

BUS EVALUATION FROM THE PERCEPTION OF THREE GENERATIONS

WILL BUSES BE THE LEAST PREFERABLE TRANSPORTATION MODE IN THE FUTURE?

Hokkaido University
Graduate School of Engineering
JSCE Student Member
Vasantha WICKRAMASINGHE¹

Hokkaido University
Graduate School of Engineering
JSCE Member
Shin-ei TAKANO²

INTRODUCTION

Public transportation is an important component of a sustainable community. Demand for the public transportation greatly depends on the age of the travelers as travel patterns and mode choices vary among different age groups. For instance, school students and elderly people have a higher preference for public transportation than middle-aged people. Due to the increase of car ownership, will public transportation, especially the buses, be the least preferable mode of transport? To understand this, it is essential to study the current travel patterns and future scenarios of transportation needs of different age groups. In this study, travel patterns and mode choices of three generations; High School Students (HSS), Middle-Aged People (MAP) and Elderly People (EP) were analyzed. This research aims:

- To study the current travel patterns and the future transportation needs
- To understand the future trends of bus transportation
- To evaluate the attitude of people from different age groups towards bus and car usage

The case study area is Ebetsu city which is located north-east of Sapporo (Figure 1). Ebetsu is a residential city with population of 0.12 million and land area of 187.55 km². The large number of school students, many newly developed residential areas and high elderly people ratio make Ebetsu a suitable choice for case study area.

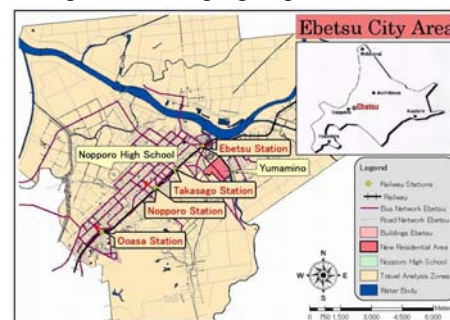


Figure 1. Ebetsu : Case study area

SURVEY DETAILS

Three questionnaire surveys (two *hand-in surveys* for HSS and EP, one *mail-back survey* for MAP) were conducted to collect demographic data, travel patterns and future travel views of each group. All three sets of questionnaires included a common question. The aim of this question is to understand the attitude of each group on public transportation and car usage. Later, all the collected data were statistically tested using t-tests to compare similarities and differences in travel patterns and future travel views of each group.

RESULTS

High School Students (HSS)

In summer, bicycle is the dominant mode of transport among HSS (84%). When it comes to a rainy day or winter, there is a significant mode shift to family cars and buses. During winter, buses (45%), cars (18%) and walking (28%) are the dominant modes of transportation while no one uses bicycle. It is clearly understood that buses play a major role in school transportation in winter. It is also evident that HSS face numerous hardships during their school trips in each mode and the condition becomes worse when it comes to a rainy day or winter. Those students who use bus as the transportation mode have mentioned that they face difficulties and inconveniences due to crowded buses (70%), low service condition (63%) and expensive bus fare (32%). Riding difficulties in winter (44%) and non availability of a family member to drive (41%) are the problems facing when they use bicycles and family cars respectively. Only 21 percent of them mentioned that they have not encountered any difficulties in traveling to school.

Middle-Aged People (MAP)

For work trips less than 5 km, the dominant mode is bicycle (68%), followed by cars (27%). If the distance is more than 5 km, 91 percent depends on cars either as a driver or a passenger. When the distance exceeds 20 km, especially trips to Sapporo, the dominant mode is JR (69%). Overall, only 3 percent uses bus for work trips. Shopping trips less than 1 km are dominated by walking (78%) while all trips more than 1 km are by family cars. People have a high driving license ratio of 84 percent. Car ownership counts 98 percent and it gives 1.47 vehicles per household. Even though they have high car ownership and driving license ratios, they may have to stop driving at one stage of their lives due to physical impairments. According to the response, 66 percent agree to stop driving before or at the age of 70 while 29 percent were undecided (Figure 2). They have to depend on a supporting transport service after quitting driving. 95 percent of them feel that they need buses as a supporting service once they get older.

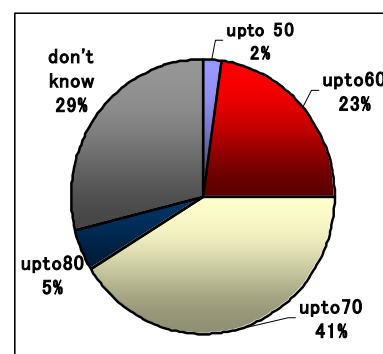


Figure 2. Expected driving age

Key words: public transportation, travel patterns, mode choices, high school students, middle-aged people, elderly people

¹ Hokkaido University, Sapporo, Kita-ku, Kita 13, Nishi 8, 060-8628, Japan. tel: 011 706 6208, e mail: vasanthawic@yahoo.com

² Hokkaido University, Sapporo, Kita-ku, Kita 13, Nishi 8, 060-8628, Japan. tel: 011 706 6205, e mail: shey@eng.hokudai.ac.jp

Elderly People (EP)

Analysis shows that they prefer walking (31%) or cycling (22%) when traveling for recreational or personal short trips in summer. These values become 42 percent and 0 percent respectively in winter as they totally stop using bicycle when winter starts. There is a modal shift to bus from bicycle and walking when it comes to medium trips. The use of bus counts 23 percent and 26 percent in summer and winter respectively. JR is the dominant mode for long trips as it is convenient, safe and congestion free. Seventy five percent of the elderly male has driving license but that counts only 17 percent for female. All driving license holders use the family car for their trips. Seventy percent of the elderly live within a distance of five minutes to the nearest bus stop. However, their frequency of bus usage is lower since they do not travel daily but one or two times per week. Initial bus fare reduction and improvement of bus stop condition are the most significant factors they expect from the present system of bus service in Ebetsu.

Bus vs Car Usage (Subjective evaluation by three generations)

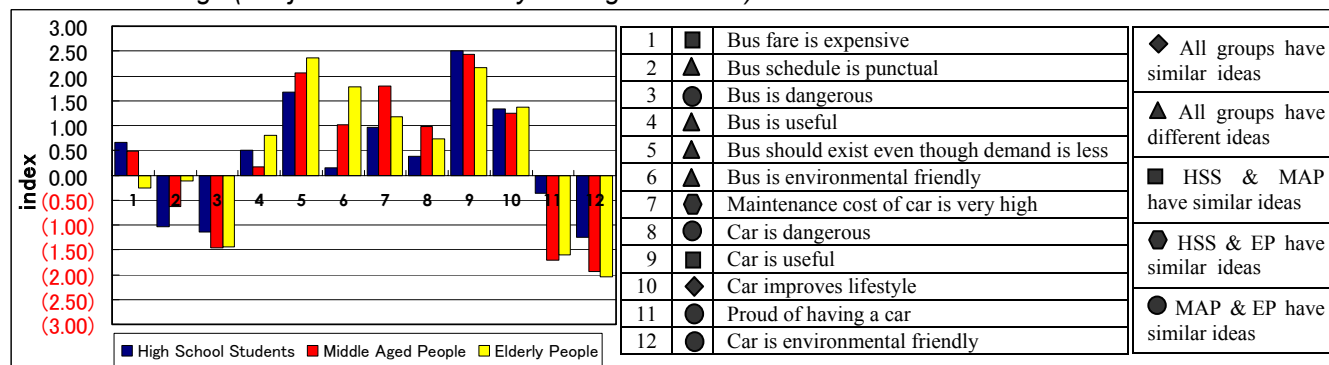


Figure 3. Attitude of people towards bus and car

Figure 3 shows an *index* which is calculated by giving weights to the respondents' answers. This index is used for comparative analysis of attitude towards bus and car usage. All groups think buses are cheap, less dangerous and environment friendly relative to cars. Even though, they think car is useful than the bus, they are not proud of having a car. Three t-tests (HSS vs MAP, HSS vs EP, and MAP vs EP) were performed to visualize the differences in attitudes among the three groups. After integrating all the test results, the following conclusions were established. All three groups have different ideas on items 2, 4, 5 and 6 (▲). HSS and MAP have similar ideas on items 1 and 9 (■); HSS and EP have similar ideas on item 7 (●); and MAP and EP have similar ideas on items 3, 8, 11 and 12 (●). All groups have similar ideas only on item number 10 (◆).

Opinion of the People

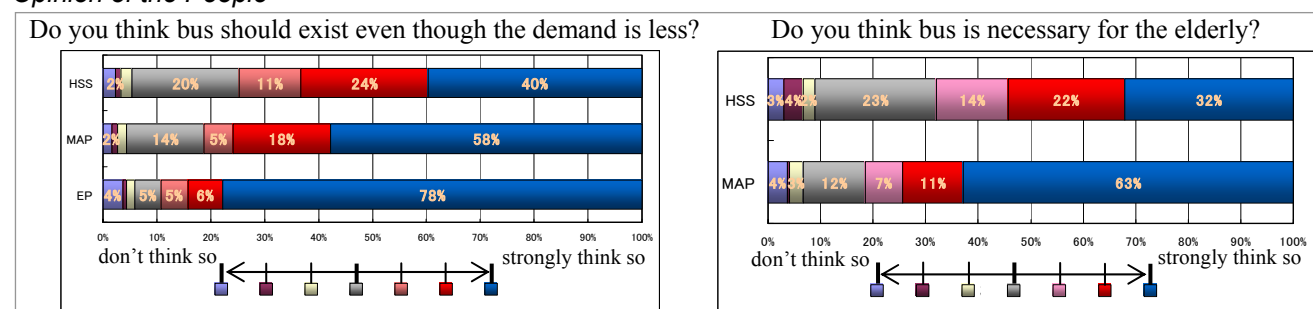


Figure 4. Opinion of people on bus transport

From the opinion of the people (Figure 4), it seems that regardless of age, all groups think that bus should exist even though the demand is less. This is a good indicator that people do not have a negative attitude towards bus. Moreover, they tend to think on future transportation opportunities and willingness to travel in buses increases with age.

CONCLUSION

There is a high demand for buses from high school students in winter even with some difficulties. MAP do not use bus at present as they are totally car dependent. Bus is the major transportation mode for EP except for short distance trips. As the elderly population increases, it can be expected that the demand for bus will increase from this group. Moreover, they have a high positive attitude towards buses than cars. Discounted bus tickets, bus stop condition improvements and other incentives will attract more EP towards bus. Even the car ownership increases, people do not have a negative attitude towards bus. They all think that bus is the most suitable mode of transport when they get older. Community bus, park and ride system and nursing cars will be the necessary services in the future. Based on the results of this study, it can be concluded that buses should exist in the future and its importance will increase slowly but steadily.

REFERENCES

1. Mackett R. L. (2003), **Why do people use their cars for short trips?** Transportation 30, pp 329-349.
2. Rosenbloom S. (2001), **Sustainability and automobility among the elderly: an international assessment.** Transportation 28, pp 375-408