Measuring the Success of Information Systems (IS) from Users' Point of View Using Goodhue Index

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Abstract

Nowadays Information systems play a decisive role in success or failure of an organization. Design and deployment of information systems and costly technology investments aim at improving organizational and individual performance. The success of such investments should be evaluated. For effective function of the organization, information systems should be applicable and acceptable by employees. Users' assessment model about Task / System fit has been suggested by Goodhue as an indicator to measure the success of information systems in the field of quantitative information in managerial decisions. The purpose of studying Task/System fit (TSF), individual abilities and system characteristics and policies is evaluating achievement of the system. This research assessed the users' evaluation and checking information system achievements in Khatamol-Anbia hospital in Gonbad in Golestan province, Iran during 1389. The method of data collecting was Goodhue questionnaire with changes in environmental conditions. The aim of this field- study research was application and the executive method was descriptive – correlation. The statistical tests were performed using regression and Eviews6 and Excel software. Results showed that information systems in Khatamol-Anbia hospital were successful according to Goodhue index and Research hypotheses were confirmed.

Keywords: Information, System, Information system, Work/system proportion

1. Introduction

According to the increasing role of information in organizations and their needs to have these kinds of information in order to continue their activities, the importance of information system (IS) is manifested. Evaluating the role of this information in organizations and achieving a useful information system that can lead to organizations' progress and development is of importance.

Hospital management information system has been activated over night and day in massive network of workstations and covers all related operational process since the patient's admission till discharge. This automated system is capable of responding to all needs and requests of medical and clinical affairs as well as performing all administrative-financial and scientific- research activities.(Arash,1388,p233).in this research the prosperity of Khatamol-Anbia's information system has been evaluated from users 'point of view.

From a technical perspective, information system is a continuous system that deals with collecting, processing, storing and distributing information to assist organization's decision making and control. Any activity which is done by the computer is called system or information system. Each information system is composed of five elements that include people, procedures, data, software, hardware. Procedures dictate to people how to transform data into information (Jordan & Machesky, 1990, p3). Information systems are means for receiving, transmitting, retrieving, storing, processing and display of information. Many empirical studies on management information systems literature (MIS) want users as a success index to assess the mentioned system. Member assessments are discussed under various titles, such as points of view, information satisfaction, valuing the management information systems, data networking trends, value and utility for users, etc(Goodhue,1992,p311).

The main objectives of information systems (IS) are policies, organizational structures, spending programs and creating value by improving performance (Crowston & Treacy, 1986).

Many researchers have expressed the relationship between features / policies, evaluation, user operation and performance in a linear design which is shown in figure 1(Davis, 1989, & Doll & Torkzadeh, 1991).
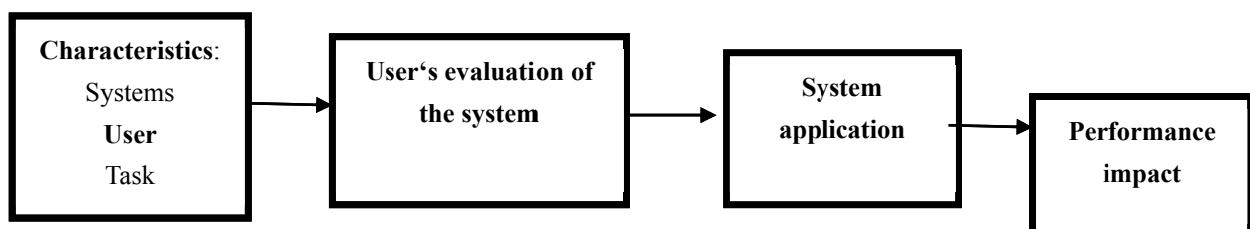

Figure 1. shown an example of a link between systems and performance

Task/System fit is an extent to which an information system or system environment help people accomplish their tasks Or is the proportion that exists within the work requisites and the

role of (MIS) environment (Goodhue, 1988).

Goodhue believes that most of user assessments have made the distinction between job requirements and individual needs unclear. That results in more uncertainty with performances. He believed that the success of the system according to user evaluation based on Task/System fit would make a closer relationship with task performance and the researchers' criteria for evaluation the system by the user should focus on the Task/Systemfit.

Criteria used in 35 studies focused on the five following structure (Goodhue, 1992, p308). 1-Features / System Policies 2-Task/System fit   3-Expected consequences of use   4-Impact on systems   5-Performance effects

2. Literature Review

Fichbein & Ajzen in 1975 Conducted research on the theory of rational performance. They believed that how to deal with technology is a kind of behavior. Person behavior is formed on the basis of his attitude and also suggests that person behavior depends on his attitude as well as his subjective norm.

Baily & Pearson in 1983 conducted a study under the user's overall satisfaction. They came to this result that user job satisfaction is an important factor which is in relation with the use of information.

Rogers in 1995 directed a research on acceptance and innovation of information technology. In his research he found five innovative characteristics that influence the selection process. These five features were: Comparative advantage, Complexity, observable, Possibility of testing and Compatibility.

Daivis in 1989 done a research on user acceptance of information technology. He declared that two factors play a key role in the acceptance of information technology.   First is individual's perception of usefulness of the technology and the second one is facility in using the technology.

Goodhue in 1992 studied user evaluation of information systems. Classification criteria used in thirty-five research in the field of information systems management were reviewed by him. All these studies emphasized on sufficient information, understanding of information systems, usefulness the systems, and opinions of the users. Many of them are objective and real, like system features, while many of them exist in users' minds.

Goodhue & Thompson in 1995 and 1998 conducted Studies as Appropriateness of technology and tasks. Facilities in using software and hardware, Compatibility, Accessibility, Accuracy and timeliness have impact on the appropriateness of technology and tasks.

3. Materials and Methods

Aim of this research is application and it is a correlated survey. The study population consisted of all employees, department officials and hospital administrators whose jobs were somehow associated with information systems in Khatamol-Anbia Social security hospital and able to cooperate in collecting data related to hospital information systems. Number of persons,

according to the preliminary investigation is one hundred. Data collection tool is a questionnaire. Needed information collected by this questionnaire and then statistical analysis was done. Given that this research study is based on Goodhue index, the questionnaire asked respondents information on their education, occupation, age, sex, years of service. In order to answer the main questions of the questionnaire Likert continuum is used. Goodhue index was used in this study to measure the success of information systems, So Goodhue questionnaire was used. Experts and users of the systems, including a computer supervisor and an expert of system stats were used. To determine the coefficient of reliability and validity of questions in questionnaire, Cronbach's alpha coefficient was calculated. The overall Cronbach's alpha coefficient for the questionnaires was 0.78. Cronbach's alpha coefficients for subscales such as Task/System fit, individual abilities and Features of the system policy were 0.76, 0.73 and 0.84 respectively.

4. Conceptual Model

One of the assessment methods to assess Task/System fit is users' evaluation model. This model was presented by Goodhue (Goodhue1992). He was an American scientist that suggested this model as a criterion for measuring the success of information systems in the field of quantitative information in managerial decision.

Task/System point of view was provided by Goodhue (1992, 1998) and Goodhue - Thompson (1995), as a conceptual basis which aims at evaluating user in order to measure information systems in the field of using recorded information for managers and decision making. His objective was to measure users' opinions and comments. He wanted to know how management information systems (MIS) meet users' business needs. He believed that the Task/system fit can have a close relationship with job performance. He presented his model as follows:
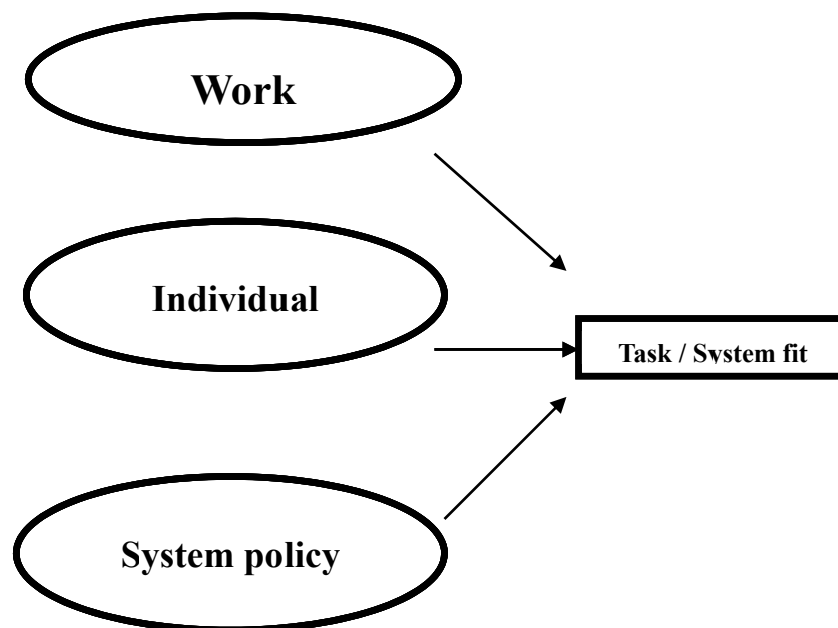

Figure 2. presented his model

In this model Task / System fit (TSF) can be sought in the characteristics of the system and task that would be adjusted with individual's abilities. In fact, with this model, multidimensional evaluation of the system or system environment can be possible.

4.1 Methods of analysis

In order to analyze data, inferential test like correlation was used. T-test for partial regression coefficients and F -statistic for significant regression was used. According to the assumptions of classical linear regression model, Ordinary least squares (OLS) regression method has the estimated optimal conditions. In this method by minimizing the square error, the alpha and beta were estimated. The first step in examining the issue, variables in information systems questions were entered into regression based on Task/System fit, individual abilities and Features of the system policy. After viewing the results, regression improvement was done step by step and an appropriate model was created.

5. Results

5.1 Test the first hypothesis

H_0: hospital information systems (IS) based on Task/System fit are successful.

H_1: hospital information systems (IS) based on Task/System fit are not successful.

Table 1. Results of Task/System fit

Dependent Variable: (SER01+SER02+SER03)

Method: Least Square				
Included observation: 88				
Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	2.011524	0.413231	4.867792	0.0000
SER04	0.197445	0.082345	2.397787	0.0188
SER05	-0.109154	0.059647	-1.829994	0.0709
SER07	0.197962	0.084966	2.329893	0.0223
SER08	0.148029	0.071105	2.081822	0.0405
SER09	0.120024	0.085755	1.399606	0.1654
SER10	0.157013	0.062314	2.519721	0.0137
R-squared	0.422923	Mean dependent var	3.746212	
Adjusted R-square	0.380177	S.D.dependent var	0.643256	
F-statistic	9.893773	Durbin-Watson stat	1.987347	
Prob (F-statistic)	0.000000			

Substituted Coefficients:

(SER01+SER02+SER03)=2.0115+0.1974*SER04-0.1091*SER05+0.1979*SER07-0.1480*SER08+0.1200*SER09+0.1570*SER10

According to Table (1) the overall results and the validity of the model are characterized by prob. (F-statistic) and the greater tendency toward zero the more significantly approved the regression.

Because the Prob. (F-statistic) is equal to zero and the Lack of correlation problem was approved through the Watson-Durbin statistic test which was equal to 1.98, so we can conclude with 99% confidence level that H0 is rejected and H1 is accepted. In other words, the success of hospital information system is approved.

5.2 Test the second hypothesis

H_0: hospital information systems (IS) based on individual capabilities are not successful.

H_1: hospital information systems (IS) based on individual capabilities are successful.

Table 2. Results of individual capabilities

Dependent Variable: (SER11+SER12) / 2

Method: Least Square					
Included observation: 81 after adjustments					
Variable	Coefficient	Std.Error	t-Statistic	Prob.	
C	0.896296	0.677047	1.323831	0.1896	
SER16	0.097939	0.103750	0.943990	0.3482	
SER18	-0.112064	0.052013	-2.154522	0.0345	
SER19	0.391757	0.099699	3.929413	0.0002	
SER21	0.186670	0.085258	2.189467	0.0317	
SER33	0.233677	0.144732	1.614548	0.1107	
EDUCAT	0.258180	0.190182	1.357540	0.1787	
R-squared	0.346704	Mean dependent var		3.672840	
Adjusted R-square	0.293734	S.D.dependent var		0.742296	
S.E. of regression	0.623823	Akaike info criterion		1.976554	
Sum squared resid	28.79744	Schwarz criterion		2.183482	
Log likelihood	-73.05044	Hannan-Quinn criter.		2.059576	
F-statistic	6.545301	Durbin-Watson stat		2.267119	
Prob (F-statistic)	0.000014				
(SER11+SER12)					2=
0.8962+0.0979*SER16-.1120*SER18+0.3917*SER19+0.18667*SER21+0.23367742034*SER33+0.2581*EDUCAT					

According to the regression test and significant coefficients in table (2), Overall results and the validity of the model is approved by prob. (F-statistic) = 0.00014, it means that the more closer value to zero, the more reliable the model will be. So we can conclude with 99% confidence level that H0 is rejected and H1 is accepted. Thus success of the hospital

information systems (IS) hypothesis based on individual ability is approved.

5.3 Test the third hypothesis

H0: hospital information systems (IS) based on system characteristics and policy are not successful.

H1: hospital information systems (IS) based on system characteristics and policy are successful.

Table 3. Shows Results of system features

Dependent Variable: (SER22+SER23+SER24) / 3			
Method: Least Square			
Date: 09/07/00 Time: 03:14			
Sample (adjusted): 2 88			
Included observations: 87 after adjustments			
Convergence achieved after 9 iterations			
Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	0.124913	0.483755	0.258215	0.7969
SER26	0.135291	0.089745	1.507509	0.0356
SER28	0.315044	0.091018	3.461336	0.0009
SER29	0.240088	0.105844	2.268318	0.0260
SER31	0.227228	0.085010	2.672970	0.0091
SER32	0.095486	0.063596	1.501452	0.0372
AR (1)	0.202454	0.119195	1.698509	0.0933
R-squared	0.533417	Mean dependent var	3.835249	
Adjusted R-square	0.498423	S.D.dependent var	0.828862	
S.E. of regression	0.587017	Akaike info criterion	1.849514	
Sum squared resid	27.56716	Schwarz criterion	2.047920	
Log likelihood	-73.45384	Hannan-Quinn criter.	1.929406	
F-statistic	15.24319	Durbin-Watson stat	1.972967	
Prob (F-statistic)	0.000000			
Inverted AR Roots	.20			

(SER22+SER23+SER24) = 0.1483*SER26 + 0.3131*SER28 + 0.2496*SER29 + 0.2343*SER31 + 0.0990*SER32 + [AR (1) = 0.1960]

According to the regression test and significant coefficients, Overall results and the validity of the model is approved by prob. (F-statistic) = 0.00, So we can conclude with 99% confidence level that H0 is rejected and H1 is accepted. In other words, the success of hospital information system is approved.Thus success of the hospital information systems (IS) hypothesis based on

system characteristics and policy is approved

The success of information systems with the three components; Task/System fit, individual abilities and System characteristics and policy was examined by Goodhue index and all three hypotheses were confirmed.

6. Conclusion

The results showed that hospital information systems (IS) based on Task/System fit, are successful. This finding is in one direction with the results of other researchers' such as Goodhue (1988) & (1995), Billy & Pearson (1983), Davis and et.al. (1989). Also results showed that hospital information systems (IS) based on individual abilities, have the necessary success. This result is in line with many researchers' findings. Studies done by Fichbein & Ajzen confirm the above.

Information systems based on system characteristics and policies have the necessary success. This finding is in one direction with the results of other researchers' such as Goodhue (1988), Doll & Torkzadeh (1988), Goodhue & Thompson (1995).

Finally, the existing information systems in hospitals from the perspective of users based on Goodhue index have the necessary success. And the findings of this research are in one direction with the results of other researchers' such as Goodhue (1992 and Goodhue & Thompson (1985).

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