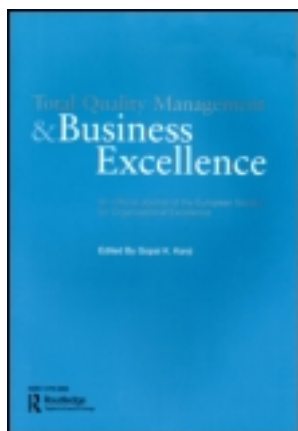


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Integrating loss aversion into a technology acceptance model to assess the relationship between website quality and website user's behavioural intentions

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Integrating loss aversion into a technology acceptance model to assess the relationship between website quality and website user's behavioural intentions

Kuo-Chien Chang^{a*}, Mu-Chen Chen^b, Chia-Lin Hsu^c and Nien-Te Kuo^d

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Incorporating the loss aversion concept into the technology acceptance model (TAM), this paper endeavours to investigate the relationship between website quality and website user's behavioural intentions in the travel agency sector. A statistical analysis of the collected questionnaires was computed based on the 1279 usable responses from the selected websites of travel agencies. Structural equation modelling is the essential analysis methodology used to examine the hypothesised relationships among the variables. Joining the loss aversion concept, the results indicate that a decrease in website quality from the website user's expectation will decrease the perceived use of ease and usefulness towards the website and then influence website user's behavioural intentions, but that an increase in website quality has no significant effects on these two TAM constructs. The results also suggest that perceived ease of use, perceived usefulness, and attitude are acting as important mediators within the model. This study demonstrates the effect of asymmetric response of website quality on website user's behavioural intentions. A discussion of the findings including managerial implications is also presented in this paper.

Keywords: website quality; loss aversion; technology acceptance model; behavioural intentions

Introduction

With great enthusiasm of the use of the Internet since the initial commercial applications in 1994, companies rushed to set up the websites to benefit from this communication channel and to explore the potential customers in the virtual marketplace (Lin & Lu, 2000). Especially, for companies using their websites for the sake of transaction generation, website quality has been recognised as a major impact on online trading (Kim & Stoel, 2004). Thus, identifying the effect of website quality on website users' behavioural intentions, such as attitude towards use a website (Cao, Zhang, & Seydel, 2005) and purchase intention (PI) (Poddar, Donthu, & Wei, 2009), is crucial for informing managers of how website users experience the level of website quality offered by the companies. In other words, the more website users' responses to website quality levels can be clarified, the better management can respond to improving website quality so as to meet website users'

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expectations (Zeithaml, Parasurman, & Malhotra, 2002), which, in turn, can generate numerous benefits for companies, such as online customer loyalty (Liang & Chen, 2009).

In the field of website quality management research, previous studies have developed the framework to relate website quality to website users' perceptions of usefulness and ease of use (i.e. technology acceptance model (TAM)) towards a website, which are key determinants of individual technology adoption (Davis, 1989; Ha & Stoel, 2009; Kuo & Lee, 2009). Thus, TAM indicates that individuals' beliefs in terms of perceived usefulness (PU) and ease of use are affected by website quality, and PU and ease of use will then influence an individual's attitude and intention to use and purchase from a website (Lin & Lu, 2000; Liu & Arnett, 2000; Cao et al., 2005). These sorts of linkages probably have assumed that website users' responses to website quality can be approximated using a smooth or differentiable function. Lin and Lu (2000), for instance, investigated undergraduate students' perceptions of website quality in relation to their beliefs of usefulness and ease of use of a website. Mathematically, the results regarding the slope of website users' website quality gain and loss related to their beliefs of a website could be interpreted as smooth or differentiable functions, such as a linear relationship. In other words, a 'sudden change' in the slopes for the functions representing the relationship between website quality and website users' responses was not considered. Therefore, some studies (Suzuki & Tyworth, 1998; Suzuki, Tyworth, & Novack, 2001; Lee & Kozar, 2006) have proposed an alternative perspective, suggesting that a non-smooth (non-differentiable) response function called a *loss aversion*, developed by Tversky and Kahneman (1991), could more accurately represent the effects of website user-perceived quality of a website. Moreover, according to the loss aversion concept applied by Suzuki et al. (2001), this study suggests that the effect of website quality is asymmetric with respect to a reference point (i.e. a website user's expectation), meaning that a website user's response to website quality would be steeper in the loss region than in the gain region. Therefore, although previous studies have unveiled the relationships between website users' perceptions of website quality related to TAM and subsequent behavioural intentions, the loss aversion concept applied in the present study further focuses on the understanding of how website users make assessments of website quality after encountering a website, as well as how the perceived website quality (PWQ) translates into the behaviour-related causal relationships. This issue is important for the website quality management of a firm.

Although several website quality–belief–attitude–intention causal links have been empirically examined, the structural interrelationships among the constructs need to be further clarified by incorporating with the loss aversion perspective. By understanding website users' asymmetric responses to website quality in an online behavioural process, company managers can gain a better understanding of how to improve their website quality to satisfy website users. Accordingly, this investigation seeks to empirically verify a loss aversion-based website quality causation model in the travel agency sector that links with the TAM used in the behavioural decision examination.

Literature review

Website user's perceptions of a website quality

Website quality is an important concept in electronic commerce as the website users' perceptions of website quality directly affects their intentions to use a site (McCoy, Everard, & Loiacono, 2009) and drive PIs (Liang & Chen, 2009). Aladwani and Palvia (2002, p. 469) have defined customer's perception of website quality as 'users' evaluation of a website's features meeting users' needs and reflecting overall excellence of the

website'. Thus, when evaluating a company's website offerings, understanding which aspects the website user considers most important has become a priority for companies to employ a successful e-strategy (Hernández, Jiménez, & Martín, 2009). That is, from the services-marketing view to attract and retain customers, online retailers need to have a clear knowledge of what online customers expect for the quality that a website should offer (Long & McMellon, 2004; Lin, 2007).

Several previous scholars have presented outstanding methods for measuring website quality by hypothesising about their own dimensions of website quality. Loiacono, Watson, and Goodhue (2002), for instance, have generated a website quality measure, namely WebQualTM, composed of the 12 dimensions to capture those aspects of a website. The study of Chiu, Hsien, and Kao (2005) is another example whose website quality construct composed of other five factors to apprehend the contents of a website. Nevertheless, as claimed by Lin (2007, p. 365), 'Despite identifying various attributes of website quality in the B2C e-commerce context, the website quality is a multi-dimensional construct comprising *information quality*, *system quality*, and *service quality*'. This three-dimensional website quality could be the principal factors to measure website users' expectations and perceptions of website quality (Delone & McLean, 2003; Shin, 2004; Lee & Kozar, 2006; Liang & Chen, 2009). This is consistent with the findings of Hernández et al. (2009) that, based on reviewing website quality-related literature from 1992–2007, quality of the information, of the system and of the service provided by the firm through its website are the key factors of commercial website design. According to Lin (2007, pp. 366–368), this three-dimensional website quality model is defined as follows, on which the information and system quality (I–S quality) are based on a technical-oriented perspective while the service quality is from a customer-oriented perspective: (1) information quality is a measure of value perceived by a customer of the output produced by a website; (2) system quality is manifest in a website system's overall performance and can be measured by customer perceived degrees of user friendliness in shopping at an online retailer; (3) service quality is defined as overall customer evaluations and judgements regarding the quality of online service delivery.

Additionally, because the aforementioned website quality concept has been used in a number of studies, most (if not at all) of the studies have not bring loss aversion perspective into the context of website quality. Therefore, the following section discusses the necessity of applying the loss aversion concept to website quality; this is a fundamental consideration for further exploration of the causal relationships derived from website quality.

Applying the loss aversion concept to website quality

The *loss aversion* concept is developed based on the theory of human choice behaviour (Suzuki et al., 2001; Yang & Jun, 2002), and represents a non-smooth (non-differentiable) response function of customers towards their evaluation of service offerings. Thus, when compared with a smooth or differentiable function from traditional economic theory, the biggest advantage of the loss aversion concept is the implication of an asymmetric effect of service quality, as perceived by customers, with respect to a reference point (Suzuki & Tyworth, 1998). The reference point used in this study is the website user's expectation of website quality, as derived from the concept of the PZB (Parasuraman, Zeithaml, & Berry, 1988) gap-based service quality model (Lin, Lee, & Jen, 2008). In this model, the reaction to experienced website quality below expectations (treated as loss) is greater than the reaction to equivalent experienced service quality above expectations (treated as gain) (Suzuki

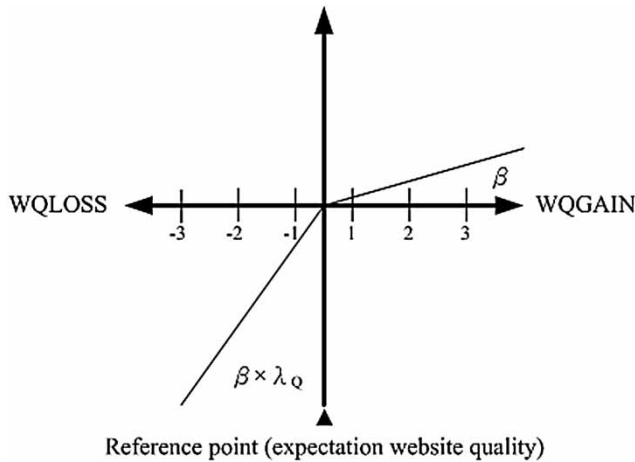


Figure 1. Slopes reflecting loss aversion ($\lambda_Q > 1$). Modified from Suzuki and Tyworth (1998).

et al., 2001). As shown in Figure 1, website quality, in terms of quality items, can be divided into loss (abbreviated as WQLOSS) and gain regions (abbreviated as WQGAIN), wherein the slope for loss is steeper than the slope for gain, representing a sudden change at the reference point (i.e. website user's expectation of website quality); λ_Q measures how the website user weighs losses relative to gains. Therefore, in order to verify the loss aversion effect, four main steps are conducted, as described by Lin et al. (2008, p. 131) and Chang, Chen, and Hsu (2010, p. 622). The first step is to construct the aggregate reference point. The expectation of website quality acts as the reference point. In the second step, based on the relationship between website quality items and the reference point, each website quality item is recoded into both quality loss and quality gain variables. In the third step, parameters for both quality loss and quality gain are calibrated in a single equation. In the fourth step, statistical tests are performed to check whether the slope of calibrate loss exceeds that of calibrate gain. This analytical procedure can be used to verify the loss aversion effect of website quality. Along with the clarification of the loss aversion effect in website quality, the causal relationship among important constructs in the online behavioural process is examined.

Linking a loss aversion-based website quality into TAM and behavioural intentions

According to the concept of website users' online behaviours, the website quality is assessed to determine how it affects related constructs, such as perceived ease of use (PEU), PU, and behavioural intentions. Thus, based on previous works, a loss aversion-based website quality causation model is constructed by first exploring the relationships among loss aversion-based PWQ, and PU, and then exploring the effects of PEU, PU, and PE on attitude (abbreviated as AT), and PI, discussed as follows.

The relationships among PWQ, PEU, and PU

Assessing the effectiveness or quality of a website is important as a way to understand whether the company is providing the type and quality of information and interaction to

satisfy website users (Kim & Stoel, 2004). Thus, regarding the issue of website quality, many studies have incorporated the TAM (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) for explaining and predicting technology acceptance among potential users in terms of the *web quality–belief–attitude–intention* casual relationship (Cao et al., 2005; Ha & Stoel, 2009). That is, TAM proposes two beliefs about a new technology, PEU and PU, to determine an individual's attitude towards using that technology, which in turn determines his/her intention to use it (Moon & Kim, 2001; Lee, Cheung, & Chen, 2005; Cheng, Lam, & Yeung, 2006; Hwang & Kim, 2007; Ha & Stoel, 2009). Accordingly, the website quality is viewed as the offering of a business and that PEU and PU (namely TAM), is assumed to have a positive effect on customer's online behavioural intentions. Although previous studies note the roles of PEU and PU in the formation of customer attitude and/or intention to use new technology, the loss aversion-based PWQ linked to these constructs still remains key issues to explore. Therefore, this study further assumes that PEU and PU, with varying levels of the effect of loss aversion-based PWQ (divided into PWQLOSS and PWQGAIN), influences website user's subsequent behavioural intentions.

Regarding the issue of loss aversion-based PWQ, as described in the Chang's et al. (2010) study, an example can be used to explain the phenomenon of customers' asymmetric responses to service quality evaluation (Stan, Evans, Wood, & Stinson, 2007). That is, on a scale from 1 to 7, if service quality rating drops from 4 to 3, the impact on customer satisfaction is larger than if the service quality rating increases from 4 to 5. Similarly, this phenomenon implies that a negative evaluation of website quality has a stronger effect on website user's subsequent perceptions (e.g. beliefs) than does a positive evaluation of the same magnitude. Thus, losses loom larger than gains occurs in terms of theoretical bases of the loss aversion concept proposed by Tversky and Kahneman (1991). Accordingly, this study attempts to investigate website users' asymmetric responses to loss aversion-based website quality on website user's beliefs which would in turn influence their online behavioural intentions, such as attitude towards e-shopping and PI.

What deserves mention is that, as proposed by previous studies (Suzuki et al., 2001; Lin et al., 2008; Chang et al., 2010), due to the coding and scoring methods that affect the relationship of the hypothesis among constructs as being positive or negative, this study makes the PWQLOSS construct negative, while all other constructs are considered positive. Consequently, six hypotheses are constructed as follows:

H1: Perceived PWQGAIN is positively and directly related to PEU.

H2: Perceived PWQLOSS is positively and directly related to PEU.

H3: The slope of perceived PWQLOSS to PEU is steeper than the slope of perceived PWQGAIN to PEU.

H4: Perceived PWQGAIN is positively and directly related to PU.

H5: Perceived PWQLOSS is positively and directly related to PU.

H6: The slope of perceived PWQLOSS to PU is steeper than the slope of perceived PWQGAIN to PU.

The relationships among PEU, PU, AT, and PI

According to the relationships among PWQLOSS, PWQGAIN, PEU, and PU, the website user's beliefs (i.e. PEU and PU) are assumed to influence the user's attitude and it could determine the PI. That is, as shown in many previous studies, beliefs lead to customer attitude, and customer attitude leads to customer intentions (Davis, Bagozzi, & Warshaw,

1992; Cao et al., 2005; Muthitacharoen et al., 2006; Ha & Stoel, 2009). Specifically, studies report that PEU directly and positively influences customer attitude and intention towards a website, as well as PU (Davis et al., 1989; Lin & Lu, 2000; Ha & Stoel, 2009); furthermore, the indirect effect of PEU on customer's attitude and intention towards a website (i.e. PEU → PU → AT/PI) is so significant as to warrant treating PU as a required mediating construct between PEU and AT/PI in the online context (Childers, Carr, Peck, & Carson, 2001; Ha & Stoel, 2009). In addition, Muthitacharoen et al. (2006) have further investigated the issue of the relative importance of PEU and PU to intention variables and have concluded that PU is found to have higher impact on intention variables due to the website providing adequate value that really matters to the target customers. Based on the aforementioned discussions, the hierarchical effect of website quality gain and loss through PEU and PU on online purchase behaviours could be investigated. That is, the indirect effect of PWQGAIN and PWQLOSS on customer's attitude and PI (PWQGAIN/PWQLOSS → PEU → AT → PI versus PWQGAIN/PWQLOSS → PEU → PU → AT → PI) are examined. The routes are to verify whether the indirect effect of PWQGAIN and PWQLOSS through PEU and PU on PI has a larger effect than the indirect effect of PWQGAIN and PWQLOSS only through PEU on PI. Therefore, the roles of PU could be clarified, regarding which one especially links and dominates the relationship between website quality and the decision-making construct (i.e. PI) for website users. Accordingly, in order to clarify the relationships among PEU, PU, AT, and PI, 10 hypotheses are constructed as follows:

H7: The PEU has direct and positive influences on PU.

H8a: The PEU has direct and positive influences on AT.

H8b: The PU has direct and positive influences on AT.

H9a: The PEU has direct and positive influences on PI.

H9b: The PU has direct and positive influences on PI.

H10a: The PU mediates the relationship between PEU and AT.

H10b: The PU mediates the relationship between PEU and PI.

H11: The AT has direct and positive influences on PI.

H12: The effect of PWQGAIN through PEU, PU, and AT on PI performs a larger effect than the effect of PWQGAIN only through PEU and AT on PI does.

H13: The effect of PWQLOSS through PEU, PU, and AT on PI performs a larger effect than the effect of PWQLOSS only through PEU and AT on PI does.

In summary, loss aversion-based website quality is proposed to reflect website users' asymmetric responses that link PEU, PU, AT, and PI. Accordingly, a loss aversion-based website quality causation framework is outlined in Figure 2 to present these assumptions.

Research methodology

Measurements and website quality coding for loss aversion

The items (listed in Appendix 1) used to measure each variable were measured on a 7-point Likert scale, ranging from 1 = strongly disagree to 7 = strongly agree. First, a survey instrument comprising 11 items in terms of system, information, and service dimensions for website quality was modified from Lin and Lu (2000) and Lin (2007). Similar to the method to evaluate service quality gap regarding a service provider (Kim, McCahon, & Miller, 2003; Chang et al., 2010), the website quality measurements used in this study were modified in order to assess the quality gap of a website, which

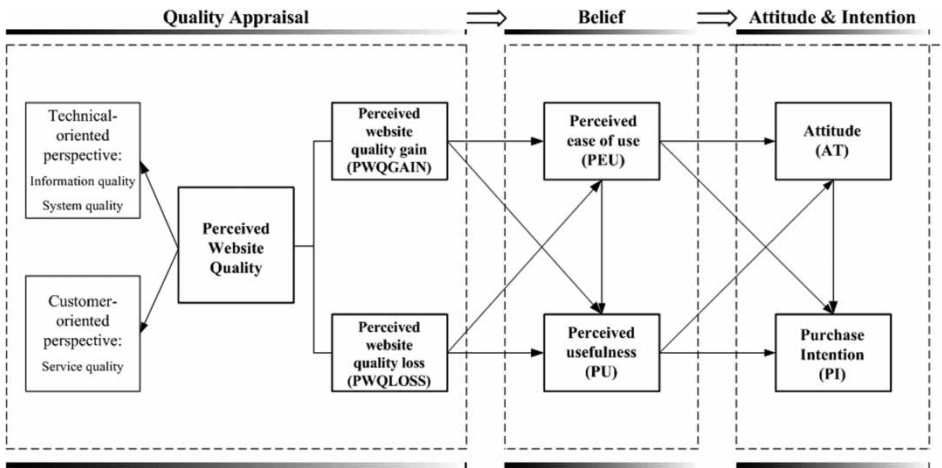


Figure 2. The research framework.

were (1) website users’ expectations of a website would be measured using ‘should’ statements (e.g. the travel agency’s website *should* be visually appealing) before website users browse a website in terms of website users’ normative expectations of what should happen of a website; (2) the perception scale that measures a website performance (e.g. the travel agency’s website is visually appealing) was completed after website users’ searching activities of a website. Thus, based on the evaluations of expectations and perceptions, the respondents are required to answer two questions related to *the degree of expectation* and *the degree of perception* towards the quality items of a website. The methods of coding towards the items in a PWQ loss (PWQLOSS) and PWQ gain (PWQGAIN) are followed and modified from the works of Lin et al. (2008) and Chang et al. (2010), as illustrated below:

$$\text{If } PWQ_{\text{percept}} \geq PWQ_{\text{expect}}, \text{ then } PWQGAIN = PWQ_{\text{percept}} - PWQ_{\text{expect}} \quad \text{and} \\ PWQLOSS_i = 0,$$

$$\text{Else if } PWQ_{\text{percept}} < PWQ_{\text{expect}}, \text{ then } PWQGAIN_i \\ = 0 \text{ and } PWQLOSS_i = PWQ_{\text{percept}} - PWQ_{\text{expect}}.$$

PWQ_{percept} represents the website users’ perceptions of the website’s performance, PWQ_{expect} is the expectation of the quality items offered by the website (treated as a reference point), and i is the website quality item index. Thus, for the website quality item i , a ‘gain’ occurs when the real experience (i.e. perception) of website quality exceeds the reference point, and a ‘loss’ occurs when the real experience of website quality falls below the reference point. Therefore, the website quality construct is split into two constructs (PWQLOSS and PWQGAIN) in this study. By using the coding methods described above, the dimension score is obtained by aggregating the score of quality items related to that dimension.

Second, about website users’ beliefs regarding a website, seven items from Chen and Barnes’s (2007) scales were used to capture ease of use (three items) and usefulness (four items), respectively. Third, three items from Porter and Donthu (2006) and three items

from Chen and Barnes (2007) were used to assess attitude towards use and PI, respectively. The back-translation method proposed by Sinaiko and Brislin (1973) was recommended in order to ensure the quality of the translation of the measure from English to Chinese. Along with the website quality measurement of expectation, following the website quality measurement of perception, the above questions were included in the designed questionnaire. Last, the respondents' demographic information, with six items (via a categorical scale) including gender, age, computer skill, experience of using the Internet (years), hours spending on the Internet in a week, and the number of online shopping, were listed at the end of the questionnaire.

Research background

The travel agency plays an important role in the tourism industry (Mamaghani, 2009) which is a key driver for socio-economic progress of the world as proposed by The World Tourism Organisation (UNWTO). Nevertheless, given the growing competition in the bricks and mortar travel agency, nowadays, with the development of the Internet and electronic commerce, websites have the potential to radically change the nature of the travel agencies business by providing online services (e.g. booking) for customers 24 h a day and giving all the information they need which would influence their assessment of a business on the network (Álvarez, Martín, & Casielles, 2007). Although it has been widely recognised that the Internet and the travel industry are highly compatible (Bennett & Lai, 2005), travel agencies need to understand how the website quality guides the behaviour of their website users, such as PU and ease of use in terms of loss aversion perspective as proposed in this study.

The travel agencies of Taiwan were taken as research targets of this study for two reasons as follows: first, within the context of Internet diffusion, Taiwan represents a nation at the forefront of technology and economic growth (Bennett & Lai, 2005). According to a report by Central Intelligence Agency Factbook of the USA, the number of Internet users in Taiwan exceeded 14 million people and it was ranked twentieth of 218 countries of the world in 2009 and is expected to be ranked higher in the future. Second, in a survey of 438 travel agencies and personnel in-depth interviews, Bennett and Lai (2005) found that travel agencies in Taiwan generally regard the Internet as an effective tool for their business. In the year 2006, the Institute for Information Industry of Taiwan has reported that travel website is the biggest industry which occupied over 60% B2C e-commerce market in Taiwan. Therefore, it is suitable that this article takes travel agencies of Taiwan as its focus to explore the research questions as discussed earlier.

Research samples and data collection

Accordingly, five travel websites (i.e. liontravel.com, www.eztravel.com.tw, www.startravel.com.tw, www.settour.com.tw, and www.colatour.com.tw) were used in this study. These travel websites (all of them have physical stores) were ranked the top five among the other Taiwan travel agencies' websites in October 2010, based on the survey of Alexa (one of the biggest web information companies in the world; <http://www.alexa.com>). Furthermore, according to a report of Insightxplorer (a market survey institute in Taiwan), based on investigating 20,000 travel website users in 2003, students in terms of the occupation category aged between 20 and 35 years old are the biggest population to browse travel websites. Since college-age consumers are a major target market for

travel website users in Taiwan, this convenient sample does provide important information about the online shopping attitudes and intentions of young adults. As stated by Lin (2007), about 40% of Internet users in Taiwan are college students, which means the students will eventually become the most active Internet users and influential consumers in the marketplace (Lin & Lu, 2000), and thus students' sample was used in many previous online-related research (Cao et al., 2005; Porter & Donthu, 2006; Lin, 2007; Ha & Stoel, 2009; Poddar et al., 2009). Therefore, adopting students as survey sample is typically considered more applicable to online consumers (Njite & Parsa, 2005; Chen & Barnes, 2007).

Regarding the survey measurement of this study, although the questions in the questionnaire are based on a review of the literature, the questionnaire needs to be pre-tested in order to examine the content validity (Lin, 2007) such that there is valid and reliable information available regarding the questionnaire design in an online shopping context (Ha & Stoel, 2009). Thus, following Lin (2007), 15 experienced online shoppers were taken as subjects and invited to comment on instrument clarity, question wording and validity. The comments of these 15 individuals then provided a basis for revisions to the construct measures (e.g. two items were deleted due to their similarities to the TAM construct). Appendix 1 lists the final questionnaire used to measure each construct.

For the main study, as suggested by Mittal and Katrichis (2000), the service quality attributes important to new website users might not be the ones that are important to loyal customer; the same rule is applied by Yang and Jun (2002) in the survey of Internet purchasers' and Internet non-purchasers' different perceptions of service quality dimensions in the context of Internet commerce. Thus, to investigate website quality, participants were asked to visit the travel website used in this study for the first time, and search for a particular product (Chen & Barnes, 2007), which creates a worthy sample for potential online customers (Gefen, Karahanna, & Straub, 2003). Therefore, at the beginning of the questionnaire, a screen process was used to identify respondents was visiting one of the target websites used in this study for the first time. Then, a sample frame of full time and part time undergraduate students (aged from 18 to 40) taking the computer course was invited to join this study at a university located in Taipei, Taiwan. To increase the response rate, a small gift (mouse pad) was offered to respondents who agreed to participate in this survey.

Regarding the survey process, first, one questionnaire regarding website users' expectations about the target travel website was distributed to students before they enter the website, and then students were given a 10 min training session of familiarise themselves with using Internet to locate and utilise the target travel website (Lin & Lu, 2000). Next, the subjects were then given a certain task representing the online search activities. The task was to search for a 5-day Ready-Made Tour in a foreign country (e.g. Japan) that they would like for their senior trip and go through the procedure of purchasing a tour programme without actually submitting the purchase transaction (Hwang & Kim, 2007). Aside from collecting the general information such as price, accommodation, and meals, they were asked to gather some specific information such as transaction security policy, privacy notice, return rule, feedback mechanism, and personal blog (Lee & Kozar, 2006; Sigala, 2009) in order to understand more about the various services provided by the chosen websites (Chen & Barnes, 2007). Last, after their searching activities, another questionnaire regarding website users' perceptions, with related behavioural intentions and respondents' demographics, was completed. This process was done to ensure responses that were as accurate as possible to evaluate website quality. Consequently, each selected travel website was recruited and 300 college students participated in this study to answer the questionnaires.

Empirical analysis and results

Statistical analyses of the collected questionnaires were computed based on the 1279 usable responses obtained from the college students. The total response rate was 85% (1279/1500). SPSS 10.0 and AMOS 6.0 statistical software were used to conduct the following empirical analyses.

Demographic profile

Of these 1279 questionnaires, 31.7% of the responses were from male respondents, while 68.3% were from females. The great majority of respondents were aged below 25 but over 18 (98.4%). Most of the participants think their computer skill are fair (70.5%), and most of them have internet experience of more than 8 years (51.7%) with Internet use of more than 11 h in a week. In addition, only few participants (13.4%) do not have online buying experience. The detailed demographic profile is shown in Table 1.

Reliability and validity analysis

Before conducting the factor analysis, the 11 website quality items in relation to their gap scores (perception questions minus expectation questions) were calculated. The evaluation

Table 1. Profile of respondents ($n = 1279$).

Variables	Frequency(s)	Percentage of total (%)
Gender		
Male	406	31.7
Female	873	68.3
Age		
18–4	1259	98.4
25–34	20	1.6
35–44	0	0
45–54	0	0
55 and over	0	0
Computer skill		
Poor	267	20.9
Fair	902	70.5
Good	81	6.3
Very good	29	2.3
Experience of using the Internet (years)		
Less than 1 year	15	1.2
1–3 years	60	4.7
4–7 years	543	42.5
More than 8 years	661	51.7
Hours spending on the Internet in a week		
Less than 2 h	64	5.0
2–5 h	316	24.7
6–10 h	288	22.5
More than 11 h	611	47.8
Number of online shopping		
Never	171	13.4
About 1–5 times	432	33.8
About 6–9 times	253	19.8
About 10–20 times	265	20.7
More than 21 times	158	12.4

process began by initially performing all the 24 items (including PEU, PU, AT, and PI) at a univariate level for normality by examining whether their absolute values of skew were less than 3 and that of kurtosis less than 4 (Kline, 1998). The results (Table 2) show that the absolute values of skew and those for kurtosis for all the items met the assumption for normality.

Next, the Cronbach's α -values for each measure exceeded 0.7 (Nunnally, 1978), indicating that the measures had high reliability. In addition, composite reliability estimates exceeded the critical value of 0.7 recommended by Hair, Anderson, Taltam, and Black (1998), indicating that it was satisfactory (Table 2).

Furthermore, Tables 2 and 3 demonstrate that both the convergent and discriminant validity were supported. As shown in Table 2, the values of the average variance extracted (AVE) were greater than 50%, which supports the convergent validity (Fornell & Larcker, 1981). In addition, the discriminant validity was considered reliable in Table 3, which demonstrates that the square root of the AVE of each construct should generally be higher than the correlations between it and any other constructs in the model (Fornell & Larcker, 1981).

Coding of PWQ for loss aversion

Based on the website quality model of this study, regarding the issue of asymmetric effects, in order to test for these effects, a procedure described and used by Lin et al. (2008) and Chang et al. (2010) was employed. That is, a 'gain' occurs when the real experience (i.e. perception) of website quality exceeds the reference point, while a 'loss' occurs when the real experience of website quality falls below the reference point. For example, on the website quality scale from 1 to 7, if a quality item is given 5 in the expectation aspect and is given 7 in the perception aspect by the respondents, this quality item then has a value coded as '2' (please refer to the equations), representing the gain, and another value, '0', representing the loss. Similarly, if a quality item is given 7 in the expectation aspect but is given 4 in the perception aspect by the respondents, this quality item then has a value coded as '-3', representing the loss, and another value, '0', representing the gain. Following this coding method, accordingly, two new sets of variables (i.e. WQLOSS1 versus WQGAIN1; WQLOSS2 versus WQGAIN2) were created based on the arithmetic means of the quality items attributed to the two website quality dimensions (i.e. *i-s* quality and service quality) constructed in this study. Therefore, these variables could be recognised as continuous variables analysed with related constructs in the established model of this study.

Expectation and perception of website quality dimensions

The mean scores of website quality dimensions are presented in Table 2. From the table, it shows that website users' overall perceptions regarding the website quality items are a bit lower than that of their expectations, which might indicate that website users are not satisfied with the websites' service offerings, namely, negative disconfirmation (Molinari, Abratt, & Dion, 2008). For this, understanding website users' responses to website quality urges managers to provide better website quality to website users. Therefore, this study applies the concept of loss aversion to clarify whether website users' responses would be steeper in the loss region than in the gain region, from a psychological perspective.

Table 2. Reliability and factor loadings of the measures.

Variable	Mean	S.E.	C.R.	<i>p</i>	<i>R</i> ² (%)	Factor loadings (>0.5)	Composite reliability (>0.7)	Variance extracted (%) (>50%)	Kurtosis value	Skew value PWQ
<i>i-s Quality (isq)</i>							0.968	83.6		
isq1 (Pe-Ex = 4.217-5.718)	-1.500	A	A	A	78.7	0.887			0.044	-0.619
isq2 (Pe-Ex = 4.336-5.952)	-1.617	0.016	64.869	<0.001	86.0	0.927			-0.030	-0.612
isq3 (Pe-Ex = 4.356-5.998)	-1.642	0.021	52.544	<0.001	85.5	0.924			0.085	-0.533
isq4 (Pe-Ex = 4.439-6.069)	-1.629	0.019	56.202	<0.001	89.9	0.948			0.071	-0.653
isq5 (Pe-Ex = 4.157-6.030)	-1.873	0.021	47.118	<0.001	78.2	0.884			-0.190	-0.293
isq6 (Pe-Ex = 4.558-6.166)	-1.608	0.020	50.935	<0.001	83.4	0.913			0.159	-0.680
<i>Service quality (sq)</i>							0.905	65.7		
sq1 (Pe-Ex = 5.090-6.030)	-0.941	A	A	A	68.6	0.829			1.785	0.002
sq2 (Pe-Ex = 5.056-5.975)	-0.919	0.030	35.234	<0.001	69.2	0.832			1.555	0.057
sq3 (Pe-Ex = 5.024-5.955)	-0.931	0.030	35.145	<0.001	71.0	0.842			1.310	0.032
sq4 (Pe-Ex = 5.195-6.072)	-0.877	0.029	34.642	<0.001	69.7	0.835			1.950	0.150
sq5 (Pe-Ex = 5.083-5.922)	-0.839	0.033	27.736	<0.001	49.9	0.706			1.887	-0.216
<i>PEU</i>							0.899	74.9		
peu1	5.16	A	A	A	70.8	0.841			0.426	-0.589
peu2	5.08	0.028	37.066	<0.001	76.5	0.874			0.121	-0.404
peu3	5.13	0.027	37.266	<0.001	77.5	0.880			0.403	-0.515
<i>PU</i>							0.935	78.3		
pu1	5.14	A	A	A	81.6	0.903			0.517	-0.544
pu2	5.14	0.018	54.947	<0.001	86.9	0.932			0.411	-0.489
pu3	5.10	0.021	44.902	<0.001	75.8	0.871			0.384	-0.535
pu4	5.11	0.022	40.624	<0.001	69.1	0.831			0.4241	-0.517
<i>Attitude (AT)</i>							0.906	76.3		
at1	4.98	A	A	A	76.4	0.874			0.302	-0.451
at2	5.09	0.024	40.262	<0.001	78.4	0.885			0.054	-0.395
at3	5.24	0.024	39.021	<0.001	74.1	0.861			0.136	-0.484
<i>PI</i>							0.951	86.7		
pi1	4.92	A	A	A	81.8	0.905			0.141	-0.449
pi2	4.90	0.017	60.962	<0.001	93.6	0.967			0.102	-0.321
pi3	4.89	0.018	54.290	<0.001	84.5	0.919			0.217	-0.378

Notes: S.E., standard error; C.R., critical ratio; A, the parameter compared by others is set as 1, therefore there are no values of S.E., C.R., and P. Ex indicates mean score of expectation. Pe indicates mean score of perception.

Table 3. Correlation matrix.

	1	2	3	4	5	6
1. isq	0.914					
2. sq	0.383	0.811				
3. peu	0.121	0.270	0.885			
4. pu	0.139	0.308	0.814	0.865		
5. at	0.102	0.198	0.734	0.719	0.873	
6. pi	0.073	0.202	0.656	0.632	0.762	0.931

Notes: All correlations significant at $p < 0.05$. The square root of AVE (the bold value) displayed in the diagonal.

Structural model

The structural model testing was conducted with path analysis by using AMOS 6.0. All constructs discussed above were included in the model, as shown in Figure 3. Regarding the model fit, even though the χ^2 -statistic was too high due to the large sample size (Bagozzi & Yi, 1988), the results indicate that the structural equation modelling (SEM) statistics, such as GFI (0.997), AGFI (0.986), NFI (0.997), CFI (0.998), RMSEA (0.035), and CMIN/DF (2.591) sampled from the respondents, match the suggested requirement for the model's goodness of fit.

According to the path analysis, Table 4 lists information on the direct effects among the constructs. The results of direct effects among constructs indicate that *H2*, *H7*, *H8a*, *H8b*, *H9b*, *H11* ($p < 0.001$), *9a* ($p < 0.05$), and *5* ($p < 0.10$) are supported and that *H1* and *H4* are rejected ($p > 0.05$). Regarding the indirect effects, the results indicate support for *H10a* and *H10b*, in which PU works as a mediator between PEU and AT/PI. In addition, based on the aforementioned statistically significant results from the path analysis, only the hierarchical loss effect of PWQLOSS on customer's behavioural intentions was investigated, i.e. the indirect effect of PWQLOSS on behavioural intentions (PWQLOSS \rightarrow PEU \rightarrow AT \rightarrow PI versus PWQLOSS \rightarrow PEU \rightarrow PU \rightarrow AT \rightarrow PI) was examined. The results show that *H13* is supported and that the indirect effect of PWQLOSS through PEU, PU, and AT on PI has a larger effect (0.055) than the indirect effect of PWQLOSS through PEU and AT on PI (0.047). Therefore, the role of PU is critical, as

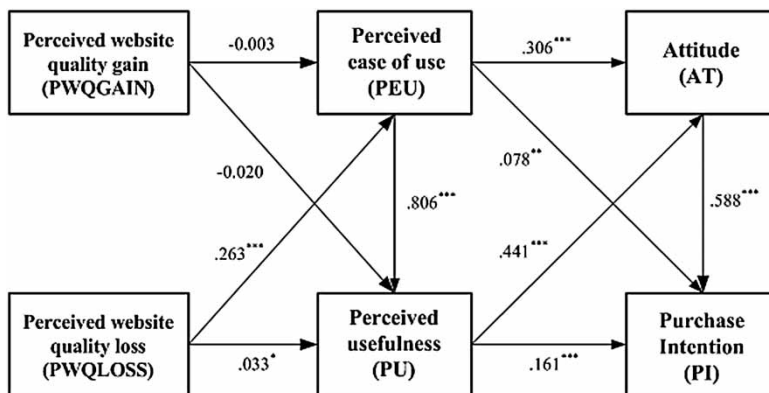


Figure 3. The results of the structure model.

Notes: *** $p < 0.001$; ** $p < 0.05$; * $p < 0.10$.

Table 4. Results of the direct effect, indirect effect, and testing result.

Hypothesis and path		Direct effect	Indirect effect	Testing result
<i>H1</i>	PWQGAIN→PEU	-0.033	-	Not supported
<i>H2</i>	PWQLOSS→PEU	0.263***	-	Supported
<i>H4</i>	PWQGAIN→PU	-0.020	-	Not supported
<i>H5</i>	PWQLOSS→PU	0.033*	-	Supported
<i>H7</i>	PEU→PU	0.806***	-	Supported
<i>H8a</i>	PEU→AT	0.306***	-	Supported
<i>H8b</i>	PU→AT	0.441***	-	Supported
<i>H9a</i>	PEU→PI	0.078**	-	Supported
<i>H9b</i>	PU→PI	0.161***	-	Supported
<i>H11</i>	AT→PI	0.588***	-	Supported
<i>H10a</i>	PEU→PU→AT	-	0.355***	Supported
<i>H10b</i>	PEU→PU→PI	-	0.130***	Supported
<i>H12</i>	PWQGAIN→PEU→PU→AT→PI	-	-	Not supported
<i>H13</i>	PWQLOSS→PEU→PU→AT→PI	-	0.034***	Supported

* $p < 0.10$.** $p < 0.05$.*** $p < 0.001$.

it especially links and dominates the relationship between website quality and website user's attitude to the decision-making construct (i.e. PI) for website users.

Furthermore, the results of *H3* and *H6* used to verify the loss aversion effect are the focus of this study. Based on the results of the path analysis in Table 4 (i.e. both *H2* and *H5* are supported), the numerical values of their slopes indicate that the website quality is positive and significant only in the loss region, whereas its effect is not significant in the gain region. This condition indicates that a decrease in website quality from the reference point will decrease PEU and PU but that an increase in service quality may not have any effect on PEU and PU. The χ^2 difference test rejected both of the null hypotheses of $\lambda_Q = 1$ (loss neutrality hypothesis) with significant p -values. The results (χ^2 difference value = 86.395, $df = 1$, $p < 0.001$) for *H3* and the results (χ^2 difference value = 3.742, $df = 1$, $p < 0.05$) for *H6* indicate that the two hypotheses are supported. Therefore, the results provide evidence supporting *H3* and *H6* ($\lambda_Q > 1$). That is, that the loss aversion phenomenon exists in our loss aversion-based website user's behavioural intentions model.

Conclusions and managerial implications

Website quality is one of the primary issues in travel agency's management, since it influences website users' behavioural intentions. First, regarding website users' asymmetric responses to website quality, the results of this study show that only the website quality in the loss region has a significant and positive effect on website users' beliefs (i.e. PEU and PU). These results are in line with previous findings that customers are loss averse for quality in choice (Suzuki et al., 2001; Fogel, Lovallo, & Caringal, 2004; Chang et al., 2010), which implies that quality perceptions may influence website users' behavioural intentions when it falls below the reference point, but that it may not have a significant effect on website users' behavioural intentions when it exceeds the reference point. As proposed by Stan et al. (2007), if losses outweigh gains, a negative asymmetry phenomenon occurs to which a drop in reliability of product/service lowers a customer's perception of product/service offerings and satisfaction; however, an equivalent increase

in reliability of product/service would produce insignificant effects on customer's behaviours. This applies to travel agency managers, who should continue to satisfy website users' demands as much as they can and to work to eliminate possible loss aversion towards the website offerings. Once this is done, it is easier to retain website users and reduce their tendency to switch to other travel agencies.

Second, regarding the effects of TAM (i.e. PEU and PU) on customers' behavioural intentions, the empirical results are in accordance with previous studies (Moon & Kim, 2001; Porter & Donthu, 2006; Ha & Stoel, 2009) in which the PEU and PU work as mediating variables in the relationship between quality perception and website user's behavioural intention. That is, website quality in the loss region (i.e. PWQLOSS) will positively influence website user's behavioural intention, and the PEU and PU would strengthen this relationship. Nevertheless, comparing with PEU, the PU is more important to influence customer's online initial trust in e-commerce (Chen & Barnes, 2007) and behavioural intention (Chen & Tan, 2004). That is, as concluded by Lin and Lu (2000), the website that provides higher quality would result in a greater PU from the used. This phenomenon should be especially considered by website management because the travel agency's brand identity is established based on the consistent value received by website users from the website.

Third, the positive relationship between PEU, PU, and AT indicates that AT is pivotal in establishing website user's PI towards a website (Shin, 2004). Following this pattern, another important finding is that the effect of PEU and PU through AT on PI is larger than the effect of PEU and PU directly on PI. That is, customers' attitude towards the website works as a mediating variable in the relationship between TAM and behavioural intention (Moon & Kim, 2001; Chen & Tan, 2004; Ha & Stoel, 2009). Specifically, TAM does not guarantee website users' PIs which should pass through the phase of attitudinal conformity towards the website.

In summary, since loss aversion is a common psychological trait that has implications for various facets of our daily life (Chang et al., 2010), for travel agencies, it is critical to frequently manage and supervise the quality of website offerings in order to obtain online customers as much as possible.

Limitations and directions for further research

The limitations of this research, addressed as follows, provide direction for future research. First, this study mainly focuses on exploring college student's behavioural intentions towards target websites. Therefore, future research should consider how travel agencies' website quality, as perceived by other customers in the loss and gain areas, might significantly differ in terms of certain demographic characteristics such as age, education, and profession. Second, because frequent website visitors and infrequent website visitors are significantly different, future researchers should note and distinguish between their perceptions regarding website quality, PEU, and PU as linked to attitude and PIs. Finally, this study did not research how other variables works as a mediator (e.g. perceived enjoyment) (Ha & Stoel, 2009) in the constructed relationship. This limited understanding of the relationships among other extending TAM variables would be interesting to consider in future research.

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Appendix 1. The survey instrument

Perceived website quality (PWQ)

i-s quality (isq)

- isq1: The travel agency's website provides up-to-date information.
- isq2: The travel agency's website provides accurate information.
- isq3: The travel agency's website provides complete information.
- isq4: The travel agency's website is convenient to access.
- isq5: The travel agency's website is visually appealing.
- isq6: The travel agency's website has a well-organised appearance.

service quality (sq)

- sq1: I think the travel agency's website gives prompt service.
- sq2: I believe the travel agency's website is always willing to help customers.
- sq3: I believe the travel agency's website is trustworthy.
- sq4: The travel agency's website provides the targeting e-mail to customers.
- sq5: The travel agency's website provides customers free personal homepage.

Perceived ease of use (PEU)

- peu1: This travel agency's website is easy to learn to use.
- peu2: It is easy to get this travel agency's website to do what I want.
- peu3: My interactions with the travel agency's website are clear and understandable.

Perceived usefulness (PU)

- pu1: The content or information on this travel agency's website is useful for buying the products or services that it sells or markets.
- pu2: The online information on this travel agency's website facilitates decision-making process.
- pu3: This travel agency's website is easy and functional for purchasing online.
- pu4: This travel agency's website can increase my purchasing effectiveness.

Attitude (AT)

- at1: I am positive towards the travel agency's website.
- at2: It makes sense to use the travel agency's website.
- at3: People should adopt the travel agency's website.

Purchase intention (PI)

- pi1: It is likely that I will transact with this travel agency's website in the near future.
- pi2: Given the chance, I intend to use this travel agency's website.
- pi3: Given the chance, I predict that I should use this travel agency's website in the near future.
-