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Assessing asymmetric response effect of behavioral intention to service quality in an integrated psychological decision-making process model of intercity bus passengers: a case of Taiwan

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Abstract This study introduces the concept of loss aversion to consumer behavioral intention at the personal psychological level to develop an integrative structural equation model for analyzing traveler psychological decision making. In this model, the relationship between behavioral intention and service quality is a non-smooth function based on the theory of loss aversion. The expectation service quality in the SERVQUAL model proposed by Parasuraman, Zeithaml, and Berry (PZB) serves as a reference point. This model can be applied to analyze the effect of non-smooth response of behavioral intention to service quality in a traveler psychological decision-making process model. Intercity travel among cities in Taiwan is used as an empirical example. Data were gathered in cities in Taiwan via a questionnaire survey, and the model was tested using path analysis performed by LISREL. The empirical result shows that all causal relationships are statistically significant. Service quality loss influences repurchase intention more than does Service quality gain. Finally, this study concludes by discussing managerial implications and suggesting directions for future research.

Keywords Loss aversion · Repurchase intentions · Service quality · SERVQUAL model

Introduction

Identifying the effect of service quality on passenger demand is critical for intercity bus services owing to its ability to provide managers with information regarding how to

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achieve specific market demand targets through specific levels of service quality and related resources needed.

In the transportation research field, previous studies on how service quality and passenger demand are related can be classified into four classes depending on two criteria: first, whether the level of demand analysis is based on personal choice behavior or personal psychological behavioral intention; second, whether the hypothesized relationship between service quality and passenger demand is a smooth and differentiable function based on traditional economic theory, or a non-smooth function based on loss aversion theory (Tversky and Kahneman 1991). Figure 1 shows these four classes in a matrix diagram. However, we are not aware of any previous research that has been performed on the fourth class.

The value of research belonging to Class 4 should be considered to determine whether it is worthwhile to do related research on Class 4. Studies on Class 4 deal with the intersection area between Class 2 and Class 3. This study attempts to demonstrate the value of research in Class 4 by discussing its advantages compared to research on classes 2 and 3. The advantage of studies in Class 2 compared to studies in Class 3 is that studies in Class 2 can verify the loss aversion effect of service quality on demand because they use a loss aversion-based model. On the contrary, the advantage of studies in Class 3 compared to those in Class 2 is that studies in Class 3 can identify the hierarchical causation effect of service quality on passenger demand because they are integrated psychological passenger decision-making process models (PDPM) for passengers. Studies belonging to Class 4 are loss aversion-based PDPM. Hence, the value of studies belonging to Class 4 lies in their ability to verify the loss aversion effect of service quality on demand and simultaneously identify a hierarchical causation effect of service quality on passenger demand. Consequently, it is worthwhile to make an effort to expand studies in Class 3 into studies belonging to Class 4.

This study attempts to expand the results of studies in Class 3 into a loss aversion-based PDPM belonging to Class 4. Besides, the loss aversion-based PDPM is verified using LISREL to disclose the hierarchical loss aversion effect of service quality on psychological constructs in this loss aversion-based PDPM.

The remainder of this paper is organized as follows. Section "Conceptual background" briefly reviews the relevant literature on applying loss aversion theory to PDPM, loss aversion-based service quality, and passenger PDPM, and finds a basic direction for constructing a loss aversion-based PDPM. In Sect. "Research Model," the hypothesized loss aversion-based PDPM is constructed based on a literature review. Section "Method" then presents the data collection method, measurements and coding of service quality for loss aversion, as well as the analysis method. Next, Sect. "Results" summarizes the results

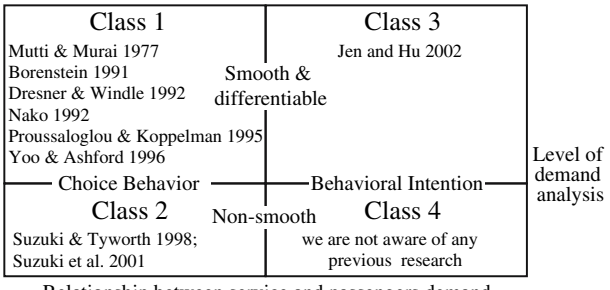

Fig. 1 Studies on the relationship between service quality and passenger demand

Relationship between service and passengers demand

of the model fitness test and estimation, respectively. Finally, managerial implications and suggestions for future research are discussed.

Conceptual background

Applying loss aversion theory to PDPM

It is necessary to discuss the possible effect of loss aversion theory on the studies in Class 4. The loss aversion property implies that service quality could be divided into the gain and loss regions, and the response function used to represent the relationship between service and demand then should be steeper in the loss region than the gain region (see Fig. 2). The model studied in Class 4 is also a PDPM. For the PDPM constructed by studies in Class 4, loss aversion theory implies the response function of behavioral intention to service quality should be steeper for loss than for gain. Consequently, doing research on Class 4 is to investigate whether the slope of the function representing the relationship between service quality and passenger behavioral intention also has a sudden change at the reference point.

Applying loss aversion theory to expand the studies in the third class into those in the fourth class requires discussing the analytical procedure. In the studies in the second class, Suzuki et al. (2001) employed four main steps to verify the loss aversion effect. The first step was constructing the reference point. Suzuki et al. discussed the aggregate relationship between service quality and market share, using the aggregate reference point. In the second step, based on the relationship between service and reference, each service quality item is recoded into both service loss and service gain variables. In the third step, parameters of both service loss and service gain are calibrated in a single equation. Moreover, during the fourth step, statistical tests are performed to check whether the slope of service loss exceeds that of service gain. If the loss aversion effect exists, a non-smooth demand function can be developed via this procedure. This analytical procedure can also be used to verify the loss aversion effect in studies in Class 4.

Loss aversion-based service quality

Service is a complex process involving numerous people and facilities and characterized by invisibility, simultaneous production and consumption, heterogeneity and perishability.

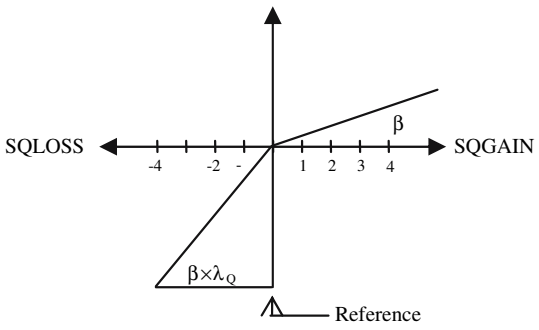

Fig. 2 Slopes reflecting loss aversion ($\lambda_Q > 1$). (Source: Suzuki and Tyworth 1998)

Therefore, it is not easy to assess and measure service quality in service industries. PZB (1985) proposed a most used model in marketing, PZB gap-based service quality model, to measure service quality. PZB gap-based service quality model suggested that quality evaluation is usually based on a relative comparison base, and the relative and comparative base to every alternative service experience in the minds of consumers could be pre-consumption service expectations (Parasuraman et al. 1994). Moreover, expectation is influenced and formed based on past consumer experience, individual needs, word-of-mouth appraisal and other market information. When consumers participate in service process they evaluate the performance of service. This evaluation result can be named as real experience service quality. While consumers get service in real experience, they compare real experience service quality to expectation service quality to determine the level of service quality. Consequently, expectation service quality acts as a reference. Therefore, this study proposes expectation service quality a personal psychological reference point. An excess-over-expectation is treated as a gain and failure to meet expectation is treated as a loss. Under this condition, whether the asymmetrical demand response to service quality with such a reference point resembles that in previous research requires further confirmation.

Integrated psychological decision making model of passengers

The research in Class 4 is a PDPM. The hierarchical causation relationship among important construct in the PDPM of passengers should be discussed. Recently, owing to continuously rising costs and competition to attract new customers, numerous companies focus their energies and resources on retaining old customers. Repurchase intentions are the main focus of market research on customer retention (Berry 1983; Fornell and Birger 1987; Fornell 1992; Jones et al. 2000). Accordingly, repurchase intention is a key variable in studying consumer purchasing behavior. In the transportation field, Jen and Hu (2003) have done research focused on repurchase intentions for developing a PDPM for city bus passengers.

The empirical test result in Jen and Hu's passengers' PDPM conforms to the theoretical relationship in other marketing studies. These confirmed relationships can be separated into two parts, direct effect and indirect effect. Related references on direct relationship among important constructs are listed in Table 1. Related references on indirect relationship among important constructs are listed in Table 2. Consequently, SQ, PNMP, PMP, PB, PC,

Table 1 Direct effects and related reference

Path	Sign	Related reference
SQ→PB	+	Jen and Hu (2003); Bolton and Drew (1991)
PNMP→PC	+	Jen and Hu (2003); Zeithaml (1988); Oh (1999)
PMP→PC	+	The same as PNMP→PC
PB→PV	+	Jen and Hu (2003); Lovelock (2000)
PC→PV	–	Jen and Hu (2003); Zeithaml (1988); Bolton and Drew (1991)
PV→RI	+	Jen and Hu (2003); Cronin et al. (2000)
AAM→RI	–	Jen and Hu (2003); Jones et al. (2000)

SQ = perceived service quality; PB = perceived benefit; PNMP = perceived non-monetary price; PMP = perceived monetary price; PC = perceived cost; PV = perceived value; RI = repurchase intention; AAM = attractiveness of alternative modes

Table 2 Indirect effects and related reference

Path	Sign	Related reference
PB→PV→RI	+	Jen and Hu (2003)
PC→PV→RI	–	Jen and Hu (2003)
SQ→PB→PV→RI	+	Jen and Hu (2003); Sweeney et al. (1997);Cronin et al. (2000)
PNMP→PC→PV→RI	–	Jen and Hu (2003)
PMP→PC→PV→RI	–	Jen and Hu (2003)
SQ→PB→PV	+	The same as SQ→PB→PV→RI
PNMP→PC→PV	–	Jen and Hu (2003)
PMP→PC→PV	–	Jen and Hu (2003)

PV, AAM, and RI are important constructs and should be included in the loss aversion-based PDPM.

Research model

The research in Class 4 is PDPM. This model could be formulated in the form of several hypotheses regarding the causation relationship among related constructs. According to the literature reviewing PDPM and the discussion on the effect of loss on PDPM, the causation relationships among these nine constructs are developed as nine hypotheses to form a loss aversion-based PDPM. What deserves to be mentioned is that the coding and scoring methods will affect the hypothesis relationship among constructs to be positive or negative. This study adopts the coding and scoring methods proposed by Suzuki et al. (2001) and makes the service quality loss construct negative and all other constructs to positive. The whole hypotheses are listed below.

H1: Perceived service quality loss (SQLOSS) is positively and directly related to PB.
H2: Perceived service quality gain (SQGAIN) is positively and directly related to PB.
H3: The slope of perceived service quality loss to perceived benefits is steeper than the slope of perceived service quality gain to perceived benefits.
H4: PNMP is positively and directly related to PC.
H5: PMP is positively and directly related to PC.
H6: PB are positively and directly related to PV.
H7: PC are negatively and directly related to PV.
H8: PV is positively and directly related to RI.
H9: AAM is negatively and directly related to RI.

Method

Data collection

This study focuses on intercity bus passengers traveling between the Taipei metropolitan area and four large cities (Hsinchu, Taichung, Tainan and Kaoshiung) in Taiwan.

These city pair routes contain ten private companies and are governed by a single government agency. The empirical data used for analysis in this study come from a questionnaire survey. All questions in the questionnaire are listed in Appendix A. The population comprises intercity bus passengers traveling between the Taipei metropolitan area and four large cities (Hsinchu, Taichung, Tainan and Kaoshiung) in Taiwan. Each city-pair route was allocated 200 questionnaires; within city-pair routes the questionnaires were shared equally among bus companies. A total of 800 questionnaires were given out.

Measurements and coding of Service Quality for loss aversion

The service quality measurement scale in this study is based on the scale developed by Jen and Hu (2003) for assessing city bus service quality. Besides service quality, the measurement scales and coding method of the other constructs, including PNMP, PMP, PB, PC, PV, AAM, and RI, are the same as in the study of Jen and Hu.

For scoring, 20 items of service quality all used the Likert 5-point scale as Part 1 of Appendix A shows. Besides service quality, the manifest variables of all other constructs used the Likert 5 point scale as Part 2 of Appendix A shows. Appendix A presents the detailed content of those measurement scales.

Meanwhile, the methods of coding service quality gain (SQGAIN) and service quality loss (SQLOSS) are listed as follows:

If $SQ_{real} >= SQ_{expect}$, then $SQGAIN_i = SQ_{real}\text{-}SQ_{expect}$ and $SQLOSS_i = 0$.
Else if $SQ_{real} < SQ_{expect}$, then $SQGAIN_i = 0$ and $SQLOSS_i = SQ_{real}\text{-}SQ_{expect}$.

SQ_{real} is real experience service quality, SQ_{expect} is reference point service quality (expectation service quality), and i is service quality item index. Thus, for the service quality item i. A "gain" occurs when the real experience service quality exceeds the reference point, and a "loss" occurs when the real experience service quality is below the reference point.

Moreover, this service quality measurement scale is a summated rating scale; therefore, the dimension score often is used as manifest variables for SEM analysis. Jen and Hu's service quality measurement scale has four dimensions. But the service quality construct is split into two constructs, SQLOSS and SQGAIN, in this study. Therefore, SQLOSS and SQGAIN each have four dimensions. In Appendix A, V1, V2, V3, and V4 represent the dimension scores and manifest variables for SQLOSS; V5, V6, V7, and V8 represent those for SQGAIN. The dimension score is obtained by aggregating the score of items related to that dimension.

Analysis method

In order to disclose the hierarchical causation relationships among constructs in the loss aversion-based PDPM, LISREL, the most popular software for performing structural equation modeling (Davies et al. 1999), is adopted in this study.

This study applies the CALIS procedure of the SAS System to perform LISREL (Hatcher 1998). In this study, the correlation matrix with standard deviation serves as the input data, and the research model is path analyzed using the Maximum Likelihood

estimator of LISREL. Furthermore, a two-step procedure based on an approach proposed by Anderson and Gerbing (1988) is adopted. The first step in this two-step procedure is confirmatory factor analysis. This step attempts to develop a measurement model that achieves an acceptable fit to the empirical data. The second step involves testing the structural model through path analysis. The meaningful causal effects of theoretical model are estimated and statistically tested in the second step.

Results

In this study 800 questionnaires were sent out to examine intercity bus service. The number of valid questionnaires returned was 385, and the valid response rate was 48.1%. Among the respondents, 86% were aged 16–45, females outnumbered males (representing 61.5% of the sample), and workers were the dominant group at 42.89%, compared to 28.42% for students. Most of the subjects were college graduates or had higher degrees.

Scale reliability accessment

In this study, service quality measurement scale is a summated rating scale consisting of multiple items. Hence, we must know whether the scales we used are reliable to measure the constructs. Cronbach α based on internal consistency is used to access the scale reliability. The information indicates that most constructs for theoretical models of this study have high reliability, with a Cronbach α exceeding 0.6 (0.8219 for SQLOSS; 0.6048 for PNMP; 0.9278 for PMP; 0.8003 for PB; 0.8419 for PC; 0.6842 for PV; 0.8583 for RI). Although the Cronbach α of SQGAIN is 0.5388, this value is still acceptable. Generally, the data have acceptable reliability.

Confirmatory factor analysis

This study uses confirmatory factor analysis (CFA) to access the psychometric properties of the measurement model used in this study. In an ideal measurement model, each manifest variable is better loaded on just one factor, and none of the manifest variables measure multiple latent variables. This means that none of the manifest variables are complex variables (Hatcher 1998). Hence, two complex variables are rejected (i.e., these two variables will be dropped from the measurement model), namely Manifest Variable 4 (V4, service quality loss in operating management support) and Manifest Variable 15 (V15, whether other alternative modes exist). The remaining manifest variables are allowed to load on only one factor and cannot cross-load on other factors.

Overall measurement model fitness

An ideal measurement model should have acceptable overall measurement model fitness. Several scholars have recommended that researchers should use the ratio of χ^2 relative to df to measure the goodness of fit of the model. (James et al. 1982; Joreskog and Sorbom 1993). The χ^2/df ratio for the modified measurement model in this study is 1.6930 (531.6119/314), which indicates an acceptable fit in this sample (Joreskog and Sorbom 1993; Hatcher 1998). Furthermore, the overall measurement model fit also uses CFI, GFI,

AGFI, NFI, NNFI, and RMR estimates, as listed in Table 3. The results in Table 2 indicate a good fit to the data, since the fit indices exceed or approach 0.9, and the RMR estimate is 0.05.

The reliability and validity of measures for each construct

In an ideal measurement model, measures of constructs should have acceptable reliability and validity. In SEM, constructs are measured by related manifest variables. Hence, the reliability and validity of manifest variables for each construct also needs to be checked in CFA. This study assesses the reliability of the measures using composite reliability and variance extracted estimates. This study also employs the *t* values of the factor loadings to access validity of measures.

The composite reliability of each construct exceeds 0.6, satisfying the minimally acceptable level (Hatcher 1998). Regarding the result of variance extracted estimates, generally speaking, the variance extracted estimates should exceed 0.5 (Fornell and Larcker 1981). However, Hatcher (1998) suggests that variance extracted estimates will often be below 0.5 in practice, even given acceptable reliability. All variance extracted estimates of each construct exceed 0.5, except for SQGAIN (0.1615), PNMP (0.3488), and PB (0.4683). However, we still can conclude that the constructs in this model perform fairly well.

Regarding measure validity, all manifest variable *t* values range from 3.4297 through 24.2670, and all factor loadings are significant ($p < 0.001$). This fact demonstrates the convergent validity of all manifest variables. This study concludes that all these manifest variables except V4 and V15 could effectively measure the nine constructs in this study (Anderson and Gerbing 1988).

The discriminant validity of loss aversion-based service quality-related constructs

The coding method proposed by Suzuki et al. (2001) is used to split perceived service quality into SQLOSS and SQGAIN in this study. In order to confirm that this coding method is able to split the original construct into two different constructs with reasonable psychometric properties, the discriminant validity between these two constructs must be further verified.

First, the discriminant validity is verified via "χ^2 difference test" (Anderson and Gerbing 1988). The unidimensional model (i.e., correlation between SQLOSS and SQGAIN is fixed to 1) is significantly different from the standard measure model (i.e., the correlation between SQLOSS and SQGAIN is freely estimated) ($\chi^2 = 112.2868$, df = 1, $p < 0.001$). In short, this test supports the discriminant validity of SQLOSS and SQGAIN.

Table 3 Overall measurement model statistics

Chi-square	df	CFI	GFI	AGFI	RMR	NFI	NNFI
531.6119	314	0.9569	0.9106	0.8844	0.0653	0.9020	0.9481

GFI = goodness of fit index; AGFI = GFI adjusted for degrees of freedom; RMR = root mean square residual; NFI = normed-fit index; NNFI = non-normed-fit index; CFI = comparative fit index

We secondly assess the discriminant validity with variance extracted test (Fornell and Larcker 1981). The variances extracted of these two constructs are 0.5939 and 0.1635 respectively; meanwhile, the correlation between service quality loss and service quality gain is estimated to be 0.3975 (t-value = 6.57). Both variance extracted estimates of these two constructs exceed the square of interfactor correlation, 0.1581. Hence, the test also supports the discriminant validity of these two constructs.

Path analysis

As mentioned above, structural model testing is conducted with path analysis via the use of LISREL, while Manifest Variable 4 and Manifest Variable 15 are dropped from the measurement model. Briefly speaking, path analysis tests whether the sample data fit the theoretical structure model composed of nine hypotheses in this study well. Regarding the goodness of fit information for the theoretical model, the χ^2/df ratio is 1.9230(638.4501/332), CFI, GFI, AGFI, NFI and NNFI exceed or approach 0.9, and the RMR estimate is 0.08. The R^2 values indicate the ability of the research model to explain variation in the four endogenous variables. Meanwhile, the R^2 values for repurchase intentions, perceived value, perceived benefits and perceived cost are 0.5429, 0.5261, 0.7600, and 0.6979, respectively. These figures demonstrate that the research model achieves a fairly good fit (Joreskog and Sorbom 1993). Table 4 lists the information on direct effects among constructs. Table 5 lists the information on the indirect effects among endogenous and exogenous constructs. All path coefficients in the loss aversion-based PDPM are statistically significant ($p < 0.01$) and as hypothesized.

The result of hypothesis 3 used to verify the loss aversion effect in studies in Class 4 is the focus of this study. Based on the results of path analysis in Table 4, Fig. 3a illustrates the estimated direct effect of asymmetric PB response to SQ. Under the coding method used in this study, the estimated path coefficients result indicates that the effects of SQ on PB in the gain and loss region are both significant and positive as hypothesized. The numerical values of their slopes indicate that the slope of SQLOSS is larger than the slope of SQGAIN. This study further validates the inequality between the SQLOSS and SQGAIN slopes using the χ^2 difference test, and this test also means validating whether the loss aversion coefficient equals 1 ($\lambda_Q = 1$). The estimated χ^2 difference value is 5.5335 (df = 1). The result reveals that we reject that the SQLOSS slope equals the SQGAIN slope ($p < 0.025$). Therefore, this result provides evidence supporting this hypothesis ($\lambda_Q > 1$). In short, the loss aversion phenomenon exists in our passenger-integrated decision-making process model.

Table 4 Results of the theoretical model tests (direct effect)

Path	Parameter**	t-value	R^2	Path	Parameter**	t-value	R^2
SQLOSS→PB (H_1)	0.8067	10.4896*	0.5429	PB→PV (H_6)	0.5939	10.4418*	0.7600
SQGAIN→PB (H_2)	0.2508	3.4637*		PC→PV (H_7)	–0.4897	–10.2696*	
PNMP→PC (H_4)	0.3134	4.8724*	0.5261	PV→RI (H_8)	0.7229	13.6299*	0.6979
PMP→PC (H_5)	0.5424	10.3500*		AAM→RI (H_9)	–0.3029	–5.3765*	

*Denotes a significant ($p < 0.01$) path. **Parameter = standardized parameter estimate

Table 5 Standardized total and indirect effects

Path	Parameter**	*t*-value	Path	Parameter**	*t*-value
PB→PV→RI	0.43	9.26*	PMP→PC→PV→RI	–0.19	–7.21*
PC→PV→RI	–0.35	–9.23*	SQLOSS→PB→PV	0.48	8.58*
SQLOSS→PB→PV→RI	0.35	7.89*	SQGAIN→PB→PV	0.15	2.52*
SQGAIN→PB→PV→RI	0.11	2.50*	PNMP→PC→PV	–0.15	–4.46*
PNMP→PC→PV→RI	–0.11	–4.36*	PMP→PC→PV	–0.27	–7.68*

*Denotes a significant ($p < 0.01$) path. **Parameter = standardized parameter estimate

The result of the hierarchical loss aversion effect of service quality on RI is another focus of this study. According to Table 5, SQLOSS has a larger indirect effect on RI than SQGAIN. Figure 3b schematically presents the estimated asymmetric indirect effect of RI response to SQ. The estimated path coefficients result indicates that the effects of SQ on RI in the gain and loss region both are significant and positive. The estimated path coefficients result also indicates that the slope of SQLOSS (0.35, *t*-value = 7.89) is larger than the slope of SQGAIN (0.11, *t*-value = 2.50).

In this study, comparing the direct effect of SQLOSS and SQGAIN on PB (as illustrated in Fig. 3a) with the indirect effect of SQLOSS and SQGAIN on RI (as displayed in Fig. 3b), we can summarize that the loss aversion effect is decreasing hierarchically.

Discussion

Managerial implications

Asymmetric response to service quality

This study argues that the expected service quality using the PZB service quality gap model acts as a reference point for individuals in passenger cognition. The empirical results related to the overall theoretical model (including the measurement and structure models) indicate that the model with expectation service quality is the reference point that has good fitness and can effectively explain the passenger decision-making process. Therefore, while managing service quality, it is recommended that intercity bus managers gather and monitor information on expectation service quality and real experience service quality, respectively.

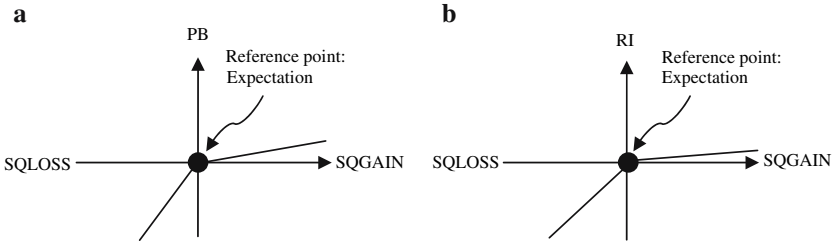

Fig. 3 (**a**) Slopes of reflecting loss aversion of direct effect. (**b**) Slopes of reflecting loss aversion of indirect effect

The empirical result indicates that the decision-making process of intercity passengers in Taiwan really displays the loss aversion. This result implies that the decrease in real experience service quality from individual's expectation reference point (expectation service quality) for intercity bus will significantly reduce passenger RI. Meanwhile, the increase in real experience service quality from individual's expectation reference point only slightly increases passenger repurchase intentions for intercity buses. Hence, for intercity buses, if their real experience service quality falls below expectation service quality, passengers' RI will decrease. Therefore, under the condition of real experience service quality being below expectation service quality, to avoid loss of passengers, intercity bus managers should strive to improve their service quality to reach the level of passenger expectation service quality. However, expectation service quality might differ among individual passengers. Therefore, intercity bus companies that want to retain all their passengers should set the maximum passenger expectation service quality as their target reference.

Integrated psychological decision-making model of travelers

The cost of maintaining relationships with old customers is lower than that of building relationships with new ones (Desatnick and Detzel 1993). Thus, how to increase passenger RI becomes an important managerial issue for intercity buses that are currently losing passengers. All the factors that attract or repel passengers must be considered together to respond to customer needs and desires (ECMT 1999).

The empirical result indicates that RI in intercity bus services is influenced by the PV and AAM. Moreover, PV has a much stronger effect on RI than does AAM. This phenomenon implies that the value of the service offered is a critical factor in retaining old passengers. Therefore, if intercity bus companies can focus their efforts and resources on creating more valuable services, they will not face strong competition from other bus companies or modes. On the contrary, if service value declines, intercity bus companies will inevitably face strong competition from other intercity bus companies or modes, since existing passengers will begin to use alternative services.

PV is a trade-off between PB and PC. Passengers are concerned with the extra value they can obtain, which implies that they are concerned with whether the PBs are sufficient compared to PC. Given specific PC, the method for increasing PV is increasing PB. On the other hand, given specific PB, the method for increasing PV is decreasing PC. Both these two methods can increase the PV of passengers and further lead to increase in passenger numbers.

PB is a combination of SQLOSS and SQGAIN. Given a specific reference point, real experience service quality increases with increasing SQGAIN and/or decreasing SQLOSS (SQLOSS is negative or zero here), and consequently increase PB. However, managers should improve SQ-based on passenger need and perceptions. Concretely speaking, intercity bus companies could increase SQ via improving tangible facilities, customer interaction, convenience of service, and operation management support.

Moreover, PC is a combination of PNMP and PMP. In the present intercity bus sample, PMP has a stronger effect on PC than does PNMP, and this result differs from the result of the city bus sample in the study of Jen and Hu (2003). Intercity bus passengers care more about whether they feel the price is reasonable than the search, psychological and time costs. Therefore, intercity bus companies should discover a reasonable price level for passengers based on the SQ they provided.

Furthermore, PV is influenced by four exogenous constructs, namely: SQLOSS, SQGAIN, PNMP, and PMP. Among these constructs, SQLOSS has the strongest effect on PV and is ranked first, while PMP ranks second and SQGAIN and PNMP both rank third. This ranking result implies that if intercity bus companies wish to retain old passengers through increasing PV, improving SQ to reach the level of passenger expectation service quality is the best strategy, reducing PMP is the second best strategy, and the last strategy is decreasing PNMP or improving SQGAIN. This improvement suggestion differs from that in the city bus context in the study of Jen and Hu (2003) and implies that the relative importance of decision factors might differ among different transportation systems. Therefore, managers should not apply the research result of other transportation systems to improvement plans to avoid making poor decisions. Applying our theoretical model to the context of other non-intercity bus transportation systems is recommended. Moreover, improvement plans for other non-intercity bus transportation systems should base on the empirical result of the integrated psychological decision-making model in their context.

Suggestions for future research

Different transportation systems have different characteristics, and thus passengers might have different preference structures in their decision-making process for different transportation systems. Accordingly, the asymmetric response of RI to SQ might differ among different transportation system. Therefore, this study recommends conducting further empirical studies on other transportation systems to further confirm the loss aversion effect of passengers.

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Appendix A: Questionnaire

Part 1: Service quality scale

Directions:

Expectation of service level: Based on your experiences as a passenger of the intercity travel bus, please think about the ideal kind of bus service that would deliver excellent quality of bus service. In the "Expectation" column, please indicate the service level to which you think such an ideal bus service should posses the feather described by each of the statement listed below. Circling a "1" means that you think the service level of the ideal bus service in this feather should be "very low," and circling a "5" means that you think the service level of the ideal bus service in this feather should be "very high."

Perception of service level: The same set of statements relates to your perception of the intercity bus service you take this time. For each statement, please indicate the service level of this bus service you perceived in the "Perception" column. Circling a "1" means that you think the service level of this bus service you take in this feather is "very low," and circling a "5" means that you think the service level of this bus service in this feather is "very high."

Latent variable	Manifest variable				
	SQ-LOSS	SQ-GAIN		Expectation	Perception
Service quality (SQ)	V1	V5	Interaction with passengers (6 items)		
			1. Drivers appreciate the safety of passengers when they get on/off the vehicle	1 2 3 4 5	1 2 3 4 5
			2. Drivers are polite and friendly to communicate with passengers	1 2 3 4 5	1 2 3 4 5
			3. Drivers drive smoothly, and his road craft is fine	1 2 3 4 5	1 2 3 4 5
			4. Drivers drive on right route and never fail to stop when passengers want to get on	1 2 3 4 5	1 2 3 4 5
			5. The company deals with accidents quickly and reasonably	1 2 3 4 5	1 2 3 4 5
			6. The company deals with passengers' opinions and complaints sufficiently	1 2 3 4 5	1 2 3 4 5
	V2	V6	Tangible service equipment (6 items)		
			7. Companies provide safe and brand new vehicles	1 2 3 4 5	1 2 3 4 5
			8. Vehicles are clean inside	1 2 3 4 5	1 2 3 4 5
			9. Noise on the vehicle isn't too loud	1 2 3 4 5	1 2 3 4 5
			10. The equipment in the vehicle satisfies passengers' needs	1 2 3 4 5	1 2 3 4 5
			11.The air conditioning is very comfortable	1 2 3 4 5	1 2 3 4 5
			12. The stop's layout is fine	1 2 3 4 5	1 2 3 4 5
	V3	V7	Convenience of services (5 items)		
			13. The places of stops or stations are proper and convenient	1 2 3 4 5	1 2 3 4 5
			14. The transshipping on the network is convenient	1 2 3 4 5	1 2 3 4 5
			15. The information about routes is marked clearly	1 2 3 4 5	1 2 3 4 5
			16. The company will have notification on the cars in short time when the routes and schedule are changed	1 2 3 4 5	1 2 3 4 5
			17.The company will correct the information at stops or stations in short time when the routes and schedule are changed	1 2 3 4 5	1 2 3 4 5
	V4	V8	Operating management support (3 items)		
			18. I don't have to worry that there is no bus	1 2 3 4 5	1 2 3 4 5
			19. I have to wait for the bus coming for a long time	1 2 3 4 5	1 2 3 4 5
			20. The bus company dispatches buses according to the schedule	1 2 3 4 5	1 2 3 4 5

Part 2: Other scales

Directions:

Based on your experience of taking this intercity bus service this time, please CIRCLE a number that best identifies your feelings about each feature listed below. Circling a "1" means that you "strongly disagree" that feature in this travel, and a "5" means that you "strongly agree" that feature in this travel. You may circle any of the numbers in the middle that show how strong your feelings are. There are no right or wrong answers.

Latent variable	Manifest variable		Strongly disagree↔ Strongly agree
Perceived non-monetary price (PNMP)	V9	It isn't convenient for me to reach stations from my departure place	1 2 3 4 5
	V10	Time to wait for the arrival isn't appropriate	1 2 3 4 5
	V11	The travel time isn't appropriate	1 2 3 4 5
Perceived monetary price (PMP)	V12	The fare is too expensive to me	1 2 3 4 5
	V13	The fare is unreasonable with this level of service	1 2 3 4 5
	V14	The fare is unacceptable	1 2 3 4 5
Attractiveness of alternative modes (AAM)	V15	If I need to change bus companies, there are other good bus companies to choose from	1 2 3 4 5
	V16	I would probably be happy with the services of another bus company	1 2 3 4 5
	V17	Compared to this bus company, there are other bus companies with which I would probably be equally or more satisfied	1 2 3 4 5
Perceived benefits (PB)	V18	The schedule and routes satisfy customers' needs	1 2 3 4 5
	V19	Customers are served well	1 2 3 4 5
	V20	The service is better than expected	1 2 3 4 5
Perceived costs (PC)	V21	The price is lower than expected (reverse coding)	1 2 3 4 5
	V22	Costs (time, money and psychic) are reasonable (reverse coding)	1 2 3 4 5
	V23	It is acceptable to pay the price (reverse coding)	1 2 3 4 5
Perceived value (PV)	V24	The service offered is valuable	1 2 3 4 5
	V25	The service based on certain price is acceptable	1 2 3 4 5
	V26	It is worthier to ride the bus than the other vehicles	1 2 3 4 5
Repurchase intention (RI)	V27	There is a possibility for me to ride again	1 2 3 4 5
	V28	There is a possibility for me to ride the same vehicle with the same costs	1 2 3 4 5
	V29	There is a possibility for me to ride the same vehicle with the same ticket price	1 2 3 4 5
	V30	There is a willingness for me to ride again	1 2 3 4 5

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