# A Study of user-centric service model and user satisfaction analysis for information service

**Chang-Su Kim\*, Hoe-Kyung Jung\*\***, *Member, KIMICS*

*Abstract*—Lately, influence of information rises and interest about satisfaction estimation of information-providing service is risin. According to rapid change in information environment, information-providing service is being changed in various form, in which center development is made in relation to the effort for customer satisfaction intended to enhance user's satisfaction level through providing more convenient and higher service centered on information service user rather than information service provider.

Organizations providing information service is also changing their service from traditional one centered on service provider to that for user's satisfaction and service quality, and evaluation of information service quality and measurement of user's satisfaction as the result of using information service are regarded important. In this respect, it is needed to measure user's satisfaction level for environmental factors of information service and analyze what kind of influence they have to enhance user's satisfaction level of information service.

Also function and efficiency of information offer service are important. Therefore, interest for satisfaction survey to heighten contents satisfaction of information-providing service, service satisfaction, satisfaction of user of system satisfaction is increased.

In this paper, we propose a model of the user satisfaction index for information-providing services and present the user satisfaction index is measured to the model. Also we this study suggest qualitative improvements of information-providing service required for change to user-centric information-providing service through measuring user satisfaction index of ITFIND system and schemes to improve information quality

*Index Terms*—Information Service, Satisfaction Index, User Satisfaction, User Satisfaction Index Model

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\* Chang-Su Kim is with the Department of Internet, Chungwoon University, Chungnam, 350-701, Korea (Tel: +82-41-630-3315, Fax: +82-41-634-8700, Email: ddoja@chungwoon.ac.kr)

\*\* Corresponding Author: Hoe-Kyung Jung is with the Department of Computer Engineering, Paichai University, Daejeon, 302-735, Korea (Tel: +82-42-520-5640, Fax: +82-42-520-5405, Email: hkjung@pcu.ac.kr)

## I. INTRODUCTION

According to rapid change in information environment, information-providing service is being changed in various form, in which center development is made in relation to the effort for customer satisfaction intended to enhance user's satisfaction level through providing more convenient and higher service centered on information service user rather than information service provider. [1,2,3].

Customer satisfaction continuously has been held in the interest of not only information service field, but also public sector, private sector, various industries and government, research institutes. Ultimate goal of customer satisfaction survey lies in creation of higher customer satisfaction and profit through setting up strategy to improving customer service and providing better customer service by finding out customer's needs and tendency. Due to this reason, lately interest of not only profit-making organization, but also nonprofit organization in customer satisfaction is increasing.

Accordingly information-providing organization is also changing from traditional service provider-centric to centering on user satisfaction and service quality, and evaluation of information service quality and measurement of user's satisfaction as the result of using information service are regarded important. In this respect, it is needed to measure user's satisfaction level for environmental factors of information service and analyze what kind of influence they have to enhance user's satisfaction level of information service.

ITFIND, information-providing service, can be also utilized as a tool for future strategy to promote information service through its function to measure satisfaction level of users of information-providing service and overall satisfaction index.

Overall composition of ITFIND user satisfaction index comprises two parts, one of item for satisfaction level of each category such as system satisfaction level and the other of item for overall perceived satisfaction. Classification of user satisfaction into that for each category and composition and overall analysis of them can contribute to enhancement of user satisfaction level, availability and reliability of ITFIND.

In this regard, this study suggest qualitative improvements of information-providing service required for change to user-centric information-providing service through measuring user satisfaction index of ITFIND system, and analysis of information service to enhance user satisfaction and schemes to improve information quality.

## II. SATISFACTION SURVEY MODEL

### 2.1 ACSI (American Customer Satisfaction Index)

Customer satisfaction survey for government's administrative service is conducted by transforming ACSI satisfaction survey model which was developed by Michigan Management School and U.S. American Society for Quality and has been applied to private sector (economy, industry, etc.) so as to be suitable to public service. [1,2].

In fact, currently ACSI measures satisfaction of 7 economic sectors, 35 industries (including e-commerce), 190 companies, and federal government or local governments.
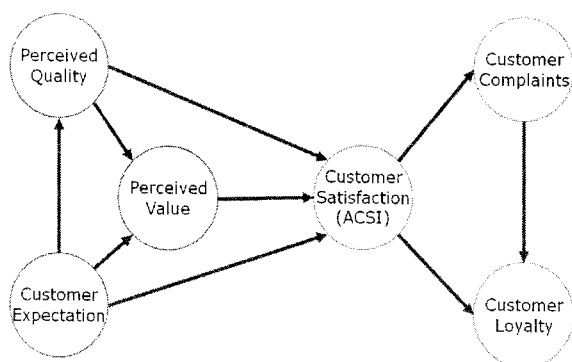


Fig. 1 ACSI Model

ACSI model, currently being used for surveying satisfaction of government organizations, is as per Figure 1. ACSI is conducted on the basis of data collected through phone interview with actual customers using product or service.

Customer Expectation is combination of experience of customers who used product or service and information from media, advertisement, story heard from other customers. Customer expectation level has

influence on evaluation of quality and forecast for how to provide better product or service. [4].

Perceived quality is measured through overall quality, reliability, suitability of provided product or service to customers demand, which have greatest influence on customer satisfaction [4,5].

Perceived value is measured by overall price compared to quality and overall quality compared to price. This has direct influence on ACSI and is influenced by perception of expectation and quality. But this tuned out to have a little less influence on satisfaction and Customer loyalty [5,6,7].

Customer complaint is a base having reverse relation with satisfaction. Customer loyalty is measured through question on the possibility of purchase of company's product or service at various price points. This has positive influence on customer satisfaction. But the extent of influence varies according to the type of company and industry [4,8].

### 2.2 NCSI(National Customer Satisfaction Index)

Korea productivity Center refers to aforementioned U.S. ACSI model. National Customer Satisfaction Index (NCSI) survey model applied by KPCIT is a factor basically to determine customer satisfaction suggesting following factors [1,2,3].

Customer's perception of service quality (Perceived Quality)

Expectation level of respondent as a customer of one service (Customer Expectations)

Customer's perception of value (Perceived Value)

State of Customer satisfaction from comprehensive viewpoint(Customer Satisfaction)

Customer Complaints and Customer Loyalty

These factors represent relative satisfaction level based on customer's expectation of survey object product or service. Currently, like U.S. ACSI, NCSI also includes public service including government such as tax, post, railway service in its survey objects, and evaluation of customer satisfaction for government-held companies in 2002 was conducted on the basis of NCSI model.

### 2.3 User satisfaction index model

Aforementioned American Customer Satisfaction Index or National Customer Satisfaction Index, widely used in marketing field, had irrationality in applying them as the model for measuring satisfaction index of information system users as it is. It is because with American Customer Satisfaction Index or National Customer Satisfaction Index applied to all industries in same way could not measure satisfaction index on detailed level in consideration of the characteristics of information system.

In this regard, this study classified information

quality, service quality, system quality having influence on user satisfaction for the composition to measure satisfaction index of information system with the purpose of measurement of satisfaction index in consideration of the characteristics of information system.
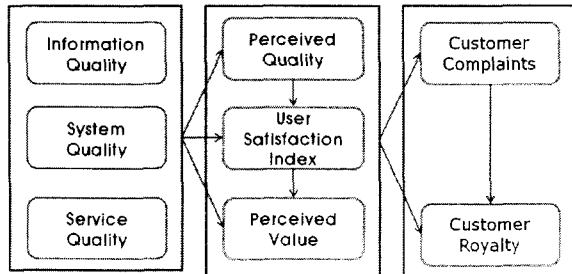


Fig. 2 ITFIND Uset Satisfaction Model

In user satisfaction index (USI) model of ITFIND system indicated in Figure 2, information quality, service quality, system quality affect perceived quality, user satisfaction, perceived value and perceived quality, user satisfaction, perceived value reduce customer complaints and enhance customer loyalty. In addition, interactive relation meaning that when user complaint is reduced, user loyalty increases is indicated.

## III. USER SATISFACTION SURVEY MODEL AND SURVEY METHOD

### 3.1 Composition of survey model

Satisfaction survey model for information service is a tool to measure the extent to which user, based on practical experience as well as his expectation, subjectively feels various factors composing service in the process of using information service. In order for this user satisfaction survey model to secure validity, important factors having influence on user satisfaction of information-providing service should be reflected.

Information service can be largely classified into information quality, system quality, and service quality. In user satisfaction survey model for information service, on the dimension of sub-factors determining user satisfaction for information service, information quality of three categories is composed of information accuracy, latestness, reliability, availability, specialness, easiness of understanding, and service quality is composed of 4 factors of outer design, reliability, immediacy, and system quality is composed of 4 factors of easiness of use, easy accessibility, response time, interactivity.

### 3.2 Survey object and analysis method

For user satisfaction survey for information service, questionnaire survey method through ITFIND homepage for information service users was selected. Survey period was from November 17, 2008 to November 26, and responded questionnaires of 1355 cases were used as analysis data.

As analysis tool to analyze data for user satisfaction survey for information service, SPSSWIN16 version and Excel 2007 was used to derive calculation formula.

### 3.3 Satisfaction calculation method

In measurement of satisfaction, 7- likert scale is used for satisfaction and level, overall perceived satisfaction of each item, where 'very dissatisfactory' is scored as 1 point and very satisfactory is scored as 7 point, which are converted again to 100-point scale through $\{(i-1)/6\} \times 100$.

Table 1 Base for satisfaction measurement

| Division | 7-likert scale | Point converted to 100 |
|---|---|---|
| Very dissatisfactory | 1point | 0.00 point |
| Dissatisfactory | 2 point | 16.67 point |
| A little dissatisfactory | 3 point | 33.33 point |
| Neutral | 4 point | 50.00 point |
| A little satisfactory | 5 point | 66.67 point |
| Satisfactory | 6 point | 83.40 point |
| Very satisfactory | 7 point | 100.00 point |

User satisfaction for information service consists of satisfaction for each category and overall satisfaction. Satisfaction for each category is an index to indicate satisfaction level on 3 levels composing overall satisfaction level. In satisfaction for each category, weight imposed to importance of detailed questionnaire item is reflected, and weight of each questionnaire item is derived on the basis of relative importance of correlation coefficient of each item for intuitive satisfaction level of each category (perceived satisfaction on each dimension). Calculation formula of satisfaction for each category is as per Formula (1).

$$Category\ Satisfaction(C_i) = \sum_{i=0}^{n} (W_i \times S_i) \qquad (1)$$

$S_i$=satisfaction of survey items

As for weight calculation, in case of weight for each item, perceived satisfaction of each category was made dependent variable and then, correlation analysis with each item of category made an independent variable was conducted to get sum of correlation coefficients of each independent item was acquired and, relative weight of each independent variable's

correlation coefficient(questionnaire) was utilized. Formula to calculate weight of each category is as per Formula (2).

$$Category\ Weight(W_i) = r_i / \sum_{i=0}^{n} r_i \qquad (2)$$

$r_i$= correlation cofficient of category

As for weight of each category for calculating overall satisfaction, we conducted correlation analysis with perceived satisfaction made an independent variable and it was calculated with relative weight of each independent variable's (category) correlation coefficient for the sum of correlation coefficient of all categories).

The reason for using correlation coefficient instead of regression coefficient) is that first, in case of regression coefficient, it is acquired on the basis of result of regression analysis for perceived satisfaction and regression analysis for perceived satisfaction of each category, but reliability of regression analysis itself is impaired by missing value. And in case extreme value or negative value (-) is acquired, those analysis is not easy. In case of correlation coefficient, there can be a matter to average weight value, but it has advantage not to consider the matter of missing value and to solve the problem of regression coefficient, and so correlation coefficient was used in this study. And in calculation of total satisfaction index of each organization, we set ratio between satisfaction index of each category and total perceived satisfaction as 70%:30%. Formula to calculate total satisfaction is as per Formula (3).

$$Total\ Satisfaction(T) = C_i \times 0.7 + E_i \times 0.3 \qquad (3)$$

$E_i$=experience satisfaction

## IV. ANALYSIS OF OUTLINE OF SURVEY RESULT

### 4.1 Satisfaction of each category

Total satisfaction index of whole users of information service ITFIND turned out to be 80.77. It was acquired through satisfaction of each category, each value to which weight is applied and users' perceived satisfaction on ITFIND. In satisfaction of each category, satisfaction on information quality turned out to be highest as 81.79, and service satisfaction was analyzed to be 74.72 and system satisfaction to be 74.69.
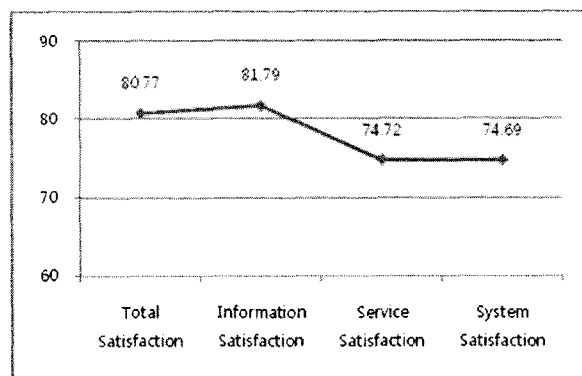


Fig. 3 Distinction of Category Satisfaction

### 4.2 Value, availability, complaint, loyalty

As a result of surveying and analyzing overall value of ITFIND, availability of ITFIND for performance improvement and performance productivity improvement, complaint against ITFIND, willingness to use it continuously and loyalty to it, value index turned out to be 73.95, availability index to be 75.36, complaint matter to be 58.57(little:1, much:100), loyalty index to be 85.77 as below Figure 4.
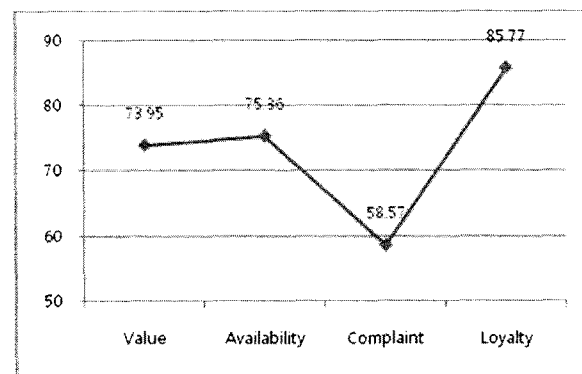


Fig. 4 Value, Availability, Complaint, Loyalty Satisfaction

### 4.3 Satisfaction index of each component in category according to sex

To review whether sex which is user attribute has any significant influence on the satisfaction index of each component in category, we conducted ANOVA to compare average between groups and verify it. As the result of ANOVA verification, user satisfaction index according to all components of category, namely information(F=840, p=.360), service(F=0.71, p=.790), system(F=0.927, p=.336) turned out to be insignificant within significance level $p \leq .05$. As per Figure 5, both of man and female showed high satisfaction index for contents satisfaction, and in case of female, they showed higher satisfaction in contents satisfaction and system satisfaction than man.
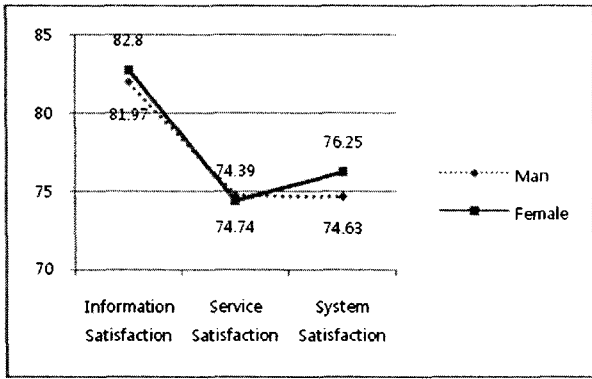
Fig. 5 Distinction of Sex Satisfaction

## 4.4 Satisfaction index of each component in category according to scholarship

As the result of ANOVA verification of user satisfaction index of each component of category according to scholarship, all of contents(F=6.159, p=.000), service(F=11.740, p=.000), system(F=8.040, p=0.00) showed significant difference within significance level p≤.001. As per Figure 6, in components of category according to scholarship, all of B.A, M.A, Ph.D. showed highest satisfaction index for contents satisfaction.
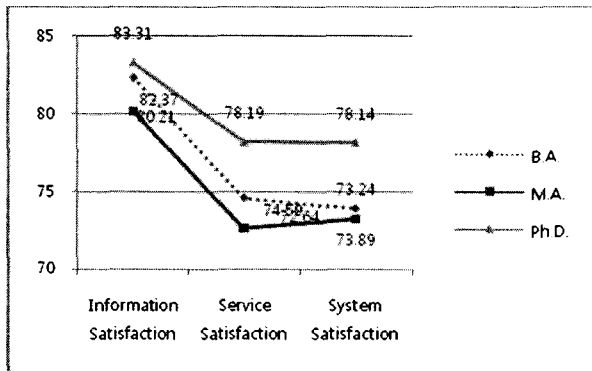


Fig. 6 Distinction of Scholarship Satisfaction

## 4.5 Satisfaction index of utilization period

Satisfaction index of information quality is high in all utilization periods with figure 7, and service satisfaction is low in utilization period about 1 year and about 2 years and any utilization period was expose that system satisfaction is low.

As the result of ANOVA verification of user satisfaction index of each component of category according to utilization period, all of contents(F=1.928, p=.103), service(F=.404, p=.806), system(F=8.28, p=.507) showed insignificant within significance level p≤.05.
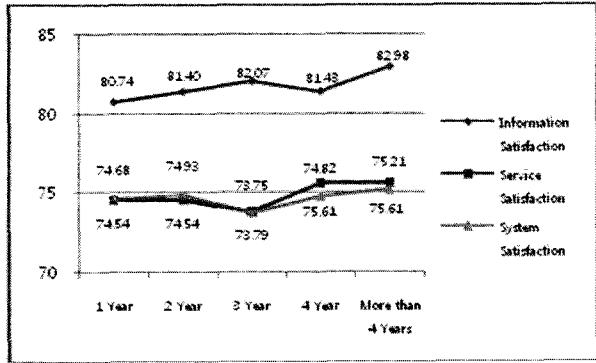


Fig. 7 Distinction of Utilization Periods Satisfaction

## IV. CONCLUSIONS

In this study, standardized and systemized user satisfaction index was calculated by using user satisfaction index model for information-providing service ITFIND. Overall satisfaction index of ITFIND user and whole users and user satisfaction index for information quality, system quality, and service quality were calculated and user satisfaction index of each dimension for each component of category, value, availability, complaint, loyalty index, customer-participatory type user satisfaction were calculated.

Satisfaction index of each user group according to sex, scholarship was calculated. Though satisfaction of each user group was analyzed through analysis of difference according to using period, access frequency, age, scholarship, work, sex, in this study, parts related to sex and scholarship were only described. For verification of satisfaction according to sex and scholarship, ANOVA was conducted. All verifications of sex-related satisfaction turned out not to be significant within significance level p≤.05, and scholarship showed significant difference within significance level p≤.001.

If ITFIND improves system quality while maintaining and managing information quality to enhance contents satisfaction in future, higher user satisfaction will be acquired. Intensive improvement of information availability while maintaining and managing latestness, specialness, reliability of category components of contents satisfaction and complementation of outer design related to design of outer appearance of homepage and interface, immediacy, reliability of service to provide accurate and right answer to request and interactivity between user and system also can be regarded as necessary strategies to improve user satisfaction in future.

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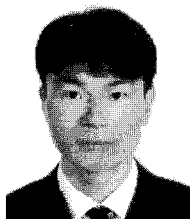
**Chang-Su Kim**

He received the B.S., M.S. and Ph. D. degrees in Computer Engineering from Paichai University, in 1996, 1998 and 2002, respectively. From 2001 to 2004, he has a lecturer of Paichai University, IT Education Center. Since 2005, he has worked as a Full-time lecture in Department of Internet at Chungwoon University. His current research interests include Document Information Processing, Web Service, and Mobile Internet Service
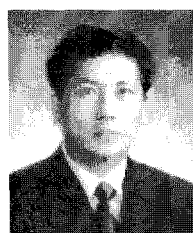
**Hoe-Kyung Jung**

He received the B.S., M. S. and Ph.D. degrees in computer engineering form Kwangwoon University, in 1985, 1987 and 1993, respectively. Since 1994, he has worked as a professor in Department of Computer Engineering at PaiChai University. His current research interests include XML, semantic web, MPEG-21, Mobile RFID