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Perceived Organizational Readiness for IT-Based Change and its Antecedents: An Exploratory Study in the Healthcare Sector

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ABSTRACT

This study builds on the change management literature and identifies variables associated with perceptions of organizational readiness for change in the specific context of health information systems. A questionnaire was distributed to the future users of a telehomecare project in 11 home care organizations. A total of 138 questionnaires were returned, for a response rate of 90%. Our findings reveal that project managers would benefit from explicitly addressing change content perceptions when pre-implementing information systems. More specifically, all three types of change sentiments – vision clarity, change appropriateness and change efficacy – have a positive influence on users' perceptions of organizational readiness. Furthermore, we observed that users' perceptions of the organization's flexibility were positively related to organizational readiness for change. In short, as organizations continue to invest in IT to improve performance, understanding the factors that influence organizational readiness for change represents an important avenue for future research.

Keywords

Perceived organizational readiness; pre-implementation phase; users' attitudes; clinical information system.

INTRODUCTION

The adoption and diffusion of clinical information systems (CIS) has become one of the critical benchmarks for achieving several health care organizational reform priorities, including home care, primary care, and integrated care networks (Jha et al., 2008). Outcomes associated with the adoption of CIS in health care organizations include higher productivity levels among clinicians (Lepanto et al., 2006), better integrated care processes (Kuhn et al., 2006), and improved patient safety and quality of care (Goroll et al., 2009). However, these systems are often strongly resisted by the same community that is expected to benefit from their adoption and use. In some cases resistance has manifested itself in boycotts of installed computer-based systems (Lorence and Richards, 2003) or threats of strikes by the medical staff to oppose the implementation of electronic medical records systems (Lapointe and Rivard, 2005). In extreme cases, technological resistance induced the hospital management to remove state of the art CIS.

Many empirical studies have found that favorable attitudes are often associated with a high level of CIS success (Chau and Hu, 2002; Alquraini et al., 2007). In this study, we argue that the pre-implementation phase is worthy of additional attention because change targets' early perceptions and beliefs play a central role in shaping future attitudes and behaviors such as negative rumors, involvement and commitment in

early planning and design phases, and resistance to system usage. It is usually during the pre-implementation phase that targeted users are introduced to the project details, see the system for the first time, and form initial impressions of how work is likely to change (Herold et al., 1995).

Users' perceptions of the organization's readiness for change have been identified by change management theorists as one important factor in understanding potential sources of resistance (Armenakis et al., 1993; 2007). An individual's perception of an organization's readiness for change is viewed as a concept similar to unfreezing, which is described as a process in which an individual' beliefs about pending change are influenced such that the imminent change comes to be seen as possible (Lewin, 1947). In this light, we do not consider organizational readiness for change as a general state of affairs that exists in an organization but instead as the organization's preparedness for a specific change.

The present study develops and tests a research model in which perceived organizational readiness is influenced by four groups of pre-implementation perceptions or beliefs. The paper is structured as follows. First, we begin by reviewing relevant work that supports the hypothesized relationships between organizational readiness for change and its antecedents. Next, the paper describes the study and the data that was collected in 11 Canadian home care organizations to test this research model. This is followed by the presentation of the study results, their discussion, future research avenues, the study's limitations, and its conclusions.

RESEARCH MODEL

Readiness collectively reflects the extent to which individuals are cognitively and emotionally inclined to accept, embrace, and adopt a particular plan to purposefully alter the status quo (Armenakis et al., 1993). These perceptions are conceptualized as existing on a continuum, from viewing the organization as capable of withstanding change and successfully adapting to it (high readiness for change) to believing the organization is not ready to undergo such a change (low readiness for change).

Based on a recent review of research on readiness for change (Holt et al., 2007), four categories of variables were identified as possibly related to an individual's interpretation of organizational readiness for change during the pre-implementation phase: 1) the attributes of the change that is being introduced, 2) the extent of leadership support for the proposed change, 3) the organizational context where the change takes place, and 4) the characteristics of the change targets (see Figure 1). Each of these variables will be discussed in turn.

Attributes of the Change

Vision clarity (discrepancy)

Change management theorists posit that one of the key sentiments to creating change readiness is the sense that change is needed (Armenakis et al., 1993; Beer, 2003). A clear vision provides much of the justification for such a sentiment. A discrepancy between current and desired performance helps legitimize the need for change. Otherwise, the motive for a change may be perceived as arbitrary (Armenakis et al., 1993). The notion of vision clarity or discrepancy is also consistent with social accounts theory, which stipulates that information should be provided by change agents to explain why an organizational change is needed (Rousseau and Tijoriwala, 1999).

Change appropriateness

Another sentiment emphasized by Armenakis et al. (1993; 2007) is the sense that the change is appropriate. Indeed, in addition to believing that a discrepancy exists, if employees are to support change, they must also believe that the specific change being proposed will effectively address the discrepancy. This sentiment is also consistent with social accounts theory (Bies, 1987) and is used to describe whether the proposed change is the correct one for the situation at hand. If the proposed change is viewed by employees as the incorrect approach for pursuing the vision, change targets may not be willing to "buy-in" to the change or attempt to make it work (Cole et al., 2006). Clearly, appropriateness of a change is important, because individuals may feel that some form of change is needed but may disagree with the specific change being proposed.

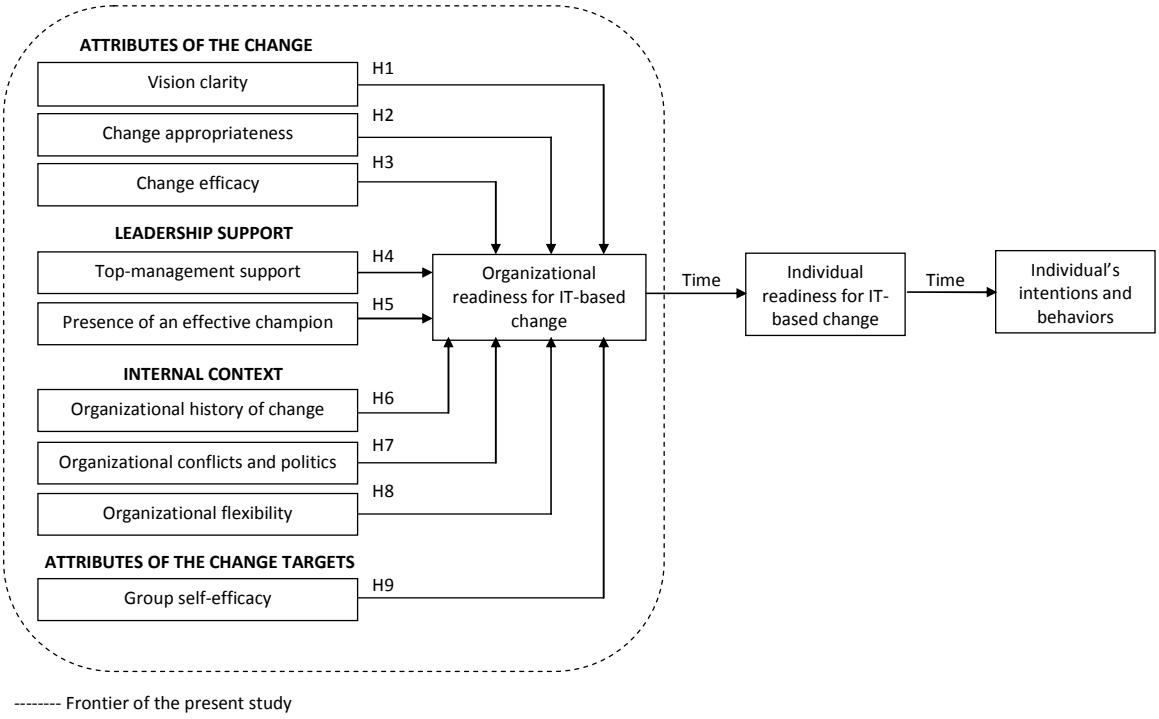


Figure 1. Research Model (adapted from Holt et al. 2007 and Desplaces 2005)

Change efficacy

A sense of efficacy, in the form of expectancy (efforts will lead to successful accomplishment), is a central tenet of most motivation theories (Vroom, 1964). To be motivated to support a change, individuals must not only feel that the change is appropriate but also that success is possible. In this sense, we believe that information from the environment may have a significant impact on individuals' perceptions of organizational readiness. If the proposed change has already been implemented successfully in similar organizations and this information has reached the appropriate individuals, one could conclude that they will see their organization as ready for a successful implementation. In contrast, if the press has reported prior failures in similar changes, one could expect some reticence on the part of the individuals affected by the change.

Based on this research, the following hypotheses are proposed:

Hypothesis 1: Individuals' perceptions of vision clarity will be positively related to perceived organizational readiness for IT-based change.

Hypothesis 2: Individuals' perceptions of change appropriateness will be positively related to perceived organizational readiness for IT-based change.

Hypothesis 3: Individuals' perceptions of change efficacy will be positively related to perceived organizational readiness for IT-based change.

Leadership Support

Social learning theory (Bandura, 1986) posits that individuals sense through their interpersonal networks the support that exists throughout the organization. In this study, principal support describes the support from upper management as well as local change agents (Armenakis et al., 2007).

Top-management support

Many researchers have argued that senior managers play a crucial role in determining whether an IT implementation succeeds or fails (Ngai, 2008). Today, the need for strong leadership – especially in large-

scale IT projects – seems to be the generally accepted wisdom among information systems academics and managerial practitioners. When upper management is highly supportive of an IT project, greater resources are likely to be allocated to develop and support the new system (Yap, 1989), enhancing facilitating conditions and, ultimately, increasing perceptions of organizational readiness.

Effective project champion

It has long been recognized by both practitioners and academics that it is highly risky to attempt complex change without a project champion (Benjamin and Levinson, 1993). In the IT context, champions are individuals who actively promote their personal vision for using IT, pushing the project over or around approval and implementation hurdles (Beath, 1991). They may have initiated the process or been convinced of its necessity by other organizational members. Dong et al. (2007) recently observed that perceived leadership behaviors of IT project champions exercise a direct and positive influence on users' attitudes toward the object of change. Their finding confirms the claim that project champions are effective leaders in terms of conveying visions and transcending users' self-interest for collective goals (Beath, 1991).

Based on this research, it is proposed that:

Hypothesis 4: Individuals' perceptions of top-management support will be positively related to perceived organizational readiness for IT-based change.

Hypothesis 5: Individuals' perceptions of the presence of an effective project champion will be positively related to perceived organizational readiness for IT-based change.

Organizational Context

Organizational history of change

To some degree all organizations are idiosyncratic; that is, previous experiences have been stored in each organization in a pattern that makes the organization different from others that may on the surface appear very similar (Nord and Tucker, 1987). Organizations are dynamically evolving systems, and each has a history of resources, commitments, successes and failures that shape the environment in which computer-based systems are developed and implemented (Kling and Iacono, 1989). Therefore, organizational history might affect the way a change is framed in terms of previous initiatives undertaken by organization and hence have a great influence on the extent of IT implementation success.

Organizational conflicts and politics

CIS implementation in health care organizations is characterized by social interactions. Among the many individuals and groups involved in the implementation process, there are usually managers, a project leader, a project champion, project team members, system developers, and a group of user representatives (clinicians). These actors have different interests and objectives for the adoption of a new CIS. Hence, system implementation might be influenced by organizational politics and power relations (Markus, 1983). Conflicting interests of different key actors and groups might lead to perceptions among targeted users that the organization is not ready for change.

Organizational flexibility

Some organizations are more agile and easily adaptable than others. For this reason, the degree to which organizational policies and practices are supportive of change may also be important to understanding how an employee perceives the organization's readiness for change (Armenakis et al., 1993). Eby et al. (2000) examined this issue in a study of two divisions of a national sales organization that was transitioning to work teams. Their results reveal that vendors' perceptions of their organization's ability to accommodate change by altering policies and procedures were strongly and positively related to perceived organizational readiness for change. Hence, we posit that clinicians are likely to hold unfavorable views about readiness for change when they perceive their health care organization's structure and policies as rigid and inflexible.

Based on prior research, we propose the following research hypotheses:

Hypothesis 6: Individuals' perceptions of prior successful change experiences will be positively related to perceived organizational readiness for IT-based change.

Hypothesis 7: Individuals' perceptions of organizational conflicts and politics will be negatively related to perceived organizational readiness for IT-based change.

Hypothesis 8: Individuals' perceptions of organizational flexibility will be positively related to perceived organizational readiness for IT-based change.

Change targets' Attributes

Group's self-efficacy

Self-efficacy refers to sentiments of confidence in one's ability to succeed. This concept is included in Bandura's social learning theory (Bandura, 1986), which suggests that employees who feel comfortable with their present skill set will believe that a different skill required to successfully execute the new job requirements can be mastered, such that they will be able to regain the comfort felt prior to the change. Hence, we posit that individuals who perceive themselves (as a group) as capable of learning new work methods and tools will be more receptive to organizational change efforts and more likely to look favorably on the organization's readiness for change.

Hypothesis 9: The extent to which individuals perceive themselves (as a group) capable of learning and using the new information system will be positively related to perceived organizational readiness for change.

METHODS

Research Design

To test the above hypotheses, we conducted a cross-sectional survey using a self-administered questionnaire. The population consisted of 154 nurses working in 11 home care units in the province of Quebec, Canada.

Study Sites

A telehomecare project was carried out in an oncology and palliative care unit in Quebec, Canada in 2007. The core of the pilot project was an implementation of SyMO^{TM} software. This computer application optimizes the process used to organize nursing activities taking place in patients' homes. More specifically, it captures clinical data on patients at their source and immediately sends the information to the other care providers involved.

This pilot project was the subject of an evaluative study that yielded encouraging results (Paré et al., 2009). Indeed, eight months after the implementation of the telehomecare application, the number of treated cancer patients increased by 6% (p=.04), the average number of home visits by nurses increased by 0.7 visit per day (p=.02), and the time allocated for direct patient care increased by 14% (p=.003). Given these positive results, senior administrators of Quebec's department of health and social services decided to invest additional funds in the project to verify whether the results were generalizable in the context of traditional home care services. The department asked 11 home care units in three different geographical regions to participate in the study.

The project and the SyMO software package were presented to the nursing staff of each of the 11 participating organizations at kick-off meetings held from May to November in 2008. The meetings were jointly organized by the managers of the health facilities and the supplier of PG Solutions in order to present the scope of the project and its objectives, the roles and responsibilities of the key stakeholders, the planned deployment approach (including project phases), and the projected schedule and budget. The meetings also included a 60-minute demonstration of the software application.

Data Collection

The data for this study was collected at each of the 11 kick-off meetings. Only nurses who would be affected by the change were asked to stay in the room while the data was collected. Once the objectives of the study had been explained, a questionnaire was distributed to all the nurses in attendance. A human ethics certificate was first obtained from the appropriate university authorities. A total of 138 nurses completed the questionnaire, for a response rate of 90%. Virtually all participants were women and 80% occupied full-time jobs. They were established nurses. On average, they had over 18 years of experience in nursing and 10 years of seniority within their health care organization. The respondents' average experience with personal computers was 4.6 on a 7-point Likert scale.

Operationalization of the Variables

Consistent with our research model, the survey's questions covered 10 variables. All except one of the variables were measured with four items. All the items were assessed on 7-point Likert scales ranging from strongly disagree to strongly agree. Scales associated with organizational readiness (OR), change efficacy (CE), organizational history of change (OHC), the presence of a champion (3 items) (C), and organizational conflicts and politics (OCP) were developed by the authors. Vision clarity (VC) was measured using a scale adapted from Armenakis et al. (2007). Top-management support (TMS) and change appropriateness (CA) were measured using scales adapted from Holt et al. (2007). Organizational flexibility (OF) was adapted from Rush et al. (1994). Finally, individuals' self-efficacy was measured using a scale adapted from Compeau and Higgins (1995). Scale items used to measure all variables are available from the first author.

RESULTS

Data analysis was performed using partial least squares (PLS), a structural equation modeling approach (Chin and Newsted, 1999). As a preliminary step, we examined the distributional characteristics of the sample. Exploratory factor analyses of each reflective construct's items and their Cronbach alpha reliabilities were first examined as a preliminary check of unidimensionality. The results from these analyses revealed that all scale items associated with a given construct loaded highly (>.60) on a single factor. Next, based on the results of the reliability analysis (Cronbach alpha), three items out of 39 were removed from their respective measurement instruments: OF4 (organizational flexibility), OCP2 (organizational conflicts and politics) and OHC4 (organizational history of changes). As a result, the remaining 36 items were then analyzed in a PLS confirmatory factor analysis (CFA). Examination of construct reliabilities (Table 1), the variance shared between constructs (Table 2) and the cross-loadings (not shown here) indicated that the psychometric properties of the 10 reflective constructs were acceptable. As can be seen, all Cronbach alphas were .71 or better and all item loadings were greater than .73. As reliabilities and item loadings greater than .70 are considered acceptable (Fornell and Larcker, 1981), the scales used in the study can be considered to have met the required standards.

Two criteria that are recommended for assessing discriminant validity are indicators loading more highly on their corresponding factor than on other factors and a square root of average variance extracted (AVE) that is higher than inter-construct correlations (Chin, 1998). The cross-loadings (not shown here) show that all indicators loaded more highly on their own factor than on others. These results indicate that the measurement model has satisfied the recommended convergent and discriminant validity criteria.

Figure 2 depicts the PLS path coefficients, construct indicator loadings, and the proportion of explained variance in the dependent variable. As can be seen, four of the hypothesized links in the research model were supported, with change appropriateness (H2), organizational flexibility (H8), vision clarity (H1), and change efficacy (H3) explaining 75% of the variance in perceived organizational readiness for change. On the other hand, five hypotheses were not supported. More specifically, top-management support (H4), presence of a champion (H5), an organizational history of change (H6), individuals' self-efficacy (H9), and organizational conflicts and politics (H7) were not found to be associated with perceived organizational readiness for change during the pre-implementation stage.

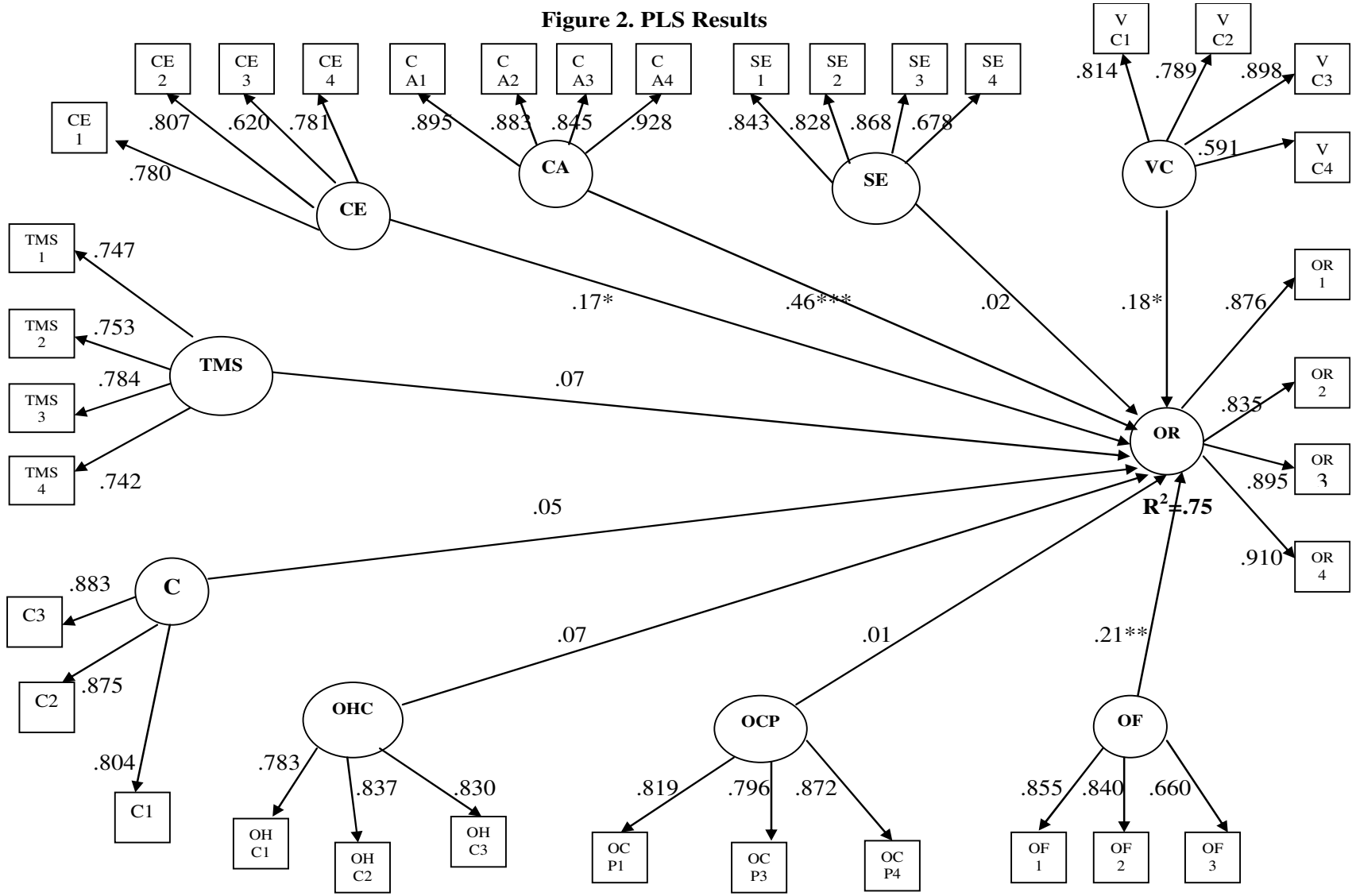
	Number of items	Cronbach alpha	Mean	Minimum	Maximum	Standard deviation
Vision clarity (VC)	4	.79	5.9	2	7	1.0
Change appropriateness (CA)	4	.90	5.9	1	7	1.1
Change efficacy (CE)	4	.85	5.7	3	7	1.0
Top-management support (TMS)	4	.76	5.3	2	7	1.1
Presence of a champion (C)	3	.87	6.1	3	7	1.0
Organizational history of change (OHC)	3	.79	5.1	3	7	1.0
Organizational conflicts and politics (OCP)	3	.78	5.2	3	7	1.1
Organizational flexibility (OF)	3	.71	4.4	1	7	1.1
Self-efficacy (SE)	4	.82	4.4	1	7	1.2
Organizational readiness (OR)	4	.89	5.7	2	7	1.1

Table 1. Descriptive and Reliability Results

	Variance									
	VC	CA	TMS	C	OHC	OCP	OF	CE	SE	OR
Vision clarity (VC)	**.82**									
Change appropriateness (CA)	.75**	**.89**								
Top-management support (TMS)	.42**	.27*	**.77**							
Presence of a champion (C)	.48**	.47**	.67**	**.89**						
Organizational history of change (OHC)	.51**	.50**	.51**	.55**	**.79**					
Organizational conflicts and politics (OCP)	-.25*	-.26*	-.55**	-.50**	-.45**	**.77**				
Organizational flexibility (OF)	.39**	.49**	.52**	.50**	.68**	-.64**	**.79**			
Change efficacy (CE)	.60**	.74**	.59**	.60**	.66**	-.47**	.55**	**.85**		
Self-efficacy (SE)	.46**	.54**	.23*	.34*	.56**	-.29**	.51**	.39*	**.81**	
Organizational readiness (OR)	.80**	.80**	.35*	.45**	.59**	-.33**	.60**	.74**	.51**	**.88**
** p<.001; * p<.05										
The bold numbers on the leading diagonal show the square root of the variance shared by the constructs and their measures. Off-diagonal elements are the correlations among constructs.										

Table 2. Variance Shared Between Research Model Variables

Figure 2. PLS Results



*** p<.001; ** p<.05; * p<.01

DISCUSSION

The purpose of this study was to identify variables associated with clinicians' perceptions of organizational readiness for change in the particular context of CIS adoption. Change management theorists argue that there are four classes of antecedents that have a direct effect on perceived organizational readiness for change: the attributes of the change that is being introduced, the extent of leadership support for the proposed change, the organizational context where the change is being implemented, and the characteristics of the change targets. Our findings imply that CIS project managers and leaders would benefit from explicitly addressing change content perceptions (change attributes) when pre-implementing CIS in healthcare organizations. More specifically, the results of this study indicate that all three types of change sentiments – vision clarity, change appropriateness and change efficacy – have a significant and positive influence on clinicians' perceptions of organizational readiness for IT-based change.

Our findings support the idea that CIS projects have greater chances of success with a compelling reason, i.e., a reason that makes clinicians recognize and accept that a change is needed. In addition to believing that change is needed, if clinicians are to support the CIS project, they must also believe that the specific change being proposed (i.e., new system) is the correct one for the present context. Furthermore, to be motivated to support a change, individuals must not only feel that the change is appropriate but that success is also possible. In this regard, sources of information outside the organization can be used to bolster messages sent by the change agents. This is effectively what happened in this project: the success of the pilot project carried out in the oncology and palliative care unit in 2007 was highly publicized through newspaper and magazine stories, as well as on television at the start of 2008. In the spring of 2008 the project was nominated for the annual 3M Innovation contest organized by Quebec's professional order of nurses. The publicity surrounding the project had a significant, positive effect on the perceptions of nurses in the 11 units of their organization's capacity to successfully implement the proposed change.

In line with Callen et al. (2008), our findings also call for careful, systematic considerations of the context within which CIS are implemented. More specifically, we observed that clinicians' perceptions of the organization's ability to accommodate changing situations by altering policies and procedures were strongly related to perceived readiness for change. As mentioned above, some health care organizations are more easily adaptable and flexible than others. As such, regardless of clinicians' comfort level with the nature of a CIS project, if the organization's structure is perceived to be inflexible and rigid, it appears that clinicians are likely to hold less favorable attitudes about the organization's readiness for change.

It is also important to ask why some variables were unable to explain organizational readiness in the present study. One explanation may be the speed with which the project was launched. The project announcement came suddenly, only a few weeks before the survey and it was only as the project was being officially presented – at the same time as data collection – that most of the targeted users were informed of management's support for the project. Another non-significant variable is the presence of an effective project champion. One possible explanation may be tied to the fact that a registered nurse had been identified to assume this role in each site at the time that we measured organizational readiness. Knowing who would assume this role may have minimized the uncertainty experienced by respondents, such that they perceived this variable as less critical to the project's success. Based on these explanations, we propose that the significance of these variables will depend on the general context in which a project is undertaken. It would therefore appear worthwhile to keep these variables in the model, knowing that their value depends on the context of the implementation. In addition, it is worth noting that, even though some factors may not have had a chance to emerge as significant, we believe that it is important to make an early assessment of organizational readiness for change, since this may provide opportunities to act as early as possible.

When taken together, the four significant variables described above explain 75% of the variance in the dependent variable. This means that our model still left some aspects unaddressed. Hence, other factors may be at play. In this light, whereas change content sentiments reflect what individuals think about the change itself, an individual's perception of change execution reflects the actual process of how the changes are introduced and unfold in the organization (e.g., forming a powerful guiding coalition, empowering others to implement change, creating opportunities for short-term wins and incremental changes). Thus, a change that is viewed positively from a content perspective can still be perceived by the change targets as being executed well or poorly.

Our findings have several implications for both practice and research. For practical purposes, conducting a pre-implementation readiness assessment will help project managers and decision makers choose whether to initiate such a project or whether to implement less costly preliminary steps that will prepare the organization for the anticipated change. In this light, it is interesting to note that 2 of the 11 sites that participated in the present study have not deployed the SyMO software because of low readiness scores. They have decided to delay the implementation until they have winning conditions in place. At the theoretical level, examining the antecedents of organizational readiness for change may help researchers better understand the organizational change process. As for future research, we believe that our results raise two important issues. First, more studies are needed in order to confirm which determinants are most significant in terms of perceived organizational readiness for IT-based change. It would be also interesting to verify which antecedents are likely to emerge, based on the particular context of the project, and those that have an impact on the perceptions of targeted users, independent of the context. Second, it would be interesting and pertinent to have an analysis of the link between the level of perceived organizational readiness and later project success.

CONCLUSION

Several researchers have argued that managing IT implementation projects has to start as early as possible (Snyder-Halpern, 2001; Callen et al., 2008). Perceived organizational readiness is arguably a key factor behind targeted users' initial support for such initiatives. This study provides an initial attempt to understand the variables affecting change targets' perceived organizational readiness for change by offering the suggestion that vision clarity, change appropriateness, change efficacy, as well as organizational flexibility and agility are all important antecedents. As organizations continue to invest in information technologies to improve performance, understanding the factors that contribute to an effective change process represents an important avenue for continued research. Lastly, prior studies have revealed that perceived organizational readiness significantly influences an individual's readiness for change (Eby et al. 2000; Rafferty and Simons 2001) which, in turn, leads to individual behaviors (adoption and use). It would therefore be interesting and pertinent to have a longitudinal analysis of the full model depicted in Figure 1.

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