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The desired quality of integrated multimodal travel information in public transport: Customer needs for time and effort savings

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Abstract

Travel information is one of the factors that contribute to the quality of public transport. In particular, integrated multimodal travel information (IMTI) is expected to affect customers' modal choice. The objective of this research is to identify customers' desired quality of IMTI provision in public transport. Customers' desired IMTI quality can vary throughout the pre-trip, wayside and on-board stages of a journey. The main determinants are time savings (travel and search time) and effort savings (physical, cognitive, and affective effort). In a sample of Dutch travellers with a substantial share of young persons, the pre-trip stage turns out to be the favourite stage to collect IMTI when planning multimodal travel; desired IMTI types in this stage are used to plan the part of the journey that is made by public transport. Wayside IMTI is most desired when it helps the traveller to catch the right vehicle en route. On-board travellers are most concerned about timely arrival at interchanges in order to catch connecting modes. In the whole travel process, travel time is the most important saving. Apart from that, pre-trip search time savings are also desired, while en route affective effort is more important than cognitive effort.

Keywords: Integrated travel information; Multimodality; Desired quality; Time savings; Effort savings

1. Introduction

Many cities and urban areas have to deal with tremendous traffic problems, causing congestion, pollution, noise, and increase of road casualties. One of the measures to reduce the inconvenience of congested roads is the promotion of public transport. Both national governments and local authorities are trying to persuade people to switch mode, from private car to public transport. However, up to the present, efforts to stimulate public transport have seldom led to the desired modal shift; public transport seems to be incapable of competing with private car. From the customers' viewpoint, the quality of public transport is not high enough, which prevents the public transport system from being an attractive alternative to replace travelling by private car.

One of the factors that contribute to public transport quality is travel information. Information provision in itself does not have the capability to persuade people to switch modes, though in various studies this service has been indicated as important, and hence it can substantially contribute to the overall satisfaction with public transport quality (e.g. Balcombe et al., 2004; Stradling et al., 2000a). Although research outcomes vary about the extent to which travel information influences modal change, it is obvious that information would have most potential to affect customers' behaviour if multimodal data were integrated (e.g. Egeler, 2001; Kenyon and Lyons, 2003). Nevertheless, despite the fact that it is often argued that integrated multimodal information provision would make public transport more attractive, there is little research that has focussed on what kind of multimodal information travellers need. Information on these customer requirements is needed to accomplish a satisfying service that might persuade people to change modes. Therefore, customers' desired quality of integrated multimodal travel information (IMTI) provision in public transport has to be identified. Such information can be expressed in terms of various IMTI types. Moreover, it is important to know

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why people need these types of IMTI in order to make it possible to forecast their desires and thus adapt information provision on this basis.

This paper summarizes a thesis by Grotenhuis (2005). It reports on research that has identified customers' requirements for IMTI in public transport only. In Section 2, the main points of the public transport information system are presented, and then extended with the conceptual structure of the research. Subsequently, the methodology is explained in Section 3, followed by the research results in Section 4. Finally, conclusions are drawn in Section 5.

2. The public transport information system

2.1. Elements of the public transport information system

In general, an information system can be considered as a complex of suitably interfaced basic structures that provide activities from data collections to presentation (Solotruk and Kristofic, 1980). It may be investigated at various levels of detail. At the level where the information system is structured, Solotruk and Kristofic (1980) determine the components: 'methods', 'activities', 'technique', 'data', and 'people', that form the basic structure of an information system. Applied to the information system of public transport, the given components can be explained as public transport elements. 'Methods' relates to the organisation in which activities take place and information has to be provided. This organisation 'sets the rules' and justifies the need for information, and here can be regarded as the public transport organisation: the organisation in which the information system functions. 'Activities' are the travels, performed by public transport modes, for which information is needed. 'Technique' represents the way in which travel information is provided, i.e. the information delivery systems. 'Data' can be considered as the kind of travel information that should be provided; in this paper, the 'data' is restricted to IMTI. And, finally, the component 'people' mainly concerns the customers, but also other actors in the information system. Of these five components, travel information and customers are the central elements investigated in this research. Therefore, Sections 2.2 and 2.3 elucidate these elements. Subsequently, Sections 2.4 and 2.5 explain the theoretical framework how to determine the customers' need for travel information.

2.2. Travel information

Travel information is an important factor of public transport quality, and can be divided in static information, dynamic information, and real-time information. It encompasses information on elements of the public transport system that helps travellers both to make decisions about planning their travel, and to execute their travel. Travel information includes not only the content of information but also the conditions of information (i.e. the medium, layout, and ergonomics) and the composition of information. This research is restricted to the content of information, which means the message itself that aims to help people make decisions about how and when to travel.

Since many journeys require multiple public transport modes to reach the desired destination, travel information has to cover the travel from door to door to assist in diminishing the sense that a journey is difficult or inconvenient. To do so, awareness of the details of travel alternatives for the journey they want to undertake is essential in order to compare various mode options, and thus requires the provision of integrated multimodal information services (Lyons and Harman, 2002). Multimodal travel information provides information on more than one mode of travel within a particular information service. Integration of multimodal information brings about information that is provided automatically (no calculation required) or presented in one glance (no combination of information or sources required), concerning different mode choice options. Furthermore, integration of travel information is also interpreted as providing travel information in all (relevant) parts of the network in order to simplify the interchange. In that way, IMTI "minimises the effort for the user in acquiring information on mode choice options and is able to expose the user to information on such options" (Kenyon and Lyons, 2003).

2.3. The journey: three different stages

When planning and undertaking a trip, travellers have different purposes to fulfil. These purposes are presumed to affect the tasks and decisions, and hence the information needs of a traveller, and can be assigned to three different stages of a journey, roughly in conformity with three location types: pre-trip, wayside, and on-board (FTA, 2003; Hine and Scott, 2000).

2.3.1. Pre-trip

The pre-trip stage is essentially the travel planning step, when the user prepares his/her future travel. The planning step defines the way in which tasks must be carried out to achieve the goal of the travel, i.e. when activities should be carried out and in what sequence. Pre-trip planning takes place at the origin of the travel, e.g. at home or at the office. In contrast to a car journey, travel by public transport needs virtually all the relevant information beforehand.

2.3.2. Wayside

Wayside locations can be bus stops, stations, ferry docks, public transport centres, park and rides, etc. Among wayside locations, first stop locations and interchanges can be distinguished. The difference is that, at first stop locations, travellers are usually much more familiar with the stop or station than on intermediate stops, which affects their need for information. Interchanges are perceived as a barrier to using public transport, and therefore suitable information is essential in this travel