Examining Positive Utility of Travel for Various Types of People Including Mobility Handicapped Persons

Nobuaki OHMORI*, Teppei OSADA* and Seiji TAKEHIRA**

Abstract: Travel such as commuting and going out for shopping is considered a demand, derived from the desire to engage in activities at destinations. However, travel has an element not only of a disutility but also of a "positive utility." Existing research has revealed that an average ideal commute time is not zero and a positive utility of travel has recently been discussed in a transportation research field. This study examined, by focus groups and questionnaire surveys, a positive utility of travel for various types of people including mobility handicapped persons.

Introduction

Japan is facing a super-aging society. It is required to provide an environment where all the people including mobility handicapped persons such as the elderly, disabled people and baby stroller users, travel safely, securely and comfortably. Generally, travel is considered a demand derived from the desire to engage in activities at destinations and travel time is also considered a wasteful time. However, travel has an element not only of a disutility but also of a "positive utility[1]." For example, Redmond and Mokhtarian (2001) found that an average ideal commute time was not zero but 16min[2]. Mokhtarian and Salomon (2001) discuss three elements of the positive utility of travel: (i) the activities conducted at the destination, (ii) the activities that can be conducted while traveling, and (iii) the activity of traveling itself[1]. The rapid spread of information and communications technologies (ICTs) such as the Internet and mobile phones have provided people with much activity opportunity while traveling[3]. Existing studies revealed what activities travelers engage in while traveling and the influence of activities conducted while traveling on travelers' subjective evaluation of travel, e.g., travel liking[4], scale of travel satisfaction[5], travel happiness[6], irritation level[7]. Mokhtarian et al. (2015) discuss extrinsic and intrinsic motivations of travel by reviewing a number of theories and typologies of motivations in psychology[8]. This study examines, by focus groups and questionnaire surveys, a positive utility of travel for various types of people including mobility handicapped persons, for better understanding the meaning and value of human travel behavior.

Survey

Firstly, we conducted focus group interviews in Utsunomiya city during July 2015 and January 2016. Respondents were wheelchair users (2 groups, 12 individuals), visually impaired persons (1 group, 5 individuals), hearing impaired persons (2 groups, 8 individuals), women rearing children (1 group, 4 individuals), foreign hostesses (1 group, 3 individuals), and university students (2 groups, 11 individuals). We asked their socio-economic attributes (age, sex, living

* Utsunomiya University, ** Oriental Consultants Co., Ltd.
E-Mail: nobuaki@cc.utsunomiya-u.ac.jp

place, etc.), travel behavior in their daily lives (trip purpose, travel mode, frequency, etc.), and especially asked the following questions: "What travel difficulties do you face in your daily lives?," "What types of travel are enjoyable for you in your daily lives?," and "For what types of travel would you want to use *dokodemo-door* (a teleportation machine) in your daily lives, if it were hypothetically available?" (called as a *teleportation test*[1]). Following the focus groups, in January 2016, questionnaire surveys were conducted for a total of 204 students of Utsunomiya University and 27 wheelchair users to collect information on the current and ideal travel (frequency, travel mode and travel time), and preferences and willingness to pay for saving travel by *dokodemo-door*.

Results

From the data obtained by focus groups, we found the differences in travel characteristics among people with different mobility constraints for their enjoyable travels and the types of travels they wanted to save by *dokodemo-door* if possible (Table 1). Also we found that the common elements which all the groups wanted to save travel by *dokodemo-door* were time constraints, travel cost, physical strength and weather.

Tables 2 and 3 show the results of the current and ideal travel modes and travel times for different trip purposes asked in the questionnaire survey. Alternatives of the ideal travel mode include *dokodemo-door* in addition to the currently available travel modes. As shown in Table 2, the highest share of the current travel mode for the university students was bicycle for all trip purposes. Whereas, for the ideal travel mode, *dokodemo-door* is the highest share for commuting (39%) and shopping trips (37%), being less share for bicycle. Regarding wheelchair users, car driving is the highest for the current travel mode for all trip purposes (Table 3). However, *dokodemo-door* is the highest for the ideal travel mode for commuting (33%) and shopping trips (37%). Analyses of the ideal travel time revealed that the average ideal travel times were less than the current ones but not zero (6.3min. for students' commuting, 5.3min. for students' grocery shopping, 24.9min. for wheelchair users' commuting, and 8.1min. for wheelchair users' grocery shopping).

Respondents were asked the reasons why they were choosing the current travel mode. As for commuting and shopping, the top reason was "to save travel time" for both university students and wheelchair users, whereas it was "for refreshment" for walking/driving. The result suggests that even commuting and shopping travel which is considered as a derived demand have some elements of a positive utility such as "exercise" and "refreshment."

Table 4 shows the ratio of respondents who want to use *dokodemo-door* for commuting and their willingness to pay (yen) for using *dokodemo-door*, for different travel situations. It was found that only 31% for students and 56% for wheelchair users preferred to use *dokodemo-door* on fine days, but when facing more difficult travel situations such as on rainy days, when in hurry, with heavy luggage, and in bad health, more respondents preferred to save the commute travel and their willingness to pay were larger than that on fine days, especially for university students. The amount of willingness to pay for wheelchair users is three to ten times larger than that for university students, which reflect their travel difficulties.

Table-1 Differences in attitude and preference towards travel among various types of people by focus groups

	"What types of travel are enjoyable for you in your daily lives?"	"For what types of travel would you want to use *dokodemo-door* in your daily lives, if it were hypothetically available?"
Wheelchair users	- Driving a car - Travel to accessible places for wheelchair users	- Short distance driving (because it takes relatively much time for boarding on/off a car) - Travel between parking place and entrance on rainy days
Visually impaired persons	- Travel while feeling ambient atmosphere such as sound, smell, air, etc.	- Travel under unusual environment such as road construction, snow and rain, etc. - Travel under an environment with less sound information (e.g., streets with less traffic volume)
Hearing impaired persons	- Visually enjoyable travel - Travel with friends while communicating by sign languages	- Travel with difficulty in communication with people around when in trouble - Transfer at train stations
Child-rearing mothers	- Driving and walking while talking with children on safe streets	- Travel from unsafe to safe streets (to avoid unpredictable children's behavior)
Foreign hostesses	- Long distant travel for leisure - Travel while feeling natural green	- Return travel to home countries - (Commuting travel is necessary for a change)
University students	- Travel on fine days for refreshment - Travel without time constraints	- Travel with time constraints - Travel in bad weather - Long distance and routine travel (e.g., commuting)

Table-2 Current and ideal travel mode and time: university students

Trip purpose	Commuting	Grocery shopping	Walking/driving
Current travel mode	Bicycle (77%) Train (9%) Car driving (7%)	Bicycle (75%) Car driving (11%) Motorcycle (6%)	Bicycle (51%) Car driving (17%) Walk (14%)
Current travel time (SD)	19.4 min. (26.6 min.)	10.1 min. (6.6 min.)	66.9 min. (72.3 min.)
Ideal travel mode	Dokodemo-door (39%) Bicycle (28%) Walk (10%)	Dokodemo-door (37%) Car driving (24%) Bicycle (22%)	Car driving (32%) Bicycle (24%) Motorcycle (11%)
Ideal travel time (SD)	6.3 min. (10.1 min.)	5.3 min. (5.7 min.)	48.3 min. (140.0 min.)

Table-3 Current and ideal travel mode and time: wheelchair users

Trip purpose	Commuting	Grocery shopping	Walking/driving
Current travel mode	Car driving (41%) Walk (11%) Taxi (11%)	Car driving (59%) Walk (15%) Taxi (6%)	Car driving (44%) Car passenger (26%) Walk (19%)
Current travel time (SD)	35.3 min. (31.4 min.)	14.3 min. (5.8 min.)	52.2 min. (40.8 min.)
Ideal travel mode	Dokodemo-door (33%) Walk (26%) Car driving (19%)	Dokodemo-door (37%) Walk (33%) Car driving (26%)	Car driving (26%) Car passenger (26%) Walk (22%)
Ideal travel time (SD)	24.9 min. (45.4 min.)	8.1 min. (9.3 min.)	50.0 min. (49.4 min.)

Table-4 Preferences and willingness to pay (WTP) for using *dokodemo-door* for commuting

Travel situations	University students		Wheelchair users	
	Dokodemo-door	WTP (yen)	*Dokodemo-door*	WTP (yen)
On fine days	31%	172	56%	1,625
On rainy days	84%	226	70%	1,353
When in hurry	82%	336	81%	2,179
When with heavy luggage	83%	287	56%	1,239
Go home in the midnight	40%	223	52%	1,571
When in bad health	63%	273	78%	1,838

Conclusions

This study examined, by focus groups and questionnaire surveys, the differences in enjoyable travel and travel which is desired to save by *dokodemo-door*, i.e. a teleportation machine, among various types of people including mobility handicapped persons. It was found that only 30% to 40% of university students and wheelchair users preferred to use *dokodemo-door* as an ideal travel mode for commuting and grocery shopping trips, and their average ideal travel times were less than the current ones but not zero. Also we found that university students and wheelchair users preferred to save commute trips using *dokodemo-door* when facing more constraints and their willingness to pay varied across different travel situations. For better understanding human travel behavior and creating livable cities for all, the positive utility and intrinsic motivations of travel need to be investigated further.

Acknowledgement

Keywords: positive utility of travel, mobility handicapped persons, ideal travel mode and time

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