



Ageing, impairments and travel: Priority setting for an inclusive transport system

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ABSTRACT

The ageing of the population in many countries suggests that transport systems will have to be adapted to the needs of an increasing number of persons experiencing travel-related impairments. This development underscores the importance of a more fundamental challenge for transport planning: providing all persons with accessibility to key destinations, irrespective of the features of a person's body. The challenge is to move beyond the notion of universally accessible transport systems towards an inclusive transport system. Where the former focuses on adapting existing transport systems to the needs of persons with the widest possible range of abilities, the latter refers to the goal to provide *all* persons with *access to a range of key destinations*. This challenge requires not only the adaption of existing transport systems, but also the extension of those systems to provide travel-impaired persons and others with access to destinations. The aim of the paper is to develop a basic framework that can be helpful to set priorities towards the development of such an inclusive transport system. The framework distinguishes two principles for priority setting, one derived from the principle of welfare maximization and one conceptualizing the notion of hardship. Based on these two principles of priority setting, three different categories of measures to enhance accessibility for persons experiencing travel-related impairments are distinguished: (1) measures that live up to the principle of efficiency or welfare maximization; (2) measures that reduce transport-related hardship through adaptation or extension of the mainstream transport system; and (3) measures that reduce transport-related hardship through dedicated services for persons with travel impairments. The proposed framework requires changes in the practice of cost-benefit analysis, as well as a clear delineation of a hardship threshold. The latter is considered essential to make the transport problems experienced by persons with travel impairments visible to the public eye.

1. Introduction

As the population in many industrialized countries is ageing, it is expected that the number of persons with travel-related impairments will grow substantially over the coming decades (Bakker and Van Hal, 2007). As mobility is a precondition for participation in social, economic and political life, ageing of the population represents a major challenge for transport policy. To guarantee accessibility to key destinations for all groups, an ambition implicitly or explicitly laid down in documents as diverse as the Civil Rights Act in the USA and the Urban Mobility Action Plan of the EU, the transport system will have to be adapted to the needs of persons with travel impairments. This requires substantial investments, as the existing transport system has historically been designed and built with little attention for its usability by persons with

varying spectra of abilities (Sawchuk, 2014). While a systematic application of principles of universal design can help to guarantee that new infrastructures are accessible for all (Audirac, 2008), two major challenges remain. First, the vast infrastructures built over the past decades must be retrofitted and adjusted to the needs of persons with abilities different from the 'normal' spectrum of abilities. Second, the thus created network of accessible transport infrastructures and services has to be extended to include destinations which are currently not served by universally accessible infrastructures and services. Given these major challenges and the sometimes severe budget restrictions, it is necessary to set priorities in order to make progress towards a transport system that guarantees accessibility to key destinations for all population groups. The aim of the paper is to develop a basic framework that can be helpful in setting these priorities, responding in part to the calls of Alsnih and

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Hensher (2003) and Metz (2000) to develop methods suitable for the evaluation of transport policies for an ageing population.

Before commencing the paper, it is important to avoid confusion by underlining how the proposed framework differs from the burgeoning literature on universally accessible transport (e.g., Odeck et al., 2010; Fearnley et al., 2011; Hwangbo et al., 2015; Watchorn et al., 2014). Universally accessible transport is based on the notion of universal or inclusive design, which in turn is concerned with the production of buildings, products and environments that are inherently accessible, irrespective of a person's abilities. Typically, universal or inclusive design as applied in the domain of transport starts from the various sub-systems of the transport system, most notably the 'system' of pavements and pedestrian routes and the public transport system, and explores how each of these systems can be designed in such a way so as to make them usable by people irrespective of their particular abilities, and irrespective of the particular circumstances. Universally accessible transport thus refers to the ambition of making a given transport sub-system accessible to as many persons as possible. The focus is on each of the transport sub-systems themselves.

In contrast, the approach presented in this paper directs the attention to one of the main *purposes* of transport systems: providing persons with accessibility to key destinations (see Levinson and Krizek, 2005; Levine et al., 2012; Litman, 2015). The question from this perspective is whether the existing transport systems allow all persons, irrespective of their particular abilities, to access the set of destinations which is considered 'normal' in a particular society (Kenyon et al., 2002; Farrington and Farrington, 2005; Lucas, 2012). This, in turn, implies going beyond an assessment of the universality of separate transport sub-systems, towards an evaluation of the entire transport system in terms of the extent to which it enables all persons to access a range of destinations (see e.g., Tyler, 2002; Martens, 2017). The framework for priority setting proposed here is thus not limited to an assessment of the use-ability of a given transport sub-system for all (potential) users, irrespective of their abilities, but includes an assessment of the extent to which all transport sub-systems taken together guarantee universal accessibility to key destinations, like employment, health care, retail, and family and friends. This broader ambition will be referred to as an *inclusive transport system*, which contrasts with the more familiar notion of a *universally accessible transport system* referred to above.

The difference between these two ambitions can be illustrated through the example of bus services in many (USA) cities. These services have historically been poorly accessible for persons with various types of impairments (e.g., Lubitow et al., 2017). Over the last decades, in part in response to the Americans with Disabilities Act, these services have often been retrofitted to live up to the standards of a universally accessible transport system. Yet, such improvements may do little to address e.g. the existence of food deserts (e.g., Widener et al., 2015), as they do not affect the set of destinations that can be reached within a reasonable time and money budget. Thus, people who cannot make use of private cars or bicycles, for whatever reason, may still face difficulties to obtain healthy food, even though the bus system lives up to the standards of universal design. The ambition of an inclusive transport system addresses precisely these types of transport problems.

The paper is organized as follows. Following this introduction, Section 2 briefly presents secondary data on the size of the population experiencing various types of travel impairments. In Section 3, the basic framework for priority setting is developed. Sections 4 and 5 discuss steps that need to be made to apply this approach. The paper ends with a brief conclusion and discussion. Note that the paper only outlines a framework for priority setting; the framework needs to be developed and implemented in actual practice to determine its usefulness.

2. People experiencing travel-related impairments

The World Health Organization (2011) recognizes disability "as a complex interaction between features of a person's body and features of

the environment and society in which he or she lives." This definition underlines the notion that disability is not simply a characteristic of a person, but rather of the relationship between the particular abilities of a person and the functionalities of his or her environment. In line with this definition, travel impairment should be viewed as a result of human-environment interaction. Thus, people become 'travel impaired' because the transport system does not provide the functionalities necessary to enable people with a particular set of abilities to use the system, thereby limiting their accessibility to destinations. Given the functionalities of the existing transport system, persons may experience three main types of travel-impairments: a motor-related impairment (e.g., an impairment resulting from the interaction between a person experiencing difficulty in walking and a poorly accessible transport vehicle), a sensory-related impairment (e.g., an impairment resulting from the interaction between a person's limited vision or hearing and a public transport hub that lacks the appropriate specification), and cognition-related impairments (e.g., an impairment resulting from the difficulty in comprehending written materials and poorly designed information systems at public transport stops) (World Health Organization, 2011). Moreover, the level of impairment does not only depend on the individual traveler, but also on his/her itinerary, including the materials that are transported (e.g. large bags) and the accompanying persons (e.g. children). Thus, a parent traveling with young children on a public transport service may experience travel impairments due to the safety risks involved in traveling to and from the public transport stop or entering or exiting a vehicle. Reversely, an elderly having difficulty walking but traveling with a partner may not experience any travel impairment, given the assistance of the partner. The inclusivity of the transport system thus depends on the extent to which the wide diversity in human abilities and conditions has been taken into account.

While historically few data have been collected on the size of the population experiencing some form of travel impairment (European Conference of Ministers of Transport, 1986), this has changed substantially over the past two decades. For instance, the USA National Household Travel Survey regularly includes a question to establish whether a respondent experiences a "handicap or medical condition" restricting the respondent's mobility. The 2001 survey included the following question: "Do you have a medical condition that makes it difficult to travel outside of the home?" From a total of about 26,000 households included in the national sample, 9% of respondents answered 'yes' to this question (Bakker and Van Hal, 2007). Since 2004, the Dutch Mobility Survey ('Mobiliteits Onderzoek Nederland') includes the following question to identify travel-related impairments among the population: "Do you have a temporary or permanent condition or handicap that results in any difficulty with traveling outside of the home?" In 2005, this question was asked to all persons included in the survey (over 64,000 persons). From all respondents, 6.1% of the population answered 'yes' to the question.

Data from other countries are roughly in line with these findings. In the UK, 9% of the adult respondents in the 2014 National Travel Survey for England reported having a mobility difficulty. From Londoner residents, 10% indicate that they have a long-term physical or mental disability or health issue that limits their daily activities or the work they can do. Of this group, 89% consider that this situation limits their ability to travel and get about (Transport for London, 2014). This implies that about 9% of the London population experiences some form of travel-related impairment. This includes persons using a wheelchair (2% of the population) and persons with a visual impairment (1% of the population).

Data from Canada and France also show comparable numbers (Timmons and Wagner, 2008; Statistics Canada, 2010; Bizier et al., 2016; Casullo, 2016). The Canadian Survey on Disability conducted in 2012 identifies persons with a mobility disability as persons "who have difficulty walking on a flat surface for 15 min or have difficulty walking up/down a flight of stairs and have their daily activities limited because of these difficulties" (Bizier et al., 2016, p. 12). About 10% of the surveyed population reported having difficulty with at least one of these two

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