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Making time count: Traveler activity engagement on urban transit

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ABSTRACT

In practice, travel time is assigned a cost and treated as a disutility to be minimized. There is a growing body of research supporting the hypothesis that travel time has some value of its own, and the proliferation of information and communication technology (ICT) may be contributing to that value. Travelers' attitudes are confounded with their mode choice, and as telecommunications mediate travel behavior, analysts must recognize the interaction between time use and customer satisfaction for appropriate travel demand management. To that end, this paper presents results from jointly estimated models of travelers' latent satisfaction and on-board activity engagement using Chicago transit rider data gathered in April 2010. The simple questionnaire and small sample corroborate the findings of past research indicating travel attitudes and activity engagement have potential to influence travelers' value of time, and many transit riders consider transit a better use of time and/or money than driving. The findings affirm the need for a more holistic understanding of value of time for travel demand management and infrastructure valuation. As time use has an influence on users' valuation of the transit mode, offering opportunities to conduct certain leisure activities could improve the perceived value of travel time.

1. Introduction

Public transportation provides a lower cost alternative to vehicle ownership and enhances urban quality of life, but it has well-documented disadvantages. Transit may not provide direct, timely access between origin and destination, and transfers are essentially additional, unintended destinations. The utilitarian design of transit vehicles is not always comfortable or appealing, and one may be unable to find a seat. Despite these shortcomings, the existence of choice riders is evidence that transit can have additional economic and emotional benefits compared to the automobile. The proliferation of information and communication technologies (ICT) has expanded these benefits (see, e.g., Ettema et al., 2012; Gripsrud and Hjorthol, 2012). Unlike drivers, who ostensibly devote considerable cognitive resources to the driving task, transit users are free to spend their travel time engaged in any number of activities such as relaxing, reading or working. It is essential for transit operators to understand these benefits in order to accurately gauge customer needs and provide appropriate services.

More accurate accounting of the value of transit to existing and potential riders should inform project valuation. As traffic congestion and vehicle miles traveled continue to grow in many large cities around the world, transit attributes that entice potential users to get out of automobiles will play an important role in travel demand management. Travel time is one of the largest components of overall transport cost, and time savings are often considered to be the most important user benefit of transport improvement projects. Indeed, other factors such as traveler comfort and travel reliability are often quantified by

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allowing different subjective valuations of travel time components to reflect qualitatively different perceived service levels (Vovsha et al., 2012), and these are a substantial part of the generalized cost for a mode. ICT use is changing the nature of travel time (Ettema and Verschuren, 2007; Ettema et al., 2012), thus proper planning requires a deeper understanding of the relationships among time use, quality of life, and accessibility that drive urban development and household decision making.

The link between accessibility and quality of life is a central tenet of urban planning. Many aspects of level of service and quality of life are not typically captured in generalized costs, as they may be difficult to measure and/or quantify. There is growing recognition that transport infrastructure appraisal fails to capture qualitative perceptions of service (Lyons et al., 2013; Mulley et al., 2013). Complicating the job of planners, workers are willing to trade their own commute time in order to provide a higher perceived quality of life for their family (Rosenberg, 2013), possibly offsetting the additional travel time cost. ICT activities also influence the number and duration of activity and travel episodes that workers may undertake (Alexander et al., 2013). To what extent do activities undertaken during travel make transit more appealing than driving? Is time use during travel more or less important than other level of service indicators such as access or waiting time? These questions provide the motivation for this work and are systematically addressed in this paper.

In particular, this paper examines how activities influence service value by analyzing the opportunity and decision to use time in travel to engage in productive or recreational/entertainment activities. Ettema and Verschuren (2007) used a stated preference survey to examine how the opportunity to multitask influenced travelers' values of time, and Ettema et al. (2012) used linear regression to examine how satisfaction with travel was related to onboard activities for work trips in Sweden. The work presented here builds on Ettema and others' work by developing joint models of service value, itself a proxy for satisfaction, and on-board activity choice, further classifying these activities according to their technology and level of attention required.

In the next section, existing work in this area is organized into related studies of value of time, then by standard measures of transit quality, such as comfort and travel time. The third section describes the data collection undertaken for this analysis. Section four describes the methodology and model development. The conclusions discuss implications of these findings and point to possible future directions for this research.

2. Background and existing work

When is travel "time well spent"? Csikszentmihalyi (1990), a psychologist, suggests that the modern worker's perception of his goals influences his level of engagement with work and leisure activities: "When we feel that we are investing attention in a task against our will, it is as if our psychic energy is being wasted" (Czikszentmihalyi, 1990, p. 160). The same could be said of travel; as something everyone must do from time to time, it may be out of one's control and a waste of energy. Transit reliability, punctuality, comfort and safety all contribute to transit users being in an environment outside their control. On the other hand, the activities one may undertake while driving or in transit may lend some value to the trip and return some of that control.

Researchers have observed on-board activities and compared them alongside aspects of travel which influence satisfaction. There is evidence that value of time varies depending on attributes of the time or how the time is spent (Czikszentmihalyi, 1990; Horowitz, 1978; Hensher, 2005; Jara-Diaz et al., 2008). The use of travel time for work, leisure or relaxation is known to affect one's satisfaction with travel (Ettema et al., 2012), but there is little work exploring how time use may affect the perceived value of one's mode choice relative to other aspects of the transit experience.

2.1. Potential value of travel time

Researchers recognize three motives that may influence the way travelers perceive their travel time: instrumental, affective and symbolic (Davis and Levine, 1966; Choo and Mokhtarian, 2004; Steg, 2005). Instrumental motives relate to the utility of the trip or destination and are the primary motives considered. However, research on affective (relating to emotions) and symbolic (what travel represents) motives has illustrated that at least some travel offers more than opportunities to conduct activities at the selected destination (Steg, 2005; Choo and Mokhtarian, 2004; Ory and Mokhtarian, 2005). Horowitz (1978) used magnitude estimation to show how the value of time spent in travel varied with trip length, time period, trip purpose, travel mode, and environmental conditions. All variables except the time period when the trip was undertaken were found to affect an individual's subjective value of time. More recently, Hensher (2005) found the value of travel time savings to decline as the number of passengers increased. One could speculate that spending time with others, an affective motive for traveling in groups, has some value of its own. Jara-Diaz et al. (2008) illustrated that the value of leisure is positive and different from the value of work and wage rate. These values also differed among cities, possibly due to cultural and social norms.

It has been suggested that when travel time is spent doing other activities, it may not be considered travel time at all, challenging the notion that travel is wasted time with a fixed budget (Lyons and Urry, 2005). In Norway, Gripsrud and Hjorthol (2012) find "more than half of all commuters and 41% of business travelers state that use of an electronic device during the journey makes the trip more worthwhile than it would otherwise be". For those whose travel time was accepted as working time, 65% of commuters and 47% of business travelers felt the trip was more worthwhile with an electronic device. While 10% of respondents in their study considered travel time to be "wasted time", a majority of travelers experienced increased value