

Web-based Information Systems and Service Quality of IS Department

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Abstract

As growth of the web-based applications, the requirements of the users who have been very familiar to the web-based user interfaces and customer-oriented services on the Internet would become more knowledge-intensive and higher technology involved in a more convenient and polite way of service delivery. Therefore, the service quality of information system department should be considered as a very important factor influencing success of information systems. The objective of this study is to provide the relationship between service quality of IS department and its impacts such as use, user satisfaction and job performance. For this purpose, we provide a research model for it and test it empirically for the users of the corporate portal in one of main telecommunication service providers in Korea. In result, our model with satisfiable validity and reliability shows not only importance of IS departments' service quality but also two-faced characteristics of service quality. That is, while technical competence which means with knowledge and expertise of IS department staffs is more related with user satisfaction on information systems, personal service which means the way and manner of service delivery is more related with use of it.

1 Introduction

As growth of the web-based applications such as commercial portal sites, online stores, virtual communities or online games, the users whose computing abilities have been more improved than the previous users have become very familiar to the web-based user interfaces and customer-oriented services on the Internet. Accordingly, the requirements of the users for the information systems in organizations which have been recently migrated into web-based ones on the Internet would become more knowledge-intensive and higher technology involved in a more convenient and polite way of service delivery. Therefore, the roles of information system department (henceforth IS department) have been evolved from simple engineering oriented ones such as design, development, installation and maintenance of information systems into managerial oriented ones including more managerial functions such as internal customer

management and service management.

However, studies on IS department service quality have not been compatible to such requirements academically. While the measurements of IS department service quality based on SERVQUAL instrument and conceptual model from service marketing community (Parasuraman, et. al. 1988; Parasuraman, et. al. 1991; Parasuraman, et. al. 1993) have been under debate (e.g. Van Dyke et al 1997; Pitt et al 1997; Kettinger and Lee 1997) as like the case of the original version of SERVQUAL, it is hard to find the empirical studies of impacts for IS department's service quality to the users of information systems such as use, user satisfaction, job performance, etc., although there are some studies in which service quality of IS department would influence the success of information systems conceptually (e.g. Pitt et. al. 1995). Most of the previous studies for IS department service quality are focused on the psychometric properties of the instrument (e.g. Kettinger and Lee 1994, Pitt et. al. 1995; Kettinger and Lee 1995a; Kettinger and Lee 1995b; Pitt et al 1997; Kettinger and Lee 1997; Van dyke et al 1997; Carr 2002; Bradely and Kang 2002).

The objective of this study is to provide the relationship between service quality of IS department and its impacts such as use, user satisfaction and job performance. For this purpose, we provide a research model for it and test it empirically.

2 Theoretical Background

2.1 Service Quality of Information System Department

Conceptually and theoretically, SERVQUAL consists of five factors tangibility, reliability, responsiveness, assurance and empathy which are defined in the following way community (Parasuraman, et. al. 1988; Parasuraman, et. al. 1991; Parasuraman, et. al. 1993):

- Tangibilities: Physical facilities, equipment, and appearance of personnel.
- Reliability: Ability to perform the proposed service dependably and accurately
- Responsiveness: Willingness to help customers and provide prompt service
- Assurance: Knowledge and courtesy of employees and their ability to inspire trust and confidence
- Empathy: Caring, individualized attention the service provider gives its customers

The instrument of SERVQUAL consists 22 paired-items on the above five factors. One half of these items are for measuring customers' expectation of service and the others are for their perception. Service quality is then measured by the so-called gap model where the difference scores between customers' perception and expectation of service along the above five factors are calculated. Although five-dimensioned SERVQUAL with gap model has had some theoretical and operational criticisms (Buttle 1996) and some alternatives (e.g. Philip and Hazlett 1996; Sureshcandar et al, 2002) have been suggested, it has been well applied to service management areas in theories and practices (e.g. Danaher and Mattsson 1994; Cunnigham et al 2000; Engelland et al 2000).

Service quality of IS department based on SERVQUAL was suggested by enhancing the lack of theoretical background in user satisfaction with information service function (Kettinger and Lee 1994) and recognizing importance of a human side in quality of information systems as well as a non-human side such as system and information quality (Pitt et al 1995). However, there have been similar criticisms to the original one in it. For example, Van Dyke et al (1997) suggest conceptual problems such as validity and reliability in gap model, ambiguity of the expectation construct, and not-consideration for uniqueness of information systems as well as operational ones such as reliability and convergent validity in difference score and unstable dimensionality of the SERVQUAL instrument, most of which have been considered as the problems in the original SERVQUAL. Although such problems are partly resolved by the other studies (Pitt et al 1997; Kettinger and Lee 1997; Watson et al 1998), some have been remained as unsolved. For example, the results measured by gap model have not been proved superior to only-perception model in reliability and validity and there may have been still misunderstanding the interpretation of expectation in gap model (Pitt et al 1997). Moreover, since the introduction (Pitt et al 1995; Kettinger and Lee 1994; Kettinger and Lee 1995) and debate on it (e.g Van Dyke et al 1997; Pitt et al 1997; Kettinger and Lee 1997 etc.), most of the studies for information system adapted SERVQUAL have focused on only the psychometric properties (Car 2002; Kang and Bradely 2002), not the application of it. For example, the relationship between service quality of IS department and use of information systems or job performance of users has not been studied yet.

While, in spite of academic controversies on the measures of service quality in information systems, most of them have followed a five-dimensioned service quality like the original SERVQUAL, Kettinger and Lee (1997) suggest a four-dimensioned one by omitting tangibilities from original SERVQUAL's five dimensions. Since most information systems services are provided to users in their own environment, instead of visiting the IS department, the visual appeals are not important for users with problems. In other hands, Kang and Bradely (2002) summarize Kettinger and Lee's four-dimensioned one into a two-dimensioned one with 'people skill' such as information system department staffs' ability to deal with users' requirements and expectations, and 'objective attributes of information system services' such as whether or not they are being provided within a reasonable timeframe. Such two factors are similar to those of Gilbert (2000), which identified two measures of internal customer satisfaction one relating to personal service and the other to technical competence.

2.2 Effectiveness and Service Quality of Information Systems

According to the Information Systems Success (ISS) model suggested by DeLone and McLean, in traditional information systems, system quality and information quality affect both use and user satisfaction which are direct antecedents of individual impacts such as job performance and organizational impacts such as profit or cost performance (1992). Although, since this model is derived from the existing MIS studies, it is only a conceptual model that

is not supported empirically, it has been considered as a very useful model to explain causality among dependent variables that had been difficult to identify.

Nevertheless, the original ISS model emphasize only a product oriented side of information systems ignoring a service side, since system quality, which describes measures of the information processing system, is related with production, and information quality, which represents those of information system outputs, is with product (Pitt et al 1995). That is, it is ignored that IS department is not only just a provider of products but also a service provider. For example, if users in an organization use an information system, they want to satisfy their needs and improve their job performance rather than just use it. Accordingly, in addition to system and information quality, success of information systems are influenced by the service quality of IS department, which include technical ability such as solving problems users may be met with, consulting the efficient use of information systems, and training users as well as the way and manner of service delivery like any industries.

3 Research Model

For analysis of the relationship between service quality of IS department and success of information systems measured by a view of users in an organization such as usage, satisfaction and job performance, we suggest a research model that is a modified version of the original ISS model by replacing system and information quality with service quality of IS department (Figure 1). Our model is based on the conceptual model suggested by Pitt et al (1995) who add service quality the original ISS model as the same level of system and information quality. However, in this study, we focus on only service quality without system and information ones, since the single impact of it may be considered as an important issue.

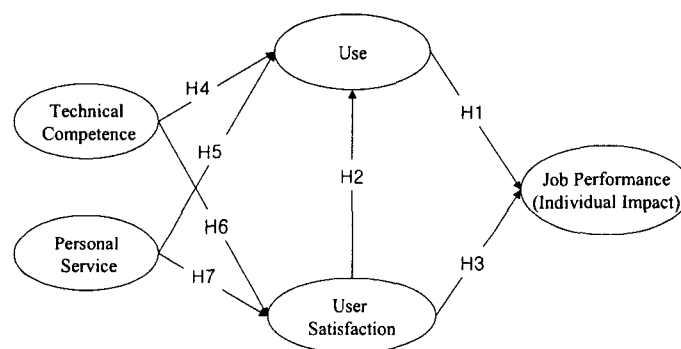


Figure 1 Research Model

4. Variables and Hypotheses

4.1 Job performance

Since, as Delone and McLean discussed, individual impact in the ISS model is closely related to improvement of my or my department's performance (1992), we view individual impact as job performance that is defined as 'improvement of employees' or managers' jobs or decisions by an information system'.

4.2 Use

In most studies on traditional MIS, use of information systems has had two typical problems in measuring it: actual or perceived use, and voluntariness (e.g. DeLone and McLean 1992; Kim and Lee 1986; Welke and Kosynski 1980). In this study, we define use as 'user-perceived voluntary use of an information system'.

If an information system in an organization is compatible to organization's goal, the more use of it, the more positive individual impact users perceived. Thus, we suggest the following hypothesis.

Hypothesis-1 (H1): Use of an information system influences job performance positively.

4.3 User Satisfaction

The importance of user satisfaction in information systems' success is not for a surrogate of MIS effectiveness but for system analysis and design (Au et al 2002). In other words, a good information system that is perceived by its users as a poor system is indeed a poor system (Ives et al 1983). In this study, we define user satisfaction as 'overall satisfaction of an information system'.

Since use of an information system in this study is not compulsory, users would not use it if not satisfied so that the following hypothesis may be followed.

Hypothesis-2 (H2): User satisfaction of an information system influences use of it positively.

Oliver (1989) defines satisfaction as the customer's fulfillment response. Fulfillment can only be judged with reference to a standard that forms the basis of comparison (Au et al 2002). In the case of user satisfaction on information systems in an organization, the standard may be considered as job performance, that is, improvement of job or decision effectiveness. Thus, since user satisfaction is assumed compatibility of positive job performance implicitly, we suggest the following hypothesis.

Hypothesis-3 (H3): User satisfaction of an information system influences job performance of it positively.

4.4 Service Quality

Based on discussion in theoretical background, service quality is defined as a two-dimensional one like Kang and Bradely (2002), and Gilbert (2000): technical competence and personal service. Technical competence is the user-perceived quality on the service related with knowledge and expertise in a technical side provided by IS department staffs. Personal service is related with the way and manner of service delivery such as courtesy of staffs or being provided within a reasonable timeframe. In the terms of SERVQUAL, the former is correspondence to assurance and the latter is to responsiveness and reliability.

In an operations management text, quality may be considered as user fitness for use of customers (Krajewski and Ritzman 1996). Thus, quality whether it is web or service is very closely related to user satisfaction and may considered as a latent variable of quality so that we suggest the following hypotheses

Hypothesis-5 (H5): User perceived technical competence of information system department for an information system influences user satisfaction of it positively.

Hypothesis-7 (H7): User perceived personal service of information system department an information system influences user satisfaction of it positively.

One of main objectives for quality improvement is increasing usages of information systems so that the followings are also suggested as hypotheses.

Hypothesis-4 (H4): User perceived technical competence of information system department an information system influences use of it positively.

Hypothesis-6 (H6): User perceived personal service of information system department an information system influences use of it positively.

5 Research Design

5.1 Measurement Instruments

Among the instruments suggested by Kettinger and Lee (1997), we select and modify six ones from assurance for technical competence (TC) and eight form responsiveness and reliability for personal service (IP). Additionally, for user satisfaction (SA), one scale, overall satisfaction for a corporate portal, for use (US), two ones, intension of use and current use, and for job performance (JP), effectiveness and efficiency of decision and job are adopted.

All instruments for service quality and web quality are developed in perceived form instead of gap model since there have not been significant difference between perceived and gap model although some cautions are required (Van Dyke et al 1997), and all instruments are developed in five-scaled form.

5.2 Sample

We survey the users of the corporate portal in one of main telecommunication service provider in Korea. Corporate portals, which are single-point web browser interfaces used within organizations to promote the management of information throughout the enterprise, offer organizational users the ability to access a wide variety of information sources directly from the desktop (Detlor 2000). Although the user interface of a corporate portal is similar to that of a general portal site, it can be regarded as a typical web-based information system dependent on service quality of IS department in an organization.

Since the corresponding company has operated and managed its corporate portal for two years, the users are very familiar to web based information systems.

The number of sample size is 390 and demographic characteristics are as depicted in Table-1.

Table 1 Demographic Attributes of the Respondents

	Frequency(%)	Percent(%)	Cumulative percent(%)
age			
less than 20	28	7%	7%
21-30	276	71%	78%
31-40	84	22%	99%
41-50	2	1%	100%
gender			
male	260	67%	67%
female	130	33%	100%

6 Data Analysis and Results

6.1 Measurement Model

Before evaluation of our measurement model, the data set is purified by confirmative factor analysis (CFA). In result, from total nineteen items, sixteen are retained as shown in Table-2. All factor loadings of retained items on the constructs are over 0.6 that is higher than recommended acceptable value, 0.60 as depicted in Table-2.

Table 2 Factor Loading of Measure

		FC : Factor Loading
Item	Measure	FC
TC1	The staffs in charge of (Corporate Portal's name) have expertise for answering my questions.	0.86
TC2	The staffs in charge of (Corporate Portal's name) have abilities for solving my problems.	0.89
TC3	The staffs in charge of (Corporate Portal's name) have my best interests at heart.	0.78
TC4	The staffs in charge of (Corporate Portal's name) understand my specific request.	0.70
PS2	IS department provides services I have requested in a reasonable timeframe.	0.81
PS3	IS department provides services I have requested right in the first time	0.83
PS4	Staffs in IS department keep their appointments.	0.82
PS5	The staffs in charge of (Corporate Portal's name) are willing to help me.	0.86
PS6	The staffs in charge of (Corporate Portal's name) always response to my request.	0.82
PS7	The staffs in charge of (Corporate Portal's name) provide prompt services to me.	0.86
PS8	The services are always available during business hours.	0.80
US1	I have an intention to use (Corporate Portal's name).	0.89
US2	I use (Corporate Portal's name).	0.83
JP1	(Corporate Portal's name) improves effectiveness of decision making or doing jobs.	0.90
JP2	(Corporate Portal's name) improves efficiency of decision making or doing jobs.	0.86
SA*	I am satisfied overall (Corporate Portal's name).	-

* : one-itemed measure

For assessing internal consistency for the measurement model, composite reliability and average variance extracted (AVE) for the latent variables of this research are computed as depicted in Table-3. All constructs have relatively higher values than recommended thresholds in case of reliability over 0.70 and in case of AVE over 0.60 (Hair et al 1998).

Table 3 Assessment of the measurement model

Latent Variables	Composite Reliability	AVE
Technical Competence (TC)	0.902	0.670
Personnel Service (PS)	0.939	0.687
Job Performance (JP)	0.873	0.775
Use (US)	0.851	0.741

AVE : Average Variance Extracted

User satisfaction(SA) is omitted since it is one-itemed

The test of the measurement model demonstrates good fit between the data and the suggested model. The chi-square for the measurement model is calculated to be 338.45 ($P=0.00$) with 95

degree of freedom (*d. f.*). Goodness of Fit Index (GFI) is to be 0.88 that is satisfiable although it is not over 0.90 that is known as an accepted threshold generally (Hair et al 1998). In addition, the values of other fitness measurement are also satisfiable (AGFI = 0.82, NFI = 0.93, NNFI = 0.93, CFI =0.95, RMR =0.021).

In addition the correlation matrix of the constructs and the mean and the standard deviation of each one are as shown in Table-4.

Table 4 Correlation matrix and Mean and Standard Deviation

	TC	PS	US	JP	SA
TC	1.00				
PS	0.84	1.00			
US	0.55	0.57	1.00		
JP	0.64	0.64	0.83	1.00	
SA	0.62	0.62	0.77	0.80	1.00
Mean	3.445	3.460	3.563	3.460	3.372
Std. Deviaiton	0.627	0.632	0.684	0.823	0.726

6.2 Structural Model and Test of Hypotheses

As like measurement one, our proposed model results in good fitness values. The chi-square is calculated to be 350.88 (P=0.00) with 97 degree of freedom. GFI is to be 0.87 that is also satisfied with a well-accepted criterion (AGFI = 0.82, NFI = 0.92, NNFI = 0.93, CFI = 0.94, RMR = 0.026).

As depicted in Figure-2, overall results of our hypotheses are very satisfiable.

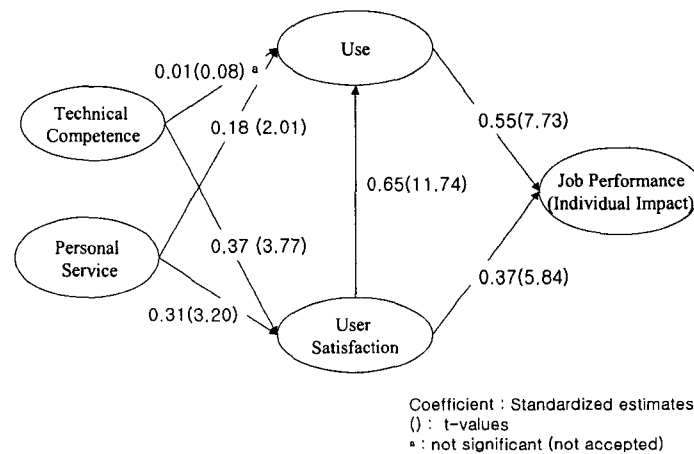


Figure 2 Path Analysis of Structural Model

First, the three hypotheses on the relationships among use, user satisfaction and job performance are all accepted with very high t-values. That is, the relationship between use and job performance (H1) has 7.73, between user satisfaction and use (H2) 11.74, between

user satisfaction and job performance (H4) 5.84.

Second, the hypothesis on personal service and use (H5) is also accepted with t-value 2.01. However, the hypothesis on the relationship between technical competence and use (H4) is not accepted with t-value 0.08.

Third, while both the hypotheses of user satisfaction with technical competence and personal service (H6, H7) are accepted, the t-value of the former (3.77) is higher than that of the latter (3.20).

7. Implications

First, service quality of IS department should be regarded as one of important factors influencing success of information systems, particularly web based information systems. In our model, dependent variables include not only satisfaction that has been frequently used as a surrogate of service quality, but also more comprehensively success measures such as usage or job performance that is based on the ISS model. However, we do not mean that system quality or information quality is less important than service quality. Importance of service quality implies that it should be considered as one of main evaluation criterion for quality of information systems similar to system or information quality.

Second, we demonstrate two-faced characteristics of service quality in information systems empirically. While technical competence is more related with user satisfaction on information systems, personal service is more related with use of it as seen in our results. It implies service delivery systems in IS department should be considered as more important than technical knowledge since the main goal of web-based information system for voluntary use such as corporate portals may be the usage of it rather than satisfaction with it. Accordingly, establishment of user-oriented service delivery system is more important than the technical knowledge or experiences for information systems for increasing use of web-based information systems.

8. Limitations and Further Researches

Though this study suggests a research model for service quality of IS department and success of web-based information systems, and test it empirically with satisfiable results, there are some limitations as followings.

First, an engineering side of quality in information systems is omitted. As discussed in implications of this study, importance of service quality that is a human side one does not imply that an engineering side of information systems' quality should not be regarded as important as a human side. Thus, our suggested model would be improved by adding an engineering side of quality factors. Particularly, in case of web-based system like this study, web quality such as content, functions and design (e.g. Aladwani and Palvia 2002; Ranganathan and Ganapathy 2002) should be considered as main factors as well as service

quality.

Second, there are some limitations in sampling. In this study, the data is collected from the users of the only one organization, a specific organization in Korea. Although the sample includes typical web-based information system's users with typical IS department, we agree the necessity of more general sampling for more reliable and valid results.

Third, the study of the relationship between service quality and other well-known research models would be one of interesting issues. The technical acceptance model (TAM) (Davis 1989; Davis et al 1989) or task-technology fit (TTF) (Goodhue 1995) may be such candidates.

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