

A Study on Job Satisfaction by Medical Information System Accomplishment

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Abstract

Purpose. The purpose of this study is to investigate the success model related to the hospital information system accomplishment. It is important to examine the success model of the hospital information system and to analyze the factors affecting the job satisfaction accomplishment.

Methods. The method of this study is to 150 copies of the entire survey data were distributed and 135 copies were collected, showing a collection rate of 90%. In order to ensure the reliability of the questionnaire items, Cronbach's Alpha was used to test reliability, and exploratory factor analysis was conducted to determine the convergence of various items. In order to grasp the convergence of various items, exploratory factor analysis was performed. The results of exploratory factor analysis were used to analyze the correlations between variables that were proven to have a single dimensionality before calculating factor loadings and regression analysis by Orthogonal Rotation by Varimax method

Results. The results of this study, first, the system quality of the hospital information system has a statistically significant effect on user satisfaction. Second, the information quality of hospital information system is statistically significant for user satisfaction, indicating that information quality improves user satisfaction. Third, service quality of hospital information system was statistically significant in user satisfaction. Finally, the higher the satisfaction of the users who use the hospital information system, the higher the accomplishment of the organization

Conclusions. This study is based on the successful model of D & M information system. In addition, the hospital information system, the user satisfaction, and the organizational accomplishment in connection with it can be found significant.

Key Words : Accomplishment, D & M information system, Hospital information system, Job satisfaction, User satisfaction

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I . Introduction

1.1. The need for research

The diffusion of information has become a basis for transforming the paradigm of the world economy into a knowledge-based economy. In the spread of such information, the Information system supports the improvement of the organizational structure, the sharing of information among the members of the organization is one of the means to improve productivity through the use of organizations and companies.

This phenomenon is changing in the healthcare field, especially in the hospital industry, which is markedly different from the past. In order to meet the needs of medical consumers and to improve the management environment, multidimensional hospital information systems that share various medical information and management information in the organization and support the decision of the CEO are needed.

Korea's hospital information system began to be introduced as a fractional system for the calculation and billing of medical expenses in the 1980s, along with the implementation of the national health insurance system. Since 2000, hospitals have been demanding rapid information, advanced patient care services, and prompt judgment by management in order to survive in an infinite competition era. The value of the knowledge on management has an increasingly higher demand in information systems¹⁾.

Most of the hospitals in Korea are operated with almost 100% of cases such as MIS, PACS, OCS, EMR, etc. However, the reality is that satisfaction with the information system of rural hospitals is very low. In order to ensure that there is no case that the hospital information system introduced by inputting a lot of capital will not be fully utilized, the results should be diag-

nosed in the same way as other businesses and systems, and the successful factors should be highlighted²⁾. In recent years, research has been conducted on user satisfaction as a research related to the accomplishment of hospital information system³⁾.

In general information system and hospital information system represented by ERP, basic systems such as personnel (including payroll) management, accounting management, purchasing management, and management are basically included as common items. However, IS focused on medical services, and general information system is a system made around production work. Therefore, it can be seen that necessary parts are used and managed based on medical service and production work in the central aspect of information system⁴⁾.

Especially, from the viewpoint of information security, which is a recent issue, the hospital information system agrees with the use of the personal information provided by the individual in order to provide the medical information such as the patient's medical information, and must be used in common. It is important to note that in the case of general information systems, information related to production and sales generated by producers and sellers for production and sales is important. Despite these differences, research has been actively conducted in relation to the accomplishment of general information systems, but there have been few studies on the accomplishment of hospital information systems related to rural areas²⁾.

Therefore, the purpose of this study is to investigate the effects of the success model related to the hospital information system accomplishment and the factors affecting the accomplishment of the research represented by the ERP⁵⁾.

II. Research method

2.1. Research model and hypothesis setting

In this study, the classification of organizational accomplishment factors of hospital information system was reclassified as factors affecting information system accomplishment by 6 dimensions suggested by the Korean D & M information system success model using the Korean literature (Kim & Mi Kim, 2002) and its application as an improved D & M model⁶⁾.

As a result, the organizational accomplishment factors of the hospital information system are divided into 5 categories, and classified into 3 occupational types (medical person, medical care support worker, and administrative worker). The causal relationship between variables is explained by using structural equation⁷⁾.



Figure 1. The research model

2.2. Setting the hypothesis

This research is based on theoretical framework of hospital information system on organizational accomplishment. The quality of the system, quality of information, and quality of service were set as the independent variables, while user satisfaction was the parameter, and organizational

accomplishment was the final dependent variable. These hypotheses are as follows based on the study framework⁸⁾.

H1: System quality of hospital information system will affect user satisfaction⁹⁾.

H2: Information quality of hospital information system will affect user satisfaction.

H3: Service quality of hospital information system will affect user satisfaction.

H4: User satisfaction of hospital information system will affect user satisfaction with organizational accomplishment¹⁰⁾.

Table 1. The data collection

	Separator	Frequency	The percentage (%)
Sex	Women's	68	50.4
	Men's	67	49.6
Ages	20 for	41	30.4
	30 for	39	28.9
	40 for	31	23.0
	50 for	24	17.8
Number of years employed	1 years less than	13	9.6
	Over 1 year ~ less than 5 years	34	25.2
	Over 5years ~ less than 10 years	23	17.0
	Over 10 years - less than 15 years	11	8.1
	Over 15 years	54	40.0
Education	High school graduate or less	3	2.2
	College graduate undergraduate	11	8.1
	Graduate school graduate	85	63.0
	Graduate school graduate	36	26.7

2.3. Data Design

1) Data collection and characteristics of respondents

The subjects of this study were senior general

hospitals in Daegu and Changwon. The reason for this is that hospitals are limited to the target population because they are hospital groups that have introduced the hospital information system relatively long ago compared to the other hospitals. One target hospital in Daegu and one in Changwon area were selected. Survey respondents surveyed employees who understood the hospital information system of the hospital where the respondent was working. 150 copies of the entire survey data were distributed, and 135 copies were returned, showing a collection rate of 90%.

The characteristics of the respondents in the questionnaire were as follows. Of the total 135 respondents, 67 (49.6%) were males and 68 (50.4%) were females. In the age group, 41 (30.4%) are in their 20s, 39 (28.9%) are in their 30s, 31 (23.0%) are in their 40s and 24 (17.8%) are in their 50s. 13 (9.6%) for less than 1 year, 34 (25.2%) for less than 5 years, 23 (17.0%) for less than 10 years, 11 (8.1%) and 54 (40.0%) for 15 years or more. In the case of education, 3 (2.2%) of high school graduates, 11 (8.1%) of college graduates, 85 (63.0%) of university graduates and 30 (26.7%) Showed a high response rate.

III. Empirical analysis

3.1. Analysis of measurement tools

1) Reliability analysis

The reliability of this study was tested using Cronbach's Alpha to obtain the reliability of the questionnaire items. As shown in <Table 2>, the reliability analysis showed that the Cronbach's Alpha coefficient of all variables such as system quality, information quality and service quality, user satisfaction and organizational accomplishment was high from a minimum of .885 to a

maximum of .949. Therefore, the measurement items of this research variable were found to have high internal consistency.

In general, the reliability coefficient is different for each scholar, but it is generally considered to be acceptable if it is 0.6 or more. The system quality, information quality, and service quality items were initially designed with six items, but four items of system quality, two items of information quality, and service quality which reduce consistency in reliability analysis were excluded. The remaining two items and four items were measured.

Table 2. Reliability analysis

The name of the variable	The initial question numbers	Final question numbers	Cronbach's α coefficient
System quality	6	2	.94
Information quality	6	4	.89
Service quality	6	4	.88
User satisfaction	3	3	.94
Organizational accomplishment	3	3	.93

2) Feasibility Analysis

(1) exploratory factor analysis

This study conducted an exploratory factor analysis to understand convergence of various items. The exploratory factor analysis is used to determine whether the concept to be measured is measured accurately. In other words, it is to confirm whether the items measuring the same concept are tied to the same factors. Logic simplifies the question by tying a large number of correlated items together.

Table 3 shows the results of the factor analysis

to test the validity of the measurement items used in this study. In addition, factor loadings were calculated by orthogonal rotation by the Varimax method.

As shown in Table 3, the results of the factor analysis were classified into 5 single factors, and the total cumulative dispersion ratio was 84.465%, which is generally high. The factor loadings of the items were found to be high, from .688 to .883.

(2) Confirmatory factor analysis

Confirmatory factor analysis analyzes the validity of the data in the causal relationship analysis and confirms whether specific items constitute potential factors based on the exploratory factor analysis results. In other words, it is to determine whether the measurement items of each concept

are acceptable by the single factor model. This is based on the theory of precedence, so the factors identified in the exploratory factor are used to identify the factors once again.

The statistical value of factorial wit was used as an index to measure convergent validity. If there is a strong relationship with a given construct, then the factorial wit value should be above 0.7, but in this study, the factorial wit value of all questions was found to be at least .824. In other words, in this study, it was confirmed that factorial wit values of confirmatory factor analysis were related to each constitutional concept, and each factorial wit value was statistically significant at significance level $p < .001$.

There is no problem in the validity of this study.

Table 3. Factor analysis

Measurement items	Service quality	Information quality	User satisfaction	Organizational accomplishment	System quality
b17	.87	.18	.10	.16	.10
b16	.84	.07	.22	.16	.21
b18	.82	.13	.18	.09	-.00
b15	.69	.17	.25	.31	.15
b7	.16	.83	.26	-.04	.26
b8	.17	.80	.35	-.02	.27
b9	.17	.79	.01	.44	.04
b10	.12	.77	.10	.43	.10
b26	.27	.20	.83	.30	.15
b27	.26	.19	.80	.34	.18
b25	.26	.26	.78	.29	.24
b32	.27	.14	.36	.76	.25
b33	.23	.17	.37	.75	.22
b31	.28	.26	.37	.71	.22
b2	.12	.21	.18	.24	.88
b1	.19	.24	.23	.21	.87
Eigen value	3.15	3.00	2.78	2.56	2.03
The distributed description ratio	19.66	18.76	17.35	16.00	12.67
The distributed cumulative ratio	19.66	38.42	55.77	71.79	84.47

Table 4. Confirmatory factor analysis

Measurement items	Latent variable	Factor loading	The standard error	C.R.	P
b7	Information quality	1			
b8		1.04	0.06	16.44	***
b9		0.82	0.09	8.87	***
b10		0.85	0.10	8.86	***
b15	Service quality	1			
b16		1.16	0.11	10.74	***
b17		1.17	0.11	10.51	***
b18		0.98	0.11	8.87	***
b25	User stisfaction	1			
b26		1.08	0.06	19.50	***
b27		1.08	0.06	19.00	***
b31	Organizational accomplishment	1			
b32		1.07	0.07	15.85	***
b33		1.08	0.07	15.60	***
b2	System quality	1			
b1		1.13	0.08	14.53	***

(p<.001:***, p<.01:**, p<.05:*)

The validity test of confirmatory factor analysis is shown in Table 5. <Table 5> shows that all six met the optimum criterion. Therefore, this

study confirms the validity of the measurement model.

Table 5. Confirmatory factor analysis fit test

Fit index	x2(df)	p-Value	GFI	AGFI	RMR	NFI	IFI	CFI
Standard		.05	1	1	.05	1	1	1
Fit coefficient	124.677 (91)	.01	.90	.85	.04	.94	.98	.98

Source: Based on the results of this study

3.2. Average difference test

In this study, we set up a research model that the organizational Accomplishment, the user satisfaction, and the system characteristics will be different according to the personal characteristics of the hospital. In order to test this, t-test and F-test were conducted. Based on the statistically

significant results at significance level p <.05, Table 6 was constructed.

In terms of gender, women's perception of service quality was relatively higher than men's. The difference in service quality between the ages of 20s and 40s is higher than that of the 50s. It was also found that people in their 20s and 40s perceived higher service quality than the

50s in terms of the difference in information quality by age group.

Table 6. The result of gender and age differences

The name of the variable	Separator	Average	Note that the probability	Refer
Service quality	Female	2.82	.046*	Female > Male
	Male	2.58		
	20's	2.89	.038*	20's>50's 40's>50's
	30's	2,60		
	40's	2,80		
50's	2.38			
Information quality	20's	4.02	.010*	20's>50's 40's>50's
	30's	3.77		
	40's	3.83		
	50's	3.46		

(p<.001:***, p<.01:**, p<.05:*)

3.3. Analysis of hypothesis testing

This study presents empirical analysis of the conceptual research model derived from the theoretical discussion. In order to test the fit and hypothesis of the research model of <Figure 1> derived from the theoretical discussion, we constructed and analyzed the structural equation model through the latent factors composed of the measurement variables.

As a result of the analysis, the index showing the fitness of the conceptual study model was X2 statistic = 139.730, p value = .002, GFI = .893, AGFI = .845, RMR = .051 NFI = .933, IFI = .977 and CFI = .977 . The evaluation of these fits was found to be generally satisfactory. However, this index does not meet the level of conformity requirement because it is evaluated from a comprehensive point of view rather than an absolute value for a specific index.

As a result of the hypothesized causal path relationship test, the system quality, information quality and service quality were statistically sig-

nificant at the significance level P <.001. The hypothesis relation of the analysis result is as follows. First, the higher the quality of the hospital information system, the higher the satisfaction of users who use it ($\beta = .258$). In other words, the failure of the hospital information system does not occur and the error does not occur in the processing of the work, it can be seen that the satisfaction of the user is increased. Second, the higher the quality of the hospital information system, the higher the satisfaction of users using it ($\beta = .261$). In other words, it is found that the members who use the hospital information system are more satisfied with the information provided by the system and the medical information, and the more updated the information is, the more the users are using the latest information. Finally, the higher the quality of the service provided by the hospital information system, the higher the satisfaction of users who use it ($\beta = .380$). In other words, it was found that the satisfaction of the users increased as the team who played the hospital information system paid the

appropriate compensation according to the accomplishment, emphasized the team play, and further encouraged the team play through 1:1 coaching with the manager. The results showed that the service quality of the hospital information system was the best variable for user satisfaction, and the total variance was 52.5%. In addition, the higher the satisfaction of the

users using the hospital system, the higher the accomplishment of the organization($\beta = .781$). In other words, if the hospital information system satisfies the user's needs as a whole, it contributes to enhance the accomplishment of the organization that achieves the organization's goals. The total variance describing overall organizational accomplishment was 61.1%.

Table 7. Hypothetical path relationship test between variables

The route relationship	Path coefficient	Standardization coefficient	T value (C.R)	p value	Hypothesis adoption whether or not	Total of variate
System quality → user satisfaction	.24	.26	3.145	.00	Adoption	
Information quality → user satisfaction	.36	.26	3.001	.00	Adoption	.53
Service quality → user satisfaction	.44	.38	4.537	.00	Adoption	
User satisfaction → organizational accomplishment	.70	.78	10.436	.00	Adoption	.61

(p <.001: ***, p <.01: **, p <.05: *)

IV. Discussion

This study examined the success factors of hospital information systems and examined the causal relationship between these factors and the factors affecting user satisfaction and organizational accomplishment. This study suggests a research model that uses key related variables of IS success model. In order to empirically investigate this research model, we surveyed the members of hospitals in Daegu and Changwon who had experience using hospital information system. The implications of this study are as follows.

First, system quality of hospital information system has statistically significant effect on user satisfaction. These results show that the hospital information system is easy and convenient for

users to access, easy to operate and visually excellent, and the lower the system error rate, the more satisfied users are with the system. Support is very important and these results will ultimately increase the accomplishment of the hospital organization.

Second, the information quality of the hospital information system is statistically significant for the user satisfaction, indicating that the information quality improves user satisfaction. This shows that when the hospital information system users use the latest hospital information the quicker and more accurately it is delivered then the higher the user satisfaction will be. Therefore, in order to continuously improve user satisfaction, information should be calculated in the direction of delivering hospital information in a proper and

accurate manner in real time in a form desired by the user.

Third, service quality of hospital information system is statistically significant for user satisfaction, and service quality has an effect on user satisfaction. This suggests that the hospital information system enhances user satisfaction by providing appropriate compensation according to accomplishment measurement and encouraging team play on teamwork. In addition, system administrator and system maintenance regulations for using hospital information system can be an opportunity to increase the satisfaction of users who utilize it.

Fourth, the higher the satisfaction of users using hospital information system, the higher the organizational accomplishment. The various qualities provided by the hospital information system make the recognition of the members who accept them positive, which enhances the organizational performance for the task processing.

V. Conclusion

The implications of this study are as follows. Most studies on the Korean hospital information system have focused mainly on the structure of the organization, the characteristics of the organization, and the individual characteristics of the information system. However, this research has contributed to the academic contribution in that it has developed the theoretical discussion based on the successful model of D & M information system. In addition, the hospital information system, the user satisfaction, and the organizational accomplishment in connection with it can be found significant.

Nevertheless, the limitations of this study are as follows.

First, the selection of hospitals in Chang-won & Dae-gu area for the users who use the hospital

information system is limited and the generalization is limited because it does not include other areas.

Second, there is a limitation in using the questionnaire as a measurement tool to control the fact that the research results are changed according to the questionnaire contents and responses of the respondents.

In the future, we will be able to broaden the scope of the study and generalize it. There is also a need to improve reliability and validity by using in-depth interviews.

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