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論文題目：

# Development and validation of a scale to measure blog service quality

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## Abstract

Blogs have become an appealing research topic due to their rapid growth and increasing influence. However, there are only a few literatures concerning the customer satisfaction of bloggers and the service quality of blog websites, which indicates that the development of blog websites as a popular Web 2.0 tool has fallen far behind the dictates of academic research. To address this issue, this study first conducted a critical analysis by aggregating relevant literature and by deriving the basic items applicable to the concept of blog service quality. A multi-stage scale development process was then constructed to investigate and to identify factors needed in evaluating the service quality of blog websites. The results showed that System Functionality, Security/Responsiveness, Personalization, Efficiency, and Enjoyment were the five key factors affecting the service quality of blog websites. This study proposed managerial and practical implications, which are expected to fulfill the research gap in the service quality literature of blog websites, as well as to provide an effective and robust evaluation tool for blog websites, users, and researchers.



**Keywords:** Blog, E-Service Quality (E-SQ), Scale development

## 1. Introduction

Blogs or weblogs have become increasingly popular in recent years. A blog is a web-based publication that allows users to add content easily and periodically, which are generally presented in reverse chronological order. Blogs also combine personal web pages with tools that make it easier to link to other pages, as well as to post comments and afterthoughts on other blogs (Blood, 2004). According to statistics from Technorati (2008), the index number of blogs was up to 133 million in 2008, which resulted in a variety of blog-related services. Typical examples are Blog-City, BlogSpot, Blogger, Diaryland, LiveJournal, Pitas, TypePad, and Xanga, which have attracted the public's interest and have also developed to certain economic scales.

For example, LiveJournal, which supports 25 languages, has recorded more than 21.61 million users in August of 2009, with an average of 4.1 million online users at any given time. The gender distribution of blog users is 2.89 million males and 5.47 million females, users aged 18 to 24 compose the most significant blog group, which means that blogging is a network activity mainly for females and young people (LiveJournal, 2009).

The increasing complexity of information and multi-outlet website functions increase selection alternatives and allow room for switching to new blog sites, which further adds to the competitive pressure among blog service providers (BSPs). As Hsu and Lin (2008) indicated, an easy-to-use interface could influence a user's preference, while a difficult interface could create user resistance. This reinforces the general belief that BSPs should continue to develop tools that only require minimum effort to learn and to use. One of the key factors that allow BSPs and bloggers to survive and compete is the effective evaluation of the perceived blog service quality to maximize the satisfaction of bloggers and readers. A service quality measurement scale can thus serve as a standard benchmarking tool, which has been seen in earlier web tools such as in e-mail and the bulletin board systems (BBS) (Murphy et al., 2007).

Although there are some studies concerning the factors in customer satisfaction and service quality, there remains a research gap in the formal literature regarding the service quality of blog websites. In other words, no existing academic research has provided an adequate and in-depth analysis to evaluate the key points of service quality in the use of blogging tools, thus presenting a situation of concern. Therefore, there is an immediate need to develop a measurement scale as an index of practical applications for BSP and bloggers and, more importantly, as the basis for follow-up academic research.

To address the focus and aims presented above, this study intends to develop a robust and comprehensive service quality measurement scale to cover all types of blog

websites through a systematized approach. Through this rigorously constructed measurement tool, the lack of relevant academic material in the field will be compensated. This study will also help BSPs in developing and in evaluating the relative application of the resulting scale. For example, BSPs can base on this scale to enhance their blog systems and functionalities, activate their blog platforms, and improve their competitiveness. It can also help bloggers survey their blog's content for future reference and improvement. Moreover, the service content and the service item function of blog websites are frequently changed based on demand (Harder and Reichardt, 2003). The structural factors of service quality and the key dimensions identified by this study can serve as a basis for future research.

## 2. Literature Review

### 2.1 Research on service quality of websites

With the phenomenal growth of e-services, a stream of research has been developing that aims to understand the dimensions of e-service quality (e-SQ) and their relationship with overall performance. For example, Loiacono et al. (2002) proposed web quality (WebQual), a scale for rating websites on 12 dimensions: informational fit to task, interaction, trust, response time, design, intuitiveness, visual appeal, innovativeness, flow-emotional appeal, integrated communication, business processes, and substitutability. These dimensions were immediately adapted in the SITE-QUAL measurement scale by Yoo and Donthu (2001), which consists of only four dimensions, namely, ease of use, aesthetic design, processing speed, and security. However, Parasuraman et al. (2005) pointed out that both WebQual and SITE-QUAL do not capture all aspects of the purchasing process and therefore do not constitute a comprehensive assessment of a site's service quality.

Unlike the general web quality structure of WebQual, Wolfinbarger and Gilly (2002, 2003) proposed .comQ and eTailQ for measuring web retail store quality and found that among the dimensions of website design, such as fulfillment/reliability, privacy/security, and customer service, fulfillment/reliability rating is the strongest predictor of quality and of customer satisfaction. Zeithaml et al. (2002) also proposed a model for understanding and improving e-service quality, relating the design and operation of the website to certain customer perspectives. Although related studies on e-SQ do not fully concur with the dimensions and statements explored, Hernona and Calvert (2005) proposed the following items: (1) e-SQ is multifaceted, not unidimensional; (2) most of the personal service issues are part of recovery service, which involves dimensions different from the core service; (3) e-SQ affects satisfaction, purchase intention, and purchase; and (4) technology readiness, a customer-specific construct, is related to the perceptions of e-SQ.

Based on the evolving literature, Parasuraman et al. (2005) combined various concepts of online service quality (Loiacono, et al., 2002; Yoo and Donthu, 2001; Wolfinbarger and Gilly, 2002, 2003) and proposed the most comprehensive work on e-service quality. They used an empirical test and a multiple item scale (E-S-QUAL) to assess the service quality of online shopping providers and divided service quality into two categories: the core web service quality (E-S-QUAL) and the E-Recovery Service Quality (E-RecS-QUAL).

Majority of recent studies on website e-SQ have touched on commercial behavior, which is fundamentally different from the nature of blogs. Blogs are originally designed for personal use, and they therefore lack a collaboration mechanism in business contexts (Yang and Liu, 2009). This is supported by motivations in a recent survey, which reported that 72.6% of bloggers record their lives through text and image and 69.6% express their moods and ideas (InsightXplorer, 2007). As a result, the above-mentioned retail-oriented studies have good measurement scales, but they are not appropriate or adequate for directly measuring the quality of blog services. Blog SQ is more related to general website quality in the early studies, although it has its own specific characteristics. Moreover, early studies on e-SQ may be too outdated to reflect current blog developments; there is also a lack of empirical validation, as observed by Yang et al. (2005). To fill this gap, constructing a dedicated measurement scale for blog service quality seems a reasonable endeavor, considering the popularity of blogs.

### 2.2 Relevant Studies on Blogs

There are many studies on blogs that probe different influences, from the characteristics and types of blogs to the investigation of user behavior, loyalty, degree of satisfaction, key success factors, and the evaluation of indices of all kinds of viewpoints, theories, frames, and models.

On research methods, for example, Pi and Ye (2007) used switch costs, user characteristics, and website characteristics to construct a revised model on the customer retention of blogs. The switching costs of bloggers were measured by risk costs, information search costs, set-up costs, learning costs, and relationship costs. Yang (2007) used hierarchical regression analyses to determine belief factors such as Internet use behavior, Internet use motivations, and users' innovative characteristics. After controlling for demographics, Yang's analyses predicted the perceived credibility of news-related blogs by Taiwanese Internet users. Kim (2008) determined that the blog phenomenon has evolved not by a single component but rather by all components according to the socio-technical systems theory, namely, a personnel subsystem, a technical subsystem, external environment, and work system design.

On research goals, Du and Wagner (2006) sought to explore weblog success from the perspective of technology. They proposed a techno-social success model for weblogs, categorized weblogs in terms of popularity rank and growth, and evaluated the relationship between weblog success (in terms of popularity) and technology use. IP and Wagner (2008) improved Task-Technology Fits and constructed Needs-Technology Fit models for blog websites, utilizing the dimensions of social needs, technology, needs – technology fit, and usage type. From the roles of technology acceptance, social influence, and knowledge sharing motivation, Hsu and Lin (2008) probed the acceptance of blog availability and found that the intention of continuously using blogs will be affected by social status and other certain social factors. Based on a blog with a language-action perspective, Yang and Liu (2009) constructed a new standard for online service processes.

Although there are many studies on blogs and an abundance of them is focused on research methods and goals, no service quality measurement scale for blogs has been found. Nevertheless, the research findings of the above scholars are valuable because they can serve as good reference for the concept and item design of a new service quality scale for blog websites.

## 3. Design of the scale development process

### 3.1 Step 1: Item generation

First, a preliminary scale was developed from the extant literature and studies, after sorting out related literature concerning the concept of website and blog service quality, this study generated a total of 76 items in an item list. To make these items more accurate and to make them meet actual situations, feedback from experts and users were sought in two stages.

In the first stage, one-on-one interviews with six managers of blog platforms were recorded, and they were asked to give advice and to amend the questionnaire items. Based on the results of the interviews, similar items were combined, several relevant items were added, and several irrelevant items were deleted. The final total number of items was 54.

In the second stage, a pre-test of the questionnaire on 37 college students with experience in setting up blogs was conducted. The items unfit for bloggers, more suited to managers, and with vague meanings were selected for evaluation; the respondents were then asked to compare the importance of questionnaire items; amendments were made and some contents were deleted. Finally there were 37 items left. The initially retained scale items and their references are shown in Table 1.

Table 1 Initial questionnaire items on blog service quality

| Questionnaire items | Sources |
|---|---|
| Q01. Blog websites contain articles with information on all aspects. | IP & Wagner (2008), Karatepe et al. (2005), Wolfinbarger & Gilly (2003) |
| Q02. The speed of opening the blog pages is rapid. | Parasuraman et al.(2005), Yoo & Donthu (2001) |
| Q03. Blog websites have basic measures of safety protection. | Parasuraman, et al. (2005), Yoo & Donthu (2001), Wolfinbarger & Gilly (2003) |
| Q04. Blog websites contain rich professional information. | Lee & Cunningham (2001), Loiacono et al. (2002) |
| Q05. Current basic facility on organization and technology supports the use of blog websites. | Du & Wagner (2006), Venkatesh et al. (2003), Wolfinbarger & Gilly (2003) |
| Q06. Blog websites operate all year with little downtime. | Szymanski & Hise (2000), IP & Wagner (2008) |
| Q07. The situation where web pages could not get responses does not occur with the blog websites. | Parasuraman et al. (2005), Aladwani & Palvia (2002), IP & Wagner (2008) |
| Q08. The usage flow and mode of blog websites are in accord with bloggers. | Loiacono et al. (2002), Yoo & Donthu (2001) |
| Q09. Blog websites provide correct user function lists. | Parasuraman et al. (2005), IP & Wagner (2008) |
| Q10. Blog websites are systematic and organized. | Aladwani & Palvia (2002), Parasuraman et al. (2005), IP & Wagner (2008) |
| Q11. Blog websites enable bloggers to communicate or interact with each other. | Herring et al. (2005) |
| Q12. The menu-link, directory or search box of blog websites leads bloggers to acquire the desired information. | Du & Wagner (2006), Wolfinbarger & Gilly (2003) |
| Q13. Blog websites offer many panel configurations for bloggers to choose from or allow bloggers to make CSS styles by themselves. | Du & Wagner (2006) |
| Q14. Blog websites offer proper help or necessary guide to bloggers. | Ho & Lee (2007) |
| Q15. Blog websites will not use blogger's personal data or other information for different purposes. | Yoo & Donthu (2001), Wolfinbarger & Gilly (2003), Parasuraman et al. (2005) |
| Q16. Blog websites protect personal privacy and other information. | Parasuraman et al. (2005), IP & Wagner (2008), Wolfinbarger &Gilly (2003), |
| Q17. The search function of blog websites is useful. | Du & Wagner (2006), Parasuraman et al. (2005), Wolfinbarger & Gilly (2003) |
| Q18. Blog websites respond to bloggers' needs rapidly. | Wolfinbarger & Gilly (2003) |
| Q19. Blog websites resolve matters promptly when bloggers encounter problems. | Wolfinbarger & Gilly (2003) |
| Q20. Blog websites' service e-mail or telephone numbers are available to the bloggers. | Parasuraman et al. (2005), Wolfinbarger & Gilly (2003) |
| Q21. The layout of blog websites is clean and simple. | Wolfinbarger & Gilly (2003) |
| Q22. Blog websites are full of all kinds of visual effects. | Loiacono et al. (2002), Wolfinbarger & Gilly (2003) |
| Q23. The configurations of color and field of blog websites let bloggers browse and use clearly and comfortably. | Loiacono et al. (2002), Yang (2007) |
| Q24. Blog websites use multimedia function properly according to its contents. | Aladwani & Palvia (2002), Yang (2007), Yoo & Donthu (2001) |

Table 1 Initial questionnaire items on blog service quality (cont.)

| Questionnaire items | Sources |
|---|---|
| Q25. The service contents of blog websites are properly provided to bloggers within proper time. | Park & Lim(1999) |
| Q26. Blog websites provide personalized service properly. | Wolfinbarger & Gilly (2003) |
| Q27. Blog websites provide desirable information to bloggers by collecting their past habitual behavior. | Lee & Cunningham (2001), Wolfinbarger & Gilly (2003) |
| Q28. Blog websites offer many customization services. | Lee & Cunningham (2001) |
| Q29. It is easy to set up or read blog website for the blogger. | Hsu & Lin(2008), Venkatesh et al.(2003), Wolfinbarger & Gilly (2003). |
| Q30. Learning how to operate the blog website does not take much of the bloggers' time. | Hsu & Lin(2008) |
| Q31. The appearance of blog websites allows bloggers to click and browse rapidly and correctly. | Parasuraman et al. (2005) |
| Q32. It is easy to find articles or information the bloggers want in blog websites. | Parasuraman et al. (2005) |
| Q33. Using blog websites does not waste time. | Hsu & Lin(2008), Wolfinbarger & Gilly (2003), Yiu et al. (2007) |
| Q34. On the whole, blog websites are attractive. | Hsu & Lin(2008), Aladwani & Palvia (2002) |
| Q35. On the whole, there are many benefits for using blog websites. | Hsu & Lin(2008), Cronin et al. (2000), Yang (2007) |
| Q36. On the whole, blog websites meet users' requirements. | Hsu & Lin(2008), Cronin et al. (2000), Yang (2007) |
| Q37. On the whole, the feeling of using blog websites is pleasant. | Hsu & Lin(2008), Wolfinbarger & Gilly (2003), Yang (2007) |

## 3.2 Step 2: First study

### 3.2.1 First data collection

With the initial scale obtained for constructing the service quality of blog websites, an internet questionnaire was used as a tool for collecting data from general bloggers. The questionnaire was divided into two parts. The first part was on respondents' background, including age, sex, occupation, education level, and living area. The second part was on the 37 service quality items of blog websites, which followed the argument of Cronin and Taylor (1992) that service effects perceived subjectively by consumers of blogs represent the blog's service quality. The responses were measured using the five-point Likert scale with 5 representing strong agreement and 1 representing strong disagreement.

As it was difficult to comprehend accurately the wide population of bloggers, this research used purposive sampling, a non-probability sampling method suitable to the sample distribution of this study. We placed the questionnaire in a fixed net address (http://yulung.isu.edu.tw/questionnair) linked to an e-mail on 5 February 2009. We invited respondents to join this investigation through messages and e-mails. In addition, we designed a lucky draw activity to attract respondents from the large

population of bloggers and to increase the questionnaire response rate.

A total of 225 questionnaires, with 209 valid questionnaires and 16 invalid questionnaires, were returned for the first batch of questionnaires. The ratio of men to women was 42 to 58. Students comprised 41.1% of the respondents, while 24.5% of the respondents came from the service industry. As for age, young people whose ages ranged from 18 to 25 accounted for 48.7% of the respondents, and those from 26 to 35 years of age accounted for 31.3%. Average time of blog use was 3 to 4 years. Wretch blog and Yahoo!Kimo net friends, which are commonly used in Taiwan, were used by 51.7% and 23.8% of the respondents, respectively.

Bartlett's Test of Sphericity for the sample was 5830.96, and the P value was 0.000 (<0.005). These two values indicate that the test information is suitable for exploratory factor analysis. Moreover, the Kaiser-Meyer-Olkin value (KMO) was 0.948, which indicates the propriety of the sample data. To decrease the number of items effectively, a reliability analysis was performed on the sorted 37 items according to the basic concepts previously discussed. Items Q20 and Q22, with Cronbach's $\alpha$ at the construct-level lower than 0.7, were then deleted, leading to a total of 35 highly reliable question items.

### 3.2.2 Results of factor analysis

The factor of eigenvalue greater than 1 was extracted by principal component analysis (PCA), and the key factor dimension with high factor loading was determined from the scale through Varimax rotation. In this matrix, the items with factor loadings less than 0.5 or the variables belonging to more than 1 factor were deleted (Hair et al., 2006). The above steps were repeated for the remaining items until all variables could be categorized in all the different factors. A total of nine items, Q5, Q6, Q7, Q21, Q23, Q24, Q30, Q32, and Q33 were deleted after repeating this method four times. The five dimensions resulting from the exploratory factor analysis and comprising 26 items explained 73.76% of the variability. Cronbach's $\alpha$ for each dimension was between 0.85 and 094, which shows that the items within each dimension have high consistency. The definition of each dimension is given below.

Efficiency: It is quick for bloggers to access and search this website for useful and professional information.

System Functionality: This website is well organized, and it offers adequate user functions and assistance that facilitate bloggers in acquiring desirable information or services properly.

Security/Responsiveness: This website establishes clear security policies for ensuring its safety and for the protection of bloggers' personal and private information, in

addition to prompt responses to bloggers' needs and problems.

Personalization: This website provides customized and personalized services based on bloggers' needs and past habitual behavior.

Enjoyment: Bloggers enjoy using this website because it meets their requirements.

To compress further the item set while retaining its representativeness, any item with a factor loading less than 0.6 and belonging to a factor dimension containing more than five items was eliminated (Hair et al., 2006). As a result, Q8, Q13, Q29, and Q31, were deleted, and only 22 items were retained for CFA analysis.

This study used the SEM-based AMOS 16 software to perform the data analyses. The results indicate that some fit indices do not reach the minimum hurdle values: Goodness of Fit Index (GFI) = 0.819 < 0.9, Adjusted GFI (AGFI) = 0.77 <0.9, Normed Fit Index (NFI) = 0.879 <0.9, Relative Fit Index (RFI) = 0.853 <0.9 (Hair et al., 2006). Laso, the $R^2$ value of Q1, was lower than 0.5. According to the suggestion of Hair et al. (2006), Q1 was deleted from the model. The remaining 21 items were again analyzed. The results for EFA and CFA in Table 2 show the values after amending the model. It was found that there was obvious improvement for all of the indices; $R^2$ of each item was higher than 0.5. The t value was also higher than 2.33 at the significant level of $p<0.01$, and the fit indices all exceeded the minimum hurdle values, that is, GFI>0.9, AGFI>0.9, RMSEA, <0.05, NFI>0.9, NNFI>0.9, and CFI>0.9.

Table 2 Results of exploratory factor analysis and confirmatory factor analysis

| Item | CFA | | EFA | | | | |
|---|---|---|---|---|---|---|---|
| | Factor loading | T value | Efficiency | System Functionality | Security/Res-ponsiveness | Personali-zation | Enjoyment |
| Efficiency (α=0. 845) | | | | | | | |
| Q02/EF01 | 0.768 | 14.067 | 0.732 | | | | |
| Q17/EF02 | 0.863 | 16.713 | 0.711 | | | | |
| Q04/EF03 | 0.749 | 13.776 | 0.743 | | | | |
| System Functionality (α=0.935) | | | | | | | |
| Q09/SF01 | 0.831 | 16.276 | | 0.670 | | | |
| Q10/SF02 | 0.824 | 16.094 | | 0.721 | | | |
| Q05/SF03 | 0.790 | 15.009 | | 0.671 | | | |
| Q12/SF04 | 0.834 | 16.395 | | 0.725 | | | |
| Q25/SF05 | 0.774 | 14.573 | | 0.756 | | | |
| Q14/SF06 | 0.861 | 17.241 | | 0.699 | | | |
| Security/Responsiveness (α=0.921) | | | | | | | |
| Q15/SR01 | 0.819 | 16.339 | | | 0.764 | | |
| Q16/SR02 | 0.813 | 17.627 | | | 0.817 | | |
| Q03/SR03 | 0.834 | 17.627 | | | 0.769 | | |
| Q18/SR04 | 0.772 | 14.304 | | | 0.718 | | |
| Q19/SR05 | 0.835 | 16.107 | | | 0.723 | | |
| Personalization (α=0.888) | | | | | | | |
| Q26/PE01 | 0.806 | 14.494 | | | | 0.613 | |
| Q27/PE02 | 0.851 | 16.002 | | | | 0.762 | |
| Q28/PE03 | 0.831 | 15.807 | | | | 0.777 | |
| Enjoyment (α=0.912) | | | | | | | |
| Q34/EN01 | 0.847 | 16.546 | | | | | 0.676 |
| Q35/EN02 | 0.880 | 17.522 | | | | | 0.736 |
| Q36/EN03 | 0.741 | 13.420 | | | | | 0.830 |
| Q37/EN04 | 0.772 | 14.630 | | | | | 0.800 |
| Goodness of fit | | | | | | | |
| $\chi^2$=195.407 | | GFI=0.937 | | NFI=0.959 | | CFI=0.99 | |
| DF=151 | | AGFI=0.904 | | TLI(NNFI)=0.986 | | RMSEA=0.033 | |

In the aspects of reliability and validity, the high factor loading of scales between dimensions shows that the factor dimension consists of scales with convergence validity. As seen in Table 3, the composite construct reliability (CCR) values between all dimensions, represented by the first figure in diagonal, are all greater than 0.7 (Nunnally and Berstin, 1994), which shows that the model has construct reliability. The average variance extracted (AVE) values, indicated by the second figure in diagonal, are all higher than 0.5，and they can function as the index of convergence validity (Fornell and Larcker, 1981). The minimum AVE is 0.632, which is greater than 0.626, and the maximum of shared variances are indicated in the upper triangle. These figures denote that this model has excellent discriminant validity (Fornell and Larcker, 1981).

Table 3 Statistics of the five factors

| Factor | Efficiency | System Functionality | Security/ Responsiveness | Personalization | Enjoyment |
|---|---|---|---|---|---|
| Efficiency | ***0.837/0.632*** | 0.626 | 0.516 | 0.610 | 0.501 |
| System Functionality | 0.791 | ***0.925/0.672*** | 0.428 | 0.489 | 0.477 |
| Security/ Responsiveness | 0.718 | 0.654 | ***0.908/0.664*** | 0.392 | 0.572 |
| Personalization | 0.781 | 0.699 | 0.626 | ***0.869/0.688*** | 0.426 |
| Enjoyment | 0.708 | 0.691 | 0.756 | 0.653 | ***0.885/0.659*** |

a. inter-factor correlations are presented in the lower triangle of the matrix; b. composite construct reliability / average variance extracted are depicted in bold italic type face on the diagonal; c. shared variances are given in the upper triangle of the matrix.

## 3.3 Step 3: Second study

### 3.3.1 Second data collection

The higher-order CFA can be regarded as an extension of a subsequent common factor with oblique rotations, that is, correlations among the obtained factors from the first factor analysis are entered into a second factor analysis to examine the possibility of second-order factors (Lai, 2006; Parasuraman et al., 2005; Karatepe et al., 2005). According to the proportional principle offered by Hair et al. (2006), the ratio of sample number to questionnaire items should generally be at least 5:1; thus, a larger scale data collection was undertaken with the same procedure as the first one.

The total returning number was 1,165 with 117 invalid questionnaires; thus, the valid sample size was 1,048. This sample size is much larger than those used in similar scale development studies (Parasuraman et al., 1988, 1991, 2005; Webster, 1990) and well exceeds the 1,000 observations sample size guideline recommended for factor analysis (Tabachnick and Fidell, 1996). The ratio of men to women was 38:62, with young people aged 18 to 25 accounting for 49.4% of the respondents; people aged 26 to 35 accounted for 27.9%; and students and people from the service industry accounted for 38.2% and 25.5%, respectively. Wretch blog was still the most frequently used website, accounting for 50.8% of the sample, which is similar to the first sample.

### 3.3.2 Results of factor analysis

Data analysis of the second sample repeated the method of the first CFA. The factor loading values of the items were all higher than 0.7 with t >2.33, indicating that the items are appropriate at the 0.01 level of significance. Meanwhile, $R^2$ was higher than the standard value of 0.5, and all fit indices reached the minimum hurdle values (GFI = 0.963 > 0.9, AGFI = 0.941 > 0.9, NFI = 0.976 > 0.9, TLI = NNFI = 0.977 > 0.9, CFI = 0.984 > 0.9, RMSEA = 0.044 < 0.05), indicating that the sample data fit

the research model well (Hair et al., 2006).

We constructed a model of the second-order CFA to determine whether the model dimensions affect a more high-level potential factor (Parasuraman et al., 2005). As shown in Table 4, the correlation coefficients ranging from 0.662 to 0.826 between dimensions also strongly support the research frame of the second-order CFA. Thus, efficiency, system functionality, security/responsiveness, personalization, and enjoyment are considered internal variables, which affect a high-level factor construct of the external variable called "blog service quality" in this case.

Table 4 Correlation coefficient of the second-order CFA

| Factor | Efficiency | System Functionality | Security/ Responsiveness | Personalization | Enjoyment |
|---|---|---|---|---|---|
| Efficiency | 1.000 | | | | |
| System Functionality | 0.786 | 1.000 | | | |
| Security/ Responsiveness | 0.722 | 0.796 | 1.000 | | |
| Personalization | 0.718 | 0.826 | 0.759 | 1.000 | |
| Enjoyment | 0.662 | 0.793 | 0.720 | 0.813 | 1.000 |

The results of the second-order CFA are shown in Table 5. The t value is higher than 2.33 at the significant level of $p<0.01$. For the goodness of fit, all indices pass the minimum hurdle values, indicating that the sample data fit the model well.

Table 5 Results of second-order CFA

| Item | Factor loading | t | $R^2$ | Item | Factor loading | t | $R^2$ |
|---|---|---|---|---|---|---|---|
| Blog Service Quality **(CCR=0.935, AVE=0.744)** | | | | Security/Responsiveness **(SR) (CCR=0.889, AVE=0.615)** | | | |
| Efficiency | 0.814 | 19.637 | 0.663 | SR01 | 0.751 | 36.501 | 0.564 |
| System Functionality | 0.929 | 22.188 | 0.862 | SR02 | 0.763 | N/A* | 0.583 |
| Security/ Responsiveness | 0.848 | N/A* | 0.719 | SR03 | 0.794 | 32.551 | 0.630 |
| Personalization | 0.902 | 20.685 | 0.814 | SR04 | 0.792 | 23.778 | 0.627 |
| Enjoyment | 0.860 | 20.567 | 0.663 | SR05 | 0.820 | 24.623 | 0.673 |
| Efficiency **(EF) (CCR=0.820, AVE=0.603)** | | | | Personalization **(PE) (CCR=0.833, AVE=0.624)** | | | |
| EF01 | 0.752 | 25.345 | 0.566 | PE01 | 0.813 | N/A* | 0.661 |
| EF02 | 0.826 | N/A* | 0.682 | PE02 | 0.747 | 24.465 | 0.557 |
| EF03 | 0.749 | 24.775 | 0.561 | PE03 | 0.809 | 27.209 | 0.654 |
| System Functionality **(SF) (CCR=0.924, AVE=0.669)** | | | | Enjoyment **(EN) (CCR=0.896, AVE=0.683)** | | | |
| SF01 | 0.794 | 31.015 | 0.63 | EN01 | 0.832 | N/A* | 0.693 |
| SF02 | 0.815 | 32.393 | 0.665 | EN02 | 0.851 | 31.717 | 0.724 |
| SF03 | 0.823 | 32.521 | 0.677 | EN03 | 0.809 | 29.333 | 0.654 |
| SF04 | 0.845 | N/A* | 0.714 | EN04 | 0.812 | 30.006 | 0.659 |
| SF05 | 0.796 | 36.695 | 0.634 | | | | |
| SF06 | 0.835 | 32.984 | 0.697 | | | | |
| **Goodness of fit** | | | | | | | |
| $x^2$=435.203 | | DF=148 | | GFI=0.962 | | AGFI=0.941 | |
| NFI=0.976 | | TLI(NNFI)=0.977 | | CFI=0.984 | | RMSEA=0.043 | |

N/A indicates those parameters that have been constrained to equal 1 in order to fix the scale of the latent variables.
CCR=composite construct reliability; AVE=average variance extracted.

After constructing a second-order CFA for this study, a reliability and validity analysis on the resulting data was conducted. As shown in Table 6, the CCR values between all dimensions, denoted by the first figure in diagonal, are all greater than 0.7 (Nunnally and Berstin, 1994), indicating that the model has constructive reliability. Average variance extracted (AVE) values, denoted by the second figure in diagonal, are all greater than 0.5, which also indicates that this model has convergence validity (Fornell and Larcker, 1981). However, in the aspect of discriminant validity, we gathered from the analysis results that there was no way for the minimum of AVE (0.60) to go beyond the maximum of shared variances (0.863), as shown in the upper triangle. Therefore, the aforementioned methods for testing discriminant validity by Fornell and Larcker (1981) cannot support this model.

Table 6 Statistics for the second-order factors

| | Blog SQ | PE | EF | EN | SR | SF |
|---|---|---|---|---|---|---|
| Blog SQ | ***0.94/0.74*** | 0.814 | 0.663 | 0.740 | 0.719 | 0.863 |
| PE | 0.902 | ***0.82/0.60*** | 0.539 | 0.602 | 0.585 | 0.702 |
| EF | 0.814 | 0.734 | ***0.92/0.67*** | 0.490 | 0.476 | 0.572 |
| EN | 0.860 | 0.776 | 0.700 | ***0.89/0.62*** | 0.533 | 0.638 |
| SR | 0.848 | 0.765 | 0.690 | 0.730 | ***0.83/0.62*** | 0.619 |
| SF | 0.929 | 0.838 | 0.756 | 0.799 | 0.787 | ***0.90/0.68*** |

a. inter-factor correlations are presented in the lower triangle of the matrix. b. composite construct reliability / average variance extracted are depicted in bold italic type face on the diagonal.. c. shared variances are given in the upper triangle of the matrix.

To seek evidence of discriminant validity, this study applied the approach implemented in Akinci et al. (2009) and Parasuraman et al. (2005) and fixed each of these pairwise interfactor correlations to 1 and redid the CFA. It produced a significant increase in the chi-square statistic in every instance, such that $\Delta \chi 2$ values with 1 d.f. were all significant at $p < .01$, proving that the model has discriminant validity. Figure 1 shows a second-order CFA model for blog service quality. The coefficients on the relationship lines between variables are the factor loading values taken from Table 6.

## 4 Discussion

### 4.1 The five factor instrument

The factor loading values, as seen in the relationship lines on the left side of Figure 1, between the first-order blog service quality and the second-order five-factor dimensions reflect the explaining power of an individual factor dimension to the entirety of service quality. It can be used to interpret the influence level of the five-factor dimensions to the whole service quality from a general but quantitative perspective.

First, system functionality and personalization with factor loadings greater than 0.9 are the two main factors in evaluating blog website service quality. This indicates that bloggers highly emphasize the integrity of systematic functions as well as pay great interest to the personalized services of websites. Second and in comparison with general websites, the entertainment value of Web 2.0 personal blog, with a factor loading of 0.86, is higher than those of general websites for bloggers. On the other hand, security and responsiveness, with a factor loading of 0.85, remains a crucial factor dimension to consider as in general websites. In particular, security involves how the private information of bloggers is protected from leaking out and how responsive BSPs are in situations where bloggers encounter troubles with their blogs. Finally, relatively speaking, effectiveness, with a factor loading of 0.81, is not as crucial as it was assumed. However, the value of 0.81 shows that the dimension of

effectiveness is still very important in blog service quality.

From the discussion above, it can be seen that there are considerable differences on service quality scales between blog websites and general websites, which support the original research motivation of this study. It is thus necessary to make comparisons with traditional websites to enhance the new knowledge obtained from this study.

### 4.2 Managerial Implications

With the analysis above and the formation of the five-factor blog SQ model, some important and meaningful implications may be valuable to BSPs or bloggers in practice:

First, the two dimensions of system functionality and personalization strongly affect the service quality of all websites. This means that bloggers should first focus on whether or not the website has complete and systematic functions. Therefore, it is recommended that BSPs consider enhancing the design and control of systematic functions of blog websites and making the interfaces of the systematic functions more user-friendly to earn positive evaluation from bloggers regarding the service quality of blog websites.

Second, bloggers are more interested in the personalized service offered by websites. This can be as easy as indicated by Herring et al. (2005). BSPs should consider system functionality while providing personalization mechanisms. For example, Huang et al. (2009) applied Serial Blog Article Composition Particle Swarm Optimization algorithm to implement blog article recommendation and to provide optimal recommended materials to users.

Third, enjoyment of blog websites is a unique emphasis by bloggers. As justified by Hsu and Lin (2008), if bloggers do not perceive blogging as enjoyable, they are unlikely to contribute to it. This means that BSPs should improve the entertainment value of blog websites.

Fourth, all studies agree that Security/Responsiveness is an important factor. For blogs, security is the protection of various blogger information from leaking out, as emphasized in many past studies discussing how to enhance the maintenance of personal data and security measures to prevent data disclosure (Agarwal and Venkatesh, 2002; Akinci et al., 2009; Parasuraman et al., 2005; Wolfinbarger and Gilly, 2003; Yoo and Donthu, 2001). The responsiveness part calls for BSPs to resolve promptly problems in the operation of blog websites. Apart from setting up Help and FAQ pages, BSPs should focus on leading bloggers to access quickly appropriate channels of help when encountering problems or when resolving situations that involve problematic web pages.

Fifth, efficiency may not be the most critical concern, but it is an important factor dimension in the service quality of blog websites. According to the research results, bloggers pay close attention to whether or not blog websites can offer more efficient functions. For BSPs, blog websites should be well-organized. Connection and searching speed must be assured for convenience and efficient communication and interaction.

## 5 Conclusions and limitations

In this study, Blog SQ measurement scale is identified as an important research issue in the Introduction and Literature Review sections, where a gap between the practical needs and support from academic research was likewise presented. To address issues on the comprehensiveness and lack of empirical validation, this study constructed a multi-stage scale development procedure by integrating both qualitative and quantitative research methods to examine and to identify factors for evaluating the service quality of blog websites.

The major research findings can be derived from two perspectives. First, among the five factors, system functionality and personalization are the most critical factors in blog website service quality, while security/responsiveness is shown to be the only commonly supported key factor among all related studies. Efficiency is important but is of the least concern among the five factors. Second, by comparing with the other three related service quality studies, personalization and enjoyment are identified to be uniquely related to blog service quality, which further justifies the need for an e-SQ study on blogs.

Despite all the efforts spent on this research, the readers need to be aware of some research limitations before applying the above research results. First, this study did not make further efforts to identify the sample bloggers, and thus there is no way to distinguish the perceived differences between bloggers with different characteristics. Therefore, future researchers should make insightful cross-comparison analyses for bloggers with different characteristics to identify the typology of bloggers and to probe the implications hidden behind the typology of bloggers. In addition, because most current blog websites are not profit oriented, considering the service quality scale for blog websites is not the same as describing the dimension items of transaction and payment processes in online retail websites, as has been done by many scholars (Parasuraman et al., 2005; Wolfinbarger and Gilly, 2003). The research model only supports general blog types and their corresponding dimensions on basic demands such as simple blog construction and reading. However, along with the evolution of technology and changes in marketing strategies, it can now be seen that some enterprises sell their products or services through blogs. Even governments and political entities promote their administrative concepts and policies through blog

website platforms. Thus, follow-up research may evaluate the service quality of blog websites based on certain target features or research objectives.

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