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Factors Affecting MIS Project Success

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Introduction

Measuring Information System success is an important issue for both researchers and practitioners. Evaluating success helps managers in assessing MIS performance and in improving MIS function. Several measures of MIS success were proposed in the past [DeLone and McLean, 1992]. What is even more important for MIS managers and researchers is the set of independent variables that affect the success of MIS. The factors that affect MIS success can be related to organization, individual, and technology. There are numerous studies in the past on MIS success factors, but they consider either technical issues or behavioral/managerial issues and not both. In this research, we take a comprehensive look at the factors in determining critical variables. We considered both these factors in our model to predict MIS success. Our research will highlight critical success variables (whether internal or external, whether technical or managerial/behavioral) that influence the success of MIS. Thus, the objectives of our research are: i) to identify the independent variables from past models, which could affect the success of MIS. ii) to find the dimensions of these variables which represent the success of MIS, by using factor analysis. iii) to build a model for success of MIS project, which identifies most critical variables. iv) to predict the success of MIS projects based on these critical factors.

Conceptual Framework

As stated above, the factors that affect MIS success are both technical and organizational issues. Ein-Dor and Segev [1978] suggested criteria for success: profitability, application to major problems of the organization, quality of decisions or performance, user satisfaction and widespread use. Improved decision making via greater information timeliness and quality, system usage [Lucas, 1975], direct cost savings [Emery, 1982], and increased revenue [Benjamin et al., 1984] are the different factors which have been used to measure IS effectiveness and success. One of the surrogates for IS success is user satisfaction [Ives et al., 1983], which is defined as the extent to which users believe that IS is able to meet their information requirements. Ives [1984] suggested system quality, system usage, user behavior/attitudes, and information satisfaction to be the measure system success. Nicolaou [1993] use two success concepts: quality of output and usefulness of system. Software maintenance accounted for up to 90% of software life-cycle effort [Gorla, 1991]; any improvement in maintenance effort should be recognized as a success. Berman and Ashrafi [1993] established four models to find the optimal software system structure considering reliability and cost of modules. Fault avoidance [Sommerville 1995] is an important strategy that is applicable to all types of system reliability. Many organizations that have used CASE, structured system analysis and design, object-oriented methodology, and walkthroughs in system development stage have reported dramatic reductions in the number of errors that go undetected. [Yourdon 1989, Rumbaugh 1991, Jacobson 1992]. Thus, some researches addressed on systems failure from engineering perspectives, which didn't consider the user and organizational influence. While some other researches took a partial treatment of MIS and failed to consider the technological factors. Here, we combined both these types of variables and use meeting user expectation, maintenance efforts, and system errors as pseudo measures of MIS project success. Thus the above variables are related to organizational, individual, technological issues. Our research framework (Figure 1) shows the influence of these variables on MIS success.

Research Methodology

Empirical verification of this study is undertaken using a mail questionnaire; measures were phrased as questions on a five-point Likert-type scale. The respondents answered questions by considering a specific IS application in their organization. Target respondents were top information system executives. Principal common factor analysis was performed on the twenty-three independent variables using the SPSS procedure FACTOR to dimensionalize the MIS success. Seven factors were obtained (Table 1). The total amount of variance explained by these factors was 61.9%. The first dimension, which contained four items, can be referred to as an indicator of user capability and involvement. The second dimension is a measure for technological capability. The third dimension is can be named as the attitude of management level. The other dimensions are maintenance efforts, stability of organization, stability of systems, and system usage. For studies at the individual level of analysis these seven factors have special appeal. They concentrate on those properties of information systems that are of current interest. Namely, these dimensions assist in managing successful systems.

Next, we use logistic regression to predict MIS success. Since logistic regression considers the variables to be dichotomous, we converted these responses into dichotomous variables. In order to predict MIS success, we use four pseudo variables for MIS success, namely, user expectation, frequency of errors, maintenance efforts, and usage. In addition, using each of these pseudo variables as dependent variables, we predicted the success (in terms of these pseudo variables) and the critical factors contributing to those.

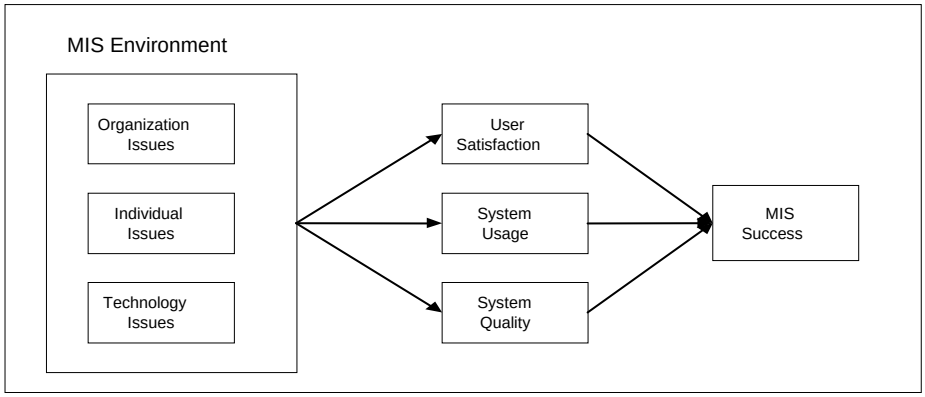

Figure 1. A Descriptive Model for MIS Success

Results

Predicting MIS Success

Here we choose MIS success as dependent variable and user expectation, frequency of errors, maintenance efforts, and system usage to be independent variables. Probability of success based on these four independent variables is 83.93% overall (Table 2). In the Table, the number in the cell is the count of responses; for example, 78 of the 112 respondents indicate that the system is successful and the model also predicted success. Intuitively, we can use these four variables to contribute to defining MIS success with an accuracy of 83.93%. Using these variables, we can predict MIS success: for example, if user expectation is very poor, frequency of errors is high, maintenance efforts are high, and usage of system is low, then probability that MIS project will be successful is 60%. In the following, we consider each of these pseudo variables to be dependent variables and find the factors contributing to these variables.

Predicting Pseudo Variables of MIS Success

The factors contributing to system usage are EXPECT (system meeting user expectation), DEPEND (the possibility that the system is used for decision making), and LANGUAGE (suitability of programming language). These factors will determine the usage of system with a probability of 99%. This gives empirical evidence that these three variables strongly determine the extent to which MIS will be used. Out of these, system meeting user expectation is the most important variable to determine the usage of system. Individual analysis indicate, for example, if the system not meeting user expectation, and the system is meant to be used for decision making purposes, and the programming language is not suitable, then probability that the system will be used is 1%. Similarly, we determine the factors contributing to the high maintenance costs, systems with large number of errors, and system mostly meeting user needs.

Conclusion

Our proposed model can predict the success of a MIS project; in addition, our model can predict the pseudo measures of MIS success. Our approach is different from the previous in that we define MIS success empirically, using the pseudo variables of MIS success, In addition, we predict the success of the pseudo variables and determine the factors affecting these pseudo variables of MIS success. Furthermore, we consider both technical and organizational factors; thus, our model is more comprehensive.

Selected References

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Table 1. Validation of Measure for MIS Success

Item	Factor loadings
Factor 1 : User capability and involvement	(eigenvalue=5.36, pct. Of var. = 23.3%)
COMPETEN (competency of user)	0.76207
USER_TRA (user training)	0.72996
INVOVE (user involvement)	0.60124
USER_KNO (user knowledge)	0.57329
Factor 2 : Technology capability	(eigenvalue=2.00575, pct. of var. = 8.7%)
DATABASE (suitability of database)	0.83090
IS_SUP (the support of IS department)	0.64720
LANGUAGE (suitability of language)	0.57125
Factor 3 : Attitude of management	(eigenvalue=1.61800, pct. of var. = 7.0%)
BUDGET (how sufficient of budget)	0.78012
QUALITY (quality of documentation)	0.69665
MANG_SUP (support from management)	0.63137
Factor 4 : Maintain efforts	(eigenvalue=1.43827, pct. of var. = 6.3%)
MAINTAIN (maintain effort)	0.66030
EASY_USE (how easy of system)	0.58557
Factor 5 : Stability of organization	(eigenvalue=1.41776, pct. of var. = 6.2%)
IS_TURN (turnover of IS department)	0.84276
COM_TURN (turnover of company)	0.81545
Factor 6 : Stability of system	(eigenvalue=1.27152, pct. of var. = 5.5%)
ERROR (error rate of system)	0.72063
CHANGE (change requests by users)	0.62401
Factor 7 System usage	(eigenvalue=1.12303, pct. of var. = 4.9%)
USAGE (system usage)	0.69303
DEPEND (user dependency of system)	0.63797

Table 2. Classification Table for MIS Success

		Predicted 0	Predicted 1	Percent Correct
Observed	0	16	8	66.67%
	1	10	78	88.64%
			Overall	83.93%