An Empirical Assessment of the Impact of ERP Task-Technology Fit on Decision Quality

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ABSTRACT

In this research study, a model is developed to assess the task-technology fit of ERP enterprise resource planning (ERP) systems and the performance of individual decision makers. The ERP task-technology factors and decision quality measures were identified from a synthesis of literature and adapted for the purposes of this study. Data were collected from the ERP system users in a firm that had deployed an ERP system. The data were analyzed using factor and multiple regression analyses techniques. The results and the implications of the findings are discussed.

INTRODUCTION

Decision quality has emerged as a critical concern for firms in today's uncertain and complex business environments. Over the past decade firms have increasingly used enterprise resource planning (ERP) systems to facilitate and support their decision making needs. Due to the high incidences of ERP deployment delays and failures, most studies have focused on the effective management of the ERP implementation process. There is a paucity of studies that have examined ERP usage issues. In this study, we address the above literature gap by evaluating the link between ERP task-technology fit and decision quality.

Past research reveals that alignment between task needs and system functionalities increases the performance impact of information systems (Goodhue, 1995; Goodhue and Thompson, 1995; Goodhue, 1998; Madapusi and Kuo, 2007; Madapusi et al., 2007; Madapusi, 2008). These studies further indicate that user evaluations of task needs and system functionalities provide a conceptual link between user evaluations and individual performance.

The above suggests that aligning ERP task needs and system functionalities will lead to increased individual performance. Further, user evaluations of ERP task needs and system functionalities would be a good indicator of the use of ERP information in decision making.

BRIEF LITERATURE REVIEW

Two broad streams of research – utilization and fit – have dominated the investigation of the linkage between information systems (IS) and individual performance (Cheney et al., 1986; Thompson et al., 1991; Benbasat et al., 1986; Vessey, 1991). The utilization school suggests that uses user's attitudes and beliefs shape the use of IS. Various organizational factors influence the intention to use and the actual utilization of IS (Cheney et al., 1986; Thompson et al., 1991). The fit school argues that individual performance is affected by the degree of fit between IS features and the requirements of a task. Studies have identified various task-technology fit factors that influence individual performance (Benbasat et al., 1986; Vessey, 1991). A considerable body of research has emerged in the past decade that synthesizes utilization and fit theories (Goodhue and Thompson, 1995; Goodhue, 1995; 1998). These researchers view IS as a facilitator to the individual performance of tasks. Hence, greater the degree of fit between IS features and user task needs, greater will be the individual performance.

Goodhue (1995; 1998) indicates that a fit between task characteristics and IS features provides a conceptual base for examining the quality of individual decision making. IS provides value to users by providing them with information that they can use in carrying out their tasks. Thus, Goodhue (1995, 1998) suggests that the strongest link between IS and individual performance will be the fit between IS features that provide users with the necessary information and task needs. User evaluations would tend to reflect the above in their IS assessment. Studies have used various measures to assess the effectiveness of IS-based individual decision-making such as decision effectiveness (Chervany et al., 1974), efficiency with tasks are completed (DeBrabander and Thiers, 1984), and increased user productivity (Rivard and Huff, 1984).

A synthesis of the discussion in the previous paragraphs indicates that past studies broadly concur on user evaluations of task-technology fit and its impact on decision-making. In this study, we adapt the above to an ERP environment and suggest that aligning ERP task needs and system features will lead to increased individual performance. This relationship is represented in Figure 1 below.

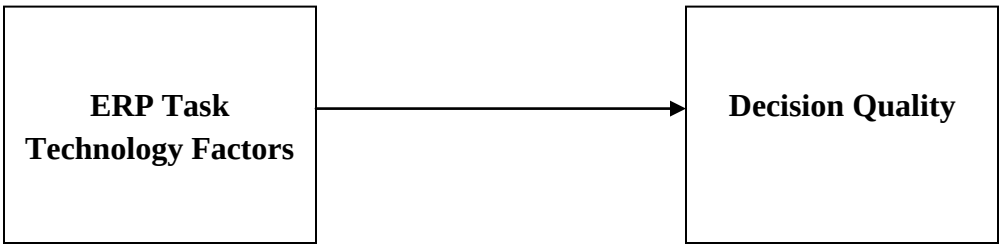

Figure 1: Relationship between ERP Task Technology Factors & Decision Quality

RESEARCH METHODOLOGY

This study uses a field survey to obtain data from key users in a firm that has implemented an ERP system. The term "user" in this study denotes a person who uses information from the ERP system for decision making. Data were collected through a questionnaire for testing the ERP task-technology factors-decision quality relationship discussed in the previous section. The questionnaire was primarily developed from a synthesis of user evaluation, ERP and decision-making literature considered pertinent to this study's objectives. The questionnaire was validated through a focus group of academicians and practitioners.

In this study, twelve factors each consisting of multiple items, primarily adapted from Goodhue (1999) was used to measure ERP task needs and system functionalities. A seven point Likert type scale ranging from "agree" to "disagree" was used to collect data on each of the twelve ERP task-technology factors – right level of detail, accuracy, compatibility, locatability, accessibility, meaning, assistance, ease of use, system reliability, authorization, presentation, and flexibility. Seven items to measure decision quality were drawn from a synthesis of information systems and decision research (Rivard and Huff, 1984; DeLone and McLean; 1992). A seven point Likert type scale ranging from "agree" to "disagree" was used to collect data on each of the seven items.

Forty responses were received from the firm. Two responses with missing data were discarded. The internal consistency method was used to evaluate the reliability of the data collection instrument. Validity was ensured through literature review to identify questionnaire items, factor analysis, and examining the correlation coefficients computed for the twelve ERP task-technology factors and each of the seven decision quality measures. The data were analyzed using factor analysis and multiple regression analysis.

RESULTS

The data collected on the ERP task-technology factors were first examined to check their suitability for conducting factor analysis. The results indicate that the correlations were greater than .30, the measure of sampling adequacy ranged from mediocre to meritorious, and the Bartlett's test of sphericity was significant. The data were then subject to factor analysis. The latent root criterion as well as the scree test criterion indicates that each of the ERP twelve task-technology factors loaded onto a single factor. The factor loadings ranged from .639 to .974. Summated scales were developed for each of the twelve ERP task-technology factors.

The data were then examined to check their suitability for conducting multiple regression analyses. No violations of the assumptions underlying multiple regression techniques were found – linearity, constant variance of the error terms, independence of the error terms, and normality of the error term distribution. A test on whether demographic data influences the relationships hypothesized in this research study was conducted. The data were then subject to regression analyses.

The relationship given in Figure 1 was tested by developing separate regression models to analyze each of the seven decision quality measures. The results of the regression analysis are presented in Table 1. The table shows the size of the standardized regression coefficients (β), coefficients of determination (R^2), and the F ratios (F) for the fitted models. Only significant parameter estimates of the fitted models are shown. All non-significant parameter estimates are omitted from the table.

Decision Quality / Task-Tech Fit	Better Decisions			Speedy Decisions			Efficiency			Confidence in Decisions		
	R^2	F	β	R^2	F	β	R^2	F	β	R^2	F	β
Right Level of Detail	.169	7.302**	.411**	.152	6.431*	.389*	.211	9.623**	.459**			
Accuracy							.093	3.693┼	.305┼			
Compatibility	.078	3.050┼	.279┼	.213	9.765**	.462**	.218	10.035**	.467**	.106	4.288*	.326*
Locatability												
Accessibility	.232	10.889**	.452**	.189	8.402**	.435**	.173	7.525**	.416**			
Meaning	.104	4.175*	.322*	.179	7.833**	.423**	.139	5.815 *	.373*			
Assistance	.156	6.652*	.395*	.102	4.091┼	.311┼						
Ease of Use	.082	3.213┼	.286┼	.377	21.773***	.614***	.301	15.482***	.548***			
System Reliability												
Authorization												
Presentation				.277	13.815***	.527***	.312	16.347***	.559***			
Flexibility												

Note: β: All values are standardized regression coefficients. Significance: ┼ p < .10, * p < .05, ** p < .01, *** p < .001

Table 1: Relationship between ERP Task-Technology Factors and Decision Quality

The results of the study indicate that seven task-technology factors – right level of detail, compatibility, accessibility, meaning, assistance, ease of use, presentation – strongly and positively influence five decision quality measures – better decisions, speedy decisions, efficiency, use of analytical tools, accuracy – in different ways. The results further indicate poor support for the relationship between five ERP task-technology factors – accuracy, locatability, system reliability, authorization, and flexibility – and various decision quality measures. Two of the decision quality measures – confidence in decisions, decision-making productivity – were found to be poorly supported.

CONCLUSION

In this study we developed a model to assess the influence of ERP task-technology fit on individual decision-making. The findings have important implications for ERP implementing firms. Goodhue (1998) suggests that the task-technology factors form part of the process by which manages process information for decision-making – identification, acquisition, and interpretation. The identification stage comprises of: right level of detail and meaning; the

acquisition stage: accessibility, locatability, authorization, ease of use, assistance, system reliability, and flexibility; and the interpretation stage: compatibility, accuracy, and presentation.

The findings suggest that adequate information is provided by the ERP system to enable efficient and effective decision-making. There is a fit in the form and format of ERP information with those used internally by the firm. The ERP system is user friendly and facilitates the easy accessibility of information. Support services are available in case of any difficulty in accessing the required information from the ERP system. The ERP information required is available in an easily readable and understandable format. There are no inconsistencies in information across functional areas and user interfaces are well tailored to the work structures of the firm.

The findings further suggest that there is difficulty in accessing new sources of information in the ERP system. The accuracy of information obtained from the ERP system is suspect. Users do not have access to the ERP information that they need to take decisions. Moreover, the ERP system is prone to frequent system problems and crashes. The standardized processes in the ERP system hinder the quick execution of tasks.

The firm needs to re-evaluate its information acquisition and interpretation processes. Users could be frustrated if they are not able to access the right data at the right time. User profiles and parameters have to be set to ensure that the right users get authorization for accessing the requisite information for decision-making. A well structured training program could alleviate the difficulty in accessing data from the ERP system's integrated database. Post 'go live' issues need to be sorted out so that system outages are minimized. The firm needs to make a call on whether to customize the ERP system to better serve its business needs; customization could pose problems during system enhancements and upgrades.

The ERP task-technology factors examine the managerial use of ERP information in decision-making. Caution should, however, be exercised in the repeated usage of the instrument as technologies, system features and task needs may change. Moreover, the case-study specific nature of investigation suggests that caution should be exercised in the generalizability of this study's results. Future research could expand the scope of the study to examine whether the ERP task-technology and decision quality linkages holds true across firms – suppliers, customers, and other stakeholders.

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