

PSYCHOLOGICAL MOTIVATION OF TRAVELLERS' BEHAVIOUR REGARDING THE USE OF PUBLIC TRANSPORTATION

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ABSTRACT

Regarding studies of travellers' behaviour, the overwhelming development of well-known theories (e.g., random utility theory) has partly weakened researcher's attention on psychological approach which was studied in early 1970s. However, psychological approach has recently emerged as an advanced solution due to weaknesses of the conventional approaches. This study aims at psychological motivation of travellers to select public transportation. Using questionnaire method, investigations have been conducted in various aspects of travellers' perception towards bus usage. Contributions of the present study were found in several aspects. The travellers' mode-choice decision-making process has been successfully described using loyalty-based approach. The loyalty-based approach was used to develop a simplified model to measure number of potential bus users. Another extension of loyalty-based approach was a successful market segmentation of bus travellers which may increase the transferability between market segments. In addition, this study provided a novel evidence for the inclusion of social-awareness factors as determinants of bus use intention. Moreover, a consideration of different perceived service qualities showed that higher perceived service quality may create more sensitive variation in bus usage than lower perceived service quality. Lastly, the effect of cost-time barrier on psychological perception of travellers has also been considered in the present study.

KEYWORDS: Travellers' Behaviour, Mode choice, Bus service

1. INTRODUCTION

1.1 Psychology on Transportation Research

A fundamental idea to consider psychology on transportation research was built on an assumption that travellers process travel behaviour based on acquired information about transport system. The same acquired information, processed by different individuals, might lead to various biased ways. The bias can be influenced by either internal driving forces (e.g., attitude, personal norm) or external driving forces (e.g., social norm). The mentioned driving forces can be either observable and unobservable. For those which are unobservable, they are normally conceptualized as constructs.

Literatures of psychological approach on travel behaviour showed a mass effort on different driving forces. Initially, researchers explained traveller's behaviour using instrumental motive in which traveller's behaviour is driven by instrumental factors (e.g., travel cost, travel time). Recent development of travel behaviour studies suggested an involvement of psychological factors. Some researchers showed evidences of various traveller's motives such as affective motive and symbolic motive (e.g., Steg, 2005). In addition, the

role of traveller's attitude and/or public acceptability towards transport policies has been widely investigated (e.g., Schade and Schlag, 2003, Eriksson et al., 2006). Notably, many researchers showed their interest in considering travel behaviour in whole structure of the decision making process. Traveller's behaviour was described in different phases including behavioural intention (e.g., Fishbein & Ajzen, 2010) and behaviour (e.g., Ajzen, 1991, Stern et al. 1999, Bamberg et al., 2011). Recently, there are evidences that traveller's behaviour can be influenced by general satisfaction in daily life (via travel satisfaction) (e.g., Friman et al., 2013).

However, most of the above mentioned studies were for car use. Based on suggestions by Gehlert et al. (2013), there is a need to have more studies focusing on single travel modes such as public transport; and a consideration on joint effects of factors such as causal link between instrumental and psychological factors on travel behaviour.

1.2 General Objective

The objective of the present study is to examine traveller's behaviour through its

connection with traveller's motivation. For that purpose, an initial effort is made to develop a consequential process of constructs which represents how traveller's use their perception to decide their bus service use. Understanding on the process then will be used as a base to develop deeper studies on different angles of traveller's perception to provide a sufficient and comprehensive consideration regarding traveller's bus service usage.

1.3 Scope of the present study

Traveller's motivation to use transport mode was either examined in self-interest motive or pro-environmental motive. Regarding self-interest motive, travellers were assumed to rely on cost-benefit motive to judge their behaviour towards a certain transport mode. In pro-environmental motive, travellers are expected to use their moral obligation to decide their behaviour towards a certain transport mode.

Under a notion that self-interest motive has a higher performance compared with pro-environmental motive in travel mode-choice behaviour (Steg and Vlek, 2009), the present study firstly focus on self-interest motive of traveller. To begin with, a loyalty-based framework has been developed which can be considered as one of the major contributions of the present study. Based on an investigation of the traveller's decision making process, the framework was established with a consequential framework of the attitudinal-intention-actual behaviour and well-defined concepts of loyalty and its components. Detail of the loyalty-framework development has been presented in Section two titled as "A deep excavation on loyalty-based decision making process regarding bus usage".

Using the developed loyalty-based framework as a background, further studies were conducted to extensively provide suggestions for managers/practitioners regarding the bus service usage. First, a loyalty-based model for measuring number of potential bus users was developed. The model allows managers to foreseen the ceiling (max) increase in number of bus users when the bus service quality is perceived as an ideal service. The model is presented in Section three titled as "A measure of potential users in the bus service". Second, a market segmentation has been implemented with focus on transferability among segments. According to the segmentation, it is suggested that there are quite a few spurious and/or latent bus users. Rather, travellers are strongly segregated into "positive perception – use" and "negative perception-don't use" groups. Detailed discussion on the matter is presented in Section four with title "Recognizing customer's pattern of bus service patronage using loyalty framework". The last issue of the self-interest motive considered

in this study, was a consideration of variation of traveller's perception in different levels of perceived service quality. Results from the comparison showed that higher is the perceived service quality, more will be perception-based behaviour of travellers. This issue is presented in Section five entitled "A comparison of bus customers' perception on different levels of the bus service".

Parallel to the self-interest motive, the present study also considered pro-environmental motive to provide a comprehensive understanding about traveller's motivation towards travel mode choice behaviour. Different from conventional studies pursued pro-environmental approach, a novel contribution of this study was to extend the scope of traveller's moral obligation to use transport mode. The main argument for the extension was that environmental obligation is not enough to motivate people to use public transportation. With such purpose, a wide range of social-awareness factors were examined. Some of the investigated social-awareness factors were found to be predictors of traveller's behaviour. Detailed discussion on the role of the factors is presented in Section six titled "Impacts of traveller's social awareness on intention of bus usage". In addition, to validate a suggestion from literature that self-interest motive is stronger than pro-environmental motive, the present study implemented a comparison between the two motives. Related discussion is presented in Section seven titled as "Choice motive regarding intention of bus usage".

As suggested in literature that there is a need to explore the causal links between psychological, social, spatial factors, and travel behaviour (e.g., Gehlert et al., 2013), this study made an additional effort on the interaction between instrumental factors (e.g., travel time, cost) and psychological factors (e.g., attitude). The consideration was not to define the relationship between instrumental and psychological factors. In stead, it was to consider the joint impact of those factors on traveller's motivation. In particular, this study investigated captivity effects on psychological motivation of travellers towards mode choice decision. This has been presented in Section eight.

2. A DEEP EXCAVATION ON LOYALTY-BASED DECISION MAKING PROCESS REGARDING BUS USAGE

2.1 Objective

The objective of this study is to elaborate the concept of loyalty based on the consequential framework of the attitudinal-intention-actual behaviour with a focus on formative construct of attitudinal loyalty and impacts of social norm and habit on traveller's behaviour. An excavation will be conducted on multidimensional construct of

attitudinal loyalty to hopefully capture the essence of attitudinal loyalty. Furthermore, proposed concept of loyalty is expected to be well-demonstrated through a structural relationship in which the roles of intention, social norm and habit are clearly drawn.

2.2 Proposed model

This study provided definitions of loyalty as follows. Attitudinal loyalty implies a general evaluation of a person towards a given service in which the evaluation covers two bases, one is a motivation originated from current perceived service quality and the other comes from related experiences. Whereas, behavioural loyalty is termed as a behaviour-oriented feedback of a person which is appeared after customers perceived general evaluation towards a given object. An original idea for proposed behavioural loyalty was raised from an argument that actual behaviour is not the only construct to show-off the loyalty. Rather, the loyalty yet is exposed via intention. The natural meaning of intention allowed to define itself as a spiritual behaviour. It means that when a person has intention, he has already performed an action in his mind and waiting for necessary conditions to transfer it into the real life. Finally, based on Dick and Basu (1994)' definition, this study defined loyalty as the relationship between attitudinal loyalty and behavioural loyalty. The difference between this study and Dick and Basu's study regarding loyalty definition was that general evaluation and behaviour-oriented feedback replaced relative attitude and repeat patronage respectively. Hence, within a setting of service context, a "true loyalty" customer has a strong positive in general evaluation and a strong behavioural feedback that ends up with a high in actual use.

Proposed conceptual model of loyalty includes attitudinal loyalty and behavioural loyalty. Attitudinal loyalty is a higher-order formative construct. The construct stands for a final emotional product resulted after a struggle between cognitive loyalty, affective loyalty and a new aspect named implicit loyalty. Implicit loyalty refers to stimulated concern or hidden pressures if travellers use bus service. Whereas, behavioural loyalty is a behavioural product originated from other struggle that aims to find out a traveller's respective feedback respect to the general evaluation. The later struggle is consecutive rather than simultaneous. It begins with conative loyalty and has an end with action loyalty. Figure 1 illustrates the whole structure of concept.

2.3 Method

The data contains results collected from a questionnaire survey in Hidaka city, Saitama prefecture, Japan. Participants received the

questionnaire via post. The time to answer questions is from September 24, 2012 to October 5, 2012. There are 7500 questionnaires distributed. Each of the questionnaires gathers two types of information. The first type is about hypothetical constructs of loyalty on bus service. The other is about respondents' demographic information. The total number of received questionnaires is 554 (7.39%). After eliminating unusable questionnaires due to uncompleted answers, there are 333 (4.44%) questionnaires used for analysis.

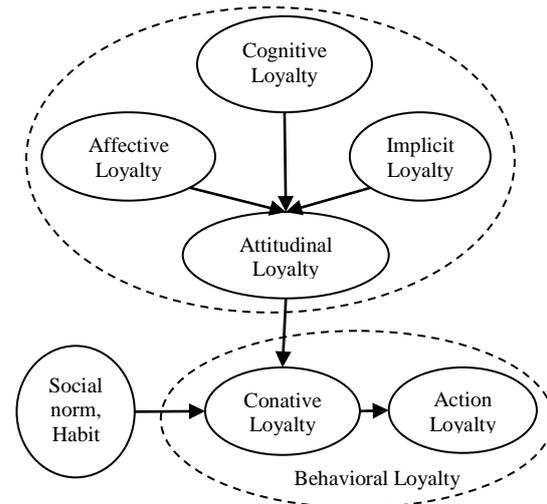


Figure 1 - Proposed structural of loyalty

2.4 Conclusions

As an additional support for the composite approach of loyalty concept with the attitudinal-behavioural relationship, this study has successfully elaborated the concept of loyalty with a deep examination on the multi-dimensional construct of attitudinal loyalty. The excavation on the attitudinal facet of loyalty went to a suggestion that affection and cognition are not enough to represent attitudinal loyalty. Rather, implicit loyalty is a supplemental component of the construct. This study also insisted its distinction as the first attempt to use formative construct to describe the nature of attitudinal loyalty. Cognitive loyalty, affective loyalty and implicit loyalty were defined as three causal indicator of the construct. In addition, this study provided an empirical examination for the conceptual issue suggested by Dick and Basu (1994), the first on the roles of social norm and situational context, and the second on the expansion of the loyalty topology. Finally, this study was the first research to examine the conceptual aspect of loyalty within the bus service context. Overall, the study has substantially contributed to the body of knowledge that exists on loyalty literature. It provided a conceptual foundation for future loyalty research in the bus industry.

Empirical findings in this study are critical for bus service managers. On the one hand, it indicated that not all people having a good perception on bus service quality are going to obtain a good attitude even perceived service quality is the key determinant of attitude. Their attitudes additionally depend on hidden factors such as concerns and pressures in case of using the bus service. As such, in order to get user having loyal attitude, efforts should cover both the improvement of service quality and the capability of mitigating hidden concern or pressure of the users. On the other hand, a task to increase loyal users in actual use is not easy. It requires not only an increase in loyal attitude but also on perception of an increase in number of people using bus and a boost in bus service attachment among users. In addition, it is not enough to expect all the loyal intention user will transfer the intention into actual use even managers succeed in getting users with a high in intention. Therefore, this suggested a deeper study on the transferring period between conative loyalty to action loyalty.

3. A MEASURE OF POTENTIAL USERS IN THE BUS SERVICE

3.1 Objective

The objective of this study is to provide a simplified model for measuring frequency of bus use. The model was developed based on a loyalty framework in which various latent factors including affective loyalty, cognitive loyalty, implicit loyalty, descriptive norm and habit were considered. The model aims to quantify users' frequency of use and measure the maximum values of bus patronage with respect to various cases of perceived ideal bus service.

3.2 Modelling approach

The solution for building the model is to consider a two-phase estimation. First phase comes with a latent variable multiple regression between intention and its determinants. In the second phase, based on the relationship between intention and frequency of use obtained from Hoang-Tung et al.(2013)'s model, the final model will express the relationship between frequency of use and intention's determinants. Because loyalty framework covers most of the key determinants of intention, thus, a regression between intention and the determinants is creditable. In addition, the correlation coefficient between intention and frequency of use obtained from the mentioned model has been developed with a consideration of consequential order of impacts. Therefore, employing the coefficient will make the proposed model close to the nature of human decision making process. Figure 2 illustrated the proposed model approach.

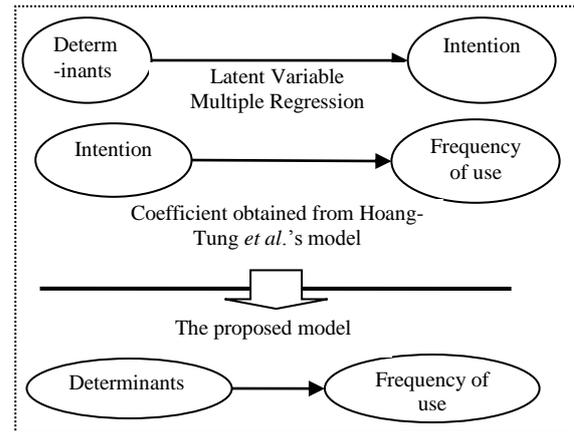


Figure 2 - Modelling approach

3.3 Proposed model

The same data set used for section 2 has been used to build proposed model. Table 1 shows coefficients of proposed model

Table 1 - Coefficients of proposed model

	Coefficient	P
Intention ← Affective Loyalty	.824	***
Intention ← Implicit Loyalty	.165	.012
Intention ← Descriptive Norm	.196	***
Intention ← Habit	-.088	.016
Interception to calculate Intention	0	
AffectiveLoyalty ↔ Imp.Loyalty	.952	***
Imp.Loyalty ↔ DescriptiveNorm	.425	***
Affective Loyalty ↔ Des. Norm	.570	***
Affective Loyalty ↔ Habit	.081	.259
Implicit Loyalty ↔ Habit	.146	.062
Descriptive Norm ↔ Habit	.160	.013
Adjusted Goodness-of- Fit Index (AGFI)	.957	
Normed Fit Index (NFI)	.985	
Root Mean Square Error of Approximation (RMSEA)	.028	
Comparative Fit Index (CFI)	.997	
Adapted from Hoang-Tung et al. (SEM results)		
Intention → Frequency of use	.441	***
Interception to calculate frequency of use	1.99	
Item1 ← Intention	.986	***
Interception to calculate Item1	3.28	***
Item2 ← Intention	1.03	***
Interception to calculate Item2	3.50	***
Item3 ← Intention	3.56	***
Interception to calculate Item3	1.00	

As can be seen from Table 2, comparisons were made between each of the supposed cases and the base case. The purpose of the comparison was to observe how frequency of use changes accordingly. It should be noted that the base case illustrates for the current service quality.

Table 2 - Frequency changed due to improvement of perceived service quality

Model	Description	Affection	Intention	Fre. of use	% change
Base case	Current service	3.07	3.72	3.46	-
Max 0	Ideal perceived service for everybody	1.00	2.01	2.71	21.74
Max 1	Ideal perceived service for men only	1.97	2.81	3.06	11.58
Max 2	Ideal perceived service for women only	2.09	2.91	3.11	10.25
Max 3	Ideal perceived service for car driver only	1.35	2.30	2.84	18.05
Max 4	Ideal perceived service for non-car driver only	2.71	3.42	3.33	03.81

3.4 Conclusions

As an additional supplement to the literature of demand models, this study has successfully proposed a psychological demand model for bus service industry. Proposed model's foundation was close to the nature of human decision-making process as well as the concept of potential users. An excavation on both service-quality-rated factors (cognitive loyalty and affective loyalty) and non-service-quality-factors (implicit loyalty, descriptive norm, habit) made proposed model outstanding in term of capability in predicting and explaining different practical scenarios. This study insisted its distinction as the first attempt to quantify bus patronage based on loyalty framework. Furthermore, it introduced a new examination on the concept of potential users by providing the maximum values of bus patronage respect to various proposed ideal service qualities. Overall, the present study has substantially contributed to the body knowledge of bus demand modelling.

Empirical findings in this study are critical for bus service managers as well as transport planner. First, it provided a reliable demand model to predict bus patronage. According to the final model, people seems to pay their reliance on affection when perceiving service quality. It meant travellers adjust service quality based on both satisfaction

and emotion related to the target service quality. Therefore, an effort towards the bus service improvement should cover both travellers' satisfaction and emotion. Second, maximum values of bus patronage with regard to different scenarios can be considered as reference limits for bus managers when making strategy of the bus service of a given residential area. In addition, the data suggested that group of car drivers with a potential increase 18.05% should be the first priority for improving the bus service quality. Whereas, group of non-car drivers was close to its limit of bus patronage with a small increase of 3.81%. Thus, the group should be at the lowest priority rank for service improvement. Finally, the data showed that even bus service reached the highest quality, bus patronage can still be increased if there is an improvement in descriptive norm, habit and/or implicit loyalty.

4. RECOGNIZING CUSTOMER'S PATTERN OF BUS SERVICE PATRONAGE USING LOYALTY FRAMEWORK

4.1 Objective

Being aware of issues in literature, with the notion that research of single travel modes (e.g., public transportation) remains poor (Glert et al., 2013), the objective of this study was to provide an initial loyalty-based effort on the operational method of segmenting bus service market. The purpose of the loyalty-based segmentation for bus service market was expected to address gaps both in the literature of loyalty and the literature of transportation segmentation. Regarding the literature of loyalty, the purpose of the present study was two-fold. First, this study contributes to the generalised customer loyalty typology by providing an operational examination on loyalty-based segmentation for bus service context. Second, this study aims to determine the accuracy of loyalty assessment towards customer segments by employing most of the loyalty-judgment criteria obtained from the related literature. From the perspective of transportation segmentation, with the advantage of the loyalty-based approach and the development of various hypotheses for theoretically strengthening the market segmentation, the current study aims to propose a new solution for a systematic segmentation approach. Based on the outcome of the loyalty-based market segmentation, a further expectation of the present study is to identify typical characteristics of bus service market segments, seeking a practical guide for bus service managers.

4.2 Conceptual framework and hypotheses

A cross-classification between attitudinal loyalty (relative attitude) and behavioural loyalty (service patronage) led to four specific loyalty

segments including no loyalty, spurious loyalty, latent loyalty and loyalty. The no loyalty segment had low relative attitude and low service patronage (non-users). The loyalty segment was characterised by a combination of high relative attitude and high service patronage (users). A low relative attitude applied to bus users creates the spurious loyalty segment. And a high relative attitude applied to non-bus users implies the segment of latent loyalty. The two later cases were expected to be achieved when non-attitudinal factors (e.g., subjective norms or situational effects) have a stronger effect on behaviour than that of attitudinal factors. Figure 3 shows the bus service market segments. In addition, service patronage should be understood as customers' behavioural feedback reflecting outcomes of the decision-making process. For example, service patronage can be the customers' intention or the customers' actual behaviour.

		Bus service patronage	
		Users	Non-users
Relative attitude	High	Loyalty	Latent Loyalty
	Low	Spurious Loyalty	No Loyalty

Figure 3 - Bus service market segments (modified from Dick and Basu's model)

Shedding light on the above conceptual framework, hypotheses were developed to test the appropriateness of the developed market typology. The focus on the concept of relative attitude was used to confirm the adaptability of the concept in the bus service context. In addition, an examination of the loyalty level of different groups of service patronages was performed to ensure the propriety of the proposed behavioural separation. Finally, a test on market shares between segments would most likely help to determine the typical characteristics of the service market.

H1. People with high (low) affective and implicit loyalty have a high (low) relative attitude.

H2. People with a higher (lower) patronage have higher (lower) loyalty measures.

H3. The bus service market is dominated by loyalty and non-loyalty segments, not by segments of spurious loyalty and/or latent loyalty.

4.3 Method

The same data set used for section 2 has been used. Please refer to the section 2 for more detail.

4.4 Conclusions

This study was the first loyalty-based attempt providing an operational method of segmenting bus service market. The success of this study in identifying customers' patterns provided a supplemental push toward the use of the loyalty framework for market segment purposes, enriching the loyalty literature with a theoretical contribution, as well as an empirical study regarding bus service context. In addition, regarding the literature of transportation, with a successful introduction of the loyalty-based approach for market segmentation, this study encouraged the trend of pursuing the systematic segmentation approach based on the attitude-behaviour relationship as a root to define customers' patterns. This paper also insisted on the possibility of employing the concept of relative attitude that emphasises the attitudinal differentiation of subjective objects. Moreover, the analysis results confirmed the dominance of loyal and non-loyal customers over spurious and latent loyal customers, indicating a strong segregation into either users or non-users. Another attractive point was that of the number of customers who use bus service while possessing a low score in attitude was small and insignificant. Furthermore, even for customers stating a high attitude and a high intention to use the bus, not all of them maintained the same intention in actual use. Notably, a blend of self-interest and pro-social motives towards bus use was supported through the involvement of both demographic and social-awareness factors in discriminating customer segments.

The empirical findings in this study are critical for bus service managers. First, the findings proved that customers were driven by attitudinal differentiation between transport modes. Thus, an effort to increase bus patronage through increasing shares of target customer groups should rely on the comparative advantage of the bus service over other transport alternatives. In other words, it is necessary to focus on the exceeding characteristics of bus service such as alcohol permission, free parking or the reduction of energy consumption. In addition, because the bus service market was observed to be strongly segregated into either users or non-users, operational attempts should be driven toward the movement from non-users towards users. Specifically, these attempts are recommended to focus on reducing the number of driver's licenses, as well as increasing the social responsibility of customers toward environmental concerns or elderly people support. Further attention should also be paid to the fact that an increase of latent loyal users was one of reasons preventing the increase of bus service patronage. Hence, further efforts need to be made on influencing factors that may occur during the transferring period from intention to actual bus use. The above findings were extracted from a single

case study; thus, caution should be used when applying these findings to a real case. A similar study conducted on a larger sample size is required for future effort to strengthen the findings of the present study.

5. A COMAPRISON OF BUS CUSTOMERS' PERCEPTION ON DIFFERENT LEVELS OF THE BUS SERVICE

5.1 Objective

Recently, there has been a down trend in the number of people using the bus service in Japan. Improving service quality is known as one of the major solutions to regain customers. Supporting to the solution, researchers have been focused on understanding how service quality influences users' perception such as customer satisfaction and intention to use services. Despite a number of studies focusing on the relationship between perceived service quality and the aforementioned psychological factors, there have been a very few efforts providing an observation on those factors under different levels of service quality. This study aims to fill this gap by investigating the three-phase decision making process (satisfaction-intention-actual use) under two levels of perceived service qualities.

5.2 Method

Two questionnaire surveys were conducted in Kawajima city and Hidaka city, Saitama Prefecture, Japan. According to suggestions from annual surveys conducted by the joint cooperation between Design and Planning Lab., Saitama University and bus providers, Kawajima city was deemed to have a poor level of bus service which is relatively lower compared with the service operated in Hidaka city. Questionnaires were distributed to residents' houses located within the service ranges of the typical bus routes in the two cities. Respondents were asked to fill the questionnaire and return it by posting pre-paid envelopes. The items included in the questionnaire were designed to measure satisfaction, advantage of bus, descriptive norm, intention, and frequency of use. Except for frequency of use, the possible answers for each of the items ranged from 1 (strongly agree) to 5 (strongly disagree) in a Likert-type scale. Of the frequency of use, coding is applied to the real frequency of bus usage filled by the respondents.

5.3 Conclusions

Results from the two surveys supported the assumption that bus service quality in Kawajima city is lower than that of Hidaka city. Thus, the two cities are appropriate samples for investigating the influences of bus service quality on bus-users perception.

Respondents in Kawajima city expressed a lower satisfaction, lower descriptive norm, lower advantage of bus, and lower intention due to lower service quality. Despite the lower perceived service scores, people in Kawajima city used bus as frequent as their counterparts in Hidaka city. This is probably explained that some of respondents were limited with substituted alternatives, then they had to use bus even they perceived a low bus service quality.

In addition, analysis results of the two surveys supported satisfaction, advantage of bus, and descriptive norm as determinants of bus-usage intention. Furthermore, it is recorded that a stronger influence of the determinants were found in case of the higher service quality (Hidaka city) compared with those of the lower service quality (Kawajima city). A stronger impact of intention toward frequency of use in Hidaka city case compared to Kawajima city case was also found. These findings may imply that a higher service quality will enhance roles of psychological factors toward intention and the role of intention towards actual service use.

Finally, descriptive norm was found as the strongest determinant of intention. Moreover, the impact of satisfaction toward intention is lower compared to advantage of bus when the service quality is low (Kawajima city case). However, the impact becomes higher when service quality is high (Hidaka city case). A possible reason explained to the finding is that people may put a stronger weight on satisfaction and a lower weight on advantage of bus when service quality is increased. In addition, this may suggest that in a higher service area, any negative incident of the bus service quality may result a bigger loss in number of bus users due to variation of perceived satisfaction.

6. IMPACTS OF TRAVELER'S SOCIAL AWARENESS ON THE INTENTION OF BUS USAGE

6.1 Objective

The objective of this study is to provide an examination of the necessity of expanding travellers' mode-use obligations towards social-awareness aspect by considering various social awareness factors in the mode-use model. Due to the social-awareness-seeking purpose of this study, the bus service setting was considered an appropriate context for the investigation. Social-awareness in the context of bus service can be understood as the awareness of all possible consequences and/or interactions of the service in society and environment. The fundamental argument leading to this definition is that environmental concerns are not the only aspect motivating travellers' obligations to use bus service. There are several aspects that may influence

travellers' motivations, such as awareness of giving support to the elderly and/or a responsibility to contribute to the local community. In addition, to expand the role of social-awareness factors in bus use intention, this study provided an additional effort on interventional policy. An investigation of the impact of a social campaign to change travellers' behaviour was conducted. The campaign used the information leaflet-dropping method, in which additional social-awareness information was distributed to persuade travellers to use bus service.

6.2 Investigated soci-awareness factors

Regarding the major concerns of this study, it should be noted that the social-awareness aspect of travellers was investigated through three latent variables. The first variable was travellers' general understanding regarding the consequences of using bus service. This variable will be referred to later in this study as social-awareness of consequences. The second variable was travellers' specific awareness regarding the consequences of using bus service in their area. This variable will be referred to later in the study as perceived service interruption. The difference between the first and the second variables was that the first variable represents general awareness of consequences, while the second variable represents specific awareness of consequences in which travellers have a connection between the bus service and the real situation of their area of residence. The final investigated variable was an unexplored variable with a focus on the interaction between the bus-service provider and travellers. The third variable was taken into account based on the argument that a positive image of a bus-service provider in social activities may encourage travellers to use bus service.

6.3 Method

The same data set used for section 2 has been used. Please refer to the section 2 for more detail.

5-step-hierarchical regression analyses were employed to investigate possibility of including social-awareness factors in mode choice models regarding bus use intentions.

6.4 Conclusions

In aiming to discuss travellers' transportation mode-use motives with the involvement of the social-awareness aspect, this study was the first attempt at providing an examination of the necessity of expanding travellers' mode-use obligations towards social-awareness aspect by considering various social awareness factors in the mode-use model. Various types of travellers' social-awareness were examined in the context of bus service. Among the investigated social-awareness variables, two out of three were observed to be predictors of bus use intention,

giving support to the extension of travellers' mode-use obligations. After controlling demographic and TPB-based variables, these variables contributed to 6.3% (0.6% for social-awareness of consequences and 5.7% for perceived service interruption) of variation of travellers' bus usage behaviour. The stronger impact of perceived service interruption, which acts as specific awareness of consequences compared with that of social-awareness of consequences, which acts as general awareness of consequences might indicate that travellers base decisions on intention to use bus service greater on mode-use consequences when it is clearly specified. In addition, although travellers might want to share the social responsibility when they realize the community-dedicated image of the bus service provider, this study could not approve recognition of the bus service provider's effort as a predictor of bus use intention. Finally, the social campaign using additional social-awareness information was found insignificant in changing travellers' bus use intention.

7. CHOICE MOTIVE REGARDING INTENTION OF BUS USAGE

7.1 Objective

Because conventional studies which follow psychological approach did not consider the influence of trip purpose on travellers' motive to use transport mode. Therefore, this study aims to re-examine the motivation of travellers towards mode choice decision by a replication work seeking to different trip purposes. An empirical case study from this study was considered in the context of bus service setting.

7.2 Method

A set of questionnaires were sent to respondents living in Saitama city, Saitama Prefecture, Japan. The local bus service in the area was mainly as a feeder service for the train system. Questionnaires were randomly sent to resident houses by post. All the houses received questionnaires are not located so close to train stations to reduce the impact of the train system towards the bus service because both modes are considered as public transport mode.

Respondents were requested to use pre-paid envelope to return their feedbacks 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 travellers' attitude, descriptive norm, perceived behavioural control (PBC), awareness of need, awareness of consequences, personal norm and intention of using the bus service. It should be noted that traveller's 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. In addition, three types of trips were considered including “go to work”, “go shopping”, and “go to social event”. To provide answer, respondents were asked to select one option among set of options provided for each of the items ranged from 1 (strongly disagree) to 5 (strongly agree) in a Likert-type scale.

7.3 Results

Aiming at the comparison between self-interest motive and pro-environmental approach, regression analyses were used to examine performance of the models in predicting traveller’s intention to use the bus service. Attitude, PBC and descriptive norm were included to self-interest model, while awareness of need, awareness of consequences and personal norm were variables for pro-environmental model. Performance of the model was valuated based on the value of adjusted R-square value. The higher adjusted squared indicates the better performance of model. Results were shown in Table 3.

Table 3 - Comparison between self-interest and pro-environmental motives

Self-interest approach		Pro-environment approach		
Go to work				
A	.453***	AN	.130	
PBC1	.143*	AC	-.010	Ad. R2 = .132
DN	.044	PN	.417**	
Go to social events				
A	.392***	AN	.168	
PBC1	-.002	AC	-.158	Ad. R2 = .141
DN	.077	PN	.421***	
Go shopping				
A	.562***	AN	.009	
PBC1	-.009	AC	-.111	Ad. R2 = .199
DN	.220**	PN	.594***	

A-attitude; PBC-perceived behavioural control; DN-descriptive norem; AN-awareness of need; AC-awareness of consequences; PN-personal norm

As suggested by recent studies (e.g., Klockner & Friedrichsmeier, 2011), combined model seems to be an additional alternative to predict traveller’s

behaviour, this study investigated a combined model which integrated self-interest and pro-environmental approaches. It should be noted that car-use habit was added to the model due to suggestion from literature. Results were presented in Table 4.

Table 4 - Combined model for traveller’s intention of bus usage

Go to work (N=270)				
A	.311***	AN	.080	
PBC1	.128	AC	-.004	Ad. R2 = .185 (Better than single model)
DN	.015	PN	.269**	
H	.012			
Go to social events (N=266)				
A	.246**	AN	.154	
PBC1	-.011	AC	-.162	Ad. R2 = .165 (Better than single model)
DN	.055	PN	.312**	
H	.043			
Go shopping (N=270)				
A	.422***	AN	-.040	
PBC1	-.023	AC	-.133	Ad. R2 = .328 (Better than single model)
DN	.186*	PN	.384***	
H	-.084			

A-attitude; PBC-perceived behavioural control; DN-descriptive norem; AN-awareness of need; AC-awareness of consequences; PN-personal norm; H-car-use habit.

7.4 Conclusions

This study investigated traveller’s motive towards bus use intention. Three types of trip have been considered including time-pressure trips (go to work and go to social event) and non-time-pressure trips (go shopping). Results from analyses showed that traveller’s seem to base on cost-benefit perception to decide bus use intention when go to work and go shopping. Regarding bus use intention for going to social event, traveller’s perception were found to be driven by environmental obligation. Notably, among investigated models, the combined model showed the best performance.

Although literature of psychological models for traveller's mode choice behavior showed a trend to assume that self-interest approach has better predictive ability compared with pro-environmental approach (e.g., Bamberg & Schmidt, 2003). However, most of related studies considered mode choice intention in a general trip type. With three investigated trip types, this study provided a further understanding on the role of trip type towards traveller's motivation. According to results of this study, self-interest motive was observed not to be dominant in all trip types. Travelers seem to decide their bus use intention based on environmental obligation regarding trips for social event. This finding, however, does not necessarily reject the dominant performance of self-interest approach. Traveller's bus use intention may depend on frequency of trip in daily life. Go-to-work and shopping trips are probably dominant in number of trips, thus leading to stronger traveller's self-interest motive regarding general perception of using bus in daily life.

In addition, this study provided an empirical evidence supporting to the development of combined model which integrates both self-interest and pro-environment motive. In the same trend with suggestion from literature, traveller's attitude and environmental obligation were found as predictors of bus use intention regardless of trip purpose. It should also be noted that influence of attitude towards intention was observed higher in go-to-work and go-shopping trips, whereas, that of environmental obligation was higher in case of social-event trips. This suggested that interventional policy should be developed with respect to different trip types. While a focus on improving bus service can be expected to attract more travellers to go to work and shopping, social campaign on using bus to protect environment can be a solution to increase public transport use when participating social events. Future works should focus on this interesting aspect of the bus service.

8. CAPTIVITY EFFECTS ON THE PSYCHOLOGICAL MOTIVATION OF TRAVELERS TOWARDS MODE CHOICE DECISIONS

8.1 Objective

The objective of this study is to provide an initial attempt to investigate the travellers' latent captivity effect towards the psychological model of single-travel-mode-choice behaviour. The latent captivity effect was investigated through a consideration of the performance of the psychological models working on different captive groups created by perceived travel time and perceived travel cost. Although the captive groups were defined based on a traveller's relative perception between car and public transport, this

study narrowed its focus to the psychological process of the traveller's behaviour towards bus usage. Two types of trips, including a time-pressure trip and a non-time-pressure trip, were considered to provide further understanding of the variation of the effect for different trip purposes.

8.2 Conceptual framework

The psychological models are expected to perform differently according to different characteristics of a traveller's perception of the relative comparison. For instance, travellers with a dominant perception of the advantage of car use will positively activate a psychological process for car use and negatively activate a psychological process for other transport alternatives, leading to car use as the final travel behaviour. This conceptual approach is illustrated in Figure 4.

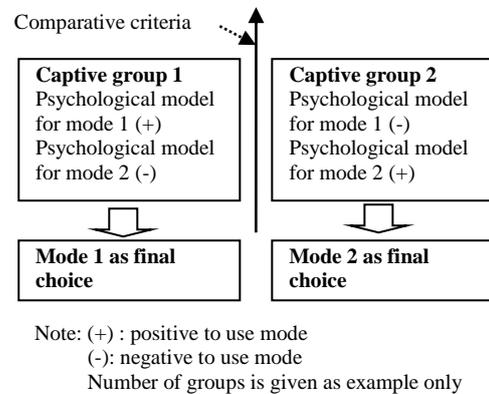


Figure 4 - Conceptual solution for traveller's latent captivity & psychological models

To determine the key comparative criteria for a traveller's mode-choice behaviour, it should be noted that travel cost and travel time towards a traveller's mode-choice behaviour have been examined at length in the literature. Therefore, it is reasonable to consider these indicators as comparative criteria to classify travellers into captive groups.

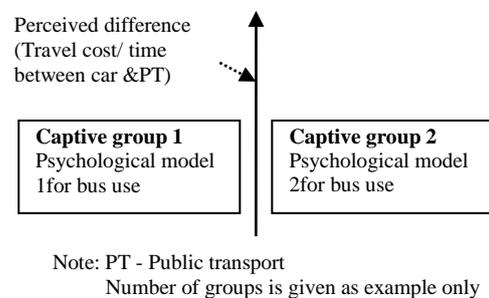


Figure 5 - Implementation of the conceptual solution

According to this, travellers are assumed to first develop a general awareness of the relative

correlations between the travel cost and/or travel time of different travel mode choices. Travellers with similar ideas of the relative comparison are expected to process similar psychological process of single-mode-choice behaviour. Conversely, those travellers with different ideas are expected to have different psychological processes of single-mode-choice behaviour. Figure 5 is used to illustrate the implementation of proposed conceptual approach.

The literature of psychological models for predicting traveller's behaviour have suggested various predictors of traveller's behaviour. Among those, some can be considered as interest-based determinants of a traveller's mode choice behaviour due to their association with the self-interest motive of travellers, while other variables can be referred to as non-interest-based determinants. The above-mentioned separation led to a possible notion that the role of non-interest-based factors towards a traveller's behaviour may depend on the status of interest-based factors. If the interest-based factors are positively activated, a traveller's behaviour may mostly be influenced by interest-based factors, contributing to the weaker influence of non-interest-based factors. For example, a car-addicted traveller can have an excessive positive attitude towards car use; thus, he may not pay attention to other people's travel mode (i.e., descriptive norm) when deciding about his car use. The role of the descriptive norm in car-addicted-traveller cases probably becomes less important compared to cases of non-car-addict-travellers. Being acquainted with the importance of travel time and cost, this study hypothesized that the travel time and cost positively activate travellers' interest-based factors in deciding mode choice behaviour. In particular, travellers' self-interest motive was assumed to be positively influenced by perceived travel time and/or cost. When travellers perceive a transport mode to be faster in travel time and/or lower in cost, they will place a lower weight on non-interest-based factors in deciding their mode choice behaviour and vice versa. The statement of the study's hypothesis is shown below.

H1. As the advantage of a travel mode caused by perceived travel time and/or travel cost is perceivable (not perceivable), the role of non-interest-based factors on deciding mode choice behaviour decreases (increases).

8.3 Method

The same data set used for section 7 has been used. Please refer to the section 7 for more detail.

8.4 Conclusions

This study can be seen as one of the first attempts to describe the effect of traveller's latent captivity on a psychological model for mode choice

behaviour. A conceptual approach has been proposed in which a traveller's perception of the difference between transport alternatives was assumed to be an external representative of the latent captivity; using such representatives to classify travellers, the effects of latent captivity was observed through variations of the performance of the psychological models on different captive groups of travellers. The conceptual approach was successfully implemented with an investigation of bus use intention that showed evidence of the impact from the traveller's latent captivity. Accordingly, the traveller's perceived difference between transport alternatives in terms of travel time and travel cost has been found to significantly contribute to the role of non-interest-based determinants of bus use intention. In particular, the hypotheses with empirical support suggested a trend where the perceivable (non-perceivable) advantage of travel mode caused by perceived travel time and/or travel cost decreased (increased) the role of non-interest-based factors on deciding mode choice behaviour. This study suggested that the impacts of a traveller's latent captivity on the performance of the psychological model is important because it was found to significantly contribute to the variation of the influenced strength of travellers' behavioural determinants.

9. CONCLUSIONS

The contribution of this dissertation to literature of transportation studies could be recognized with several findings: (1) A successfully elaboration of the concept of traveller's loyalty; (2) A novel loyalty component and loyalty-based structure was found to describe the decision-making-process of travellers; (3) An initial psychological model which integrated both service-quality-related factors and non-service-quality-related factors, has been developed to measure number of potential travellers using the bus service; (4) The first loyalty-based attempt providing an operational method of segmenting travellers in bus service market; (5) Two novel determinants of traveller's behaviour were found including social-awareness of consequences and perceived service interruption; (6) The first attempt to successfully investigate impact of traveller's latent captivity on performance of psychological models. Besides, thorough literature reviews of broad aspects of traveller mode choice behaviour provided in this dissertation, are expected to help readers to catch up with the current research trend in mode-choice studies.

Although effort has been made to address gaps remained in literature of transportation studies, this dissertation could not cover all the problems due to time restriction and capacity. Therefore, necessary recommendations have been made to introduce

several interesting issues to readers who are interested in psychological motivation of traveller's mode choice behaviour. These are presented as below. (1) It was generally assumed that traveller's decision making process follows three main stage process namely attitude-intention-actual behaviour. Most of psychological studies have been focus on the first two phases (i.e., from attitude to intention), however research attention on the transfer period from intention to actual behaviour is still rather spare; (2) Notion of multi-dimensional constructs to represent traveller's mode-choice perception has been widely accepted. However, most of the constructs were measured based on a form of reflective construct that has some limitations in representing essence of some complicated aspects of travellers. Thus, there is a need to examine higher-order types of construct in which formative construct is considered; (3) Literature of market segmentation showed numerous studies in which attitudinal indicators are employed to classify traveller groups. However, there is few studies able to explain the transferability between market segments, leading to a weak assistance for transport managers to drive market towards expected direction; (4) Regarding determinants of traveller's mode choice behaviour, social-awareness factors are still few. Therefore, further effort should be made to understand how travellers' based on their social awareness to adjust daily travel transport mode; (5) One of the critical issues of psychological model is that the approach can only deal with single mode choice (e.g., behaviour to use bus, behaviour to use car). The approach is unable to explain how travellers proceed to the final choice among set of available alternatives. This can be seen as a challenging issue for future studies.

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