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Validating IS Success Factors: An Empirical Study on Webbased State or Local E-government Systems

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ABSTRACT

While Various research has been done about IS success factors such as system quality, information quality, and service quality in the private sector, little attention has been paid to those in the public sector, especially state or local web-based e-government systems. Meanwhile, the current practice of e-government assessments has mainly focused on system and information quality and paid little attention to service quality. This study aims to fill this gap; it validates the relationships between IS success factors and IT effectiveness, based on the case of web-based metropolitan city or provincial (state or local) e-government systems in South Korea. The result shows that not only system and information quality but also service quality have strongly significant relationships with IS effectiveness. It has practical implications for effective e-government policy development and implementation; this study suggests that current constructs of e-government assessments need to be remodeled in a way that includes service quality factor. The key contribution of this study is a theoretical and empirical foundation on which any attempt to initiate or reinforce e-government customer services can be based; this is the first empirical study to validate the influence of the service quality factor on a state or local e-government level.

Keywords

IS success factors, state and local e-government, IT effectiveness, citizen satisfaction, e-government assessments, service quality

INTRODUCTION

The topic of discovering success factors of information systems (IS) has been widely studied by the IS research community. DeLone and McLean (1992) comprehensively reviewed relevant previous research and categorized various IS success factors. Since then, empirical evidence that discusses the fitness of the IS success model has been investigated through various cases and viewpoints (Guimaraes and Igbaria, 1997; Guimaraes and Igbaria, 1997; Taylor and Todd, 1995; Teo et al., 2008; Teng and Calhoun, 1996; Wang and Liao, 2008; Weill and Vitale, 1999; Yuthas and Young, 1998). However, most of these research studies have been about the private sector; little attention has been paid to the public sector, especially e-government systems that deliver crucial public information and services to citizens and businesses. A few research studies tried to empirically validate the fitness of DeLone and McLean's IS success model into national e-government systems (Wang and Liao, 2008; Teo et al., 2008). However, the topic of study has rarely visited the state or local level of e-government systems that offer government information and services to citizens and businesses through websites of the state or local government, which are the closest to citizens in their everyday lives.

Meanwhile, various e-government evaluations have been conducted in an effort to advance e-government across the world, such as E-government Survey (United Nations, 2008), Digital Governance in Municipalities Worldwide (Holzer and Kim, 2007), Global E-government Study (West, 2007), to name a few. In addition, national, state or local levels of website assessments have been performed in some e-government leading countries, including the United States and South Korea; they include the U.S. Municipalities E-governance Report 2008 (Holzer et al. 2008), the U.S. States E-governance Report 2008 (Holzer et al., 2008), an Assessment of Public Agencies' Websites (Ministry of Public Administration and Security, 2007), and an Assessment Report on Seoul Metropolitan Government Website (Website Value Group, 2001). These assessments have used various measures that are important in developing and advancing websites because the measurements become informative criteria that government agencies adopt as a sort of guideline for improving their websites. Ideally, the measurements should be rigorously derived from theoretical and empirical studies, and most of them in actuality have a strong theoretical and empirical foundation. However, while the aforementioned evaluation practices include "system quality" and "information quality" as crucial factors that could affect the successfulness of web-based e-government systems, they have not paid enough attention to the third critical success factor, "service quality." In the private sector, service quality, as well as system quality and information quality, has been proven to be a significant IS success factor. How about in the public sector? Is service quality not significant or meaningful in measuring the successfulness of e-government? To answer the question, the general IS success factors theoretically and empirically proven in the private sector need to be validated in the public sector and to be interpreted in the public context.

Hence, the paper tries to validate the IS success factors, which are system quality, information quality, and service quality, in the context of web-based state or local e-government systems that have rarely been paid attention to in this subject area. Therefore, the main purpose of the paper is to determine which IS success factors significantly influence the level of effectiveness of web-based state or local e-government systems. To do so, the paper first reviews the development of the main IS success factors. Second, a web-based e-government systems success model with a set of hypotheses is proposed. Third, methods, measures, and results are presented. And finally, theoretical and practical implications are discussed. The validated IS success factors in web-based state or local e-government systems may serve as a theoretical foundation for further e-government research on success factors and their policy implications.

LITERATURE REVIEW AND RESEARCH MODEL

Identifying over 100 measures utilized in the 180 previous studies, DeLone and McLean (1992) developed a six dimension taxonomy for an IS success model; the model identified system quality and information quality as two main success factors that affect system use and satisfaction, which then bring up individual and organizational impact. Various research has been conducted to theoretically and empirically prove the relationship between system quality and system use (Guimaraes and Igbaria, 1997; Taylor and Todd, 1995; Weill and Vitale, 1999), between information quality and system use (Teng and Calhoun, 1996; Teo et al., 2008), and between system and information quality and user satisfaction (Negash et al., 2003; Rai et al., 2003; Teo et al., 2008; Wang and Liao, 2008). Seddon and Kiew (1994) clarified the individual relationships among system quality, information quality, system use, and satisfaction, which were broadly proposed on a conceptual level by the DeLone and McLean model.

Meanwhile, observing the reality that although IS functions include a service component, measures of IS effectiveness focus on product aspects rather than on service aspects, Pitt et al. (1995) included a service quality dimension as a significant IS success factor; they argued that "there is a danger that IS researchers will mismeasure IS effectiveness if they do not include in their assessment package a measure of IS service quality" (Pitt et al., 1995, p. 173). Myers et al. (1997), in their extended and sophisticated model based on contingency theory, included service quality as well as system and information quality. Watson et al. (1998) also demonstrated that IS service quality could be achieved at the strategic, tactical and operational level and emphasized that continuing attention to IS service quality should be paid to increase the possibility of IS success. Incorporating various arguments into their previous model, DeLone and McLean (2003) included IS service quality in their IS success model. However, while there have been some studies that tried to empirically validate the relationship between IS service quality and IS effectiveness, no single, consistent evidence has been identified about the relationship; for example, while Teo et al. (2008) found a significant relationship between service quality and user satisfaction, Negash et al. (2003) and Wang et al. (2008) reached a conclusion that there is no or limited relationship between service quality and user satisfaction. This may mean that the relationship between IS success factors and IS effectiveness would be better proven and interpreted on a case-by-case basis. This is a background of the research to validate IS success factors in the context of web-based metropolitan city or provincial (state or local) e-government systems in South Korea.

System Quality

System quality is about "measures of the information processing system itself" (DeLone and McLean, 1992, p. 64), and generally what users look at and feel about an information system. Many different system characteristics have been identified as crucial determinants of system quality perception: accessibility or ease of access (Bailey and Pearson, 1983; Molla and Licker, 2000), ease of use or learning to use (Han, 2001; Rainer and Watson, 1995; Seddon and Kiew, 1994; Seddon, 1997; Teo et al., 2008; Wang et al., 2008), response time (Bailey and Pearson, 1983; Han, 2001; Molla and Licker, 2000), reliability or stability (Molla and Licker, 2000; Han, 2001; Seddon, 1997), etc. Usefulness of specific features of system was also mentioned as a frequent measure for system quality (Hiltz and Turoff, 1981; Goslar, 1986); however, it may be interpreted as a sum of other system quality measures, and as such, generally classified along with usability and use (DeLone and McLean, 1992; Pitt et al., 1995). Other characteristics of system quality that appeared in system quality literature includes the following: User-interface (Seddon, 1997), flexibility (Bailey and Pearson, 1983), and ease of maintenance (Seddon, 1997), to name a few.

From the literature review above, such system quality measures as accessibility or ease of access, reliability or stability, ease of use or usability (including ease of learning how to use), and response time or system speed are adopted here in the research model. In keeping with previous studies, the research model defines "accessibility" as the degree of easiness in accessing what users want to locate, defines "reliability" as navigating page to page without any link error or system down to the degree which users can rely on the system, defines "ease of use" as not requiring specific IT knowledge or experience or being easy to learn how to use the system, and defines "response time" as quick uploading and downloading e-government contents and speedy processing of transactions.

Hypothesis 1 (H1): System quality positively affects the level of satisfaction of citizens who use web-based state or local e-government systems.

Information Quality

Information quality relates to "measures of information system" (DeLone and McLean, 1992, p. 64), and "a function of the value of the output produced by a system" (Negash et al., 2003, p. 758). Just like system quality, information quality is a typical research topic in the IS research community, and various measures have been identified or developed to evaluate information quality: Understandability, including conciseness or precision (Bailey and Pearson, 1983; Rainer and Watson, 1995; Seddon and Kiew, 1994; Wang et al., 2008), completeness or sufficiency (Bailey and Pearson, 1983; Joshi and Rai, 2000; Seddon and Kiew, 1994; Teo et al., 2008; Wang et al., 2008), currency or timeliness (Bailey and Pearson, 1983; Joshi and Rai, 2000; Rainer and Watson, 1995; Seddon and Kiew, 1994; Teo et al., 2008; Wang et al., 2008), format or flexibility (Bailey and Pearson, 1983; Rainer and Watson, 1995; Teo et al., 2008), etc. Some other measures include response time (Hamilton and Chervany, 1981), accuracy (Bailey and Pearson, 1983; Rainer and Watson, 1995; Seddon and Kiew, 1994), reliability (Bailey and Pearson, 1983; Joshi and Rai, 2000), relevancy (Bailey and Pearson, 1983; Joshi and Rai, 2000), volume (Joshi and Rai, 2000), and generalizability (Bailey and Pearson, 1983).

The research model adopts understandability, completeness, currency, and format as measures to assess information quality. Response time or processing time may be better included in system quality. Such measures as relevancy, accuracy, or reliability may also be explained by measures like currency or timeliness. The research model defines "understandability" as being easy to understand any information due to the use of concise, precise and user-friendly terms or symbols, defines "completeness" as covering all the relevant information through administrative or civil services, defines "currency" as updating any change of information on a real-time basis, and defines "format" as offering information in the form that fits citizens' use so that there is no need of data conversion.

Hypothesis 2 (H2): Information quality positively affects the level of satisfaction of citizens who use web-based state or local e-government systems.

Service Quality

While system and information quality are related to the information system itself and its outputs, service quality is a fundamentally different issue (Negash et al., 2003); it is about the process involved with using the system and information. Service quality has been an important topic in business marketing or management. Parasuraman et al. (1991) asserted that service quality should be the core of the overall customer service activities. However, service quality is a relatively new construct in the quality study in the IS research community, as compared with system and information quality. In their explanatory research, Parasuraman et al. (1985) developed 10 potential dimensions, so-called SERVQUAL, to assess service quality by consumers: tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding/knowing the customer, and access (A description of the dimensions can be found in Parasuraman et al., p. 47.). Again, Parasuraman et al. (1988) reduced 10 dimensions to 5 dimensions by removing a few items with relatively low item-to-total correlations and by combining dimensions through factor analyses; the five dimensions are tangibles, reliability, responsiveness, assurance, and empathy. Parasuraman et al. described the five dimensions as follows: (1) tangibles (physical facilities, equipment, and appearance of personnel), (2) reliability (ability to perform the promised service dependably and accurately), (3) responsiveness (willingness to help customers and provide prompt service), (4) assurance (knowledge and courtesy of employees and their ability to inspire trust and confidence), and (5) empathy (caring, individualized attention the firm provides its customers) (p. 23).

With regard to the Parasuraman et al. model, Cronin and Taylor (1992) argued that the existing operationalization of service quality is inadequate because it confounds satisfaction and attitude. In addition, it may be inadequate to apply the SERVQUAL in measuring the effectiveness of IS (Van Dyke et al., 1997). However, the research model adopts the five dimensions of service quality of Parasuraman et al. (1988) since most related research on the service quality of IS refers to Parasuraman et al. (1985, 1988). In keeping with the description of Parasuraman et al. (1988), the research model defines "reliability" as completeness of service offered, defines "responsiveness" as helping state or local e-government website users by providing them with service promptly, defines "assurance" as courtesy expressed through the e-government web services and transparent service processes to inspire trust and confidence about the customer service, and defines "empathy" as individualized attention to the users who asked for services. However, the research model does not include a measure for tangibles because it is hard to operationalize the concept; customer services for web-based e-government systems have no way to show physical appearance to the users, and therefore, this element of service quality is removed. The research model initially tried to include tangibles by defining them as the physical aspects of customer service, such as explicit referral to relevant service persons on every e-government service

webpage or easy-to-find links to contact information from each web page, but defining tangibles in this way did not look relevant. With regard to this issue, Negash et al. (2003) included tangibles by defining them as "physical features of the system, such as whether the system is appealing and looks good" (p. 760); however, this definition is confusing because it seems to be related with system quality rather than service quality.

Hypothesis 3 (H3): Service quality positively affects the level of satisfaction of citizens who use web-based state or local e-government systems.

User Satisfaction as IT Effectiveness

Although much research on IS performance deals with separate constructs for measuring IT effectiveness (DeLone and McLean, 1992, 2003; Myers et al., 1997; Pitt et al., 1995), user satisfaction could be a good proxy to represent IT effectiveness (Negash et al., 2003). It is argued that overall citizen satisfaction is "a necessary criterion variable for identifying the derived importance of a specific public service (Ryzin, 2004). Measures for the construct of user satisfaction are also adapted from previous research in order to make sure of the content validity in representing the concepts about which generalizations are to be made; measures were selected from Andreassen and Olsen (2008), Fornell et al (1996), and Ryzin (2004). The research model constructs user satisfaction with three measures: overall satisfaction, expectancy disconfirmation (performance that falls short of or exceeds expectations), and ideal disconfirmation (performance versus the citizens' ideal e-government services in the category). These measures are currently used in measuring American citizens' satisfaction index (ACSI) on federal e-government services. According to Ryzin (2004), the ACSI is "a well-known national barometer of the quality of goods and services in the U.S. economy" (p. 11). The scale of the model is composed of an overall satisfaction anchor, a comparison to prior expectations, and a comparison to an ideal point. The strength of the model has been well recognized (Ryan, Buzas, and Ramaswamy, 1995; Ryzin, 2004; Vavra, 1997).

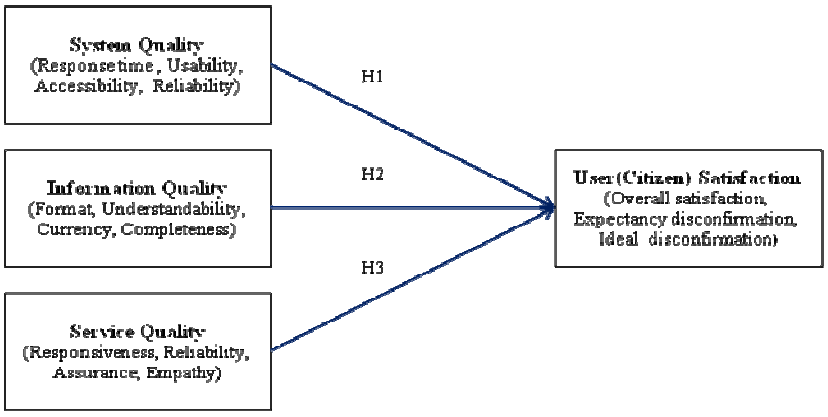


Figure 1: Research Model

METHODOLOGY

Data Collection

The current research is a part of a project funded by the Korean government to investigate IT success factors in web-based metropolitan city or provincial (state or local) e-government systems. As it was intended to cover all the metropolitan city and provincial level governments in South Korea, a cross-sectional research design was chosen, and the research methodology thought to be most appropriate was a survey questionnaire; question items in the questionnaire were theoretically grounded as discussed in the previous section. A survey is a popular method used by the IS research community (Newsted et at., 1998). According to Newsted et al. (1998), surveys provide responses that can be generalized to other members of the population and often to other similar populations, and they can provide a way of comparing responses over different groups, times, and places.

A professional on-line survey firm was hired to conduct the data collection. The data used to test the research model were obtained from a sample of experienced users of e-government services. To increase the generalizability of the result, the respondents were evenly spread across all Korean metropolitan city and provincial governments: 100 respondents for each provincial government, with 1,600 respondents together. E-government services can be grouped into three categories: Providing public information, processing civil services on-line, and allowing citizen to participate in government affairs. The survey results need to represent all of these three service experiences proportionately through the provincial governments. Finally, the survey allocated a quota to respondents according to their gender, age, education, and income level to represent the citizens. Before the

questionnaire was finalized, it was piloted with 121 sample respondents. Several changes were made to the final version of the instrument, based on comments and suggestions from pilot respondents. These included the rewording of several questions and the elimination of IT jargon and acronyms.

Demographic Data

To meet the demographic allocations, the study adopted an on-line panel survey to control the numbers of respondents according to their demographic characteristics; automatic and real-time screening of respondents was enabled by an on-line survey system. An on-line panel survey could be justified in that respondents should have an experience of using e-government services. In addition to these advantages, an on-line panel survey offers some unique advantages that increase the validity of responses because it gives respondents a chance to be reminded of those service experiences by allowing them to revisit the e-government websites of provincial governments. To increase the validity of responses, the survey system automatically removed any response that took too little time to answer the questions in an appropriate manner. The demographic characteristics of respondents are summarized in Table 1.

Characteristic		Number	Percentage
Gender	Male	896	56%
	Female	704	44%
Age	20-29	432	27%
	30-39	512	32%
	40-49	432	27%
	>50	224	14%
Education	High School	289	18%
	Undergraduate	1,159	72%
	Graduate	152	10%
Occupation	White-collar	692	43%
	Blue-collar	193	12%
	Self-owned	168	11%
	Housekeeper	227	14%
	Student	221	14%
	Others	99	6%
E-government experience	Information	992	62%
	Civil services	480	30%
	Participation	128	8%

Table 1: Characteristics of Respondents

Current users of e-government services in South Korea have the following characteristics: the percentage of users with age over 50 is relatively lower than that of the other age groups; the percentage of users with an undergraduate or graduate degree is much higher than that of the overall population; the percentage of users with a white-collar job position is relatively higher than that of the other occupation groups, among others.

RESULTS

The first thing to do in structural equation modeling is to fit the model to the data collected. If model-fit indices are lower than acceptable levels, then the statistics produced by the analysis cannot be interpreted in a significant manner. Various model-fit measures were used to assess overall goodness of fit for a given structural equation model; commonly used measures include normed chi-square [NC, the ratio of X^2 to degrees-of-freedom (df)], goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), normalized fit index (NFI), comparative fit index (CFI), root mean square residual (RMSR), and root mean square error of approximation (RMSEA).

Fit Indices	Acceptable Level of Value*	Current Research Model
NC (X^2/df)	≤ 3	2.936
GFI	≥ 0.9	0.983
AGFI	≥ 0.8	0.971
CFI	≥ 0.9	0.992
RMSR	≤ 0.1	0.060
RMESA	≤ 0.08	0.035

* Acceptable level of value is based on the criteria used in Wang and Liao (2008)

Table 2: Fit Indices for the Structural Model

As shown in Table 2 above, all the model-fit indices exceeded their respective common acceptance levels suggested by previous research, demonstrating that the structural equation model of the research shows a fairly good fit with the data collected for the research: NC=2.936, GFI=0.983, AGFI=0.971, CFI=0.992, RMSR=0.06, RMSEA=0.035.

Schumacker and Lomax (2004) recommended stricter interpretation of fit indices; GFI and AGFI close to or greater than 0.95 are acceptable. However, they suggest that NC between one and five would be good enough, which is a somewhat generous interpretation; NC value less than one indicates a poor fit, and a value greater than five reflects a need for improvement (Schumacker and Lomax, 2004, p. 82). The model fit indices of the research model in the study meet this rigorous level of acceptance as well, as shown in Table 2. Meanwhile, Andreassen and Olsen (2008) argued that the Chi-square (X^2) is "sensitive to the sample size above 200" (p. 318). In this context, the Chi-square (X^2) would not be a good indicator of model fit in this study because the sample size of the research is 1,600. Putting all criteria and their values together, all paths in the structural model of the study can be interpreted according to the statistical output, running the AMOS software; it can be claimed that the model of the study fits the data reasonably well.

In addition to the model fit analysis, it is necessary to make sure that measures in each construct (factor) are reliable in representing the factor. The study used Cronbach's Alpha to test internal consistency reliability, the degree to which responses are consistent across the items within a single factor or construct; the test result is shown in Table 3 below. If internal consistency reliability is significantly low, then the content of the construct may be "so heterogeneous that the total score is not the best possible unit of analysis for the measure" (Kline, 2005, p. 59). Though there is no universal standard about how high Cronbach's Alpha should be, an Alpha coefficient over 0.9 can be considered "excellent"; a coefficient value over 0.8 is "very good"; and a value over 0.7 is "adequate" in general (Kline, 2005, p. 59).

Factor	Items (Measures)	Corrected Item-Total Correlation	Cronbach's Alpha (Standardized Items)
System Quality	Accessibility	0.674	0.864
	Reliability_sys	0.708	
	Usability	0.750	
	Response time	0.719	
Information Quality	Completeness	0.684	0.850
	Currency	0.719	
	Understandability	0.673	
	Format	0.680	
Service Quality	Responsiveness	0.818	0.922
	Reliability_ser	0.814	
	Assurance	0.830	
	Empathy	0.816	
User Satisfaction	Overall satisfaction	0.866	0.920
	Expectancy	0.841	
	Ideal disconfirmation	0.804	

Table 3: Construct Reliability Analysis

As shown in Table 3 above, the Cronbach's coefficient alpha for the system quality factor is 0.864, 0.850 for the information quality, 0.922 for the service quality, and 0.92 for user (citizen) satisfaction, respectively; all the values are close to or over 0.9, indicating that the internal consistency reliability of each construct (factor) is high enough.

Because the research model was verified in its model fit and internal consistency reliability, statistic outputs produced can be interpreted according to their significance. The first analysis output is factor loading. As shown in Table 4, all the coefficients loaded were statistically strongly significant.

The regression weights and their significance levels of each causal path are presented in Table 5 to explain each equation in the hypothesized model. As hypothesized, the system and information quality had a strongly significant influence on user (citizen) satisfaction (γ=0.36 and 0.35, respectively, at 0.1% significance level), supporting H1 and H2. Although its level of impact is relatively weak when compared with system and information quality, the statistic value (γ=0.26) shows that the service quality also has a strongly significant effect on user (citizen) satisfaction with web-based provincial (state or local) e-government systems supporting H3. The analysis output of AMOS, including regression weights and their significance, is summarized below in Figure 2.

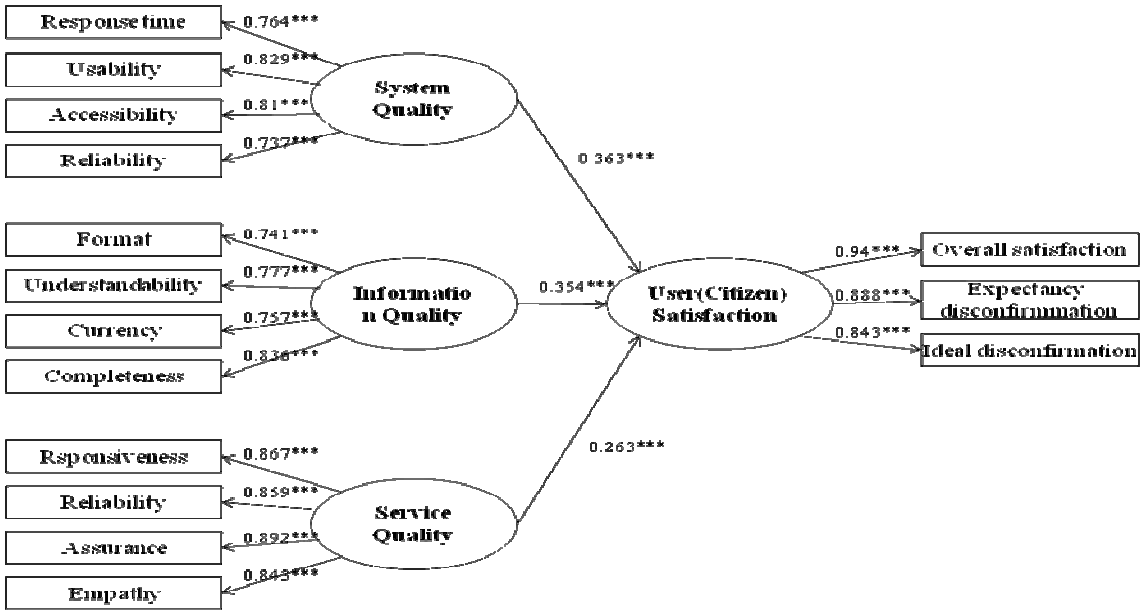
Factor	Items	Estimate	Estimate	S.E.	C.R.	P-value
System Quality	Response time	1.000	0.764		*	
	Usability	1.081	0.829	0.034	32.000	<0.001
	Accessibility	0.990	0.810	0.035	28.233	<0.001
	Reliability_sys	0.962	0.737	0.028	33.812	<0.001
Information Quality	Format	1.000	0.741		*	
	Understandability	1.049	0.777	0.035	29.667	<0.001
	Currency	1.046	0.757	0.035	30.023	<0.001
	Completeness	1.052	0.836	0.036	29.185	<0.001
Service Quality	Empathy	1.000	0.867		*	
	Assurance	0.945	0.859	0.024	40.012	<0.001
	Reliability_ser	1.027	0.892	0.028	37.044	<0.001
	Responsiveness	0.964	0.843	0.025	38.377	<0.001
User Satisfaction	Overall Satisfaction	1.000	0.940		*	
	Expectancy disconfirmation	0.979	0.888	0.017	58.445	<0.001
	Ideal disconfirmation	0.940	0.843	0.018	51.204	<0.001

* T-values for these parameters were not available because they were fixed for scaling purposes.

Table 4: Factor Loading

Causal Paths				Estimate (Unstandardized)	Estimate (Standardized)	S.E.	C.R.	P
H1	System Quality	→	User(Citizen) Satisfaction	0.372	0.363	0.045	8.254	<0.001
H2	Information Quality	→	User(Citizen) Satisfaction	0.388	0.354	0.056	6.875	<0.001
H5	Service Quality	→	User(Citizen) Satisfaction	0.212	0.263	0.02	10.331	<0.001

Table 5: Path Coefficients



*** Significant at the 99.9 % confidence level

Figure 2: Hypothesis Test Results

DISCUSSION

Implications

Currently, most state or local governments don't conduct a periodic satisfaction survey to see how well the e-government systems perform and to get feedback from citizens and businesses to improve e-government services. Who determines the quality of IS is not the developer but the end-user (Pitt et al., 1988). In this sense, the validated effect of service quality on citizens' satisfaction in e-government services implies much in terms of their current practices, which lack consideration of customer service aspects; the government has rarely paid enough attention to service quality. For example, especially in South Korea, measures of the annual government and public website assessment are mostly about system and information quality (Ministry of Public Administration and Security, 2007); in addition, there is no regular citizen satisfaction survey on metropolitan city or provincial (state or local) e-government services. Since most existing evaluation criteria have something to do with system and information (product) quality, government officials who want to be ranked higher in the next evaluation usually focus their efforts on the system and information quality. Evaluations or assessments have formative functions (Langbein, 2006; Vedung, 1997; Wholey et al., 1994); information from an evaluation helps policy or program implementers or related stakeholders to improve the effectiveness of a policy or program. However, this would be only possible when all the relevant success factors or measures are reflected in the evaluation or assessment. If not, only limited information may be generated based on unbalanced or incomplete evaluation measures. This is exactly what happens to the current e-government evaluation or assessment practice as discussed earlier. According to the pilot survey, with the number of 988 respondents, only 12.3% of internet users have an experience of using e-government services. A good way to attract the remaining 87.7% to the e-government world would be to implement relevant customer services to help citizens who don't have enough IT knowledge, skills, or experiences use those services. Indeed, service factors really matter to citizens who (will) use web-based state or local e-government services.

Future Research Directions

Validating the existing theory of IS success models has only recently started in the public area on some federal-level (nation-level) e-government systems. E-government services offered by state or local governments are still not paid sufficient attention although they are very important in that the state or local government is the closest government entity to local citizens and businesses. This study validated the effect of the service quality factor on user (citizen) satisfaction, which is the same result in Teo et al. (2008). However, the research of Negash et al. (2003) and Wang et al. (2008) showed a totally different result; the effect of the service quality factor was statistically insignificant or just marginally supported (not statistically significant at 5% significance level). More research needs to be conducted to verify the influence of service quality on user satisfaction. Moreover, the data for the research were collected only from citizens who have some experiences with local e-government services. The current e-government systems users might be better equipped with the IT knowledge, skills, and experiences needed for utilizing e-government services than non-users. The result--that the effect of the coefficient of the information and system quality factor on user (citizen) satisfaction is higher than that of the service quality factor--may reflect this possible characteristic of respondents. Service quality may be more important to those people who don't use IS due to their lack of knowledge, skills and confidence about the technology. By including these potential users who would use e-government systems if provided with relevant customer services to help them work through the systems, arguments about IS success factors would become stronger. Therefore, this may be a very important future research topic that should be addressed because it entails a crucial implication for the current e-government practices; the government should take more care in their service delivery process (service contact point of citizens). The research result of Kraemer et al. (1993) shows how important user support is. Managerial issues should be regarded as important as technical issues (White, 2007).

Limitations

As with all empirical studies, this research has potential limitations in terms of its external and internal validity. The first limitation is related to the fact that all the data were collected through self-report scales from citizens who responded to the survey. This may lead to the well-known "common method bias." Originally, in the IS research community, this bias has been cited as one of the strong criticisms of theory tests with the structure of the technology acceptance model (TAM) or the theory of planned behavior (TPB) research survey questionnaire (Straub et al., 2004). When a survey instrument influences the scores or measures being gathered, this common method variance occurs in a way that the previous question is highly correlated with the next question, leading to the respondent's tendency to correlate the answer to two subsequent questions. The survey questionnaire of this study may not be an exception to this bias. However, each question was carefully written to make it distinct from the previous and the next ones through a pilot study. Second, the findings of this study may be limited to the case of South Korea. People from different cultures may behave differently. Because the Korean people may be different in recognizing the system, information, and service quality from people in other countries, the generalization of the research results may be limited.

CONCLUSION

While two studies on validating the IS success model in the public arena show different results on the significance of service quality as a factor that affects user satisfaction on national-level e-government systems (Teo et al., 2008; Wang et al., 2008), this study shows the validity of service quality as a factor that influences the effectiveness of local level web-based e-government systems for the first time, based on the South Korean survey data. The result of this study leads to a conclusion that citizens' satisfaction with e-government services depends not only on the product (system and information) quality but also on the service delivery process quality to increase the utilization rate, leading to a high return on investment in local e-government systems. There would be no such thing as a perfect e-government; e-government can be described as continuously developing and improving. The government may need to produce not only a better product but also better support (service process); the government should ensure that every citizen can benefit from e-government services, given the level of the available e-government services. The government should not wait until citizens catch up with technologies but provide them with appropriate technical support or assistance on a daily basis. Using this approach, the government may reduce the digital divide that would affect the effectiveness of e-government policies in various ways.

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