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Traveller information in support of the mobility of older people and people with disabilities

User and provider perspectives

LUND UNIVERSITY

Nina Waara

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Key words: Public transport, Accessibility, Usability, Motility, Conflicts of interest, CHAID, Travel chain, Implementation process, Inertia

Abstract:
Traveller information designed to fulfil needs and expectations of individual travellers is a key factor in improving access for older people and people with disabilities to public transport. The overall aim of this thesis is to contribute to the knowledge of user and provider perspectives on the provision of traveller information for older people and people with disabilities in public transport with a focus on use and provision of such traveller information through online traveller information services. The research work is based on perceptions of older people and people with disabilities, together with experts' views on the implementation process. Both qualitative methods (interviews, focus group interviews, group discussions, workshops) and quantitative methods (questionnaires) were used. The substantial influence on the travel of older people and people with disabilities of use of online traveller information services is the empowerment of those of the older travellers and travellers with disabilities that are anxious and insecure before a journey. Through better access of traveller information offered by online traveller information services these travellers can find what they need to build their confidence before a journey and subsequently be supported in their roles as travellers. That is, when they do travel in public transport they want to be able to do so safely and with confidence; they do not necessarily want to increase the number of journeys they undertake. Thus, theoretically the concept of motility has higher relevance for this particular group of travellers than the concept of mobility. The exploration of the traveller information content shows that even though the need to plan and prepare for a journey seems to be equally important for the whole group of older people and people with disabilities as it is for subgroups based on functional limitations, the importance and the intended use of the traveller information differ between groups as the focus shifts from comfort information on an aggregated level to an increasing importance of accessibility information for subgroups. Finally, to be accessed the traveller information needed by older people and people with disabilities need to be implemented. The inertia of the implementation process was explored through conflicts of interest that can help forward barriers in the implementation process. The findings point to there being a verbal problem in policies, legislation and guidelines that leave room for interpretation of the necessity of implementation of measures like traveller information needed by older people and people with disabilities-

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Sammanfattning

Resenärsinformation utformad för att uppfylla behov och förväntningar hos enskilda resenärer är viktigt för att förbättra resandet i kollektivtrafiken bland äldre personer och personer med funktionsnedsättningar. Det övergripande syftet med den här avhandlingen är att bidra till kunskapen om behov och användning av resenärsinformation bland äldre personer och personer med funktionsnedsättningar och hur leverantörerna av resenärsinformation ser å implementering av sådan resenärsinformation. Fokus ligger på webbaserade resenärsinformationstjänster. Arbetet baseras på erfarenheter hos äldre personer, personer med funktionsnedsättningar och experter med ansvar för att implementera resenärsinformation för dessa grupper. Både kvalitativa metoder (intervjuer, fokusgruppsintervjuer, gruppdiskussioner, workshops) och kvantitativa metoder (enkäter) användes. Användningen av resenärs-informationstjänster har en positivt inflytande på resandet i kollektivtrafiken genom att öka upplevelsen av trygghet och säkerhet inför och under resan. Genom bättre tillgång resenärsinformation genom webbaserade resenärsinformationstjänster kan de som känner sig oroliga och otrygga inför en resa hitta vad de behöver för att bygga upp sitt självförtroende inför en resa. Detta stödjer dem som resenärer. Det vill säga att när äldre personer eller personer med funktionsnedsättningar reser i kollektivtrafiken vill de kunna göra det säkert och med självförtroende, antalet resor behöver inte nödvändigtvis öka. Således kan, åtminstone i teorin, begreppet motilitet ha högre relevans för just denna grupp av resenärer än begreppet mobilitet. Den resenärsinformation som efterfrågas visar att även om behovet av att planera och förbereda för en resa tycks vara lika viktig för hela gruppen av äldre personer och personer med funktionsnedsättningar som för undergrupper av dessa baserade på funktionella begränsningar, så skiljer sig användnadet av resenärsinformationen åt. På aggregerad nivå ligger fokus på komfortinformation medan den för undergrupperna ligger på tillgänglighet. Både komfortinformationen och tillgänglighetsinformationen gör det möjligt att bedöma vilken ansträngning det innebär att genomföra en resa, det vill säga att de båda är avgörande för valet att resa. Komfortinformationen fokuserar dock på det individuella valet att resa medan tillgänglighet informationen gör det möjligt att bedöma om resan alls är möjlig att genomföra. Slutligen, för att äldre personer och personer med funktionsnedsättningar ska kunna använda resenärsinformationen de efterfrågar måste denna implementeras. Den tröghet som finns i implementeringsprocessen undersöktes genom underliggande intressekonflikter som om de ges utrymme kan

bidra till att skapa barriärer som hindrar implementering. Resultaten pekar på att det är ett verbalt problem i hur politik, lagstiftning och riktlinjer förmedlas vilket lämnar utrymme fört genomföra åtgärder som äldre resenärer och resenärer med funktionsnedsättningar behöver för ett självständigt liv och delaktighet i samhället. Slutligen visar denna avhandling även på vidare forskning inom alla dessa tre aspekter av resenärsinformation i den här avhandlingen.

Abstract

Traveller information designed to fulfil needs and expectations of individual travellers is a key factor in improving access for older people and people with disabilities to public transport. The overall aim of this thesis is to contribute to the knowledge of user and provider perspectives on the provision of traveller information for older people and people with disabilities in public transport with a focus on use and provision of such traveller information through online traveller information services. The research work is based on perceptions of older people and people with disabilities, together with experts' views on the implementation process. Both qualitative methods (interviews, focus group interviews, group discussions, workshops) and quantitative methods (questionnaires) were used. The substantial influence on the travel of older people and people with disabilities of use of online traveller information services is the empowerment of those of the older travellers and travellers with disabilities that are anxious and insecure before a journey. Through better access of traveller information offered by online traveller information services these travellers can find what they need to build their confidence before a journey and subsequently be supported in their roles as travellers. That is, when they do travel in public transport they want to be able to do so safely and with confidence; they do not necessarily want to increase the number of journeys they undertake. Thus, theoretically the concept of motility has higher relevance for this particular group of travellers than the concept of mobility. The exploration of the traveller information content shows that even though the need to plan and prepare for a journey seems to be equally important for the whole group of older people and people with disabilities as it is for subgroups based on functional limitations, the importance and the intended use of the traveller information differ between groups as the focus shifts from comfort information on an aggregated level to an increasing importance of accessibility information for subgroups. Both the comfort information and the absolute information enable assessment of the effort required to carry through a journey. This is decisive for the choice to travel, but the traveller information focused on comfort relates more to the individual choice to travel while absolute traveller information enables the traveller to assess whether travel is possible at all. Finally, to be accessed the traveller information needed by older people and people with disabilities need to be implemented. The inertia of the implementation process was

explored through conflicts of interest that can help forward barriers in the implementation process. The findings point to there being a verbal problem in policies, legislation and guidelines that leave room for interpretation of the necessity of implementation of measures like traveller information needed by older people and people with disabilities. Finally this thesis carries implications for further research within all three areas that have been researched.

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Finally, heartfelt thanks to my mother Helena Waara for her infinite support throughout everything, and to my son Fabian for reminding me of what really matters in life ♥

Nina Waara
Stockholm, January 2013

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Appendix I

Appendix II

Papers I-IV

List of terminology

Accessibility	The person-environment relationship in terms of a person's or group's functional capacity and the demands of the physical environment. It is an objective concept relating to norms and standards that is measured on population or group level (Iwarsson and Ståhl, 2003).
Ageing, old age	There is no general agreement on the actual age at which a person becomes old. In western countries the definition of old age is usually related to retirement from work, giving chronological age a significant role in the definition of old age (as opposed to biological age, social age etc.). The age of 65, which roughly corresponds to the retirement age in most developed countries, is widely regarded as the beginning of old age. That is, in this thesis, regarding traveller information services in public transport in Sweden, people over 65 years are regarded as older people. See also *retired people, retirement*.
Barrier	Something that impedes or separates, either immaterial like behavioural or cultural barriers, or material like something blocking a passage (www.merriam-webster.com). This thesis is limited to consider immaterial barriers.
County, counties	Authorities responsible for the coordination of state activities in the regions. Areas of responsibility include the environment, the labour market, competence sourcing, the business community, social development, animal protection, gender equality, integration, transport, infrastructure and housing. Counties are also responsible for ensuring that nationwide policy objectives are achieved in the counties (www.lst.se).

Disability, disabled people, people with disabilities	The World Health Organisation defines disability as an umbrella term covering impairments, activity limitations and participation. A disability always occurs in a context and is a unifying concept for people who experience disablement in society: people with disabilities (WHO, 2010). The time-frame in which this thesis has been produced implies the use of different denotations for people with disabilities in the papers, like disabled people, people with disabilities and people with functional limitations. See also *functional limitations*.
Environment	Environment refers to the physical surroundings in terms of indoor/outdoor and private/public environments. In this thesis environment encompasses the travel chain in public transport, including vehicles, terminals/stations/ stops and pedestrian facilities like pavements and footpaths. Social environments are not treated within this thesis.
Functional capacity, functional limitations	Functional capacity refers to restrictions in a person's ability to perform daily activities while functional limitations refer to limitations of that task (Jette, 2006).
Implementation	Giving practical effect to, and ensuring actual and appropriate fulfilment of objectives by concrete measures. The implementation process relates to the treatment and consideration of objectives and measures in policy and planning.
Mobility	Mobility is not a generally defined concept, but one of different meanings depending on context. In a broad sense it refers to movement through ones environment, like walking, riding a bike, driving a car or taking a bus (WHO, 2010) including both destination-dependent and destination-independent movement (Metz, 2000).
Motility	Motility refers to potential mobility, or how and to what degree mobility will be realised taking into account the individual needs, plans and wishes for mobility and thus refers to the ability to be mobile (Kaufmann et al, 2004).

Need	The lack of something necessary, desirable or useful (www.merriam-webster.com). In this thesis needs are used as a comprehensive concept for wishes, requirements, demands etc. regarding the importance of traveller information.
Older people, older older people	People over 65 years of age. Older older people is sometimes used to refer to people over 75 years (sometimes over 80 years) of age. Also see *ageing, old age, retired people.*
Provider	Someone who supplies or makes available something wanted or needed (www.merriam-webster.com).
Public transport	A planned and regular transport offered to the public (or parts thereof) through given regulations and that fully or to some degree is financed by society (SIKA, 2005). This thesis is limited to consider regional and interregional public transport by bus and train.
Public transport service	Transport services offered by public transport that may take many forms, vary in distance covered and types of vehicle used, and can be operated with fixed or flexible routes and schedules. Services may be operated by public or private companies, and be provided using vehicle fleets of various sizes. This thesis is limited to consider regional and interregional public transport services by bus and train.
Public transport system	All public transport offered within a defined geographical area. This thesis is limited to consider regional and inter-regional public transport services by bus and train.
Retirement, retired people	Retirement is the withdrawal from active working life. In most developed countries this occurs around 65 years of age. Retired people are people in retirement. See also *ageing, old age, older people.*
Special Transport Services (STS)	Special public transport services offered to people who have great difficulty in using conventional public transport.

Travel chain	Travel chain denotes the journey from door to door generally involving one or more travel modes like walking from home to the bus stop, a bus ride, and a final walk from the bus stop to the destination. In this thesis, a travel chain perspective on accessibility implies that every event occurring during a trip from start to finish must be usable in order to be a realistic alternative for travelling (Ståhl, 1997; Börjesson, 2002).
Traveller information	Information that helps travellers to plan and undertake journeys. In this thesis traveller information in regional and interregional public transport is considered.
Traveller information service, online traveller information service	Conveys traveller information to travellers, like telephone services, travel agents and information desks at stations and terminals. Online traveller information services are web based traveller information services that travellers access and search independently. This thesis is limited to consider online traveller information services for travel by regional and interregional public transport by train and by bus.
Traveller information system	A traveller information system is a computer system designed to provide web based traveller system information services. Traveller information systems are not considered in this thesis.
Usability	The extent to which a product or process allows users to reach their goals with the use in a satisfactory way. That is, in ways that are effective, efficient and satisfactory in a specified context of use (ISO, 1998). In a given environment usability is thus the outcome of the joint analysis of the accessibility and a desired activity to be performed in that environment. As usability by definition includes the perceptions of users it is a subjective concept that is assessed by a person or group of persons (Iwarsson and Ståhl, 2003). See also *accessibility*.

List of publications

Paper I Waara, N. (2009) Older and disabled people's need and valuation of traveller information in public transport. European Transport conference 2009: Conference Proceedings. 5-7 October, 2009, Leeuwenhorst, the Netherlands (www.etcproceedings.org).

Paper I is a summary of the licentiate thesis: Waara, N. (2001) The need of information in public transport. Older and disabled people's pre-journey travel information requirements. Bulletin 206. Lund: Department of Technology and Society. Lund University.

Paper II Waara, N, Brundell-Freij, K, Risser, R and Ståhl, A. Segmenting functional limitations for feasible provision of targeted traveller information in public transportation. (under review by Transportation research Part A: Policy and practice)

My contribution: Development of questionnaire and realisation of questionnaire study, analysis of questionnaire answers in collaboration with co-authors, writing the larger part of the paper.

Paper III Waara, N, Risser, R and Ståhl, A. (2013) Exploring influence of online traveller information services in older peoples and peoples with functional limitations travel in public transport: A mixed methods approach. Journal of Technology and Disability. (accepted)

My contribution: Analysis of questionnaire answers, realisation of focus group interviews, analysis of focus group data and writing the larger part of the paper.

Paper IV Waara, N and Risser, R. Exploring implicit causes of inertia in the implementation process of public transport traveller information needed by older people and people with disabilities. (submitted)

My contribution: Realisation of workshop, analysis of workshop data in collaboration with co-author and writing the larger part of the paper.

Introduction

A significant Swedish policy objective is an inclusive society that enables full participation of all citizens regardless of disabilities (Prop. 1999/2000:79). Within transport and urban planning the objective of the transport policy is to ensure efficient and sustainable transport services throughout the nation (Prop. 2008/09:93) explicitly stating that the transport system is to be designed to be usable for people with disabilities. In this context public transport becomes a strategic mean to achieve policy objectives, as public transport plays a key role in improving accessibility for all, and thus mitigating social exclusion and improvement of social cohesion in society (ECMT and UITP, 2004). In view of this older people and people with disabilities are to be included as participants in society and as passengers in all modes of public transport.

Mobility plays a key role in sustaining independence and participation in society in old age (Schwanen and Ziegler, 2011; Mollenkopf et al., 2004; Metz, 2003). This also refers to people with disabilities reflected by the inclusion of participation in the International Classification of Functioning, Disability and Health (ICF) with mobility as one of nine dimensions of participation (WHO, 2010). Accordingly the mobility of older people and people with disabilities has been a central theme for research in the latest decade both in a Swedish perspective and from a European point of view (e.g. GOAL, 2012; Waara and Henriksson, 2010; Wretstrand and Ståhl, 2008; SIZE, 2006; Mollenkopf et al., 2005).

Public transport is important for the mobility of older people and people with disabilities (Asplund et al., 2012; Fürst and Vogelauer, 2010; Montarzino et al. 2007; Golob and Hensher, 2007; Whelan et al., 2006). Even though travel by car is the most preferred travel mode among older people (e.g. Hjorthol et al., 2011; Follmer et al., 2010) travel by public transport becomes increasingly important with old age (Currie and Delbosc, 2010; Follmer et al., 2010; Su, 2007). Difficulties to use public transport also increase with old age; twice as many people over 90 years compared with people 75-79 years experiences difficulties in using public transport (Hjorthol et al., 2011). People with disabilities also have difficulties with using public transport with nearly half forgoing travel by public transport due to problems with accessibility (Riks-Stroke, 2010).

Accordingly, an inclusive public transport requires accessibility for all travellers. That is, for travel by public transport to be a realistic alternative for older people and people with disabilities, the whole travel chain must be accessible, and all aspects of the journey from door to door must be usable to enable travel (Hjorthol et al., 2011; Linder, 2007; Tennøy and Usterud Hanssen, 2007; Ståhl and Iwarsson, 2007; Olsson, 2003; Ståhl, 1997). Consequently much effort has been put into researching different aspects of accessibility of the travel chain (e.g. Wretstrand et al., 2011; Wennberg, 2009; Carlsson, 2004; Svensson, 2003). The essential outcomes of these efforts have resulted in extensive knowledge concerning aspects like improved vehicle design and elimination of physical barriers in the public transport environment, and also in the general outdoor environment. While accessibility of public transport has improved as a result of these efforts, equally important aspects of accessibility remain to be thoroughly researched for the whole travel chain to become increasingly accessible. Traveller information designed to fulfil needs and expectations of individual travellers is one such aspect that is identified as a key factor in improving access for older people and people with disabilities to public transport (e.g. Wretstrand and Ståhl, 2008; ECMT and UITP, 2004; Ståhl, 1997). It also constitutes the first link of the travel chain in a public transport journey (ECMT, 2006; ECMT and UITP, 2004).

Traveller information is important for travel by public transport in various ways; it informs on the travel options available for a specific journey, it enables more fully informed travel choices, and it assists in the successful undertaking of journeys (Lyons et al., 2007). With the Internet becoming an integral part of everyday life, access to online traveller information services allow quick and convenient access to traveller information and can also present traveller information in more detail than other forms of traveller information, like printed timetables. However, the use of such services requires both access to and experience of the Internet. In Sweden three quarters of people aged 65 to 74 have access to internet in their homes, of which nearly half use it on a daily basis. Furthermore, one third states that they have used the internet to access services related to travel in the past year (Statistics Sweden, 2012). Among people with disabilities the use of Internet is similar and comparable to the general population (Findahl, 2007). There is thus potential in providing traveller information for older people and people with disabilities through the Internet, notwithstanding that this is not a solution suitable for all, especially those over 75 years of age (Marques, 2008). It is however a reasonable assumption that with time use of the Internet and related services will increase also in this age group.

Previous studies show that the needs and requirements of older people and people with disabilities with regard to traveller information in public transport are not satisfied (Tennøy and Unserud Hanssen, 2007; MTC, 2004, 2000; Börjesson et. al. 1999). Findings show that older people and people with disabilities start to plan and prepare for a journey by public transport well in advance to be able to handle

unexpected events during the journey (MTC, 2004; Börjesson et. al. 1999). There is also research suggesting that older people find access to pre-journey traveller information about public transport more important than what younger people do (Grotenhuis et. al. 2007). This may be due to a journey by public transport involving uncertainty in a more substantial way for older people and people with disabilities. From a travel chain perspective a journey by public transport may include multiple events that need to be dealt with during the journey in addition to the unexpected occurrences that affect all travellers (Börjesson et. al. 1999; Ståhl, 1997). This may have a negative influence on choices made with regard to travel by public transport as the expected effort needed to handle such events may become overwhelming and prevent the undertaking of a journey (Stradling 2002; MTC, 2000). To plan and undertake a journey by public transport in a satisfactory way thus requires traveller information that enables older people and people with disabilities to interpret and understand how a journey can be undertaken. That is, traveller information should allow an understanding of the accessibility of the public transport environment so that an assessment of the usability from an individual perspective is enabled (Iwarsson and Ståhl, 2003). This entails understanding whether the complexity of the planned journey is in balance with the effort (Stradling, 2002) that can be spent on the journey, or in other words, enabling the covert competence to be activated to the maximum and transformed into overt ability that enables optimum coping (Svensson, 1987a). Traveller information can thus "help close the gap between perceived and actual "cost" of the journey" (Lyons et al., 2007). In this perspective traveller information that meets the traveller information needs of particular groups in society, like older people and people with disabilities, becomes decisive for the usability of complex and dynamic public transport services (Lyons and Harman, 2002) and contributes substantially toward the overall satisfaction with such services (Balcombe et al., 2004; Stradling, 2002). Traveller information that meets the needs and expectations of travellers may thus have a positive influence on travel behaviour among older people and people with disabilities.

There are few systematic studies addressing the traveller information needs of older people and people with disabilities in detail, but one example would be the TågplusGuiden Serviceinfo project where these needs were explored (Waara, 2001). However, when the results from this study were implemented nearly half of the traveller information needs of older people and people with disabilities were neglected due to organizational, technical, competitive and social barriers in the implementation process (Rexfelt and Rosenblad, 2006).

Implementation is crucial if the accessibility of the travel chain is to improve. However, in this particular policy field the implementation of measures considered important to improve accessibility in public transport is slower than what could be expected. This is true for traveller information needed by older people and people with disabilities as well as for other accessibility measures in the public transport

environment (Skr. 2009/10:166). That is, regardless of policies, legislation and directives enforcing implementation, the traveller information needs of older people and people with disabilities are not thoroughly considered in planning and development of the public transport service. This implies the existence of underlying causes that forwards barriers (e.g. Risser et al. 2010; SIZE, 2006; Grönvall, 2004) slowing down the implementation process.

From a transport policy perspective a desired, to not say expected outcome of traveller information is that more of the journeys of older people and people with disabilities should be made by regular public transport instead of by special transport services. That is, in Swedish society an improved accessibility in public transport is understood to increase the number of journeys older people and people with disabilities undertake in regular public transport. That is, a measurable effect on the mobility of older people and people with disabilities. However, the perspectives of older people and people with disabilities on the possible influence of traveller information on their travel in public transport, as well as possible barriers to the implementation of such traveller information has hitherto not been thoroughly explored and understood.

Aims

The overall aim of this thesis is to contribute to the knowledge of user and provider perspectives on the provision of traveller information for older people and people with disabilities in public transport. The focus is on use and provision of such traveller information through online traveller information services.

The research is based on perceptions of older people and people with disabilities, together with experts' views on and experiences of the implementation process. The thesis consists of three sub aims underpinned by research questions:

1. The traveller information needed by older people and people with disabilities: the content of online traveller information services.

    i. What traveller information do older people and people with disabilities need when planning a journey?

    ii. How do functional limitations and combinations thereof influence need of traveller information among older people and people with disabilities?

    iii. How can the traveller information needed by older people and people with disabilities be provided feasibly?

2. Influence on travel by online traveller information services: Motives of older people and people with disabilities to find and use traveller information through online traveller information services:

    i. How do older people and people with disabilities use online traveller information services when planning a journey?

    ii. Does the use of online traveller information services influence choices made with regard to travel?

    iii. How does use of online traveller information services influence older peoples and peoples with disabilities as travellers?

3. Implicit causes of barriers in the implementation process of the traveller information content needed by older people and people with disabilities: Why is the traveller information not being implemented?

    i. Are there implicit causes of inertia in the implementation process?

    ii. How do the implicit causes affect the implementation process?

Theoretical context

People with disabilities, people with functional limitations and older people

The World Health Organization (WHO) defines disability as “an umbrella term, covering impairments, activity limitations, and participation”. A disability is a limitation in the performance of activities referring to an imbalance between demands on social and physical functioning posed by the environment and an individual’s ability to respond to such demands. That is, a disability always occurs in a context and is not very useful for measurements or classifications, but is a unifying concept used about people that experience disablement in society (WHO, 2012).

A more useful concept for the measurement and classification of human functioning is functional limitations that are “limitations in performance at the level of the whole organism or person” caused by impairments or “anatomical, physiological, mental or emotional abnormalities” that weaken, reduce or hinder functioning in some operative respect (Jette, 2006). As functional limitations refer to human functioning unrelated to the environment it can be used for objective measurements and descriptions of a person’s functional capacity (Iwarsson and Slaug, 2010). People with a particular functional limitation (or combinations of two or more) thus refer to homogenous groups of people with similar needs in the encounter with the environment.

There are several commonly used definitions of old age, but there is no general agreement on the actual age at which a person becomes old. Often, especially in developed countries, the definition of old age is related to retirement from work, giving chronological age a significant role in the defining of old age (as opposed to biological age or social age). The age of 65, which roughly corresponds to the retirement age in most developed countries, is widely regarded as the beginning of old age (Thane 1989; Roebuck, 1979). That is, in western countries older people are usually, as in this thesis, defined as persons of 65 years or older.

While the biological ageing process is a reality faced by all ageing people, biological age is not equivalent to chronological age. That is, a definition of old age based on chronological age entails great variation of functional capacity within

the group of older people and between older people of the same chronological age (Dehlin & Rundgren, 2000). The biological ageing process, however, does lead to a gradual decline in functional capacity which in turn results in functional limitations and the use of mobility devices becoming more common with increasing age (Löfqvist et. al., 2007; Parker et. al., 2008). For a person with a congenital or acquired disability the functional capacity with regard to the disability is in many cases more inert compared to the biological ageing process. This facilitates an increased awareness of one's functional limitations and consequently also a better understanding of one's capabilities in relation to environmental demands. Older people with a declining functional capacity may not be aware of their functional limitations and capabilities in the same way.

The person-environment relationship

The research context of this thesis embraces the perspective of Lawton's ecological model of ageing; see Figure 1, which is a psychological model on the relationship between environmental press and the individual competence and resources (Lawton and Nahemow, 1973). The model is based on the environmental docility hypothesis suggesting that the lower the capacity of the individual, the greater the impact of environmental press on the individual (Lawton, 1986).

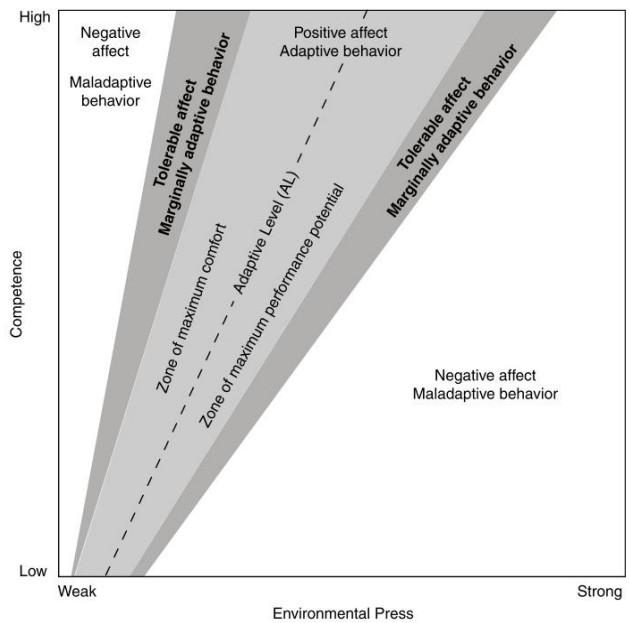

Figure 1: The ecological model of adaptation and ageing (Lawton, 1986).

The environment includes the personal, social and physical environments and the personal competence and resources contain all the physical and psychological capacities of the person. The personal competence influences the share of environmental resources available, which in turn may be used to fulfil personal needs and preferences. When these needs are fulfilled, the environmental demands and the person's ability to respond to these demands are in balance. If the environmental demands are either too low or too high, the performance is reduced.

Svensson (1987a) develops the model further by acknowledging the interdependence of the personal competence and resources available to an individual, and the environment of the person. This expands the model to include growth and decline in personal competence rather than just decline. By recognising that personal competence is influenced over the entire lifespan the ecological model deals with ageing rather than decline in old age only.

When the individual is able to respond to the demands of the environment, the covert personal competence and resources can be activated to the maximum and consequently to be transformed into overt abilities that enable optimum coping. The overt competence is the outcome, or behaviour that is measured in and affected by the environment. That is, to perform a task requires not only functional capacity but also motivation and enough ego strength to actually perform the task at hand.

The ability to activate one's personal competence is influenced during the entire lifespan. The illustration of the ecological lifespan model of ageing is the same as Lawton's model (1986) with the addition of the covert and overt competences as parallel horizontal lines, see Figure 2. The gap between the lines illustrates the ability to handle changes in environmental press where a wide gap indicates a higher probability of adaptation to changes in environmental press (Svensson 1987a; Svensson 1987b). For older people and people with disabilities the intersection between the covert and overt competences on one hand and the environmental press on the other will most probably appear in different locations. The ecological lifespan model of ageing suggested by Svensson (1987a; 1996) thus applies to the entire lifespan and thereby also encompasses individuals with disabilities who are not yet affected by the biological ageing process. However, even though the environmental demands of a given environment are the same for older people and people with disabilities, the disablement that an older person and a person with disabilities experience in that environment may vary. Older people affected by the biological ageing process and people with disabilities who are not yet affected by the decline in functional capacity due to the biological ageing process, are likely to have different levels of covert competence. They will most likely not be able to handle the situation equally well, that is, to activate their overt competence to the same extent.

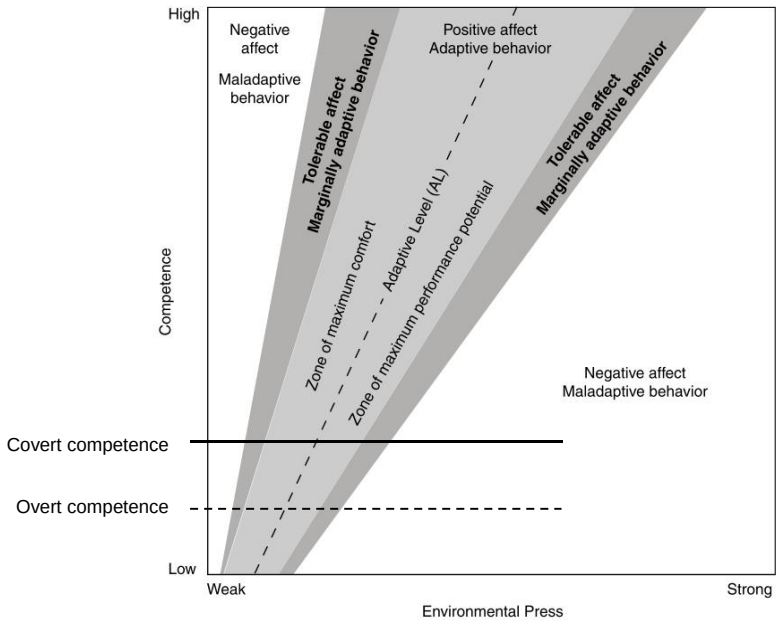

Figure 2: The ecological lifespan model of ageing (Svensson, 1987a).

With regard to traveller information and the travelling of older people and people with disabilities in public transport, Lawton's and Svenson's models both allow the argument that traveller information that keeps the complexity of the journey at a medium level with respect to individual abilities enables optimum performance. That is, adequate traveller information designed to meet user needs may help to keep complexity at a level which allows covert abilities to be activated to the maximum and transformed into overt ability that enables optimum coping.

Accessibility and usability

Accessibility is the outcome of a joint analysis of the relationship between a personal component based on knowledge of human functioning and an environmental component based on physical barriers (Iwarsson and Ståhl, 2003). Both the personal component and the environmental component are assessed objectively; while norms and legislation underpin objective assessments of barriers in the physical environment, the objective assessment of human functioning is enabled by functional limitations that are used to assess the functional capacity of a person or group of persons. It is an objective concept relating to societal norms and legislation and is primarily measured at group or population level.

Usability denotes the “extent to which a product (process, activity) can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (ISO, 1998). For usability to be achieved the activities performed require both functionality in terms of effectiveness and efficiency of the performance, and of satisfied users in terms of being able to perform the desired activity in a satisfactory way.

In a given environment usability is thus the outcome of the analysis of the accessibility of that environment and a desired activity to be performed in that environment. As usability by definition includes the perceptions of users it is a subjective concept that is assessed by a person or group of persons (Iwarsson and Ståhl, 2003). That is, while accessibility is assessed by the degree of agreement with objective standards and legislation, the usability of an environment is continuously assessed in the sense that the occurrence of barriers in the environment is dynamic and unpredictable. This also applies to functional capacity as a person’s health may differ from day to day, or even during the day. The subjective perceptions of the environment may therefore vary.

In the context of older people and people with disabilities in the public transport environment, usability is thus achieved when these users can perform a specific activity, like undertaking a journey by bus or train, in a way that is satisfactory to them. Traveller information may enable assessment of the public transport environment, given that it allows interpretation and understanding of the accessibility of the same.

Mobility and motility

Mobility is not a generally defined concept, but one of different meanings depending on context. In a broad sense it refers to movement through ones environment, like walking, riding a bike, driving a car or taking a bus (WHO, 2010) and is a prerequisite for participation in modern society with functional and spatial separation of everyday activities. Mobility is more than mere transport and embraces both destination dependent transport undertaken to reach desired people and places, and destination independent transport where travel is in itself is the desired activity. Other destination independent dimensions of mobility are exercise benefits associated with everyday mobility, social involvement in the local community and also potential travel, or knowing that travel is an option should one wish to travel (Metz, 2000). Potential mobility, or the possibility to participate in desired activities, is further elaborated in the concept of motility (Kauffman et al., 2004) that refers to how and to what degree mobility will be realised. That is, it takes into account the individual needs, plans and wishes for mobility and the ability to use the transport system and thus refers to the ability to be mobile.

Mobility plays a key role in sustaining independence in old age (Metz, 2003). The destination-independent dimensions of mobility become increasingly important with old age, that is, to be able to participate in society (Mollenkopf et al., 2005). Research on the meanings that older people connect with outdoor mobility includes aspects like “zest for life, autonomy and freedom, the sense of belonging and the pleasure of just moving about” (Mollenkopf et al., 2011). The importance of participation in society also refers to people with disabilities reflected by its inclusion in the in the International Classification of Functioning, Disability and Health (ICF) with mobility as one dimension of participation (WHO, 2010).

Expenditure of effort on a journey

In a public transport context a journey is made up of events that all need to be usable to enable travel. Recurring minor barriers that can be handled one by one, may all taken together become overwhelming for a person and prevent travel in the same way as an absolute barrier that cannot be overcome. Every link of the complex chain of events from door to door that constitutes a journey must be usable for the traveller for a journey to be undertaken. The travel chain perspective is therefore essential for travel in public transport to be a realistic alternative (Ståhl 1997; Börjesson 2002; Wretstrand and Ståhl, 2008).

A usable travel chain allows convenient travel, that is, it takes into account the psychological needs of the travellers. This means that the personal expenditure in terms of physical, cognitive and affective effort as described by Stradling (2002; 2006) is traded off against the traveller’s willingness to spend effort for a convenient journey. An inconvenient journey may be so to an extent where the expenditure of effort has an influence on the choice to travel (Stradling, 2006). Physical effort is spent on walking, standing and waiting during the whole journey with public transport, while cognitive effort is spent on information gathering and interpretation, navigation and progress monitoring before and during a journey. Affective effort is emotional expenditure spent on dealing with uncertainty before and during a journey by public transport (Stradling, 2006). Journeys that threaten to make demands on all three dimensions of effort are least attractive (Stradling, 2002). This is especially true for older people and people with disabilities as a public transport journey involves uncertainty in a more substantial way than for travellers without disabilities (Ståhl, 1997; Börjesson et. a. 1999).

The choice to travel by public transport involves reconciling anticipated demands of the journey with the resources available to the traveller. Traveller information plays an important role in reducing uncertainty in public transport primarily affecting expenditure of affective effort, and potential affective expenditure may well, as Stradling (2002) puts it, “be the biggest psychological barrier to preferring public to private transport”.

Method

Four papers were accomplished within the scope of this thesis. Paper I was carried out between 1998 and 2001 while papers II-IV were carried out in 2006-2010. Between the years 2002 and 2005 results from paper I was used in the development of an online traveller information service for interregional public transport by train and bus. The structure of the thesis work and the design of the studies resulting in papers I-IV are illustrated in Figure 3 while Table 1 presents an overview of the papers. Papers I-IV are appended at the end of the thesis.

Paper I address the first research aim of the need of traveller information among older people and people with disabilities and is based on a postal questionnaire to older people and people with disabilities in six of Sweden's 24 counties. It was conducted as a part of a comprehensive development project called TågplusGuiden Serviceinfo in which the Swedish public transport coordinator expanded its online traveller information service. This was done to ensure that travellers with special needs, including older people and people with disabilities, would be able to plan and carry out safe and comfortable regional journeys by public transport. The expanded service containing traveller information on the accessibility of the main stations and bus stops of the six counties of Halland, Kronoberg, Skåne, Stockholm, Västerbotten and Örebro was launched in 2002.

In 2003 a service with traveller information about the accessibility of travel chains for interregional travel by train and bus was also introduced in the neighbouring counties of Dalarna, Gävleborg, Västmanland and Örebro (Olsson, 2003). One of the starting points for this development was results on user needs from paper I. In 2006 when this traveller information service had been in active use for several years, further exploration of the need for traveller information and the role of traveller information services in the travelling of older people and people with disabilities were conducted.

Paper II concerns the first research aim on the need for traveller information. It covers the significance of functional limitations on the need for and valuation of traveller information. This was done by means of a postal questionnaire on the importance of traveller information and online traveller information services for the planning of a regional journey by public transport.

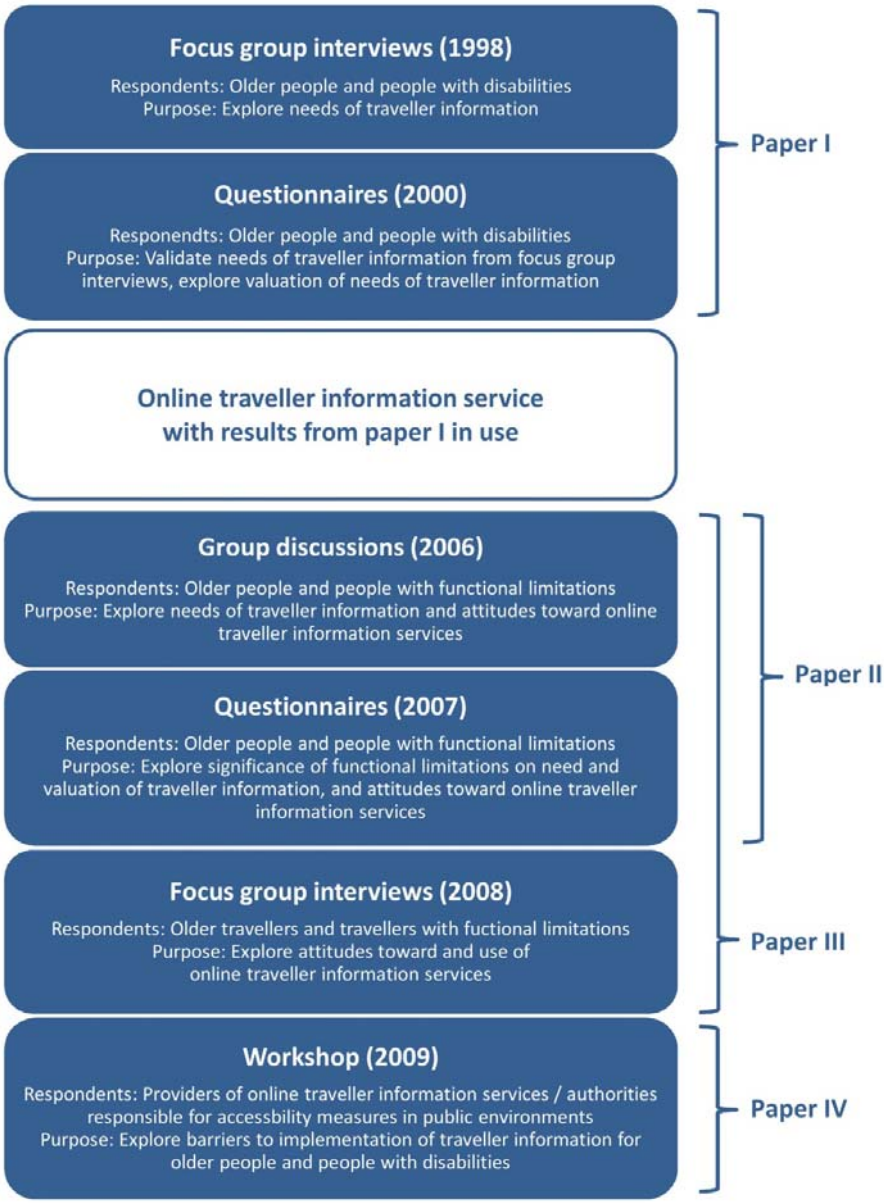

Figure 3: Structure of the thesis work and design of studies underpinning papers I-IV.

Paper III addresses the second research aim on influence on travel by online traveller information services by exploring attitudes toward online traveller information services and motives to use these services. Drawing on results from the questionnaire in paper II, explanatory focus group interviews were then carried

out with a selection of respondents to the questionnaire based on predefined inclusion criteria in order to further explore the motives for older travellers and travellers with functional limitations to use online traveller information services when planning a regional journey by public transport.

Paper IV concerns the third research aim on the lack of implementation of the needed traveller information by exploring implicit causes to barriers of implementation. This was done by means of a workshop with experts working with the implementation of accessibility measures in public transport and being in a position to influence decisions within their organisations.

Samples used in paper I-III

The samples of paper I and papers II-III both represent older people and people with disabilities. Both samples come from pensioners' organizations and organizations for people with disabilities. These two groups are independent of each other but are also similar as many older people have disabilities and many members of the organizations for people with functional disabilities are older people. The same organizations were used for the samples in paper I and in papers II-III, but the samples were recruited independently of each other.

Table 1: Overview of papers I-IV

		Paper I	Paper II	Paper III	Paper IV
Focus		Need and valuation of traveller information	Need and valuation of traveller information, attitudes to and use of online traveller information services	Role of online traveller information services in travel	Barriers to implementation of traveller information
Geographical area		Skåne, Halland,Kronoberg, Örebro, Stockholm and Västerbotten counties	Gävleborg, Örebro, Västmanland and Dalarna counties	Gävleborg, Örebro, Västmanland and Dalarna counties	
Mixed-method approach		Sequential explorartory design (qualitative-quantitative)	Sequential explorartory design (qualitative-quantitative)	Sequential explanatory design (quantitative-qualitative)	
Data collection	Qualitative	Focus group interviews	Group discussion	Focus group interviews	Workshop (group discussion)
	Quantitative	Questionnaire (cross-sectional)	Questionnaire (cross-sectional)	Questionnaire (cross-sectional)	
Particpants	Qualitative	Older people and people with disabilities N=57 (5 groups)	Older people and people with disabilities N=43 (4 groups)	Older travellers and travellers with disabilities N=29 (5 groups)	Experts N=5 (1 group)
	Quantitative	Older people and people with disabilities N=1890	Older people and people with disabilities N=2758	Older travellers and travellers with disabilities N=805	
Qualitative data analysis		Grounded theory: categorisation of interview transcripts and notes	Content analysis: grouping and categorisations based on transcripts and notes	Content analysis: grouping of explanatory statements based on quantitative results	Content analysis: categorisation of workshop transcripts and notes
Quantitative data analysis	Analyses	Frequencies, differences between independent groups, correlations between groups	Frequencies, differences between independent groups, identification of relevant groups	Frequencies, differences between independent groups	
	Variables	Nominal, Ordinal	Nominal, Ordinal	Nominal, Ordinal	
	Statistical methods	Mann-Whitney U-test; Spearman rank correlations	Mann-Whitney U-test; CHAID analysis	Mann-Whitney U-test	

Paper I

Paper I explores the needs for traveller information in public transport of older people and people with disabilities when planning a journey by regional public transport. This was done by means of exploratory focus groups followed by a questionnaire to older people and people with disabilities validated by means of a postal questionnaire to older people and people with disabilities, which also allowed statistical analyses to be performed.

Focus group interviews were chosen as the means for exploration as it is useful for orientating oneself to a new field, generating hypotheses based on informants' insights and developing interview schedules and questionnaires (Morgan, 1997). The point of a focus group discussion is not to build consensus, solve problems or make decisions, but to produce a diversity of ideas. The success of a focus group interview thus relies on an open and trusting environment without persuasion and coercion of opinions (Krueger and Casey, 2000). This was thought to be a suitable method for exploration of traveller matters where there may be different and conflicting interests between participating groups. Participants are selectively invited based on similarity in the characteristics relevant to the research question and the number of focus groups depend on the question in focus and the number of population subgroups required (Morgan, 1997).

Focus group interviews

The focus groups were performed in Halland County in August 1998. The participants were recruited through local organizations for older people and people with disabilities. The selection was done by voluntary entry by members of the organizations. Five focus groups with participants representing the visually impaired, hearing impaired, and mobility impaired people with medical impairments and one group with older people were conducted. A total of 57 people participated in the focus group interviews with group sizes ranging from 8 to 12 people. The topic guide used for the focus group interviews focused on the participants' need for traveller information when planning an interregional journey and on their experiences of interregional travel by public transport. The focus group interviews were recorded, and key words and important statements were written on a white board for all participants to see during the session. The recordings were transcribed verbatim and analysed by grounded theory based content analysis (Eneroth, 1994). The focus group resulted in 83 items of traveller information expressed in user terms, see Appendix I.

Questionnaire study

Sampling of participants

The sample was recruited among adult members of the three main pensioners' organizations and 9 organizations for disabled people. The participating organizations were: the Pensioners' National Organization, the Swedish Association for Senior Citizens, the Swedish National Organization for Pensioners, the Visually Handicapped National Organization, the Heart and Lung Patients Association, the Association of the Swedish Deaf-Blind, the Swedish Federation of Disabled Persons, the Swedish National Association for Disabled Children and Young People, the Swedish Association of Neurologically Disabled, the Swedish Rheumatism Association, the Swedish Association for Persons Disabled by Accidents or by Polio and the Swedish Association of Hard of Hearing People.

The organizations for disabled people were chosen in accordance with a list of 11 organizations that the Swedish central committee for the organizations for people with disabilities had approved as being representative for the body of people with disabilities. The Swedish National Society for Persons with Mental Handicaps was excluded due to loss of cognitive skills not being included in the study, and the Swedish National Association of the Deaf declined the invitation to participate.

4500 respondents from the participating organizations were randomly chosen among adult members in the chosen counties; 1,500 from pensioner's organizations and 3,000 from organizations for the disabled. The sample from each organization was proportional to the total number of members of the organization, see Table 2.

The sampling process resulted in a sample that cannot be expected to be formally representative of any defined population, but nevertheless could be expected to reflect conditions among older people and people with a range of disabilities.

Questionnaire design

The results from the focus group interviews resulted in a list of 83 traveller information demands expressed in user terms. These were used to develop a questionnaire on need and importance of traveller information. The questions on traveller information had predefined alternatives where the respondents rated the importance of specific items of traveller information. This was done on a seven-grade Likert-scale ranging from not important at all to very important traveller information.

Table 2: Sample size and response rate per organisation

Organisation	Number of responses per organsiation	Sample size per organisation	Response rate per organisation (%)	Share of total number of responses (%)
Visually Handicapped National Organisation	73	224	33%	4%
Heart and Lung Patients Association	241	568	42%	13%
Association of the Swedish Deaf-Blind	5	18	28%	0%
Swedish Federation of Disabled Persons	138	406	34%	7%
Swedish National Association for Disabled Children and Young People	101	248	41%	5%
Swedish Association of Neurologically Disabled	134	210	64%	7%
Swedish Rheumatism Association	324	754	43%	17%
Swedish Association for Persons Disabled by Accidents or by Polio	77	140	55%	4%
Swedish Association of Hard of Hearing People	186	432	43%	10%
Pensioners' National Organisation	285	891	32%	15%
Swedish Association for Senior Citizens	260	479	54%	14%
Swedish National Organisation for Pensioners	53	130	41%	3%
Total	**1877**	**4500**	**42%**	**100%**
Organisations for people with disabilities	1279	3000	43%	68%
Organsiations for older people	598	1500	40%	32%

The questionnaire study also collected background information on the respondents concerning age, gender, use of mobility devices; travel by public transport and a self-assessment of the severity of their (if any) functional limitations on a four grade scale ranging from moderate some of the time to severe all of the time. Six types of functional limitations could be scored: loss of sight, loss of hearing, poor balance, and limitations of stamina, limitations of speech and loss of mobility.

In order to limit the task for the respondents, but still have each respondent answering a mix of questions on the need for traveller information regarding general traveller information, traveller information regarding the train stations and bus terminals and traveller information regarding the vehicles, 12 versions of the questionnaire were produced. Each questionnaire contained 40 questions on need for traveller information covering all these areas. To ensure relevant phrasing of the questions, a draft version of all questions were tested on nine members of the target population. The pilot survey resulted in further rephrasing of the questions.

Distribution of questionnaire

The questionnaires were distributed in September 2000. It was ensured that each of the participating organizations received a mix of the 12 versions of the questionnaire. The organizations mailed the questionnaires together with a reply-paid envelope to their share of the sample. One reminder questionnaire was sent out ten days after the initial questionnaire and a postcard reminder another ten days after that.

Response rate

The overall response rate was 42 % (N=1890), with variation in response rate of 28 %-64 % between organizations, see Table 2. The response rate from each county varied between 37 % and 44 %. The respondents ranged in age from 19 to 96 years with a median age of 69 years. Overall, 39,5 % of the respondents were men and 60,5 % were women, with slightly less men (34,6 %) and more women (65,4 %) among respondents under 65 years of age and slightly more men (43,4 %) and less women (56,6 %) among respondents over 65 years of age. The 83 questions on need of traveller information were answered by between 547 to 1366 respondents.

Data analysis

In the analysis of the questionnaire data, traveller information was treated as important if it reached a grade of three or higher. The Mann-Whitney U-test was used to compare groups (p=0.5). The evaluation of the need for traveller information that increases in importance with the severity of the disability was made by means of rank correlation. The Spearman rank correlation was used for this purpose (p=0.5).

Paper II

Paper II explores how functional limitations and combinations of functional limitations contribute to the need of specific types of traveller information. This was done by means of a questionnaire to older people and people with disabilities on the need and importance of traveller information, on their use of and attitudes toward online traveller information services and the influence such services have on their travel. First the previous results of 83 traveller information items needed by older people and people with disabilities from paper I were reassessed by means of group discussions with older people and people with disabilities on their needs of traveller information. Group discussions were chosen as a method as they are useful for generating ideas and solutions among the participants (Susskind et al., 1999). This was desired as the purpose of the group discussions were to understand how the 83 original items of traveller information from paper I could be organized into comprehensive groups of traveller information and the participants use of and attitudes toward online traveller information services.

Group discussions

The group discussions were conducted in Gävleborg County in February 2007. The participants were recruited through local organizations for older people and people with disabilities in the study district. Selection was done by voluntary entry by members of the organizations. To cover different types of disabilities expected (based on results from paper I) to have similar needs for traveller information, the

group discussions were carried out in three groups with participants recruited to represent the visually impaired, hearing impaired and mobility impaired, and two groups recruited to represent older people. Altogether 38 people participated in the group discussions with group sizes ranging from 6 to 8 people (Flick, 2009; Kitzinger and Barbour, 1999). The discussions lasted for 1 to 2 hours.

The group discussions were recorded, transcribed verbatim and analysed by repeatedly reading and re-reading the transcripts to get a sense of what they were about. Using a constant comparative technique the transcripts were searched for statements that would explain the need for specific traveller information and use of and attitudes toward online traveller information services (Mayring, 2004). This procedure resulted in the 83 original items of traveller information being reduced and grouped into 14 comprehensive groups of traveller information: time of departure/arrival, changes/number of changes, booking and paying, the terminal/station, the vehicles, booking a specific seat, service at the station/terminal, personal service at the station/terminal, personal service at the station/terminal available during the journey planned and traveller information concerning special needs (people with severe loss of sight/severe loss of hearing/severe loss of speech/loss of mobility/people with allergies), see Appendix II.

On the suggestion by the participants of the group discussions and the reference group of experts for the research done for paper II, four functional limitations were added to the standardized question of 11 functional limitations developed by Iwarsson and Slaug (2010) included in the questionnaire. Original functional limitations: severe loss of sight, blindness, severe loss of hearing including deafness, prevalence of poor balance, limitations of stamina, difficulty in moving head, loss of upper extremity skills, difficulty in handling/fingering, loss of lower extremity skills, overweight and allergies. Additional functional limitations were: loss of concentration skills, severe pain, incontinence and severe loss of speech.

Questionnaire

Sampling of participants

The sample consisted of 5000 older people and adult people with disabilities living in the study district and being members of either one of the three main pensioners' organizations in Sweden or one of nine Swedish organizations for people with disabilities chosen in accordance with the sample of paper I. 1500 of the sample were from pensioners' organizations and 3500 from organizations for people with disabilities. The sample size from each organization was drawn as in paper I. Table 3 shows the sample from each organization.

Table 3: Sample size and response rate per organisation

Organisation	Number of responses per organsiation	Sample size per organisation	Response rate per organisation (%)	Share of total number of responses (%)
Visually Handicapped National Organisation	104	258	40%	4%
Heart and Lung Patients Association	383	664	58%	14%
Association of the Swedish Deaf-Blind	0	13	0%	0%
Swedish Federation of Disabled Persons	306	477	64%	11%
Swedish National Association for Disabled Children and Young People	x	293	x	x
Swedish Association of Neurologically Disabled	82	247	33%	3%
Swedish Rheumatism Association	556	873	64%	20%
Swedish Association for Persons Disabled by Accidents or by Polio	129	171	75%	5%
Swedish Association of Hard of Hearing People	360	504	71%	13%
Pensioners' National Organisation	437	890	49%	16%
Swedish Association for Senior Citizens	307	478	64%	11%
Swedish National Organisation for Pensioners	94	132	71%	3%
Total	**2758**	**5000**	**55%**	**100%**
Organisations for people with disabilities	1920	3500	55%	70%
Organsiations for older people	838	1500	56%	30%

Questionnaire design

A 32-item questionnaire was developed based on the results of the group discussions of the need for traveller information. The questionnaire consisted of two parts: one part with background questions (age, gender, functional limitations, use of mobility devices, travel with public transportation and preferred sources of traveller information) and another part about traveller information in which respondents rated the importance of the 14 comprehensive types of traveller information and their use of/attitudes to online traveller information services on a five-point Likert-scale ranging from not at all important/useful to very important/useful. Respondents were also asked to leave their names and telephone numbers if they agreed to participate in a follow-up qualitative study with the intention to deepen the understanding of findings from the quantitative data. To ensure relevant question phrasing, a draft version of the questionnaire was tested in a pilot survey with ten members of the target population in Gävleborg County. The pilot survey resulted in further rephrasing of the questions.

Study district and distribution of questionnaire

The questionnaires were sent out in May 2007, followed by one postcard reminder ten days after the questionnaire. The participating organizations distributed the questionnaires to their share of the sample in Dalarna, Västmanland and Örebro counties. By mistake the questionnaires to members of the Swedish National Association for Disabled Children and Young People were sent to members of all

ages and not only to members over the age of 18 as requested. Subsequently the sample from this organisation was omitted from the study.

Response rate

2758 people participated in the survey giving an overall response rate of 55 %, with variation in response rate of 33 %-75 % between organizations, see Table 3. The response rate from each county varied between 44 % and 58 %. The respondents ranged in age from 19 to 95 years with a median age of 68 years. Overall, 39,3 % of the respondents were men and 60,7 % were women, with slightly more men (43,3 %) and less women (56,7 %) among respondents under 65 years of age and less men (29,7 %) and more women (70,3 %) among respondents over 65 years of age.

Data analysis

Chi-Squared Automatic Identification Detection (CHAID) (Levin and Zahavi 2001; Magidson 1994) was used to explore how functional limitations and their combinations contribute to the need for specific types of traveller information. CHAID is an exploratory grouping method that identifies discrete groups of respondents and by taking their responses to explanatory variables (functional limitations) seeks to predict the impact on the dependent variable (the yes/no response to whether a specific type of traveller information was important). The analysis then proceeds in a stepwise fashion. In each step, the most significant predictor is used to partition the entire sample into two (or more, in the case of non-binary predictors) mutually exclusive segments. Thereby the segments will not overlap and each case in the sample is contained in only one segment (Magidson, 1994). It also produces a predictive model by combining relevant predictor variables (Kass, 1980), that enables identification of relevant groups (target groups) within the sample. The CHAID grouping method is widely used in applied fields as diverse as medicine (diagnosis), business (marketing), computer science (data structures), botany (classification), and psychology (decision theory). The advantage of CHAID compared to other grouping methods, for example discriminant analysis and cluster analysis, is that it can be used for nominal, ordinal or categorical predictor variables data as opposed to only nominal or ordinal predictor variables.

The Answer Tree 3.0 program was used for the CHAID-analysis. The merge level and alpha level for predictor eligibility were set to 0.05 and stopping criteria were set to 100 observations before and 50 observations after the division of the sample (Magidson, 1994). An indirect consequence of the last criterion was that the functional limitation blindness with 36 observations was excluded from the analyses. No limit was set to the number of functional limitations to be combined. Data was further reduced in two respects before the analysis. With respect to types of information, the 14 comprehensive groups of traveller information were reduces

by excluding three such groups from the analysis (departure time, fares, and how to book/pay). Such general information was expected to be less relevant to target for specific population segments. With respect to functional limitations, the functional limitation overweight was excluded from the analyses as there were indications of the question having been difficult to assess for the respondents, leaving altogether 13 functional limitations to be included in the analyses.

A CHAID-analysis was performed for each of the remaining 11 comprehensive groups of traveller information, with the expressed need (yes/no) for such information as output, and 13 functional limitations as predictor variables. The large number of analyses entails that detailed analyses of each of those analyses separately would not be feasible for presentation. Also, for the same reason, it was deemed less relevant to emphasize analyses of how specific the final groups were, as such final groups differ between analyses. Instead the predicted mean value of importance (Likert-scale response) that identified segments gave types of traveller information was used to illustrate differences between groups and relevance of groups. Thereby, the results of the CHAID-analyses were verified and the relevance of the grouping quantified in a secondary analysis. However, in comparisons across analyses the segments are no longer fully mutually exclusive: a respondent may occur in different subgroups in different analyses depending on the number of steps of the final segmentation of each analysis, and in what order different functional limitations were used for segmentation.

Paper III

Paper III explores motives of older people and people with disabilities to find and use traveller information through online traveller information services. The paper builds on descriptive data from the questionnaire from paper II together with focus group interviews in a sequential explanatory mixed method design, where the secondary qualitative data supports and explains the primary quantitative findings (Cresswell and Plano Clark, 2007). That is, the quantitative data on the use of and attitudes toward online traveller information services among older people and people with disabilities, and the influence these services have on their travel, were illuminated further by qualitative data on the motives of older travellers and travellers with disabilities to use online traveller information services.

Focus group interviews were chosen as the means for exploration as it is useful for orientating oneself to a new field, generating hypotheses based on informants' insights and developing interview schedules and questionnaires (Morgan, 1997). The point of a focus group discussion is not to build consensus, solve problems or make decisions, but to produce a diversity of ideas. The success of a focus group interview thus relies on an open and trusting environment without persuasion and coercion of opinions (Krueger and Casey, 2000). This was thought to be a suitable

method for exploration of traveller matters where there may be different and conflicting interests between participating groups. Participants are selectively invited based on similarity in the characteristics relevant to the research question (Morgan, 1997). Depending on the purpose of the focus group the number of participants varies. For marketing purposes the recommended group size are 8-10 people while group sizes for research purposes can be smaller, with 3-4 people as a minimum (Bloor, et. al. 2001).The number of focus groups depend on the question in focus and the number of population subgroups required (Morgan,1997).

Quantitative data analysis

Quantitative methods were used to obtain participant demographics, and descriptive statistics were computed for all variables measured, including frequency counts and percentages. Inferential non-parametric statistics were used to analyse differences between groups where applicable (age, gender).

Focus group interviews

Focus group interviews were carried out with selected respondents of the questionnaire using the following inclusion criteria: willingness to participate in a qualitative follow-up study, having travelled by regional public transport by train or bus in the past year and using online traveller information services when planning journeys by public transport. This resulted in 41 possible participants of whom 29 participated in the focus group interviews. Five focus group interviews were carried out in November 2008 in the regional centres of the study district. Group sizes were 5-7 participants (Kitzinger and Barbour, 1999).

The topic guide used for the focus group interviews focused on the participants' use of and attitudes toward the internet, their travel in regional public transport and their use of traveller information and online traveller information services.

The focus group interviews were recorded and key words and important statements were written on white board for all participants to see during the session. The qualitative data analysis builds on specific questions resulting from the quantitative data analysis. That is, the focus group transcripts were read and re-read repeatedly to give a sense of what they were about. Using a constant comparative technique, the transcripts were searched for explanatory statements in relation to the results of the quantitative analysis that would further illuminate the motives of older travellers and travellers with functional limitations to use online traveller information services (Cresswell and Plano Clark, 2007).

Paper IV

Paper IV explores the process of implementation of traveller information needed by older people and people with disabilities with the aim of understanding the implicit causes of barriers in the implementation process. This was done by means of a workshop that are a way of bringing together professionals to discuss experiences of the specific area to be researched (Westerlund, 2007) that allow experience-based learning and discovery of phenomena that are not exposed through direct empirical methods. It was thus expected that the experts would talk about "procedures that are otherwise not made transparent, that is, to discover informal issues that influence professional work" (Risser et al., 2010). This exploratory approach provided insight into the processes of implementation and the barriers that prevent it. It also gave an understanding of the individual experiences of the conflicts of interest that prevent implementation from happening.

Workshop

The workshop was conducted in October, 2009. The participants were chosen on the basis of their professional roles and their experiences of working with implementation of accessibility measures in public transport. The planning and marketing executives of regional public transport authorities in southern Sweden and specialists working with public transport and older and disabled travellers at the national rail and road authorities were listed as potential informants. This resulted in a list of fifteen potential informants of which eight informants accepted the invitation to participate in the workshop. On the day of the workshop three informants were unable to attend the workshop due to illness and other unforeseeable obligations. As three to four participants is regarded to be a thumb rule minimum number of participants in group discussions (Kitzinger and Barbour 1999, Bloor et. al. 2001) the outcome of five participants was decided to be enough to go forward with the workshop. Accordingly five informants participated in the workshop of which two were planning and marketing executives of regional public transport authorities and three were high ranking officials at the national rail and road authorities.

The workshop took one day and consisted of three two-hour sessions with breaks in between. The workshop began with an introduction of the participants followed by a reminder of the purpose of the workshop: talk about the process of implementation of accessibility measures in public transport and possible barriers to implementation. The participants were also encouraged to reflect upon their personal experiences and observations as well as the interests of their organizations.

The three themes developed for the workshop were inspired by Barbour (2007) who explains that a few well thought-out questions or themes are enough to both trigger and sustain a group discussion. The first theme was current challenges that older people and people with disabilities pose for public transport. The second theme concerned realistic solutions to the challenges of the first session. The solutions had to be agreed upon between the participants. Finally, the theme for the third session was barriers to implementation of the solutions from session two.

The workshop was recorded and key words and important statements were written down on white board for all participants to see during the session. The recordings were transcribed verbatim. Content analysis with inductive category formation as described by Mayring (2004) was used for the analysis in which categories are gradually developed form the material. The categories were then summarized into two umbrella categories explained by six similar but opposite aspects of the implementation process. The interpretation of the findings is based on the concept of conflicts of interest as described by Rahim and Bonoma (1979) and their influence on the implementation of measures as described by Chaloupka-Risser et al. (2011).

Results

The results of papers I-IV are organized in three parts. The first part, *"The content of online traveller information services"*, contains results from paper I on the need for traveller information among older people and people with disabilities and from paper II on objective measures of functional limitations in relation to the importance of traveller information needs. The second part, *"Influence on travel by online traveller information services"*, contains results of paper III on how online traveller information services influence older peoples and peoples with disabilities travel. The third part containing results from paper IV is denoted *"Implicit causes of barriers to implementation of the traveller information content"*.

In the account of results below the concept of *people with disabilities* is used for results on an aggregated level, while the concept of *people with functional limitations* is used when results refer to subgroups based on functional limitations or combinations thereof.

The content of online traveller information services

The analysis of the need of 83 traveller information items on which paper I is based show that the need of traveller information varies depending on which of the older people and people with functional limitations that are discussed. Some of the traveller information is important for all of these people while other types of traveller information are important mainly to subgroups with functional limitations resulting in a physical restriction. The less frequent travellers have higher means for all general traveller information than the more frequent travellers, and people over 75 years express a somewhat higher need than younger age groups.

On an aggregated level much of the traveller information found important is traveller information that is necessary regardless of physical restrictions, like price and different options when booking. For this group the focus of the traveller information needs are mainly on practical matters like knowing the stop/platform on departure, at connections and at the destination, whether parking is available at the station, what luggage storage facilities that are available and whether it is possible to buy a ticket on board the train or bus. There is also interest in knowing

the service available during the planned journey and whether staff will be available at the station during the planned journey.

Even though the traveller information needs on an aggregated level is focused more on comfort than on accessibility, the needs are still detailed to enable careful planning and preparation of the journey. That is, the choices that this traveller information enables are focused on the ease at which a journey can be carried through rather than if it can be carried through at all due to barriers in the public transport environment. That is, for all older people and people with functional limitations the traveller information needed when planning a journey relate to the comfort of the journey more than to specific aspects of accessibility of the public transport environment.

Among subgroups based on prevalence of functional limitations the traveller information needs relate to the accessibility of the public transport environment. Six subgroups of people with functional limitations were analysed: physical disabilities, prevalence of poor balance, low stamina and either severe loss of hearing, sight or speech. The analysis resulted in three distinct subgroups of functional limitations based on the importance of traveller information:

- a joint group on mobility based on physical disabilities, prevalence of poor balance and low stamina
- a group based on severe loss of hearing
- a group based on severe loss of sight.

Within these subgroups the needs of traveller information largely depend on the restrictions that the functional limitations result in when travelling. The focus is on traveller information that informs the traveller of the accessibility of the public transport environment including both the physical aspects of accessibility and the access to traveller information. The traveller information needs are thus more absolute in the sense that they are not so focused on the comfort of the journey or the ease at which the journey can be executed, but about whether travel is possible at all. That is, the focus of the traveller information needs among these subgroups is more on accessibility than on comfort.

A more *severe* degree of disablement increases the importance of traveller information about the accessibility of the public transport environment and on how to access traveller information. That is, a more severe functional limitation is likely to generate a greater interest in traveller information about the accessibility of the public transport environment, as that enables assessment of whether travel is possible at all.

Summing up, the need of absolute traveller information is more important for people with functional limitations and becomes increasingly important with the degree of disablement, see Figure 4. Even though the need to plan and prepare for a journey seems to be equally important for the whole group of older people and people with disabilities and for the subgroups based on functional limitations, the importance and the intended use of the traveller information differ between these groups. The focus shifts from comfort information on an aggregated level to an increasing importance of accessibility information within subgroups. Both the comfort information and the absolute information enable assessment of the effort required to carry through a journey. This is decisive for the choice to travel, but the traveller information focused on comfort relates more to the individual choice to travel while absolute traveller information enables the traveller to assess whether travel is possible at all.

Figure 4: Illustration of the differing needs of traveller information among older people and people with functional limitations.

The traveller information needs of older people and people with disabilities thus cover a broader range of traveller information than what is usually offered. This is true for older people and people with disabilities in general and for subgroups based on functional limitations. In addition to this traveller information the subgroups based on functional limitations need traveller information that informs them on the accessibility of the public transport environment. Subsequently all the traveller information needed by older people and people with disabilities is important for their planning of journeys in public transport.

The analysis of the need for 11 types of traveller information based on 13 functional limitations on which paper II and paper III are based show that there are a limited number of particular combinations of functional limitations that contribute to an additional increase in the need of traveller information. That is, the contribution of these combinations increases need for traveller information above what could be expected based on each functional limitation in itself. Also the traditionally identified groups based on a single functional limitation constitute relevant target groups for many types of traveller information. The traveller information needs of these groups need to be taken into account in the provision of traveller information in public transport.

Altogether 11 combinations of functional limitations that contribute to an increased need of traveller information were identified. Loss of lower extremity skills and prevalence of poor balance affect the need of different types of traveller information more than other the other studied functional limitations. Together or in combination with other functional limitations they increase the need for traveller information in 10 of the 11 identified combinations of functional limitations with increases as high as 1,12 above population averages, see Table 4. However, the increase that they represent is however moderate being at most 0,1 points above population averages.

The combination of functional limitations that include either loss of lower extremity skills and Prevalence of poor balance and other functional limitation(s) with the highest increase in need above population averages is the combination of Prevalence of poor balance and Severe loss of sight. Their combined increase in need is 1,12 points comparing to an increase of 0,41 points that adding their individual contributions to increase in need yields. This illustrates the additional increase that combinations have compared with considering the functional limitations as separate entities and just adding their traveller information needs.

Loss of lower extremity skills and prevalence of poor balance, alone or in combination with other functional limitations trigger an increased need compared to population averages for all types of traveller information with the exception of traveller information compiled for travellers with severe loss of hearing including deafness and travellers with allergies.

Table 4: Averages for affected segments, population averages and increase in mean compared to population averages.

			General infrastructural conditions			Service provision			Conditions related to special needs					
Affected segments			Terminal	Vehicles	Seat or compartment	General service available at staion or terminal	Personal service available at station or terminal	Personal service available at station or terminal during planned journey	Severe loss of sight	Severe loss of hearing including deafness	Severe loss of speech	Loss of mobility	Allergies	Increase in mean value of imporrtance compared to sample
Incontinence	alone		3,28	2,31	3,05									0,21
Difficulty in fingering/handling	alone		3,10											0,03
Allergies	alone					2,93		2,66					2,82	0,50
Severe loss of speech	alone								1,97		2,27			0,62
Severe pain	alone			2,05									1,89	0,04
Severe loss of sight	alone								1,98					0,35
Severe loss of hearing including deafness	alone									3,26				1,34
	with	Severe loss of sight								3,68				1,76
Loss of lower extremity skills	alone		3,24	2,13	3,04	3,03	1,43	2,75				2,17		0,10
	with	Incontinence		2,51	3,34		3,16	3,05						0,75
		Severe loss of speech						3,54						0,90
		Loss of upper extremity skills				3,13								0,71
		Severe pain										2,45		0,32
Prevalence of poor balance	alone		3,12	2,11					1,68		1,42			0,06
	with	Severe loss of sight					3,46	3,41				2,74		1,12
		Severe loss of speech	4,08											1,01
		Limitations of stamina	3,70											0,63
Loss of lower extremity skills and prevalence of poor balance	alone				3,59							3,41		0,95
	with	Severe pain										2,34		0,21
		Severe pain and loss of upper extremity skills										3,24		1,11
Averages (affected segments only)			3,42	2,22	3,25	3,03	2,68	3,08	1,87	3,47	1,84	2,72	2,35	
Averages (affected segments only)				2,96			2,93				2,45			
Grand mean (population)			3,07	2,01	2,92	2,42	1,48	2,64	1,63	1,92	1,37	2,13	1,86	

The last of the 11 combinations of functional limitations to increase needs above populations averages is the combination of Severe loss of hearing including deafness and Severe loss of sigh that together increase the need of traveller information with 1,76 points above population averages. The addition of their individual contributions to increase in need yields 1,69 points above population averages.

Also, apart from the increase in need that they represent, covert and therefore often neglected types of functional limitations like incontinence and severe pain contribute to an increased vulnerability that need to be taken into account and compensated for in traveller information.

Not all functional limitations are included in the identified combinations of functional limitations. Difficulty in moving head and loss of ability to concentrate did not increase the need for any of the comprehensive types of traveller, alone or in combination with other functional limitations. Difficulty in handling/fingering contributed to segmentation for one type of traveller information only, but as a single functional limitation.

To sum up the results show that it is feasible to consider combinations of functional limitations when providing traveller information in public transportation, as such considerations may be taken without ending up with an unmanageable number of target groups. Only 11 of the 2^{13} possible combinations have means over population averages for specific types of traveller information. When providing traveller information for older people and people with functional limitations it particularly people with combinations of functional limitations that include loss of lower extremity skills and prevalence of poor balance are in need of relevant traveller information provision. However, also covert and therefore often neglected types of functional limitations like incontinence and severe pain contribute to an increased vulnerability that need to be taken into account and compensated for in traveller information provision in public transportation. Furthermore the study shows that groups of people with functional limitations have a greater need for traveller information concerning different aspects of travel (and not just aspects that relate to the functional limitations they have reported).

Influence on travel of online traveller information services

The substantial influence on the travel of older people and people with disabilities of online traveller information services is the empowerment of those of the older travellers and travellers with disabilities that are anxious and insecure before a journey. Through better access of traveller information offered by online traveller information services these travellers can find what they need to build their confidence before a journey and subsequently be supported in their roles as travellers.

The primary effect of the use of online traveller information services among these groups of travellers thus seem to be on the quality of the journeys undertaken rather than the frequency of journeys. The interviews exemplifies that access to online traveller information services have influenced their regional travel by public transport by strengthening them as travellers. This is illustrated in the following statements:

> *"I'm stronger as a traveller today than I was before [online traveller information services], the information about the journey makes me feel safer, it reduces the worry I sometimes feel before a journey, especially if I'm travelling on my own… I know what will happen." (Woman, 78 years, severe loss of sight, prevalence of poor balance)*

> *"The access to traveller information strengthens me as a traveller, it confirms me in my way of doing things, I'm curious and want to know stuff, others who are more cautious or anxious get confirmed in other ways, like reducing their insecurities before a journey… my wife always wants to have things checked and confirmed before the journey." (Man, 63 years, difficulty in fingering, severe pain)*

The improved access to traveller information that online traveller information services provide allowed the interviewees to satisfy their need of traveller information to some extent. The services and the information in them supported them as travellers regardless of why they seek out the information.

The effect of online traveller information services being about the quality of the journey is also implied by the vast majority of the respondents that are satisfied with the online traveller information services they use and find them to be both useful and important when planning a journey even though they only influence the frequency of travel for a few that perhaps represent travellers that are already confident and secure when travelling by regional public transport, see Figure 5.

Figure 5 shows that 17,2 % (N=78) of the respondents that use online traveller information services to plan regional journeys by public transport say that they travel more frequently in regional public transport as a result of having access to online traveller information services, and that they find these services to be both important and useful when planning a journey. 77,9 % (N=353) of these respondents say that access to online traveller information services have had no effect on their travel frequency, but that they still find these services to be important and useful when planning a journey. As there were no significant differences between age or gender groups Figure 5 contains respondents of all ages and both genders that have expressed an attitude other than neither/nor.

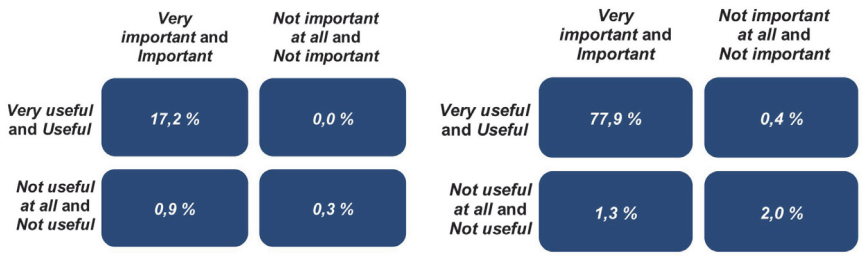

Figure 5: Share of respondents with an increase in travel frequency of online traveller information services (left) and no increase in travel frequency (right) as a result of using such services.

Interview data does not explicitly express the importance and usefulness of online traveller information services; instead the older and disabled interviewees talk about needs that on-line traveller information meets like trust and reassurance that have already been mentioned earlier, and in building up confidence in one's ability before a journey:

> *"I find out more [about the journey] now, I can see what it will look like and find out what will happen and where I should go. There's less to think about now, less worry before the journey. I know more, and knowing more is safer, I'm not as worried before the journey as I used to be." (Woman, 78 years, severe loss of sight, prevalence of poor balance)*

Confidence is intertwined with trust and the confirmation that some interviewees seek from a complementary source of traveller information service when booking a journey. Even though the purpose of this is to be reassured of one's choices, the interviewees also express that they act with greater confidence than before they had access to online traveller information services as they are now more aware of the options available and are consequently in a better position to deal with the staff at the travel agency or at the other end of the line at a telephone service. This is exemplified in the following statement:

"When I'm going to book my journey I know the options and can interact better with the travel agency when I go there or call them. I do as I did before [when booking], I really don't do anything differently, but I act with greater confidence as I know what I want and what the options are." (Woman, 71 years, severe pain, prevalence of poor balance)

The interviews show that traveller information is used to confirm and reassure choices made with regard to travel, and in building up confidence in one's ability before a journey. For instance, the traveller information provided online is used to try out different travel options based on individual conditions, especially when travelling to unfamiliar places or having to change at an unfamiliar station/terminal. In the interviews several examples were provided, illustrated by the following statements:

"...it's easier today compared with before to for example try out the journey before you go, and see if everything works out. That couldn't be done before." (Man, 77 years, blind)

"...I used to be uneasy to travel on my own, but now I can see what it will look like and where I should go and I'm calmer. Most of the time it [the information] corresponds well with reality." (Woman, 71, prevalence of poor balance, loss of lower extremity skills)

The interviewees check out vehicle types and designs, the design of the station/terminal and other important aspects that may be decisive for carrying out the journey. Such aspects may be both physical and psychological, for example knowing that there is a toilet at the station/terminal that is usable for wheel-chair users and knowing that it is possible to get help during the journey if something fails, that is, knowing that there will be staff at the station/terminal during the planned journey.

To sum up, the point in offering traveller information of high quality to older travellers and travellers with functional limitations through online traveller information services thus seems to be to provide access to traveller information that enables an older person or a person with functional limitations to undertake a journey as confident travellers. With time this may eventually influence older peoples and peoples with functional limitations choices made with regard to travel in regional public transport, thereby increasing the frequency of journeys this group undertakes.

Implicit causes of barriers in the implementation process of the traveller information content

The findings suggest that there is a lack of guidance from policy, legislation and directives concerning the implementation of measures contributing to policy intentions to be fulfilled. This is displayed by disparate understandings of the implementation process by the experts, that is, significant differences in how the experts expect the implementation process to be working, or how it should work, and how the implementation process seems to be working.

While the implementation process as it should be working displays a rational process with consecutive phases much in resemblance of the literature on policy decision making (e.g. Hupe and Hill, 2006; John, 2012), the process as it seems to be working displays a different picture, see Figure 6. Here the overarching framework and formal requirements for the implementation are in place and functioning, but the corresponding framework on the operative level of the implementation process is not fulfilling these requirements well.

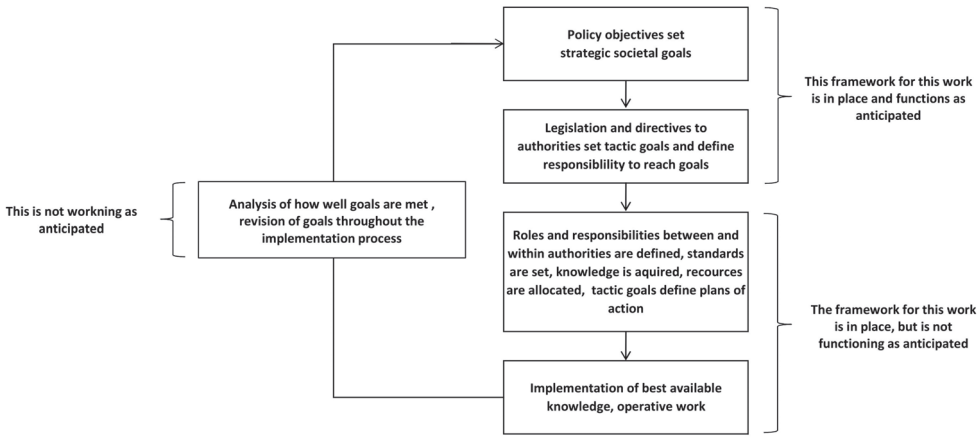

Figure 6: Overview of the implementation process as it should be working with comments on how it seems to be working.

On the operative level of the implementation process the findings suggest that there are several types of barriers related to the definition of roles and responsibilities. There is a lack of common standards and a lack of coordination. Appropriate assessments are not enabled, and prioritizations of implementation activities and allocation of resources are arbitrary as they are based on criteria that are irrelevant to the fulfilment of policy intentions. Conflicts of interest as described by Rahim and Bomona (1979) seem to facilitate barriers in the

implementation process following the principles suggested by Chaloupka-Risser et al. (2011). The lack of guidance on what is expected in terms of implementation seems to lead to uncertainties among and within actors responsible for the implementation. As questions on how to deal with these uncertainties seem to go unanswered from policies, legislation and directives, the actors working on the operative level are left to themselves to find answers. This leaves room for individual interpretation, and thus for discrepancies within and between individuals and organizations.

What is to be achieved is either not clear, perceived as negotiable or decided upon based on motives that are not in line with the intentions of the overarching framework. Organizations rely on different knowledge and also value knowledge differently, have differences in financial resources, staff resources, technical recourses etc., and have different experiences of the technical know-how needed for implementation, see Figure 7

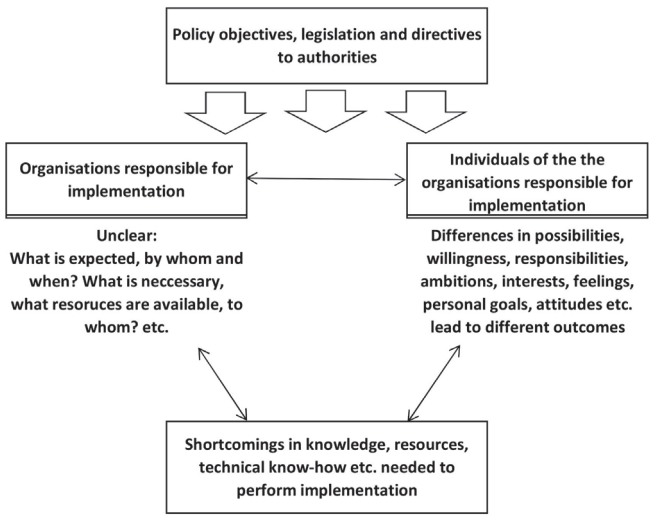

Figure 7: Sources of discrepancies in the implementation process

The people in the organisations are also affected by the restrictions that these resources constitute. Even though the implementation work is done to the best ability of all involved, organizational differences will lead to dissimilar results of the implementation process if the process is not guided appropriately. That is, such differences need to be bridged between organizations and also within organizations for the implementation process to lead to an increased usability of the travel chain in public transport throughout the country. For instance, the experts describe a situation where older people and people with disabilities are not

prioritized in their own right. That is, to become prioritized, or to be high enough on the to do list to receive resources for implementation, measures like this cannot be described in terms of accessibility or as measures directed at older people and people with disabilities. Instead it is perceived as necessary to describe such measures in terms of other groups of travelers like commuters or leisure travelers, or in paraphrasing by avoiding direct reference to older people and people with disabilities.

This leaves the intentions of policy, legislation and directives to be fulfilled by individual officials, that is, the organizational responsibility becomes an individual responsibility. This makes implementation of such measures seem arbitrary as they depend on the individual officials taking responsibility for implementation. This situation also implies the organizations overlooking the intentions of policy, legislation and directives as the needs of older people and people with disabilities in the public transport environment seem not to be valid reasons to abide by formal requirements. That is, it implies the existence of norms of how implementation of measures like public transport needed by older people and people with disabilities are dealt with that diverge from the intentions of policy, legislation and directives.

Furthermore measures aimed at improving accessibility of the public transport environment are perceived to require contributing to an increase of older travelers and travelers with disabilities. This is not in line with the policy intentions that are clear about a transport system accessible to all being about improving the possibility for older people and people with disabilities to travel, and not about increasing the number of such travelers. That is, in the implementation process as it seems to be working the needs of older people and people with disabilities appear not to be perceived as valid reasons for implementing measures to improve the accessibility of the public transport environment, and even if such measures do become prioritized and implemented they need to fulfill goals that are not corresponding to the intentions of society.

In conclusion, conflicts of interest seem to be at the root of many of the barriers that cause inertia in the implementation process. Solving or decreasing this influence cannot be done without explicit clarification of duties and tasks of the actors involved in the implementation process. That is, there should be no room for interpretation of whether implementation is important or not. This is a verbal problem as lack of clear guidelines for the implementation process leaving room for the actors involved in implementation to decide for themselves whether older people and people with disabilities are important or not. This necessitates awareness rising, education measures and ultimately law enforcement if a change in attitudes is to happen and ultimately if policy intentions of full participation of all citizens are to be realised. This must be done if the needs of older people and people with disabilities are to be considered appropriately.

Discussion

Traveller information in public transport has an important role to play in the travel of older people and people with disabilities. The findings of this thesis suggest the potential of traveller information for older people and people with disabilities to contribute toward the policy objectives of an inclusive Swedish society with full participation for everyone regardless of disabilities. This refers to the independent participation of people with disabilities in society on their own terms and to the extent they chose.

The findings of this thesis show that the primary influence of traveller information from a user perspective is on the quality of the journeys undertaken by older people and people with disabilities. Access to traveller information through online traveller information is found to be both important and useful when planning a journey by public transport even though they have little influence on the number of journeys undertaken. Instead the traveller information is found to support older people and people with disabilities in their roles as travellers in public transport. By offering the possibility of reassurance before and during a journey traveller information helps to build confidence that in turn enables travel. That is, it allows older people and people with disabilities to focus on handling actual difficulties during the journey rather than worrying about every possible difficulty that might occur. This is a finding in line with earlier studies showing that older people and people with disabilities start to plan and prepare for a journey by public transport well in advance of the journey (MTC, 2004, 2002: Börjesson, M. et.al. 1999). Access to online traveller information services thus has the potential to empower those of the older people and people with disabilities that are worried and insecure before a journey by public transport. The point of offering traveller information of high quality to older people and people with disabilities is thus to provide traveller information that enables such travellers to undertake journeys by public transport as confident travellers. This in turn implies offering these people traveller information that enables them to assess the quality of the planned journey.

This finding corresponds with Stradling's (2006) argument that it is the personal expenditure in terms of essentially affective effort that is reduced by access to traveller information. The confidence in one's ability to travel that use of traveller information seems to facilitate could then be transformed into overt abilities that enables optimum coping when undertaking a journey by public transport

(Svensson, 1987a). This in turn would affect the way in which the public transport system can be appropriated and thus the extent to which mobility can be realised, that is the motility (Kauffman et al., 2004). This kind of indirect influence on the travel in public transport of older people and people with disabilities may with time contribute to changes in their perception of public transport (Lyons, 2006). That is, confident travellers undertaking satisfactory journeys in public transport will most probably travel again, thereby increasing the number of journeys undertaken by older people and people with disabilities and thus also having an effect on the mobility.

A successful policy outcome requires traveller information that older people and people with disabilities need to build their confidence before a journey. The findings of this thesis show that for all older people and people with disabilities the traveller information needs to include detailed information about how the journey will come about, focusing on the ease at which the journey can be undertaken. Among the subgroups of older people and people with disabilities based on functional limitations the traveller information needs are not so much about the comfort of the journey, but more about whether travel is possible at all. That is, the traveller information needs among these subgroups are more absolute focusing on assessing the accessibility of the public transport environment. The need to plan and prepare for a journey thus seems to be equally important on an aggregated level as it is among the subgroups based on functional limitations, but the intended use of the traveller information differs. This carries implications for the provision of traveller information for older people and people with disabilities. The three terms suggested by Lyons et al. (2007) to consider the traveller information people want exemplifies the difficulty in providing the traveller information needed by older people and people with disabilities. This entails providing it in a way that allows individual users quick and easy access to the traveller information that they need. Very important traveller information refers to information needed to decide whether travel is possible at all (absolute traveller information in this thesis), useful traveller information refers to information about the comfort of the journey (comfort traveller information in this thesis) and irrelevant traveller refers to information that is of no value when planning or undertaking a journey. If all older people and people with disabilities are considered, the traveller information needed can be grouped using the first two terms. When subgroups are considered however, the share of very important and useful traveller information changes, and some, or even a lot of the traveller information becomes irrelevant. On an individual level this is of course even more accentuated. The organisation and presentation of the traveller information content is thus essential to encourage older people and people with disabilities to find and use the traveller information that is relevant to them. However, traveller information in public transport is based on generalisations of traveller information needs of groups of travellers rather than on individual needs even though the

search and use of traveller information is based on individual prerequisites. Targeting of traveller information is thus necessary to allow quick and convenient access to traveller information relevant to individual needs (Lyons and Harman, 2002).

For older people and people with disabilities such targeting should enable individual assessment of the usability of the public transport environment, that is, it must allow an interpretation and understanding of the accessibility (Iwarsson and Ståhl, 2003) of the whole travel chain. This involves using objective descriptions of both the physical environment and of functional capacity. The findings of this thesis show that 11 of 2^{13} possible combinations of the functional limitations considered are relevant target groups for specific types of traveller information. It is thus a manageable task to provide traveller information needed by people with a combination of functional limitations. However, the findings also show that a few functional limitations have a broad influence on need of specific types of traveller information as they occur in almost all of the relevant target groups, but the increase in need they that they represent is moderate. Other functional limitations increase the need of traveller information for only a few specific types of traveller information, but do so with a significant increase in need. The breadth and depth of needs of specific types of traveller information should be considered in the provision of traveller information needed by older people and people with disabilities.

The findings of this thesis thus show that it is feasible to offer older people and people with disabilities the traveller information that they need. This can be done without ending up with an unmanageable number of groups, and should subsequently also not involve an unmanageable cost associated with inclusive online traveller information services (Lyons et al. 2007) in terms of traveller information content. However, prioritisations between groups of older people and people with disabilities are likely to be needed in provision of traveller information, especially with reference to comfort and absolute traveller information as well as the breadth and depth of need of traveller information.

For traveller information to play a role in the travel of older people and people with disabilities such traveller information needs have to be implemented. That is, online traveller information services must address the traveller information needs of these people. However, traveller information needed by older people and people with disabilities is not implemented to the extent anticipated based on policy objectives and legislation (Skr. 2009/10:166). The findings of this thesis point to there being a verbal problem in the implementation process; a lack of clear guidelines for implementation seem to leave room for the actors involved in implementation to decide for themselves whether older people and people with disabilities are important or not. This has implications for the implementation of traveller information needed by older people and people with disabilities as these

people are not prioritised in their own right, because this would be the right thing to do according to policies and legislation. Instead measures like traveller information must be vaguely described without direct reference to the group or be a part of a larger undertaking aimed at travellers in general implying that the group is either ignored or too small to be prioritised. Measures like these also need to show results in terms of an expected increase of travel in public transport of older people and people with disabilities/a decrease in older people and people with disabilities in special transport services to receive adequate resources for implementation. That is, the policy objectives of an inclusive society are overlooked by making it hard for older people and people with disabilities to be prioritised even though their participation in society is the very core of the policy objectives of an inclusive society. Also, to be prioritised the outcome of the measures implemented is expected to have an effect on the mobility of older people and people with disabilities. The outcome is thus measured in traditional terms of mobility rather than motility capturing the mobility that is possible to realise (Kauffman et al., 2004). This is done regardless of traveller information having a small and inconclusive behavioural effect on mode choice. Instead the benefit of traveller information lays in the confirmatory possibilities that traveller information offers (Lyons et al., 2007).

Older people and people with disabilities are not concerned with the number of journeys they make by public transport, their main concern is that when they do travel they can do so safely and with confidence. This is in line with the policy objectives of an inclusive society, and can also be seen as an effect on the travel of older people and people with disabilities by the use of traveller information, albeit not in number or share of journeys made by public transport. Instead the effect lies in the realisation of such journeys, or in the motility of older people and people with disabilities. Instead of focussing on the number of journeys that older people and people with disabilities make by public transport efforts should be made to ensure that those of the older people and people with disabilities that do travel keep doing so with confidence. This may subsequently influence the number of journeys that these travellers undertake in public transport.

In conclusion, this thesis shows that when older people and people with disabilities do travel in public transport they want to be able to do so safely and with confidence; they do not necessarily want to increase the number of journeys they undertake. Thus, theoretically the concept of motility has higher relevance for this particular group of travellers than the concept of mobility. Access to traveller information plays a key role for confident travel; both the content and the quality of the traveller information are important. Furthermore, the traveler information content needed by older people and people with disabilities is in many ways similar regardless of type of functional limitation. Therefore, since the implementation process of traveller information for these groups has been rather slow, the findings of this thesis should contribute to an increase in the

implementation of such traveller information. This concerns not a limited number of people in society; it is a large and growing part of the population.

Methodological considerations

The thesis work was done in two separate parts, in 1998-2001 and in 2006-2012 which influenced the scope and aim of thesis. In the time between the two parts of the thesis work, results on user needs of traveller information from paper I were implemented in an online traveller information service covering a defined geographical area in which other accessibility measures were also implemented. The possibility to explore use of and attitudes toward traveller information services among older people and people with disabilities laid the foundation for the second part of the thesis work. Furthermore, in between 2001 and 2006 the use of the Internet and related services became more common, especially among older people, which also forwarded the scope and aim second part of the thesis work. Paper I reflects the research work done in the first part, and papers II-IV reflects work done in the second part of the thesis work. In both parts of the thesis work based on perceptions of older people and people with disabilities, together with experts' views on the implementation process.

The research methods used in paper I-IV were successful in capturing user and provider perspectives on traveller information needed by older people and people with disabilities in public transport. The traveller information content in paper I-II was explored by primarily quantitative methods underpinned by qualitative methods. A methodological strength is the large quantitative samples used in paper I (N=1890) and paper II (N=2758). This made it possible to analyse need of traveller information among subgroups of people with functional limitations. The sampling process in paper I and paper II resulted in a sample that could be expected to be formally representative of any defined population. The sampling process did however enable the questionnaire to reach older people and people with disabilities which would have been difficult to manage using any other sampling method, especially with regard to people with disabilities. The samples used are however expected to reflect conditions among older people and people with a range of disabilities.

The response rates of paper I and paper II were 42 % and 55 % respectively. This is quite low, but in line with what can be expected when dealing with older people and people with disabilities. A more similar response rate could have been expected based on both the questionnaires going out to older people and people with disabilities. In retrospect the questionnaire used in paper I may have been somewhat complicated However, the questionnaire study with 12 different questionnaires each containing 40 of the 83 original items of traveller information may have been somewhat difficult to answer. Firstly, together with background

questions there were altogether 64 questions making the questionnaire rather long. However, the design yielded a sufficient number of responses for each of the questions with 547-1366 respondents answering each question about the need of an item of traveller information.

Also, in paper II, being able to relate the need of traveller information to a categorised personal component based on a validated objective instrument (Iwarsson and Slaug, 2010) is a methodological strength. This provided the objectivity needed for exploration of relevant groups of older people and people with disabilities that would benefit from the provision of specific traveller information. This was further enhanced by the close cooperation with organisations for older people and people with disabilities which contributed to four more functional limitations being analysed. This proved to be relevant as many of these additional functional limitations emerged as being most significant in the CHAID-analyses.

However, the CHAID-method used in paper II also set constraints to the ability to identify small segments although such groups may be as important and in as great need of traveller information as the segments that were identified. An example is that for methodological reasons, due to the size of the group, people with the functional limitation blindness could not be identified as a relevant segment irrespective of how great need they had expressed.

The influence on travel by online traveller information services in paper III was explored by qualitative methods explaining results from the quantitative study used in paper II. That is, a mixed methods design was used in paper III. The decision to use an explanatory sequential approach to further explore the quantitative findings was productive; the qualitative findings illuminated the quantitative findings in way that could not have been done in an independent quantitative study, or in an independent qualitative study.

The small number of participants in the qualitative part of paper III could be regarded as a weakness of the thesis. However, qualitative exploration is about experiences and not about numbers and with the selection criteria reflecting the question in focus the participants were people with experiences of the matter at hand. Also, the literature on research methodology suggests a group size minimum of 3-4 people for research purposes (Kitzinger and Barbour, 1999; Bloor et al., 2001)

In paper IV implicit causes of the inertia of the implementation process were explored by qualitative methods. The heuristic approach chosen for this study provided valuable insights into the experiences of professional life in this field by allowing “reading between the lines” of the experts’ discussion. The findings elucidated aspects of the implementation process that could not have been gained

through other qualitative methods like interviews, and much less quantitative methods. Conflicts of interest used to interpret the findings were also helpful in analysing the roots of inertia in the implementation process (Rahim and Bonoma, 1979; Chaloupka-Risser et al., 2010).

However, also in paper IV the small number of participants participating in the workshop could be seen as a weakness of the thesis. As in paper III, the number of participants were regarded as sufficient to go forward with the workshop and see what the outcome would be (Kitzinger and Barbour, 1999; Bloor et al., 2001). As the participants were information rich they were able to sustain a discussion about different aspects of the implementation process.

Implications for policy and planning, further research

The findings of this thesis on the influence on travel of online traveller information services, the traveller information content and on implicit causes of barriers to the implementation of the traveller information content with regard to older people and people with disabilities have implications for policy and planning in society as well as for research.

The influence on travel of online traveller information services on travel shows that there is a point in offering older people and people with disabilities traveller information of high quality; access to online traveller information services enables these groups to undertake the journeys they wish to and do so to safely and with confidence. Planners and policymakers seeking to enhance the travel of older people and people with disabilities in public transport should thus consider the quality of the journey in public transport for these groups rather than just the possibility to travel. This refers to the accessibility of the whole travel chain, but also to traveller information about the accessibility and about travel in public transport. Traveller information is an essential part of such travel chains that enable assessments of the usability of the public transport environment. The influence of access to online traveller information services are complex and should be researched further with regard to for instance, who among the older people and people with disabilities are most influenced in relation to the breadth and depth of the need of traveller information, what the dimensions are of that influence and how this can further forward the motility of older people and people with disabilities. Also, the attitudes and views on access to and use of traveller information among those of the older people and people with disabilities who do not use online traveller information services should be explored to better understand how to meet their needs in times of change with regard to traveller information provision. On a theoretical level it would also be interesting to research connections and overlapping between the ecological model of ageing (Lawton and Nahemow, 1973), the ecological life span model (Svensson, 1987a),

Stradling's theory on effort (2002) and the concept of motility (Kaufmann et al., 2004).

The traveller information content needed by older people and people with disabilities to build confidence should meet the needs of older people and people with disabilities. Furthermore, older people and people with disabilities should be encouraged to find and use the traveller information to plan and undertake journeys in public transport. The findings of this thesis shows that older people and people with disabilities as a group have a need for traveller information about most aspects of travel in public transport and not just about traveller information with regard to disabilities, and also that much of the traveller information need is similar regardless of type of functional limitation or combinations thereof. Planners and policymakers wanting to address the traveller information needs of older people and people with disabilities are thus advised to start by implementing the traveller information needed on an aggregated level as this is also likely to have a greater impact with regard to the size of the group compared to people with specific types of functional limitations. In doing this they should also keep in mind that this also relates to groups of people with covert functional limitations to which little consideration is usually given with regard to traveller information, for instance, incontinence and severe pain. They are also advised to remember that there are groups of people with single functional limitations and groups of people with combinations of functional limitations that benefit more from targeted traveller information than to traveller information in general. The groups in a broad spectrum of traveller information are likely to include loss of lower extremity skills and/or prevalence of poor balance in combinations with other functional limitations. Further research is needed on the traveller information needs of small groups of people with functional limitations like people with the functional limitation Blindness. Also cognitive functional limitations need to be further researched with regard to need of traveller information. Further research is also needed on the needs of traveller information of those of the older people and people with disabilities that do not travel, as these people may have different needs compared with those that travel. This work is advised to be carried out in collaboration with the organisations for people with such functional limitations to fully understand the needs and implications brought about by the functional limitation when travelling in public transport. Also, the design of the online traveller information services needs to be investigated to ensure that older people and people with disabilities are able to find the traveller information they need. In doing this it is important that older people and people with disabilities can seek and find the traveller information they need without having to be defined, or define themselves as being an older traveller or a traveller with a disability. That is, the online traveller information service should not demand this information of the users to inform them of these options but rather let the users chose the option of traveller information for older travelers and travelers with disabilities if the

wish to do so, but rather offer traveller information to for instance, people with disabilities.

The findings on *the implicit causes of barriers to the implementation of the traveller information content* show that the implementation process needs to be looked over and revised with regard to communication and information. Planners and policymakers are advised to ensure that all actors of the implementation process have the same point of departure in the implementation of measures considered important for older people and people with disabilities. Further research includes more studies on the implicit causes of inertia in the implementation process to fully understand how and when these forward barriers preventing implementation from happening.

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Appendices

Appendix I

The 83 original traveller information items identified in paper I

General traveller information

1. Information about different price alternatives for my journey
2. Information about whether I can choose my seat when I book my journey
3. Information about whether I can book a journey by train or bus without having to make any connections
4. Information about whether I can book a journey with shorter or longer time for changing at connections
5. Information about delays or other disturbances on board the train or bus
6. Information during my journey about a late departure for my booked trip by train or bus
7. Information about connections at arrival
8. Information about where smoking is allowed on board the train or bus
9. Information about whether I can bring my pet along during my journey (including a guide dog)
10. Information about which platform or bus stop my connecting train or bus will depart from
11. Information about how to get to the station or bus stop easily from my starting point (e.g. home)
12. Information about which platform or bus stop my train or bus will leave from at my departure
13. Information about where at the stop the bus will pull up so that I will know approximately where to get on or off the buss
14. Information about where at the platform my car will stop so that I will know where to get on or off the train
15. Information about which platform/bus stop the train or bus will pull up at on arrival

16. Information about which side of the train to disembark from on arrival
17. Information specially compiled for the hearing impaired
18. Information specially compiled for the visually impaired
19. Information specially compiled for the lower-body impaired
20. Information specially compiled for the upper-body impaired
21. Information specially compiled for me according to my specific needs during a journey
22. Information about whether staff on the train or bus know how common diseases an impairments manifest themselves and how to cope with them

The bus terminal

23. Information about whether there will be staff at the bus terminal to assist me during my journey
24. Information about where I can store my luggage at the bus terminal
25. Information about what service is available at the bus terminal (e.g. restaurant, café, lavatory)
26. Information about where the changing table is located at the bus terminal
27. Information about whether special food is available at the bus terminal (e.g. vegetarian or gluten-free food)
28. Information about where parking is available close to the bus terminal/bus stop
29. Information about where handicap parking is available close to the bus terminal/bus stop
30. Information about the possibilities of moving around at the bus terminal without having to climb steps or use ramps
31. Information about the bus terminal/bus stop in the form of a picture or the layout
32. Information about where there are automatic doors at the bus terminal
33. Information about the location of door openers in relation to automatic doors at the bus terminal
34. Information about the location of the handicap lavatory in the form of a picture or the layout (e.g. the width of the door)
35. Information about whether there is a tactile map of the bus terminal and, if so, where it is located in relation to the main entrance (a tactile map is a relief map)

36. Information about whether there are grooved walkways at the bus terminal and in its immediate vicinity (grooved walkways are grooves paths in the floor or in the ground)
37. Information about whether there is an audio channel at the bus terminal

The railway station

38. Information about whether there will be staff at the station to assist me during my journey
39. Information about where I can store my luggage at the station
40. Information about what service is available at the station during my journey (e.g. restaurant, café, lavatory)
41. Information about where the changing table is located at the station
42. Information about whether special food is available at the station (e.g. vegetarian or gluten-free food)
43. Information about where parking is available close to the station
44. Information about where handicap parking is available at the station
45. Information about the possibilities of moving about in the station area without having to use stairs or ramps
46. Information about the station in form of a picture or the layout
47. Information about the location of automatic doors at the station
48. Information about the location of the door openers in relation to automatic doors at the station
49. Information about the location of the handicap lavatory at the station
50. Information about the handicap lavatory at the station in form of a picture or the layout
51. Information about whether there is a tactile map at the station and, if so, where it is located
52. Information about whether grooved walkways are available at the station and in its vicinity (grooved walkways are grooves paths in the floor or in the ground)
53. Information about whether audio channels etc. are available at the station
54. Information about whether there is an escort service at the station (escort service means that assistance is offered at the station)

The bus

55. Information about special seats on the bus for passengers with allergies
56. Information about whether there is a lavatory on the bus
57. Information about the lavatory on the bus in the form of a picture or a layout
58. Information about what service is available at the bus (e.g. food and drink, films)
59. Information about whether there are special handicap seats with room for a walking aid or wheel chair
60. Information about where the handicap seats are located on the bus
61. Information about the number of steps I have to climb to embark and disembark the bus and how high they are
62. Information about whether there is a wheel chair lift or ramp on the bus
63. Information about the capacity of the wheel chair lift on the bus
64. Information about whether audio channels etc. are available on the bus
65. Information about whether it is possible to buy my ticket on board the bus
66. Information about the interior of the bus in the form of a picture or the layout, where, for example, the width of the mid aisle is indicated

The train

67. Information about whether there is a telephone on the train
68. Information about where I can store my luggage on the train and what the storage facilities look like
69. Information about whether there are special seats on the train for passengers with allergies
70. Information about whether special food is available on the train (e.g. vegetarian or gluten-free food)
71. Information about whether it is possible to buy my ticket on the train
72. Information about where the changing table is located on the train
73. Information about how many steps I have to climb to embark and disembark the train and how high they are
74. Information about whether there is a wheel chair lift or ramp on the train
75. Information about the capacity of the wheel chair lift

76. Information about the interior of the compartment in the form of a picture or the layout

77. Information about where there are handicap seats on the train

78. Information about the handicap seats on the train in form of a picture or the layout indicating seat height and legroom

79. Information about whether there is room for my walking aid by the handicap seats on the train

80. Information about whether there is room for my walking aid by my seat in the compartment

81. Information about whether there is a handicap lavatory on the train

82. Information about the handicap lavatory in form of a picture or the layout

83. Information about whether there is an audio channel etc. on the train

Appendix II

The 14 comprehensive groups of traveller information identified in paper II

1. Information about time of time of departure, time of arrival, travel time, and number of changes
2. Information about different travel options to the chosen destination
3. Information about booking and paying, including booking a specific seat
4. Information about the accessibility/physical design of the terminal/station
5. Information about the accessibility and design of the vehicles
6. Information about booking a specific seat
7. Information about service (parking, luggage storage facilities, cafes and restaurants) available at the station/terminal
8. Information about the personal service (information desks, ticket sales, guidance) available at the station/terminal
9. Information about whether the personal service available at the station/terminal is available during the planned journey
10. Traveller information compiled for people with severe loss of sight
11. Traveller information compiled for people with severe loss of hearing including deafness
12. Traveller information compiled for people with severe loss of speech
13. Traveller information compiled for people with loss of mobility
14. Traveller information compiled for people with allergies