

Development and Validation of A Scale to Measure Blog Service Quality¹

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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.

Key Words: Blog, E-Service Quality (E-SQ), Scale development

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部落格服務品質量表之建置與驗證

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摘要

近年來部落格數目與影響力迅速的成長，使得部落格成為近來一個熱門的研究議題。然而，正式文獻中僅有一些涉及顧客滿意及服務品質的模式研究，缺乏專門探討部落格網站的服務品質的研究，對已普及化的 Web 2.0 網路工具之一而言，學術研究的進展上遠不及實務應用上的需求。本研究首先彙整相關之文獻進行評判分析，從中推導出適用於部落格服務品質概念之基本題項，並建構多階段之量表發展程序，以檢驗並揭露出評量部落格網站服務品質之因素結構。研究結果顯示由 21 個題項所萃取出的系統功能性、安全與回應、個人化、有效性以及娛樂性五個構面，為影響部落格網站服務品質之關鍵因素。本研究提出實務面與管理面之意涵和建議，預計不但可填補學術研究上對於部落格於網站服務品質深化知識之不足，更可提供部落格網站、使用者及後續學術研究的一個有效衡量基礎工具。

關鍵詞：部落格、網站服務品質 (E-SQ)、量表建置

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; the content is generally presented in reverse chronological order. Blogs also combine personal web pages with tools that make linking to other pages as well as posting comments and afterthoughts on other blogs easier (Blood, 2004). According to statistics from Technorati (2008), the index number of blogs was up to 133 million in 2008, which resulted in the emergence of 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, recorded more than 21.61 million users in August 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 has raised the selection alternatives and allowed more room for switching to new blog sites, further adding 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, whereas 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 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. Thus, a service quality measurement scale can serve as a standard benchmarking tool, which has been observed in earlier web tools, such as e-mail and bulletin board systems (Murphy et al., 2007).

Although there are some studies discussing the factors in customer satisfaction and service quality, there remains a gap in the formal literature regarding the service quality of blog websites. No existing academic research has provided an adequate and in-depth analysis of the key points of service quality in the use of blogging tools, thus presenting an issue 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 a basis for follow-up academic research.

To address the focus and aims presented above, the current study intends to develop a robust and comprehensive service quality measurement scale to cover general 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 can also help BSPs in developing and evaluating the relative application of the resulting scale. For example, BSPs can use this scale as a foundation for enhancing their blog systems and functionalities, activating their blog platforms, and improving their competitiveness. It can also help bloggers survey the content of their blogs for future reference and improvement. Moreover, the service content and 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 basis for future research.



2. Literature Review

2.1 Research on the 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. Yoo and Donthu (2001) developed the SITE-QUAL measurement scale, 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 the 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 one-dimensional; (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; Wolfinbarger and Gilly, 2002, 2003; Yoo and Donthu, 2001) 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 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 the 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

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

As regards 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, an external environment, and a work system design.

As regards 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 the 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) investigated the acceptance of blog availability and found that the intention of continuously using blogs would 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 a large quantity 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 serve as good reference for the concept and item design of a new service quality scale for blog websites. The rationale is that although there are many different usages of blogs, most blog websites are not for specific use. Therefore, concentrating on general blog types contributes to a wider scope of understanding of blog SERVQUAL.

3. Design of the Scale Development Process

3.1 Step 1: Item generation

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

In the first stage, one-on-one interviews with six managers of blog platforms were recorded. The managers were asked to give advice and 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 the questionnaire items; amendments were made, and some contents were deleted. In the end, 37 items remained. 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 and Wagner (2008), Karatepe et al. (2005), Wolfinbarger and Gilly (2003)
Q02. The speed of opening the blog pages is rapid.	Parasuraman et al. (2005), Yoo and Donthu (2001)
Q03. Blog websites have basic measures of safety protection.	Parasuraman, et al. (2005), Yoo and Donthu (2001), Wolfinbarger and Gilly (2003)
Q04. Blog websites have acquired a great deal of specialized information about what users require.	Lee and Cunningham (2001), Loiacono et al. (2002)
Q05. Current basic facility on organization and technology supports the use of blog websites.	Du and Wagner (2006), Venkatesh et al. (2003), Wolfinbarger and Gilly (2003)
Q06. Blog websites operate all year with little downtime.	Szymanski and Hise (2000), IP and Wagner (2008)
Q07. The situation where web pages could not get responses does not occur with the blog websites.	Parasuraman et al. (2005), Aladwani and Palvia (2002), IP and Wagner (2008)
Q08. The usage flow and mode of blog websites are in accord with bloggers.	Loiacono et al. (2002), Yoo and Donthu (2001)
Q09. Blog websites provide correct user function lists.	Parasuraman et al. (2005), IP and Wagner (2008)
Q10. Blog websites are systematic and organized.	Aladwani and Palvia (2002), Parasuraman et al. (2005), IP and 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 and Wagner (2006), Wolfinbarger and Gilly (2003)
Q13. Blog websites offer many panel configurations for bloggers or allow bloggers to make their CSS styles.	Du and Wagner (2006)
Q14. Blog websites provide FAQ information or include a search input box to help users find what they need.	Ho and Lee (2007)
Q15. Blog websites will not use blogger's personal data or other information for different purposes.	Yoo and Donthu (2001), Wolfinbarger and Gilly (2003), Parasuraman et al. (2005)
Q16. Blog websites protect personal privacy and other information.	Parasuraman et al. (2005), IP and Wagner (2008), Wolfinbarger and Gilly (2003)
Q17. The search function of blog websites is useful.	Du and Wagner (2006), Parasuraman et al. (2005), Wolfinbarger and Gilly (2003)
Q18. Blog websites respond to bloggers' needs rapidly.	Wolfinbarger and Gilly (2003)
Q19. Blog websites resolve matters promptly when	Wolfinbarger and Gilly (2003)



Q20. Blog websites' service e-mail or telephone numbers are available to the bloggers.	Parasuraman et al. (2005), Wolfinbarger and Gilly (2003)
Q21. The layout of blog websites is clean and simple.	Wolfinbarger and Gilly (2003)
Q22. Blog websites are full of all kinds of visual effects.	Loiacono et al. (2002), Wolfinbarger and 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 and Palvia (2002), Yang (2007), Yoo and Donthu (2001)
Q25. The service contents of blog websites are properly provided to bloggers within proper time.	Park and Lim(1999)
Q26. Blog websites can be personalized to meet one's needs.	Wolfinbarger and Gilly (2003)
Q27. Blog websites provide desirable information to bloggers by collecting their past habitual behavior.	Lee and Cunningham (2001), Wolfinbarger and Gilly (2003)
Q28. Blog websites offer many customization services.	Lee and Cunningham (2001)
Q29. It is easy to set up or read blog website for the blogger.	Hsu and Lin (2008), Venkatesh et al. (2003), Wolfinbarger and Gilly (2003).
Q30. Learning how to operate the blog website does not take much of the bloggers' time.	Hsu and 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 and Lin (2008), Wolfinbarger and Gilly (2003), Yiu et al. (2007)
Q34. Blog websites looks attractive.	Hsu and Lin (2008), Aladwani and Palvia (2002)
Q35. While participating in blogs, I experienced pleasure.	Hsu and Lin (2008), Cronin et al. (2000), Yang (2007)
Q36. I have fun while using blog.	Hsu and Lin (2008), Cronin et al. (2000), Yang (2007)
Q37. The process of participating in blogs is enjoyable.	Hsu and Lin(2008), Wolfinbarger and Gilly (2003), Yang (2007)

3.2 Step 2: Study one

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 the 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 the service effects perceived subjectively by consumers of blogs represent the blog's service quality. The responses were measured using a five-point Likert scale, with 5 representing strong agreement and 1 representing strong disagreement.

The current research targeted subjects who had experience in using blogs. An online questionnaire was designed to be accessed from the web link <http://yulung.isu.edu.tw/questionnaire>. To increase the response rate of blog participants, we placed the survey link in the most popular blog websites in Taiwan, such as Yahoo! Kimo blog (<http://tw.blog.yahoo.com/>), Wretch blog (<http://www.wretch.cc/blog/>), Yam (<http://blog.yam.com/>), and Xuite blog (<http://blog.xuite.net/>). A perfect random sampling was not possible without accessing the internal databases of these blog sites. To make the sampling as random as possible, we randomly drew the sample list from every category based on the blog categories listed by the blog service providers. Each blog category list usually has at least several hundreds of blogs with a certain number of page views. For example, the Yahoo! kimo blog site has 16 blog categories each with several sub-categories; each sub-category lists at least 200 blogs. This public blog site structure makes a near random sampling possible within the blog categories. These sample blog owners were invited to participate in our online questionnaire activity through inquire email and blog posting. Participants were asked to give their ID number for screening to avoid repeat responses. Those who filled out the questionnaire were given a random drawing to receive one of several gifts 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 42:58. Students comprised 41.1% of the respondents, whereas 24.5% of the respondents came from the service industry. Young people aged 18-25 accounted for 48.7% of the respondents, and those 26-35 years of age accounted for 31.3%. Average time of blog use was 3-4 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 (EFA). Moreover, the Kaiser-Meyer-Olkin value 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 α at the construct level lower than 0.7, were then deleted, leading to a total of 35 highly reliable question items.



3.2.2 Factor analysis results

The factor of eigenvalue greater than 1 was extracted by principal component analysis with Varimax rotation, each involving the elimination of items with low loadings (below 0.5) on all factors or high cross-loadings on two or more factors (Hair et al., 2006; Ho and Lee, 2007; Parasuraman et al., 2005). The five dimensions resulting from the EFA and comprising 26 items explained 73.76% of the variability. Cronbach's α for each dimension was between 0.85 and 0.94, which shows that the items within each dimension have high consistency. The definition of each dimension is given below.

Efficiency: Bloggers can access and search this website quickly for useful and professional information.

System Functionality: This website is well organized. It offers adequate user functions and assistance that facilitate the bloggers' proper acquisition of desirable information or services.

Security/Responsiveness: Aside from giving prompt responses to bloggers' needs and problems, this website establishes clear security policies to ensure its safety and the protection of bloggers' personal and private information.

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 of 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 confirmatory factor analysis (CFA) analysis.

This study used the structural equation model (SEM)-based AMOS 16 software to perform the data analyses. The results indicate that some fit indices did 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, and Relative Fit Index (RFI) = 0.853 < 0.9 (Hair et al., 2006). Also, the R^2 value of Q1, was lower than 0.5. Based on the suggestion of Hair et al. (2006), Q1 was deleted from the model. The remaining 21 items were again analyzed. The EFA and CFA results in Table 2 show the values after amending the model. There was obvious improvement in all 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 $p < 0.01$. 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 EFA and CFA results

Item	CFA			EFA			
	Factor loading	T value	Efficiency	System Functionality	Security/Responsiveness	Personalization	Enjoyment
Efficiency ($\alpha=0.845$)							
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 ($\alpha=0.935$)							
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 ($\alpha=0.921$)							
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 ($\alpha=0.888$)							
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 ($\alpha=0.912$)							
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							
$\chi^2=195.407$		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 the scales between dimensions shows that the factor dimension consists of scales with convergence validity. 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. The maximum values 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	Personaliza- tion	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: Study two

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; Karatepe et al., 2005; Parasuraman 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 development studies of a similar scale (Parasuraman et al., 1988, 1991, 2005; Webster, 1990) and well exceeds the recommended sample size guideline of 1,000 observations for factor analysis (Tabachnick and Fidell, 1996). The ratio of men to women was 38:62. Young people aged 18-25 accounted for 49.4% of the respondents; people aged 26-35 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, similar to the first sample.



3.3.2 Factor analysis results

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. R^2 was higher than the standard value of 0.5. 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).

The inter-factor correlation is represented in Table 4. According to Kline (2005), discriminant validity can be established when the inter-factor correlation is below .85. This criterion was also adopted by the study of Byon et al. (2010).

▼ 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

Due to the different fit statistics considering different aspects of fit, researchers should report multiple fit statistics in SEM studies (Noar, 2003; Thompson, 2000). For this reason, five models were developed to assess which model fits the data the most. The comparative results of the competing models are shown in the Table 5. Although both the correlated-factor model and the hierarchical model are qualified by satisfying all the recommended values, the hierarchical model generally performs slightly better than the correlated-factor model in each of the fit indexes.

▼ Table 5 Evaluation outcomes of competing models

Fit Index	Recommended value	Null	One-factor	Uncorrelated-factor	Correlated-factor	Hierarchical
χ^2/df	<3	28.149	8.102	8.035	2.992	2.941
RMSEA	<0.08	0.285	0.150	0.150	0.044	0.043
GFI	>0.9	0.149	0.656	0.654	0.953	0.962
AGFI	>0.9	0.064	0.58	0.577	0.939	0.941
NNFI	>0.9	0	0.721	0.723	0.976	0.977
CFI	>0.9	0	0.749	0.751	0.984	0.984



According to the recommended fittest model above, 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). Thus, efficiency, system functionality, security/responsiveness, personalization, and enjoyment are considered internal variables affecting a high-level factor construct of the external variable called “blog service quality” in this case.

The results of the second-order CFA are shown in Table 6. The *t* value is higher than 2.33 at the significant level of $p < 0.01$. In terms of the goodness of fit, all indices passed the minimum hurdle values, indicating that the sample data fit the model well.

Table 6 Second-order CFA results							
Item	Factor loading	<i>t</i>	R^2	Item	Factor loading	<i>t</i>	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							
$\chi^2=435.203$	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. In Table 7, 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. The 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).

▼ Table 7 Statistics of 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

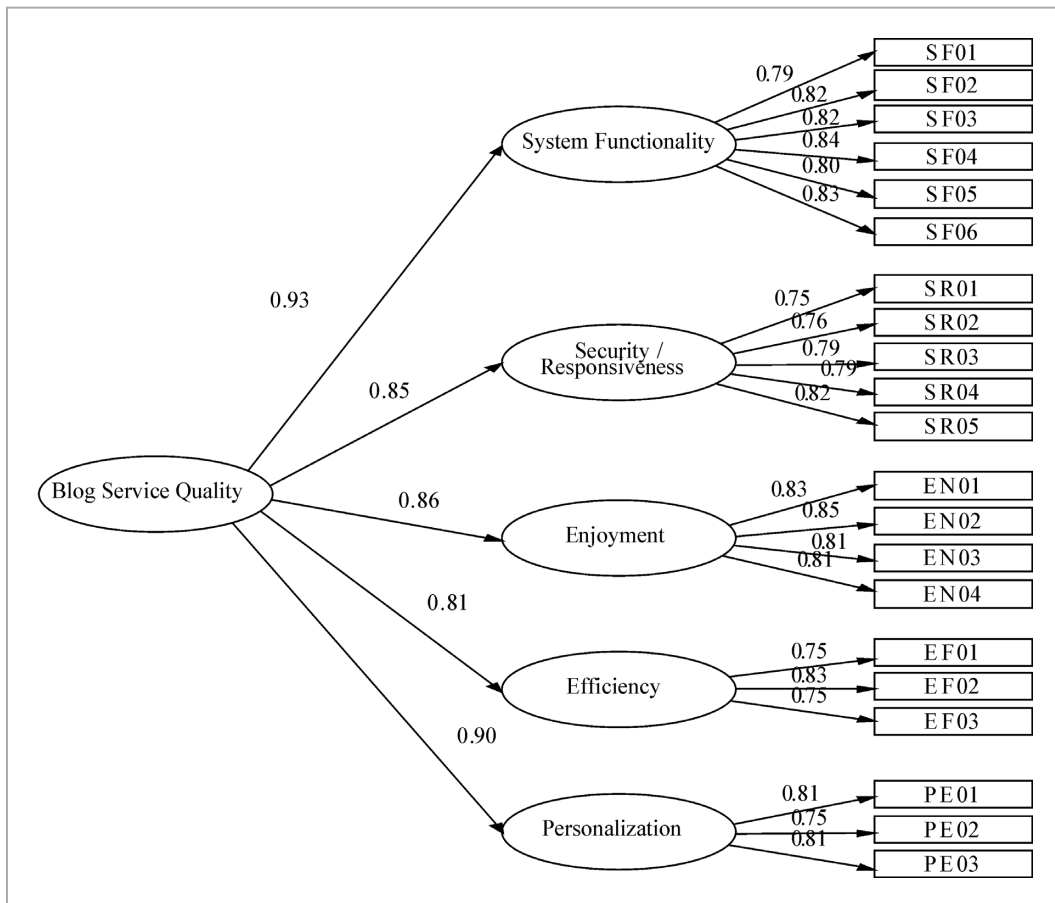
a. inter-factor correlations are presented in the lower triangle of the matrix. b. composite construct reliability / average variance extracted are depicted in bold italic type face on the diagonal.. c. shared variances are given in the upper triangle of the matrix.

To seek more evidence for discriminant validity, the current study applied the approach implemented in Akinci et al. (2010) and Parasuraman et al. (2005), fixed each of these pairwise interfactor correlations to 1, and reconducted the CFA. A significant increase in the chi-square statistic was produced in every instance, such that the $\Delta\chi^2$ 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 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 indicate the explaining power of an individual factor dimension to the entire service quality. This outcome can be used to interpret the influence level of the five-factor dimensions on the whole service quality from a general but quantitative perspective.



▲ Figure 1 Second-order CFA model for blog service quality

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 attention to the personalized services of websites. Second and in comparison with general websites, the entertainment value of a Web 2.0 personal blog, with a factor loading of 0.86, is higher than that of general websites for bloggers. 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 trouble 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.



Based on this discussion, there are considerable differences in service quality scales between blog websites and general websites, supporting the original research motivation of this study. Thus, making comparisons with traditional websites to enhance the new knowledge obtained from this study is necessary.

4.2 Managerial Implications

Given 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, BSPs are recommended to consider enhancing the design and control of the 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 the Serial Blog Article Composition Particle Swarm Optimization algorithm to implement blog article recommendation and provide optimal recommended materials to users.

Third, the enjoyment of blog websites is a unique emphasis given 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 previous studies discussing how to enhance the maintenance of personal data and security measures to prevent data disclosure (Agarwal and Venkatesh, 2002; Akinci et al., 2010; Parasuraman et al., 2005; Wolfenbarger and Gilly, 2003; Yoo and Donthu, 2001). The responsiveness part calls for BSPs to resolve problems promptly in the operation of blog websites. Apart from setting up Help and FAQ pages, BSPs should focus on leading bloggers to access appropriate help channels quickly 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 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 the current 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 is likewise presented. To address the 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 identify the 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 in blog website service quality, whereas 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, compared with the other three related service quality studies, personalization and enjoyment are identified to be uniquely related to blog service quality, further justifying the need for an e-SQ study on blogs.

Despite all the efforts spent on this research, it still has some limitations, which future researchers should be aware of before applying the above research results. First, this study did not make further efforts to identify the bloggers. Thus, there is no way to distinguish the perceived differences between bloggers with different characteristics. Therefore, future researchers should make insightful cross-comparison analyses on bloggers with different characteristics to identify the typology of bloggers and to probe into the implications hidden behind the typology of bloggers.

In addition, because most current blog websites are not business 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. The rationale is that although there are many different uses of blogs, most blog websites are not for specific use. Therefore, focusing on general



blog types contributes to a wider scope of understanding on blog SERVQUAL.

However, with the evolution of technology and changes in marketing strategies, 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. Finally, as mentioned in the context of our first data collection, without accessing the internal databases of blog sites, perfect random sampling was not possible. Future research should try to collaborate with the blog site service providers to achieve a more appropriate random sample from official blog databases.

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