pedestrian</u>? *(with or without a mobility device and/or wheelchair) (Please mark only one option)*

- ☐ Daily (5-7 times/week)
- ☐ Repeatedly during a week (3-4 times/week)
- ☐ Sometimes during a week (1-2 times/week)
- ☐ Repeatedly during a month (3-4 times/month)
- ☐ Sometimes during a month (1-2 times/month)
- ☐ Sometimes during a year (3-4 times/year)
- ☐ Seldom or never (less than 3 times/year)

16b.Do you go for a walk as often as you would like in Kristianstad? *(number 1 = lowest possible valuation, number 7 = best possible valuation: Mark the <u>one</u> of circles which most accurately matches your perception)*

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

To small extent To large extent

7. Do you experience fear of…

a. Falling while walking outside in Kristianstad?

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

To small extent To large extent

b. Being hit by a <u>motorised vehicle</u> (e.g. car, bus) while walking outside in Kristianstad?

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

To small extent To large extent

c. **Being hit by a cyclist while walking outside in Kristianstad?**

1 2 3 4 5 6 7

To small extent To large extent

18a. Do you experience problems with cyclists while walking outside in Kristianstad?

1 2 3 4 5 6 7

To small extent To large extent

18b. What do you experience as problematic with cyclist?

(more than one option can be marked)

- ☐ They cycle too fast
- ☐ They don't signal
- ☐ They don't let you pass while crossing the road
- ☐ They place/park their bicycles on the sidewalks
- ☐ The sidewalk becomes overcrowded
- ☐ They cycle on the sidewalk
- ☐ I can't hear them
- ☐ Accidents happen
- ☐ Other, what ……..
- ☐ Nothing

19a. Do you experience problems with drivers while walking outside in Kristianstad?
(number 1 = lowest possible valuation, number 7 = best possible valuation: Mark the one of circles which most accurately matches your perception)

1 2 3 4 5 6 7

To small extent To large extent

19b. What do you experience as problematic with drivers?

(more than one option can be marked)

- ☐ They drive too fast
- ☐ They don't stop at crossings
- ☐ They park where they should not
- ☐ It is difficult to obtain eye contact with the driver
- ☐ They make a lot of noise and cause pollution
- ☐ Other, what ……..
- ☐ Nothing

20. How often do you participate in activities in Kristianstad? *(outside your home, e.g. shopping, visiting friends/relatives, pleasure/recreation, culture, exercise, visit parks and green areas, visit a day centre, café- or restaurant visits, healthcare, etc.) (Please mark only one option)*

- ☐ Daily (5-7 times/week)
- ☐ Repeatedly during a week (3-4 times/week)
- ☐ Sometimes during a week (1-2 times/week)
- ☐ Repeatedly during a month (3-4 times/month)
- ☐ Sometimes during a month (1-2 times/month)
- ☐ Sometimes during a year (3-4 times/year)
- ☐ Seldom or never (less than 3 times/year)

21a. Are you participating as much as desired in activities in Kristianstad?

(Please mark only one option)

- ☐ Yes
- ☐ No

21b. Is there any special reason for not participating in activities as much as desired? *(More than one option can be marked)*

- ☐ Yes, my own health
- ☐ Yes, difficulties getting in or out of my home
- ☐ Yes, difficulties/obstacles in the walking environment
- ☐ Yes, there are not enough parks and green areas
- ☐ Yes, difficulties/obstacles in public transport
- ☐ Yes, long distances to the bus
- ☐ Yes, difficulties getting help
- ☐ Yes, I am in need of a mobility device (crutches, walker) and/or wheelchair
- ☐ Yes, other, please state …….....
- ☐ No

22a. Do you feel that you have enough activity options for you to participate in, in Kristianstad? *(Please mark only one option)*

- ☐ Yes, to a large extent
- ☐ Yes, to some extent
- ☐ No, not at all

22b. Do you think any activities are missing in Kristianstad? .....……
……..……...
.....

23a. Do you have a disability?

- ☐ Yes
- ☐ No

23b. Are you experience any of the following? *(more than one option can be marked)*

- ☐ Difficulties interpreting information
- ☐ Total loss of sight

- ☐ Sight deprivation
- ☐ Hearing deprivation
- ☐ Poor balance
- ☐ Reduced stamina
- ☐ Reduced neck movement
- ☐ Reduced arm movement
- ☐ Difficulties handling/fingering small objects
- ☐ Reduced back/leg movement
- ☐ Overweight
- ☐ Allergies
- ☐ Other, what …….
- ☐ Nothing

24a. Do you use any mobility devices and/or wheelchair when you are outside? *(more than one option can be marked)*

- ☐ No, I do not *(continue to question 25)*
- ☐ Cane/crutches
- ☐ Rollator (walker)
- ☐ Wheelchair
- ☐ Powered wheelchair
- ☐ Other, please state …….

24b. If you use multiple mobility devices and/or wheelchair outside, which do you mostly use?

……
…….

25. Have you thought about starting to use mobility devices or anything else, apart from what you are already using? *(Please mark only one option)*

- ☐ Yes, (please state) ……..

- ☐ No, I am happy with the mobility device I already have
- ☐ No, I do not need any mobility devices

26. Do you need assistance of someone else while being outside? *(Please mark only one answer)*

- ☐ Yes, always
- ☐ Yes, sometimes
- ☐ No

27. How long continuous walking can you do without resting……

a Without assistance? *(Please mark only one option)*

- ☐ Less than 50 metres
- ☐ Between 50 and 100 metres
- ☐ Between 100 and 200 metres
- ☐ Between 200 metres and 1 kilometre
- ☐ Unlimited distance

b With assistance? *(Please mark only one option)*

- ☐ Less than 50 metres
- ☐ Between 50 and 100 metres
- ☐ Between 100 and 200 metres
- ☐ Between 200 metres and 1 kilometre
- ☐ Unlimited distance

28. Do you experience problems with any of the following?

(more than one option can be marked)

- ☐ Walking long distances
- ☐ Walking in hills
- ☐ Walking in stairs or over high curbs or steps
- ☐ Carrying things, e.g., groceries

- ☐ Getting in or out of your house without the help of another person
- ☐ Using/handling your walking aid and/or wheelchair
- ☐ Other, what ……..
- ☐ Nothing

29a. How often do you exercise? *(e.g., a walk, walking to activities, group-workout, golf, swimming, etc.) (Please mark only one option)*

- ☐ Daily (5-7 times/week)
- ☐ Repeatedly during a week (3-4 times/week)
- ☐ Sometimes during a week (1-2 times/week)
- ☐ Repeatedly during a month (3-4 times/month)
- ☐ Sometimes during a month (1-2 times/month)
- ☐ Sometimes during a year (3-4 times/year)
- ☐ Seldom or never (less than 3 times/year)

29b. In what way do you exercise? ……..

……...

30. How do you perceive *(number 1 = lowest possible valuation, number 7 = best possible valuation: Mark the one of circles which most accurately matches your perception)*

a. Your health

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

Poor Excellent

b. Your current physical mobility

○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7

Poor Excellent

31. Age .....

32. Gender

- ☐ Female
- ☐ Male

33. Are you born in Sweden *(Please mark only one option)*

- ☐ Yes
- ☐ No, please state where .....

34. Which is you highest level of education? *(Please mark only one option)*

- ☐ Elementary school
- ☐ Secondary- or girls' school
- ☐ 2-year high school or trade school
- ☐ 3- to 4-year high school
- ☐ University or collage, less than 3 years (less than 100 p)
- ☐ University or collage, 3 years or more (120 p or more)
- ☐ Another education, which one?

35. Marital status *(latest) (Please mark only one option)*

- ☐ Married / cohabiting
- ☐ Unmarried
- ☐ Widow / widower
- ☐ Divorced

36. How many people live in your household? *(yourself included)*

.....**person /-s**

37. Do you have any children or other relatives who can help you with everyday activities, e.g., shopping for groceries? ***(Please mark only one option)***

- ☐ Yes
- ☐ No, I do not need any help
- ☐ No, but I would like to have help

38. What kind of house do you live in? *(Please mark only one option)*

- ☐ An apartment building
- ☐ Single family house
- ☐ Other

39. Can you access your home without climbing stairs/steps?

- ☐ Yes
- ☐ No

40. Do you have any additional comments that you feel are important for this investigation?

…….....
.....……
……..……...……
…….....
……
……..

Thank you for your cooperation!

I would like to participate in a follow-up to this project.

Name…….....
.

Telephone-number: …….....

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"We have a moral duty to remove the barriers to participation, and to invest sufficient funding and expertise to unlock the vast potential of people with disabilities. Governments throughout the world can no longer overlook the hundreds of millions of people with disabilities who are denied access to health, rehabilitation, support, education and employment, and never get the chance to shine"

(Stephen Hawking p. ix, in WHO World Report on Disability 2011).

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