

# *Investigating the Asymmetric Effects of Website Quality on Customer Satisfaction and Trust:*

*An application of information system success model*

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**Abstract**—This study applies the information system success model to analyze the website quality of a restaurant (the website of T.G.I. Friday's as the research case). Website quality was analyzed according to three dimensions: information quality, system quality, and service quality. Customer perceptions related to losses and gains due to website quality were assessed to determine whether such perceptions have an asymmetric effect on customer satisfaction and trust. Our results indicate that a negative asymmetric effect does exist. Perceived losses have a disproportionate effect on customer satisfaction and trust. In other words, perceived losses related to the system quality of the website have a significantly greater impact than perceived gains on customer satisfaction and trust. Thus, both obtaining positive asymmetric effects and minimizing the negative asymmetric effects are important concerns for website operators in the management of commercial websites.

**Keywords**—website quality, asymmetric effect, satisfaction, trust, information system success model

## I. Introduction

Many companies, in this high-tech era, have entered the online market and established websites as a marketing channel for their products [1]; the restaurant industry is no exception. By providing an interface with customers, websites have become an important part of marketing; therefore, improving the quality of websites is a crucial strategy for companies seeking to stand out from their competitors [2].

In previous research [3] [4], it has been assumed that there is a linear correlation between the perceived quality of a website and website user satisfaction. In other words, when perceived quality creates a positive or negative effect, the size of those effects could be assumed to be equal and symmetrical. However, some studies have postulated that perceived quality may have asymmetric effects on customer satisfaction [5] [6].

Trust is another important factor in website operations. The feeling that a website is of high quality increases the level of trust in the company [7]. Thus, this study also investigates whether the asymmetric effect exists between the relationship of customer perceptions of website quality and customer trust. Clarifying the asymmetric relationships between website quality, customer satisfaction, and customer trust could be of value to companies dedicated to the management of website quality.

## II. Literature Review

### A. Information System Success Model

Previous researchers have tended to focus on assessing the quality of brick and mortar stores; however, in recent years there has been growing interest in the topic of website quality. In reference [8], the “information system success model” was proposed, and has since been widely applied in studies related to the management of information technology. The authors subsequently updated the model for application in the field of electronic commerce [9]. They found that success in website management is affected by three quality dimensions: information quality, system quality, and service quality. The

present study adopted this model for the assessment of website quality and an exploration of its asymmetric effects on customer satisfaction and trust.

## B. Asymmetric Effects

Many studies have confirmed a link between website quality and customer satisfaction [3] [10]. Much of the extant literature has assumed that the effects of customer perceived website quality on customer satisfaction are essentially symmetric. That is, perceived gains and losses in website quality have corresponding and equal effects on customer satisfaction [11]. However, a number of studies have observed an asymmetric relationship between website quality and customer satisfaction [6] [12] [13]. Asymmetric effects occur when a non-linear relationship exists between customers' expectations of website quality and their reactions when they encounter the actual site. Some authors have attempted to use this relationship to measure the effects of quality attributes on customer behavior [14].

## C. Customer Satisfaction with Websites

Satisfaction is a psychological reaction to a consumption experience related to a previous expectation. The psychological effort consumers expend in obtaining a product can increase their satisfaction with the product. However, the failure of a product to meet expectations may result in an experience "gap" that detracts from one's satisfaction with a website [15]. Thus, customer satisfaction is an effective means to assess website quality [4].

## D. Trust in Websites

Customer trust is a necessary consideration when attempting to understand customer intentions in electronic commerce [16]. Website operators must generate trust from their customers in order to facilitate an effective call to action. If customers feel that a website can deliver on its promises, and that it treats customers honestly, they will feel trust in it [17]. Trust is therefore another key concern for the assessment of website quality.

## E. Asymmetric Effects in Measuring Customer Satisfaction and Trust

In reference [18], it was demonstrated that symmetric effects are unable to explain the process of making choices under conditions of uncertainty. They found that potential gains and losses have different effects on one's choices. Customers tend to take a reference point (e.g. price or product quality) relative to which gains and losses are compared. When customers consider potential gains and losses associated with website quality, their reactions are quite different. Losses exceeding gains generate a negative asymmetric effect; gains exceeding losses generate a positive asymmetric effect; where losses and gains are equal, there is a loss neutral effect. Reference [11] suggested examining the issue of website quality as an asymmetric effect to provide a more

comprehensive understanding of the influence of website quality on customer satisfaction and trust.

In Fig. 1, the loss aversion coefficient  $\lambda Q$  measures how the market weighs losses relative to gains [14]. When customers assess their losses and gains associated with website quality (e.g. information quality, system quality, and service quality), there is a clear negative asymmetric effect: the negative impact of losses is larger than the positive impact of gains. The loss aversion concept suggests that the effect of website quality is asymmetric with respect to a reference point (i.e., a customer's expectation), meaning that a customer's response to website quality would be steeper in the loss region than in the gain region [14]. For example, on a seven-point Likert scale, a website user who perceives a loss arising from website quality will record a drop in customer satisfaction and trust from 4 (neutral) to 2. A website user who perceives a gain will typically indicate that his or her satisfaction and trust rose from 4 to 5. We therefore developed six hypotheses as follows:

H1-1: *Perceived losses from information quality on a website will have a larger impact on customer satisfaction than perceived gains.*

H1-2: *Perceived losses from information quality on a website will have a larger impact on customer trust than perceived gains.*

H2-1: *Perceived losses from system quality on a website will have a larger impact on customer satisfaction than perceived gains.*

H2-2: *Perceived losses from system quality on a website will have a larger impact on customer trust than perceived gains.*

H3-1: *Perceived losses from service quality on a website will have a larger impact on customer satisfaction than perceived gains.*

H3-2: *Perceived losses from service quality on a website will have a larger impact on customer trust than perceived gains.*

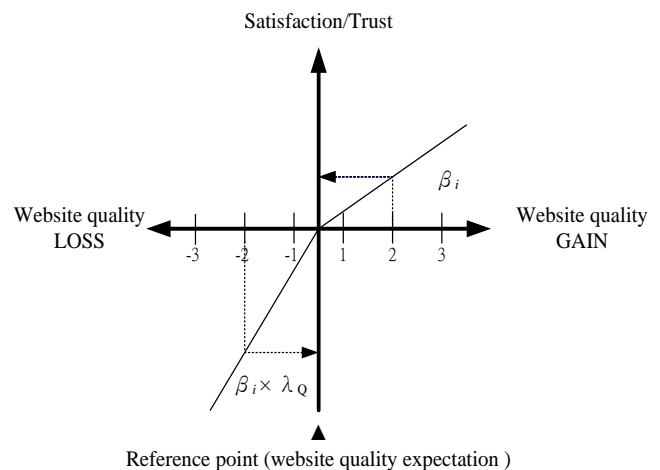


Figure 1. Loss aversion ( $\lambda Q > 1$ ). Source: modified from [13].

### III. Research Methods

#### A. Research Framework

Our research framework, based on the literature review, is presented in Fig. 2. We, using the website of T.G.I. Friday’s as a research target, examined the impact of information quality, system quality, and service quality on customer satisfaction and trust.

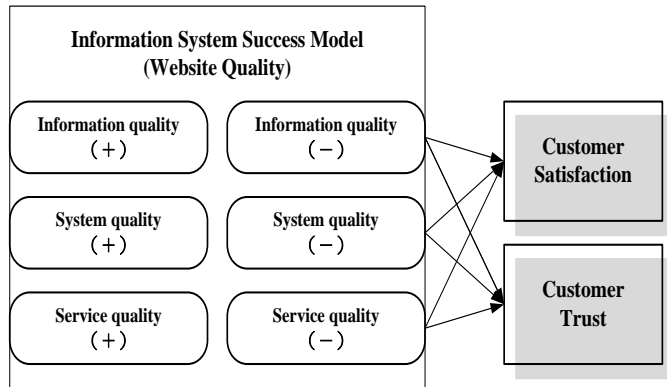


Figure 2. Research framework.

#### B. Measurement

The survey instrument (as shown in TABLE I) was comprised of twenty-two items measured on a 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree. The items were adapted to the restaurant website context from previous studies including studies on website quality (information quality, system quality, and service quality), customer satisfaction [19], and customer trust [7] [20]. Lastly, the respondent demographic information was collected using five items (via a categorical scale) on gender, age, educational level, monthly income, and the website surfing experience of T.G.I. Friday’s.

#### C. Sampling

This study employed a questionnaire aimed at consumers who had viewed the T.G.I. Friday’s website. Snowball sampling was used: acquaintances were asked to forward an email questionnaire to their friends and colleagues. A total of 300 questionnaires were sent out, and 266 responses received. Then, invalid (incomplete) responses were eliminated, leaving 247 usable responses (response rate 82%) for further analysis.

#### D. Data Analysis Procedure

Questionnaire items related to perceptions of information quality, system quality, and service quality were compiled according to the method presented in [11]. Using a seven point Likert scale (strongly agree to strongly disagree), website users were coded into three groups: perceived losses, perceived gains, and neutral experience. These were converted into dummy variables, which were treated as predictors of customer satisfaction and trust in a multiple regression. The responses collected could take one of three values: where the

answers were 1, 2, or 3, the value of the variable was “loss”; where the answer was 4, the value was “neutral”; where the answers were 5, 6, or 7, the value was “gain”. Then, the neutral group was coded as (0, 0); the loss group was coded as (0, 1); and the gain group was coded as (1, 0). These coded responses and average values of customer satisfaction and trust were analyzed to determine whether asymmetric effects exist.

SPSS 18.0 analysis software was used for analysis. We first checked the validity and reliability of the measures. Then the hypotheses were tested by applying regression analysis. Where the  $\beta$  value of the regression analysis reached the level of significance, the absolute value of the  $\beta$  coefficient was taken as a comparative measure of the impact of the independent variable on the dependent variable. For example, where the  $\beta$  coefficient is high, the impact of this dimension of website quality on customer satisfaction and trust is also high.

### IV. Results

#### A. Demographic Profiles

The sample included a majority of women (66%), and was concentrated in the 18-24 age range (93%). Most respondents had a BA degree (77%); most earned less than TWD 10,000 per month (78%). Most had never viewed the T.G.I. Friday’s website previously.

#### B. Summary of Measurement Scales

The basic information of the constructs and their measure items (mean and standard deviation) is shown in TABLE I.

TABLE I. THE INFORMATION OF MEASUREMENT SCALES

Construct	Measure items	Mean	S.D.
Website Quality	<i>Information quality</i>		
	This website produces the most current information.	5.72	0.96
	This website provides me with all the information I need.	5.55	0.85
	This information provided by the website is accurate.	5.63	0.81
	In general, this website provides me with high-quality information.	5.69	0.89
	<i>System quality</i>		
	This website enables me to get on to it quickly.	5.67	1.08
	This website performs reliably.	5.43	1.07
	This website can be adapted to meet a variety of needs.	5.43	0.92
	In terms of system quality, I would rate this website highly.	5.57	0.95
	This website makes it easy to get anywhere on the site.	5.62	0.97
	<i>Service quality</i>		
	This website is prompt in responding to my queries.	5.32	1.03
	This website understand the needs of their customers.	5.44	0.92
This website delivers the service exactly as promised.	5.53	0.93	
When I use this website, this website instills confidence.	5.57	0.98	

Construct	Measure items	Mean	S.D.
Customer Satisfaction	I am very satisfied with the information I receive from this website.	5.51	1.04
	I have a positive attitude toward website surfing.	5.50	1.13
	My interaction with this website is very satisfying.	4.90	1.49
Customer Trust	This website has a good reputation in the Internet.	5.48	1.01
	I believe this website would act in my best interest.	5.31	1.09
	This website is interested in my well-being, not just its own.	4.74	1.51
	This website is truthful in its dealings with me.	5.46	1.04
	This website would keep its commitments.	5.51	1.05
	The website is sincere and genuine.	5.44	1.00

Notes: S.D. = Standard Deviation.

### C. The Reliability and Validity for the Constructs

Initially, the Cronbach’s alpha values for each construct were calculated and exceeded 0.7 [21], indicating that the measures had high reliability. Furthermore, we used the AMOS 18.0 analysis software to employ the CFA with a five-factor measurement model. The measurement model showed all factor loadings over 0.5. In addition, the composite reliability estimates exceeded the critical value of 0.7, which was recommended by [22], indicating that they were satisfactory. The SEM statistics (e.g. GFI, AGFI, RMR, and CMIN/DF) match the suggested requirements for the model’s goodness-of-fit. The values of the average variance extracted (AVE) were greater than 50%, supporting convergent validity [22]. In addition, the discriminant validity was considered to be reliable, thus demonstrating that the square root of the AVE of each construct is higher than the correlation between it and any other construct in the model [22].

### D. Regression Analysis: the Effect of Website Quality on Customer Satisfaction and Trust

The results of the regression analysis regarding the effect of website quality on customer satisfaction is shown in TABLE II.

TABLE II. THE EFFECT OF WEBSITE QUALITY ON CUSTOMER SATISFACTION

Website Quality	$\beta$ Value & Significance	P Value
Information quality ( + )	0.15 **	0.03
Information quality ( - )	0.08 non-significant	0.22
System quality ( + )	<b>0.27</b> ***	0.00
System quality ( - )	<b>-0.30</b> ***	0.00
Service quality ( + )	0.17 **	0.02
Service quality ( - )	0.14 non-significant	0.06

Notes: \*\*\*(p<0.001); \*\*(p<0.01) ; \*(p<0.05).

Besides, the results of the regression analysis regarding the effect of website quality on customer trust is shown in TABLE III.

TABLE III. THE EFFECT OF WEBSITE QUALITY ON CUSTOMER TRUST

Website Quality	$\beta$ Value & Significance	P Value
Information quality ( + )	0.29 ***	0.00
Information quality ( - )	0.06 non-significant	0.29
System quality ( + )	<b>0.13</b> *	0.04
System quality ( - )	<b>-0.15</b> *	0.03
Service quality ( + )	0.42 ***	0.00
Service quality ( - )	0.01 non-significant	0.89

Notes: \*\*\*(p<0.001); \*\*(p<0.01) ; \*(p<0.05).

According to the results of TABLES II and III, only the information quality and service quality have positive effects on both customer satisfaction and trust. Nevertheless, a comparison of the absolute value of the  $\beta$  for significant effects indicates that mere *system quality* generated negative asymmetric effects on both customer satisfaction and trust.

For the effect of gains in system quality on customer satisfaction, the result was (the absolute value of the  $\beta=0.27$ , p<0.001); for the effect of losses in system quality on customer satisfaction, the result was (the absolute value of the  $\beta=0.30$ , p<0.001). This is a confirmation of H2-1 (*Perceived losses from system quality on a website will have a larger impact on customer satisfaction than perceived gains*).

Similarly, for the effect of gains in system quality on customer trust, the result was (the absolute value of the  $\beta=0.13$ , p<0.05); for the effect of losses in system quality on customer trust, the result was (the absolute value of the  $\beta=0.15$ , p<0.05). This is a confirmation of H2-2 (*Perceived losses from system quality on a website will have a larger impact on customer trust than perceived gains*).

## v. Conclusions

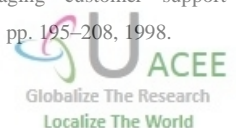
The results of this study indicate that for those who viewed the website of T.G.I. Friday’s, the system quality of the website had a negative asymmetric effect on customer satisfaction and trust. One possible explanation is that most modern websites provide high standards in usability, reliability, and speed. A failure to meet these standards tends to generate strong feelings of dissatisfaction and distrust. Thus, improving the quality of all system functions on a website is the most important task for website operators. One example would be ensuring that the webpage files for the homepage should be designed appropriately to ensure quick loading, so that viewers do not lose interest and patience.

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