

변화준비성이 전사적 정보시스템의 수용에 미치는 영향에 관한 연구*

곽기영**

Examining the Effect of Readiness for Change on Enterprise Systems Acceptance*

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■ Abstract ■

To rapidly respond to uncertainties in the business environment whilst remaining competitive, every organization needs to be able to successfully introduce and manage organizational change. Cognizant of the role of information systems (IS) as an enabler of organizational change, many organizations have paid attention to Enterprise Resource Planning (ERP) systems for successful organizational change primarily because of their change-driving forces across organizations. This study focuses attention on the role of readiness for change in the ERP systems adoption. Readiness for change described as views about the need for organizational change is posited to be an antecedent of two expectancies about the system, performance expectancy and effort expectancy, which lead to actual system use. Based on data gathered from the users of the ERP systems, structural equation analysis using LISREL provides significant support for the proposed relationships.

Keyword : Enterprise Systems, Organizational Change, TAM

본 논문은 2005년도 한국경영과학회 추계학술대회(2005년 10월 29일) 최우수논문상(이론부문) 수상논문으로 소정의 심사과정을 거쳐 게재 추천되었음.

* This work was supported by the research program 2006 of Kookmin University in Korea.

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1. Introduction

Because of today's increasingly dynamic environments, organizations are continually faced with the need to change their structures, objectives, processes, and technologies. Therefore, every organization needs to be able to successfully introduce and manage organizational change to achieve and sustain competitive advantage. Cognizant of the role of IS as an enabler of organizational change [22], many organizations have paid attention to Enterprise Resource Planning (ERP) systems for successful organizational change primarily because of their change-driving forces across organizations. A study reported that nearly 34 percent of surveyed organizations had investigated, piloted, or implemented ERP packages [7]. However, despite the popularity of ERP systems, on the other hand, their implementation has been plagued by a high failure rate and difficulty to realize the promised benefits. Approximately one-half of all ERP projects fail to achieve anticipated benefits due to managers underestimating the efforts involved in managing change [4]. Compared with traditional and comparative simplistic IT efforts, the adoption of ERP systems usually involves radical organizational change as it is often associated with fundamental organizational improvements that cut across functional and organizational boundaries. ERP systems are also inherently organization-wide systems and their implementation involves multiple stakeholders [3]. As a result, enterprise-wide initiatives have often faced resistance to change from organizational members. The resistance to change may result to the user's dysfunctional behavior when engaging with the system.

Creating readiness for change has been most often explained in conjunction with prescriptions for reducing resistance. In essence, readiness for change may act to preempt the likelihood of resistance to change, increasing the potential for change efforts to be more effective [5]. It has been also argued that the reason so many change efforts run into failure is usually directly connected to individuals' non-readiness for change [23]. Therefore, cognizant of the nature of ERP systems in terms of organizational change, in this research, we investigate the role of readiness for change in the adoption of ERP systems. Furthermore, this research examines how the readiness for change can be formed.

2. Conceptual Background: Readiness for Change

Organizational change is defined as an attempt, or series of attempts, to modify an organization's structure, goals, technology or work tasks. A range of perspectives on organizational change have developed over the past decades. Among them, three paradigms have influenced studies of technology-based organizational change: planned change, technological imperative and punctuated equilibrium [20]. Transforming organizations with IT is an important business objective since traditional structures and processes are often ineffective in producing desired levels of productivity and customer service [22]. As each new generation of technology and each major technological advance have emerged, organizations will be radically and fundamentally altered.

Readiness for change can be described as the extent to which organizational members hold positive views about the need for organizational

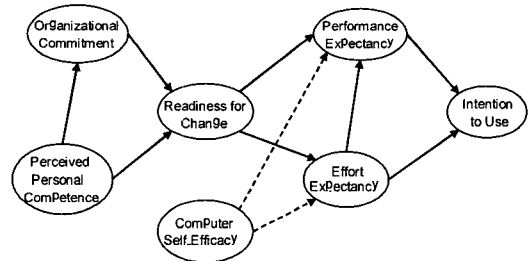
change, as well as the extent to which they believe that such changes are likely to have positive implications for themselves and the organization [5]. Change is a fundamental theme in human life and organizational behavior, with which individuals generally resist. Readiness is the cognitive precursor to the behaviors of either resistance to, or support for, a change effort [5]. Researchers have often attributed many IS implementation problems to users' propensity to resist change. Markus [17] explained resistance to change and implementation difficulties primarily in terms of the conflict for increased power among users.

Readiness for change is reflected in organizational member's attitude regarding the extent to which changes are needed and the organization's capacity to make those changes successful [5]. Organizational member's attitude toward change can play an important role in determining whether an individual chooses to support or resist a change. Attitude toward change in general consists of a person's affective reactions to change, cognitions about change, and behavioral tendency toward change [9]. Affective responses are a greater or lesser feeling of being linked to, satisfied with, or anxious about change. Cognitive responses are the opinions one has about the advantages and disadvantages, usefulness, and necessity, and about the knowledge and information required to handle the change. Finally, behavioral responses are the actions one has already taken or may take in the future for or against the change. Within this multidimensional view of responses to organizational change, resistance to change is represented by the set of responses to change that are negative along three dimensions, and support for change is represented by the set of responses that are positive along three dimensions. Different individuals may respond differently to a particular organizational change: for some, an organizational change gives satisfaction, while the same change brings disadvantages for others [26].

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3. Research Model and Hypotheses

To explore the role played by readiness for change in understanding individual's reaction to the adoption of ERP systems, this research situates the construct within a nomological net that consists of its consequences and antecedents. This results in a theoretical research model of the constructs that presents a plausible network of relationships for readiness for change. The research model is depicted in [Figure 1].



[Figure 1] Research model

Extant IS research has explored how and why organizations and individuals adopt and use new IT. A dominant emphasis in much of the research focused on user behaviors toward IT has been on notions of instrumentality and cognitive complexity [1]. Therefore, it has been posited that usage behavior is driven by these two notions such as performance expectancy and effort expectancy. Performance expectancy is defined as the degree to which an individual believes that

using the system will help him or her to attain gains in job performance, while effort expectancy is defined as the degree of ease associated with the use of the system [25]. Part of this research examines the relationships between performance expectancy, effort expectancy, and behavioral intention to use the system. Many previous studies have indicated that individuals' behavioral intention to use the system is influenced by their performance expectancy. The primary reason that an employee exploits the systems that have been launched in an organization is that they expect they find the systems useful for their job performance. Extensive research provides evidence of the significant effect of effort expectancy on behavioral intention to use the system, either directly or indirectly through its influence on performance expectancy. The systems need to be easy to use and easy to learn in order to prevent the belief that it is 'useful but underutilized'. These issues are encapsulated in the following hypotheses:

H₁ : Performance expectancy for an ERP system will have a significant effect on behavioral intention to use the ERP system.

H₂ : Effort expectancy for an ERP system will have a significant effect on behavioral intention to use the ERP system.

H₃ : Effort expectancy for an ERP system will have a significant effect on performance expectancy for the ERP system.

A state of readiness for change can be derived from two issues: (a) the need for change, that is, the discrepancy between the desired end-state and the present state; and (b) the perceived capability to change of parties affected by the change efforts [5]. Creating the belief that organ-

izational change is needed implies that there is a performance gap between the current state and some desired end-state. As a result, the change efforts such as the adoption of ERP systems to fill up the gap are expected to bring the improved performance to the individuals and organization. Thus, a state of high level of readiness for change is expected to positively influence performance expectancy. Therefore, we can expect that individuals with high level of readiness for change believe that using the information systems required for organizational change will help them to attain gains in job performance.

In order to establish the relevance of readiness for change as a determinant of performance expectancy, it needs to consider other key predictors as well. Among the determinants of performance expectancy, computer self-efficacy has been proposed and has accumulated empirical support as an important antecedent of perceived usefulness, which is similar to the notion of performance expectancy [1]. Based on the social cognitive theory, Compeau and Higgins [6] argued that self-efficacy has a positive influence on individual expectancies about the consequences of performing a specific behavior. In other words, computer self-efficacy can be established as an additional important predictor of performance expectancy. Therefore, we test the following hypothesis:

H₄ : After controlling for computer self-efficacy perceptions, a state of readiness for change will have a significant effect on performance expectancy of an ERP system.

The perceived capability to change, which plays a role of creating a state of readiness for change, is closely related to the individual and

collective confidence of parties affected by the change efforts. The belief on this confidence is likely to easily adapt the individuals to the new circumstances. They tend to believe that they can learn and utilize new practices and technologies that are needed for the new situation, without severe cognitive effort on their part. Therefore, we can expect that individuals with high level of readiness for change believe that they can learn how to use the information systems required for organizational change with little effort. This is especially true for the case of ERP systems since they require learning to overcome knowledge barriers, and unlearning of what is already known [21].

As with performance expectancy, many empirical studies have supported the relationship between computer self-efficacy and effort expectancy. Venkatesh and Davis [24] argued that computer self-efficacy would exhibit a positive influence on perceived ease of use, that is, effort expectancy. The reasoning was justified on the basis that the confidence in one's computer related abilities can be expected to serve as the basis for an individual's judgment about how easy a new information system will be to use. Considering that we suggest readiness for change is a predictor of effort expectancy, a state of readiness for change and computer self-efficacy will together positively influence on the cognitive effort for the system use. Therefore, drawing upon this discussion, we suggest the following hypothesis:

H₅ : After controlling for computer self-efficacy perceptions, a state of readiness for change will have a significant effect on effort expectancy of an ERP system.

Prior research have identified that organizational commitment and perceived personal competence play key roles in employees' acceptance of change [16, 18]. Organizational commitment can be defined as the relative strength of an individual's identification with, and involvement in, a particular organization [19]. Various empirical studies have supported the impact of organizational commitment on readiness for change. It is argued that individuals with strong organizational commitment would be more willing to accept organizational change if such a change does not alter the basic values and goals of the organization and is seen as beneficial to the organization [26]. Individuals' commitment to an organization affects how they evaluate organizational change [16]. This implies that a highly committed individual might more readily identify with, and accept, organizational change efforts that are perceived as beneficial. The above discussion suggests that the degree of individuals' commitment to an organization have varying effects on their readiness for change; and underpins the following hypothesis for subsequent testing:

H₆ : Organizational commitment will have a significant effect on a state of readiness for change.

There is a growing body of literature supporting the positive relationship of perceived personal competence to a state of readiness for change [10]. Perceived personal competence can be defined as the degree of the individual's feelings of competence in the work role. According to Gebert et al. [11], the change-oriented action is a function of employee motivation; and thus employees with strong perceived personal com-

petence are likely to pursue further change initiatives. High levels of perceived personal competence derived from the satisfying work experiences give employees self-confidence [11]. Individuals with a strong sense of self-confidence tend to believe that they can execute the particular job under any settings and also perform tasks that are slightly different. Therefore, the more satisfied in perceived personal competence in aspect of their work employees are, the more ready for change they can be; by recognizing ways and means of performing their tasks. Thus, the following hypothesis is posited:

H₇ : Perceived personal competence will have a significant effect on a state of readiness for change.

Examining the various studies, it is evident that major influences of organizational commitment can be found throughout the work environment [19]. Therefore, there has been a considerable amount of research investigating the links between variables of work experiences and organizational commitment [18]. Organizational commitment develops as the result of the satisfying work experiences that are compatible with employees' values; and thus contribute to perceived personal competence [18]. Herzberg [13] identified that employees tend to describe the satisfying work experiences in terms of factors that are intrinsic to the job role, which he called motivators. As a consequence, based on this notion, it might be expected that perceived personal competence plays an important role in building the satisfying work experiences that are tightly associated with organizational commitment. Based on this discussion, we suggest the following hypothesis:

H₈ : Perceived personal competence will have a significant effect on organizational commitment.

4. Study Context and Sample Characteristics

The items used to operationalize the constructs included in this study were mostly adapted and modified from previous studies, with some changes necessary for the target information system and the organizational context (refer to Appendix). The questionnaire employed a seven-point Likert scale, with anchors ranging from 'strongly disagree' to 'strongly agree'. The data were collected from employee subjects that worked with ERP systems to perform their tasks. A questionnaire was designed and sent to the users of the ERP systems of the organizations chosen for this study. Of the 350 questionnaires distributed, 312 were returned. After being initially screened for usability and reliability, 283 responses were found to be complete and usable. Slightly over half the respondents (51 percent) were comprised of males. About 14 percent had completed high school, while the remainder of respondents (86 percent) had obtained at least college degree. On average, the respondents were approximately 29 years old and had about 5 years of work experience.

5. Data Analysis and Results

5.1 Measurement Model

A confirmatory factor analysis (CFA) using LISREL 8.7 was conducted to test the measurement model. The measurement model in the CFA

was revised by removing items, one at a time that had large standardized residuals and/or weak correlations with other items. After removing items, the measurement model exhibited an overall good model fit, with the data collected from the respondents by meeting the acceptance levels commonly suggested by previous research. The χ^2 of 767.756 with 524 degrees of freedom showed a χ^2 to degrees of freedom ratio (1.465) of less than the recommended 3.0. GFI at 0.865 was below but closer to the recommended level 0.90. AGFI at 0.838, NFI at 0.977, NNFI at 0.991, and CFI at 0.992 were all within the accepted thresholds. As other indices, RMSR and RMSEA had values of 0.033 and 0.041, respectively, which were within the recommended threshold values for good fit. Recognizing the good model fit for the measurement model, further analysis was conducted to assess the psychometric properties of the scales, *i.e.*, the construct validity of the research instruments.

The convergent validity was assessed by three measures, as shown in <Table 1>. All of the factor loadings of the items in the measurement model were greater than 0.60, with most of them above 0.80. Each item loaded significantly ($p < 0.01$ in all cases) on its underlying construct. The composite construct reliabilities were also within the commonly accepted range greater than 0.70, with all of them above 0.80. Finally, the AVE was all above the recommended level of 0.50 [12], which meant that more than 50 percent of the variances observed in the items were explained by their underlying constructs. Therefore, all constructs in the measurement model had adequate convergent validity. Then, the discriminant validity was examined; the shared correlations between constructs were compared with

the square root of AVE of the individual constructs. As shown in <Table 2>, all constructs share more variance with their indicators than with other constructs. This result revealed no violation of the criteria for the discriminant validity of the constructs in the research model.

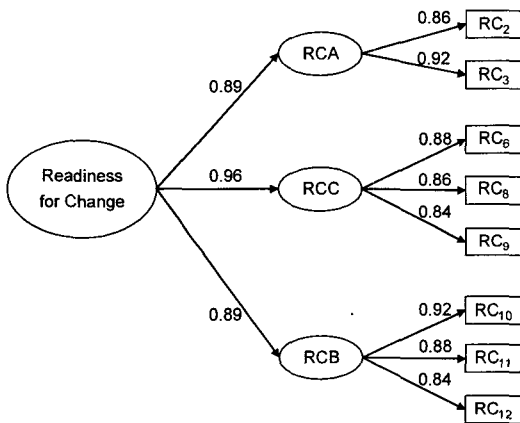
<Table 1> Convergent validity test

Constructs	Items	Factor loading	Composite reliability	AVE
OC	oc1	0.818	0.895	0.631
	oc2	0.767		
	oc3	0.816		
	oc4	0.883		
	oc6	0.673		
RCA	rc2	0.864	0.887	0.796
	rc3	0.920		
RCC	rc6	0.882	0.895	0.739
	rc8	0.856		
	rc9	0.840		
RCB	rc10	0.917	0.912	0.776
	rc11	0.880		
	rc12	0.844		
EE	ee1	0.838	0.935	0.742
	ee2	0.829		
	ee4	0.858		
	ee5	0.896		
	ee6	0.884		
PE	pe1	0.855	0.942	0.765
	pe2	0.913		
	pe3	0.853		
	pe4	0.862		
	pe5	0.888		
IU	iu1	0.905	0.876	0.779
	iu2	0.860		
PPC	ppc2	0.734	0.855	0.597
	ppc3	0.835		
	ppc4	0.691		
	ppc5	0.821		
SE	se3	0.860	0.952	0.767
	se4	0.873		
	se5	0.872		
	se6	0.894		
	se7	0.886		
	se8	0.871		

〈Table 2〉 Discriminant validity test

Constructs	OC	RCA	RCC	RCB	EE	PE	IU	PPC	SE
OC	0.794								
RCA	0.470	0.892							
RCC	0.510	0.858	0.860						
RCB	0.468	0.797	0.859	0.881					
EE	0.495	0.548	0.589	0.585	0.861				
PE	0.487	0.622	0.759	0.706	0.584	0.875			
IU	0.502	0.581	0.706	0.664	0.686	0.810	0.883		
PPC	0.500	0.435	0.495	0.475	0.462	0.485	0.511	0.773	
SE	0.441	0.386	0.453	0.370	0.425	0.396	0.512	0.647	0.876

Note) Diagonals represent the square root of AVE of each construct. Off diagonal entries are the correlations among constructs.



GFI = 0.951 AGFI = 0.897 NFI = 0.984 NNFI = 0.982 CFI = 0.989 RMSR = 0.025

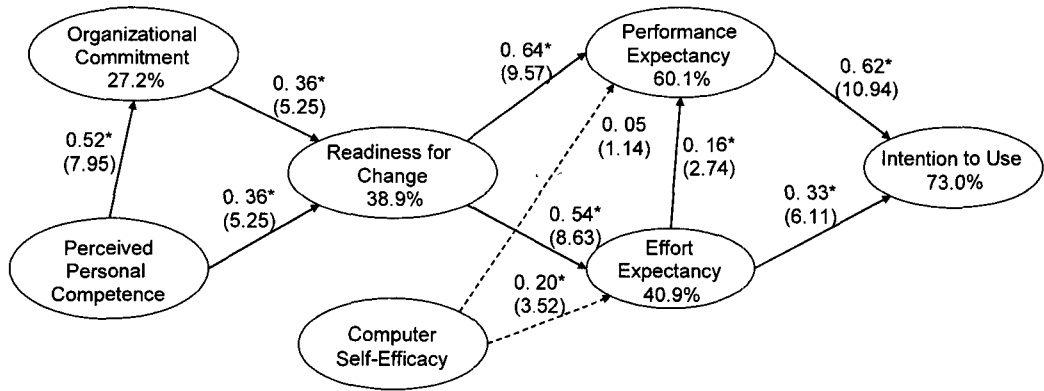
[Figure 2] Second order CFA for readiness for change

In addition, a second order CFA was conducted to confirm the multidimensionality for the construct of readiness for change. As illustrated in [Figure 2], all of γ -coefficients and all of the factor loadings of the items were greater than 0.80; and all the values were significant ($p < 0.01$ in all cases). The second order factor model exhibited an overall good model fit with the data collected from the respondents, by meeting the commonly recommended levels. GFI at 0.951, AGFI at 0.897, NFI at 0.984, NNFI at 0.982, CFI

at 0.989, and RMSR at 0.025 were all within the accepted thresholds. These results confirmed the multidimensionality of the construct of readiness for change.

5.2 Structural Model

The structural model, including the research hypotheses and the causal paths, was examined using the confirmed measurement model. The model's overall fit with the data was evaluated by the same set of fit indices used in the measurement model. The structural model exhibited a fit value satisfying the commonly recommended threshold for the respective indices, providing evidence of a good model. The path coefficients and the overall fit indices are shown in Figure 3. As illustrated in Figure 3, LISREL results provided significant support for hypotheses 1, 2, and 3, which were empirically validated from previous studies [8, 25]. Hypotheses 4 and 5 were significantly supported. Readiness for change is a strong predictor of both performance expectancy (hypothesis 4) and effort expectancy (hypothesis 5). Both organizational commitment



$\frac{\chi^2}{df} = 570.651/394 = 1.448, GFI = 0.881, AGFI = 0.860, NFI = 0.976, NNFI = 0.991, CFI = 0.992, RMSR = 0.054, RMSEA = 0.040$

* significant at the 0.01 level

[Figure 3] LISREL test results

and perceived personal competence had a significant effect on readiness for change (hypothesis 6 and 7). Finally, hypothesis 8 was strongly supported, indicating that perceived personal competence is an antecedent of organizational commitment.

6. Discussion and Conclusions

In our analysis, we found significant support that behavioral intention to use the ERP system is affected by performance expectancy and effort expectancy about the system. This result is consistent with most of the prior studies. In addition, it was also found that effort expectancy significantly affects performance expectancy, as suggested by many prior studies. As proposed in the research model, readiness for change significantly affected both performance expectancy and effort expectancy. It was also observed that readiness for change plays an important role in explaining two expectancies by identifying the increased variances; the addition of readiness for change to the model increased the explained var-

iance by 22.7 percent in performance expectancy and 21.3 percent in effort expectancy. This study also examined how readiness for change can be formed. One mechanism for influencing readiness for change is through organizational commitment. Because organizational commitment basically reflects a belief in the values and goals of an organization, highly committed individuals are willing to accept organizational change efforts that are considered to be beneficial to the organization. Another mechanism for influencing readiness for change is through perceived personal competence in the work role. Perceived personal competence is similar to job motivation in that it is associated with the satisfying work experiences. Individuals with strong perceived personal competence are ready to accept organizational change efforts because they believe that organizational change will bring about a better work environment and thereby they will be able to accomplish difficult tasks under any settings.

From the perspective of practice, there are some additional implications. First, despite the

promised benefits, the ERP systems are considered to be inherently risky because they require significant organizational resources; and organizations often adjust slowly to complex enterprise system packages [3, 21]. Thus, the ERP systems are viewed as a completely different class of IT application compared with traditional IT systems [3]. Cognizant of the different features of the ERP systems, therefore, it is imperative that organizations understand the particular conditions under which they will be adopted and utilized. Investigating the role of employees' readiness for change might explain aspects of why many organizations installing and launching the same ERP system show the mixed results with their acceptance. This study sheds some light on this issue by showing that the readiness for change influences the expectancies about the system, which in turn affects the behavioral intention to use the system. Second, recently, many organizations have been increasingly aware of the concept of the Real-Time Enterprise (RTE) since Gartner Group has introduced it. The RTE is a business improvement concept that involves substantial changes to business processes using modern IT and telecommunications. The big challenge that many organizations have faced with IT for the RTE is also user resistance to the IT due to the change efforts [15]. Acknowledging that the Gartner Group expects that the RTE will become an important IT investment area in the near future, this study's finding emphasizes the need for practicing managers in charge of the introduction of new type of change-enabler systems such as the RTE systems to focus on readiness for change of the organizational members as well.

The introduction of enterprise-wide systems

calls for critical decisions that consider the large investments and the implications leading from the initiatives. Recognizing that the ERP systems are different from traditional IT systems and their implementation is overshadowed by a high failure rate, we focused attention on employees' views about the need for organizational change. As a result, the framework developed in this work incorporated a conceptual construct called readiness for change that captured beliefs about positive implications of organizational change. We found encouraging results on the role of readiness for change and its mediation effect on the behavioral intention to use the ERP systems. Acknowledging that the ERP systems continue to grow with promising potential benefits, this study has value for theoretical as well as practical development; while several avenues for future research remain.

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〈Appendix〉 Questionnaire Items

Construct	Description
Intention to use [14]	
IU1	I intend to use the ERP system for performing my job as often as needed
IU2	To the extent possible, I would frequently use the ERP system in my job.
Performance expectancy [8, 25]	
PE1	Using the ERP system enables me to have more accurate information.
PE2	Using the ERP system enhances my effectiveness in performing my task.
PE3	Using the ERP system is useful for performing my task.
PE4	Using the ERP system increases my productivity in performing my task.
PE5	Using the ERP system enables me to access more relevant information.
PE6	Using the ERP system enables me to acquire high quality information.
Effort expectancy [8, 25]	
EE1	Learning to operate the ERP system is easy.
EE2	It is easy to remember how to use the ERP system.
EE3	I find it easy to get the ERP system to do what I want it to do.
EE4	My interaction with the ERP system is clear and understandable.
EE5	It is easy to become skillful at using the ERP system.
EE6	I find the ERP system to be easy to use.
Readiness for change [9]	
RC1	I look forward to changes at work.
RC2	Changes tend to stimulate me.
RC3	I find most change to be pleasing.
RC4	Change usually benefits the organization.
RC5	Most of my co-workers benefit from change.
RC6	Change often helps me perform better.
RC7	Other people think that I support change.
RC8	Change usually helps improve unsatisfactory situations at work.
RC9	I usually benefit from change.
RC10	I am inclined to try new ideas.
RC11	I usually support new ideas.
RC12	I often suggest new approaches to things.
RC13	I intend to do whatever possible to support change.
Organizational commitment [2]	
OC1	I would be very happy to spend the rest of my career with this organization.
OC2	I enjoy discussing my organization with people outside it.
OC3	I really feel as if this organization's problems are my own.
OC4	This organization has a great deal of personal meaning for me.
OC5	It would be very hard for me to leave my organization right now, even if I wanted to.
OC6	Too much in my life would be disrupted if I decided I wanted to leave my organization now.
Perceived personal competence [2]	
PPC1	In general, the work I am given to do at my organization is challenging and exciting.
PPC2	The requirements of my job are demanding.
PPC3	In this organization you are encouraged to feel that the work you do makes important contributions to the larger aims of organization.
PPC4	I am usually given feedback concerning my performance on the job.
PPC5	In my organization, I am allowed to participate in decisions regarding my workload and performance standards.
Computer self-efficacy [6]	
I could complete a job using the information system...	
SE1	if I had only the system manuals for reference.
SE2	if I had seen someone else using it before trying it myself.
SE3	if I could call someone for help if I got stuck.
SE4	if someone else had helped me get started.
SE5	if I had a lot of time to complete the job for which the information system was provide.
SE6	if I had just the built-in help facility for assistance.
SE7	if someone showed me how to do it first.
SE8	if I had used similar information systems like this one before to do the job.