TRAVELERS’ MOTIVES IN USING THE BUS: AN AWARENESS OF THE ROLE OF TRIP PURPOSE

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Existing literature on the psychological approach to traveler’s mode choice behavior has underlined two main streams of traveler motivation for using transport mode. Those are self-interest motive and pro-environmental motive. Travelers are assumed to consider cost-benefit mechanism when deciding on mode choice in the self-interest motive, whereas environmental obligation has been cited for deciding travelers’ behavior with respect to the pro-environmental motive. Self-interest-based models were commonly found to be better compared to pro-environmental-based models in predicting travelers’ behavior; however, conventional studies seem to ignore the important role of trip purposes towards travelers’ mode-choice behavior. This study, therefore, aims at investigating travelers’ mode-choice motive under different trip purposes. Results from 270 respondents in Saitama City, Japan, showed that travelers have different motives according to different trip purposes. In particular, travelers use cost-benefit perception to decide on bus use when going to work and going shopping. Regarding intention to take the bus to go to social events, travelers’ perception were found to be driven by social-environmental obligation. Further efforts on combined models which integrate both self-interest motives and pro-environmental motives, suggested that travelers do not completely ignore pro-environmental motives in self-interest trips.

Key Words: mode-choice motive, travelers’ perception, bus service

1. INTRODUCTION

Existing literature on the psychological approach to travelers’ mode choice behavior has underlined two main streams of traveler motivation for using transport mode. Those are self-interest motive and pro-environmental motive.1) The theory of planned behavior2) can be seen as a fundamental basis for the self-interest motive; whereas, pro-environmental model was developed based on norm-activation model (NAM).3) On the self-interest motive, travelers are assumed to rely on cost-benefit mechanism to decide on transport choice. Widely known variables in self-interest-motive models include attitude, social norm, perceived behavioral control (PBC) and behavioral intention. Regarding the pro-environmental model, travelers’ environmental obligation is expected to drive travelers’ behavior. Variables commonly investigated in NAM models were personal norm, environmental awareness of consequences, and environmental awareness of need. In the context of travel mode choice, personal norm was understood as an environmental obligation to use transport mode.

The literature on psychological models for travelers’ behavior showed several efforts to compare performances of the above-mentioned approaches. A general consensus was that the self-interest model has a better performance compared with that of pro-environmental model. For example, Bamberg & Moser (2007)4) examined the intentions in car use and self-reported car use. Various structural relationships under two fundamental forms of self-interest and pro-environmental motives were investigated in the study. According to its findings, self-interest-based variables were observed to have better performance than pro-environmental variables. Aiming at a similar purpose of comparing the two approaches, Abrahamse et al. (2009)5) also concluded a better performance of TPB-based models for car use compared with that of NAM-based models. In addition, a thorough literature review by Steg and Vlek (2009)6) suggested
that the NAM-based models seem to have a weak predictability in high behavioral cost domains such as travel mode-choice behavior.

Although the weakness of pro-environment motives in deciding travelers’ behavior has been well documented, there is not enough basis to conclude an absolute dominance of the self-interest motives. This is because the environmental obligation of travelers was investigated in a general manner, which did not consider situational factors such as characteristics of trips. It is obvious that travelers cannot give priority to environmental motives in a time-pressure trip where benefits of travel time should be at the highest priority. Another example is that an investigation conducted on travelers whose trips were of the time-pressure type, showed a less likely support to pro-environmental motives. As such, a consideration of trip characteristics should be of interest.

Notably, the literature on mode-choice studies suggested that trip purpose may take an important role on travelers’ mode choice because it influences the complexity of trip chain, thus leading to different mode choices. First, a study by Krizek (2003) showed a relationship between trip purpose and the complexity of travel chain. Later, several studies suggested that the complexity of trip might lead to different mode choices. Hensher and Reyes (2000) found less use of public transport due to an increase of trip complexity. A similar finding was suggested by Cicillo and Axhausen (2002) with an increase in car use as the trip complexity increased. The relationship between tour complexity and mode choice was also revealed by Ho and Mulley (2013).

However, conventional studies that follow the psychological approach did not consider the influence of trip purpose on travelers’ motives to use transport mode. Therefore, this study aims to reexamine the motivation of travelers towards mode choice decision by a replication work looking at different trip purposes. An empirical case study from this study was considered in the context of bus service setting.

2. DATA COLLECTION

A set of questionnaires was sent to respondents living in Saitama City, Saitama Prefecture, Japan. The city has approximately 1.2 million people in which 50.1% are male and 49.9% are female. The local bus service in the area was mainly used as a feeder service for the train system with around 150,000 passengers per day. Questionnaires were randomly sent to resident houses by post. Houses that were not so close to the train station were selected to receive questionnaires to reduce the impact of the train system towards the bus service because both bus and train services are considered public transport modes.

Respondents were requested to use pre-paid envelopes to return their feedback by post. All typical variables of the two approaches were investigated. Respondents were asked about their perception regarding the use of the bus service. Items were designed to capture travelers’ attitude, descriptive norm, perceived behavioral control (PBC), awareness of need, awareness of consequences, personal norm, and intention for using the bus service. It should be noted that travelers’ attitude was considered via an aspect of affection. Detailed discussion on the components of attitude can be referred to a work by Ajzen (2001). All the measures were adopted from related theories except awareness of consequences, which was expanded by an additional item representing travelers’ perception of social impact of the bus service. The argument for the expanded version of awareness of consequences originated from a belief that travelers’ obligation to use bus service should include both environmental and social aspects. In addition, three types of trips were considered, including “going to work,” “going shopping,” and “going to social event.” To provide answers, respondents were asked to select one option among a set of options provided for each of the items ranging from 1 (strongly disagree) to 5 (strongly agree) in a Likert-type scale. Measures of the designed items are presented in Table 1.

Among 3000 questionnaires distributed, there were 307 (10.2%) returned questionnaires. However, due to some uncompleted questionnaires, there were only 270 questionnaires (9.0%) usable for analysis. With 58.9% male and 41.1% female, the analyzed samples had a relatively similar gender structure to the population of the city, thus it was representative of the population.

In addition, with respect to a poor value of Cronbach’s alpha coefficient of PBC (see Table 1), which implies the degree of internal consistency between measured items, this study only considered a single item to measure the value of PBC. Regarding literature on PBC studies, the construct was generally assumed to cover two aspects, including capacity and autonomy (e.g., Ajzen, 2005). In a specific case of the present study, the first item was designed to capture travelers’ capacity for using the bus service, while the second item was designed to measure travelers’ autonomy to use the bus service. Based on an assumption that travelers put a higher weight on capacity than autonomy to decide their bus use intention, the items designed for measuring travelers’ capacity have been selected for further analyses.
Table 1 List of variables measured by the questionnaire survey.

| Items               | Cronbach’s α |
|---------------------|--------------|
| **Attitude**        |              |
| Q1 You love to use bus in your daily life | .842         |
| Q2 You prefer to use bus in your daily life | .529         |
| **Perceived Behavioral Control** |          |
| Q1 You find no difficulty in using the bus in daily life | .820         |
| Q2 Your freedom to use bus in daily life is high | .738         |
| **Descriptive norm** |            |
| Q1 Number of people using bus is currently increasing | .817         |
| Q2 Most of the people you know currently tend to use bus more | .842         |
| **Awareness of need** |            |
| Q1 Bus use is an urgent problem for environmental protection | .820         |
| Q2 You believe that using bus will help to solve environmental problems | .683         |
| **Awareness of consequences** |        |
| Q1 If you increase your bus use, you contribute to climate protection | .738         |
| Q2 Your decision to use bus has consequences for environment improvement | .817         |
| Q3 Bus is important for elderly people. | .842         |
| **Personal norm**   |              |
| Q1 Due to values important to you, you feel obliged to use the bus as much as possible | .842         |
| Q2 Due to your values/principles, you feel personally obliged to use environmentally friendly means of transportation such as bus | .683         |
| **Car use Habit**   |              |
| Q1 Car is your automatic mode for any trip | .683         |
| Q2 You have uneasy feeling when you do not use car for your trips | .842         |
| **Intention 1**     |              |
| Q1 Intention to use bus to go to work daily is high | .683         |
| **Intention 2**     |              |
| Q1 Intention to use bus to go shopping is high | .683         |
| **Intention 3**     |              |
| Q1 Intention to use bus to go to an social event is high | .683         |

3. RESULTS

(1) Descriptive analyses

Descriptive analyses were conducted to examine the characteristics of variables. Correlations between intention to use the bus service and other investigated variables are presented in Table 2. It should be noted that if more than one item were used to measure a variable, an averaged item was used to produce values in Table 2.

As can be seen from Table 2, except for car-use habit, all the rest of investigated variables had significant correlation with the intention of using bus regardless of trip purposes. Respondents showed negative attitude towards the bus service with an average value of 2.89. Most of the respondents found no difficulty in using the bus service in daily life (average value of PBC1 was 3.78). They were also negative in perceiving an increase of the bus usage among other travelers (mean value DN = 2.77). In addition, travelers’ perception regarding necessity and environmental consequences of bus usage and environmental obligation was observed to be positive (all average values were above 3). Regarding perception of car-use habit, travelers were neutral (mean value of CH is 3.06). Among three trip types investigated, travelers showed a positive intention to use bus to go to work and social events (mean value of IW and IE were 3.17 and 3.14, respectively). In contrast, travelers’ intention to use bus for shopping was negative (mean value of IS = 2.61).

(2) Travelers’ motive for the intention of bus usage

Aiming at a comparison between self-interest motive and pro-environmental approach, regression analyses were used to examine performance of the models in predicting travelers’ intention to use the bus service. Attitude, PBC and descriptive norm were included in the self-interest model, while awareness of need, awareness of consequences, and personal norm were variables for the pro-environmental model. Performance of the model was valuated based on the value of adjusted R-squared. A higher adjusted squared indicates a better performance of the model. It should be noted that absolute values of adjusted R-squared were not a concern in this analysis because the purpose was to compare the two motives. Results are shown in Table 3.

As seen in Table 3, the self-interest model has a better performance compared with that of the pro-environmental model regarding bus use intention to go to work. Travelers’ attitude was observed to have the strongest impact towards the intention to use the bus to go to work. However, the pro-environmental model showed a better predictive ability in the case of trips to social events. Travelers’ environmental
Table 2  Pearson’s correlation between investigated variables.

| No. | Variable | Mean | SD    | 1   | 2   | 3   | 4   | 5   | 6   | 7   |
|-----|----------|------|-------|-----|-----|-----|-----|-----|-----|-----|
| 1   | Attitude | 2.89 | 1.05  |     |     |     |     |     |     | 1   |
| 2   | PBC1     | 3.78 | 1.25  | .333** | 1   |     |     |     |     |     |
| 3   | DN       | 2.77 | 0.95  | .379** | .144* | 1   |     |     |     |     |
| 4   | AN       | 3.54 | 1.06  | .327** | .179** | .136* | 1   |     |     |     |
| 5   | AC       | 3.81 | 0.88  | .311** | .146* | .173** | .753** | 1   |     |     |
| 6   | PN       | 3.38 | 1.10  | .475** | .198* | .257** | .537** | .600** | 1   |     |
| 7   | CH       | 3.06 | 1.21  |     |     |     |     |     |     |     |
| 8   | IW       | 3.17 | 1.43  | .383** | .239** | .172** | .264** | .258** | .369** | .064 |
| 9   | IS       | 2.61 | 1.31  | .508** | .164** | .329** | .205** | .220** | .452** | .159** |
| 10  | IE       | 3.14 | 1.26  | .345** | .118* | .181** | .262** | .220** | .377** | .019  |

Note: [**p < 0.01; *p < 0.05], PBC - perceived behavioral control, DN – descriptive norm, AN – awareness of need, AC – awareness of consequences, PN – personal norm, CH – car use habit, IW – intention to go to work (by bus), IS – intention to go shopping (by bus), IE – intention to go to (social) events (by bus)

Table 3  Comparison between self-interest and pro-environmental motives (unstandardized coefficients).

|                | Self-interest approach | Pro-environment approach |
|----------------|------------------------|--------------------------|
|                | Adjusted R²            |                          |
| Go to work     |                        |                          |
| Attitude       | .453***                | AN .130                 |
| PBC1           | .143*                  | AC -.010                |
| DN             | .044                   | PN .417**               |
| Adjusted R²    | .152                   |                          |
| Social event   |                        |                          |
| Attitude       | .392***                | AN .168                 |
| PBC1           | -.002                  | AC -.158                |
| DN             | .077                   | PN .421***              |
| Adjusted R²    | .112                   |                          |
| Shopping       |                        |                          |
| Attitude       | .562***                | AN .009                 |
| PBC1           | -.009                  | AC -.111                |
| DN             | .220**                 | PN .594***              |
| Adjusted R²    | .272                   |                          |

Note: [***p < 0.001, **p < 0.01, *p < 0.05], PBC – perceived behavioral control, DN – descriptive norm, AN – awareness of need, AC – awareness of consequences, PN – personal norm.

obligation was found to be the key variable in deciding bus use intention for social-event trip. In addition, travelers were observed to use cost-benefit merit (through the attitude construct) to select bus as transport mode for shopping trips. Travelers’ attitude and descriptive norm (i.e., perception about other’s trend of using bus service) were found significant in deciding bus use intention for shopping trips.

In a notion of the dominance of self-interest motives, further efforts were made to consider whether or not travelers completely ignore pro-environmental motives when self-interest motives exist. Towards that aim, combined models that integrate the two motives were developed for trips that were dominantly decided by self-interest motives (i.e., self-interest trips). It was hypothesized that if the combined models worked better than the single models, and if pro-environmental variables were significant in predicting behavior, then travelers would not ignore pro-environment motives. Analyses therefore were made for working and shopping trips. A combined model was also developed for social event trips. It should be noted that car-use habit was added to the models due to suggestions from literature. Again, this analysis was not concerned with absolute values of adjusted R-squared. Results are presented in Table 4.

As can be observed from Table 4, the combined model shows better performance compared with the single models (i.e., self-interest model and/or pro-environmental model). Adjusted R-squared values of the combined model are higher than those of the single models regardless of trip type. Travelers’ attitude and environmental obligation are found to be predictors of bus use intention in either of the three investigated trip types. Descriptive norm is only observed to be significant towards bus use intention of going shopping.
Table 4 Combined model for travelers’ intention of bus usage (unstandardized coefficients).

| Trip Purpose | Self-interest approach | Pro-environment approach | Adjusted R² | Notes |
|--------------|------------------------|--------------------------|-------------|-------|
| Going to work | Attitude: .311*** | AN: .080 | Adjusted R² = .185 | (Better than single model) |
| N = 270 | PBC1: .128 | AC: -.004 | | |
| | DN: .015 | PN: .269*** | | |
| CH: .012 | | | | |
| Social event | Attitude: .246** | AN: .154 | Adjusted R² = .165 | (Better than single model) |
| N = 265 | PBC1: -.011 | AC: -.162 | | |
| | DN: .055 | PN: .312** | | |
| CH: .012 | | | | |
| Shopping | Attitude: .422*** | AN: -.040 | Adjusted R² = .328 | (Better than single model) |
| N = 270 | PBC1: -.023 | AC: -.133 | | |
| | DN: .186* | PN: .384*** | | |
| CH: -.084 | | | | |

Note: [***p < 0.001, **p < 0.01, *p < 0.05], PBC – perceived behavioral control, DN – descriptive norm, AN – awareness of need, AC – awareness of consequences, PN – personal norm, CH – car use habit.

4. DISCUSSION AND CONCLUSIONS

This study provided a deep investigation on travelers’ motives with a consideration of the impact of trip purposes. The findings of this study suggested that trip purposes did influence travelers’ motives. Importantly, it demonstrated that there was no absolute dominance of self-interest motives, and that the pro-environmental motives were essential in deciding travel behavior. Three types of trip were considered, including time-pressure trips (going to work and going to social events) and non-time-pressure trips (going shopping). Results from the analyses showed that travelers seem to rely on cost-benefit perception to decide on bus use intention when going to work and going shopping. Regarding bus use intention for going to social events, travelers’ perception were found to be driven by environmental obligation. Notably, the empirical findings of the present paper supported the hypothesis that travelers do not completely ignore pro-environmental motives in self-interest trips.

Literature on psychological models for travelers’ mode choice behavior showed a trend towards the assumption that self-interest approach has a better predictive ability compared with pro-environmental approach. However, most of the related studies considered mode choice intention for general trip purposes. With three investigated trip types, this study provided a further understanding on the role of trip purposes towards travelers’ motivation. According to the results of this study, self-interest motive was observed to be non-dominant in all trip types. Travelers seem to decide their bus use intention based on environmental obligation regarding trips for social events. This finding, however, does not necessarily reject the dominant performance of self-interest approach because travelers’ general bus use intention may depend on frequency of trips in daily life. Going to work and shopping trips are probably dominant in number of trips, thus leading to stronger travelers’ self-interest motive regarding general perception of using the bus in daily life. In sum, trip purposes were found to significantly influence travelers’ motivation to use the bus. This indicated that interventional policy should be developed with respect to different trip purposes. Particularly, an improvement of bus services may attract more travelers to use this mode for work and shopping. A social campaign promoting the bus for environmental concerns can be a solution to increase bus use for social events. Future works should focus on this interesting aspect of bus services.

In addition, with a better performance of the combined models (in comparison with single models) and a significant role of pro-environmental motives in self-interest trips, this study suggested that travelers do not ignore environmental obligation even when they are driven by self-interest motives, thus showing that pro-environment-based interventional policies are not completely useless for self-interest trips. This was found in accordance with suggestions of recent studies (e.g., Klockner & Friedrichsmeier, 2011) that combined models seem to work better in predicting travelers’ behavior. In a particular case of this study, although self-interest motives (e.g., attitude) were found to be dominant in choosing bus use for trips to go to work and shop, the role of pro-environment motive (i.e., personal norm) was significant in deciding bus use intentions. In addition, the combined
model developed for social event trips suggested that the self-interest approach can add further explanation in addition to pro-environment approach even for pro-environmental-driven trips. To conclude, considering the application of self-interest-based interventional policies together with pro-environmental-based interventional policies is recommended to increase bus use for working, shopping, and social event trips.

Some limitations of the present studies should be noted. The construct of perceived behavioral control was only able to consider travelers’ capacity in using the bus due to a low internal consistency of measured items. In addition, models developed in the present study should only be used to compare motives, but not to predict behavior due to low values of adjusted R-squared. Lastly, a replication work with a bigger sample size is desirable in future studies.

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