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Perceived Organizational Readiness Study on EHR Implementation

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ABSTRACT

Electronic Health Record (EHR) systems represent an opportunity to improve the delivery of health care. However, low implementation rates inhibit the ability of EHR to fulfill the promise of the information systems. One possible reason why implementation rates remain low is the high degree of customization required by clinical workers to fit the information systems to the organization. This work is unlikely to occur when such potential users believe the organization to be ill-prepared for the system. The present study reports on a multiple case qualitative study examining how individual stakeholders perceive their organization's readiness.

Keywords

Organizational readiness, Interpretivist case study, Electronic Health Records, Implementation

INTRODUCTION

The Bush and Obama administrations have hailed advances in technology as a key to reducing waste and inefficiency, especially as it relates to healthcare. Electronic Health Records (EHR) are critical to this effort. These systems allow physicians to share information, to provide care more effectively and efficiently, and to coordinate the activities of the stakeholders. While the benefits of EHR have been touted widely, implementation of the technology by physicians remains low (DesRoches, Campbell, Rao, Donelan, Ferris, Jha, Kaushal, Levy, Rosenbaum, Shields, and Blumental, 2008). Only 4% of physician practices and 1.5% of hospitals have implemented comprehensive electronic records (DesRoches et al., 2008; Jha, DesRoches, Campbell, Donelan, Rao, Ferris, Shields, Rosenbaum, and Blumental, 2009).

One of the major benefits of EHR is the availability of information within and across organizations. Lab results for a patient should be available to primary care providers, specialists, physicians brought in for consultation, and arguably to health insurance organizations. For the promise of EHR to be realized, adoption levels must increase far beyond current levels.

EHR systems often require significant customization to fit the needs of the organization. This burdens clinical staff (i.e. doctors and nurses) with defining the processes that will be implemented in software. Customization is required to enjoy the benefits of EHR but can be lengthy and must be completed while the clinical staff performs their normal duties. Thus, significant employee involvement is required between the organization's adoption decision and utilization of an EHR system.

This research seeks to understand what occurs between the adoption and implementation phases for EHR. For employees to customize an EHR system, they must believe that such a system can be successfully used by their particular organization (Vroom, 1964). Thus, perceived organizational readiness may influence their willingness to take the time and put forth the effort required to configure the system for their organization. Perceived organizational readiness is the extent to which an individual believes that her organization is ready to implement the information system. Our research question is "How do individuals determine their organization's readiness for EHR implementation?" Perceived organization readiness is expected to be necessary but not sufficient for implementation of EHR. Other factors remain critical to successful implementation, such as sufficient levels of financial resources and technological expertise.

Valuable insight can be gained by reviewing prior literature. Three major literature streams are reviewed briefly below: Electronic Health Record (EHR) research, adoption and diffusion research, and organizational readiness research.

ELECTRONIC HEALTH RECORDS RESEARCH

The importance of the topic and the availability of stimulus funding to support both implementation of and research about EHR have motivated scholars to turn their attention towards understanding EHR adoption. Research either warns against implementation without considering the consequences or gives advice on how to encourage adoption (Flegel, 2008; Majeed, Car, and Sheikh, 2008). Fears of information overload and the dangers of repetitive information (Hartzband and Groopman, 2008), lost productivity when implementing (Hillestad, Bigelow, Bower, Girosi, Meili, Scoville and Taylor, 2005), and concerns about information ownership (Flegel, 2008; Urowitz, Wiljer, Apatu, Eysenbach, DeLenardo, Harth, Pai, and

Leonard, 2008) dominate the practitioner literature. EHR appears to decrease the utilization of health services without necessarily saving time (Chaudhry, Wang, Wu, Maglione, Mojica, Roth, Morton, and Shekelle, 2006).

Researchers are attempting to tease out factors encouraging and barriers preventing adoption of EHR. Capital expenses related to implementation have been well-represented in the literature (e.g., Hillestad et al., 2005; Miller and Sim, 2004; Blumenthal, 2009). Other barriers include standardization and interoperability issues (Viswanath and Scamurra, 2007), lack of a business case (Tang, Ash, Bates, Overhage, and Sands, 2006), complexity of the systems (Anderson, 2006), scalability, reliability, security, and lack of IT staffing with the required expertise (Bahensky, Jaana, and Ward, 2008). Ludwick and Doucette (2009) discuss how design features of the software can hinder perceptions of the usefulness and usability of the systems. In most studies, enhanced patient outcomes or efficiency seem to be the main goal, but others (e.g., Blumenthal, 2009) suggest that avoiding the cuts Medicare will impose represents a significant reason to implement EHR.

Researchers warn that the processes for choosing and implementing EHR are far more complex than previously conceptualized (Gans, Kralewski, Hammons and Dowd, 2005). Time constraints have been blamed for limiting practitioners' interest in selecting, implementing, and using EHR systems (Ludwick and Doucette, 2009). This research argues that time constraints alone may not fully explain this reluctance; rather, organization members may not believe their organization is ready to implement EHR.

ADOPTION AND DIFFUSION RESEARCH

Prior adoption literature has examined adoption from a normative approach; when certain factors are present (or absent), an organization or individual is predicted to adopt a technology (or not). For instance, TAM posits that perceived ease of use and perceived usefulness predict intention to use, which in turn predicts usage (Davis, 1989; Davis, Bagozzi and Warshaw, 1989). The Unified Theory of Acceptance and Use of Technology (UTAUT) includes individual characteristics as moderators and adds social influences and voluntariness to enhance the model.

Iacovou, Benbasat and Dexter (1995) propose a model of adoption that suggests that external pressure, perceived benefits, and organizational readiness determine an organization's intention to adopt an innovation, a model later supported by empirical tests (Chwelos, Benbasat and Dexter, 2001). The concept of readiness in these studies refers to financial and technological resources available to the organization.

Rather than only using the normative models above, adoption and implementation can (and should) be studied from a process-based perspective. One framework for analyzing the process conceptualizes technology implementation as a six-phase process: pre-adoption (when organizations determine a need and scan the environment for solutions), adoption (the point at which an organization chooses to implement a technology), pre-implementation (planning for the technology introduction), pilot study (the first time most users see the technology "up-close"), implementation (the transition to the new technology), and post-implementation (when the new technology becomes routinized) (Herold, Farmer and Mobley, 1995). The present study responds to Herold et al.'s (1995) call for additional research on the pre-implementation phase, looking at the time after the adoption decision is made but before implementation commences.

ORGANIZATIONAL READINESS RESEARCH

A recent review of the literature on organizational change underscores the necessity of organizational members to be ready for change (Weiner, Amick and Lee, 2008). Studies including organizational readiness to date predict readiness by the resources available to the firm (e.g., Iacovou et al., 1995; Chwelos et al., 2001). These objective measures are clearly important for an organization to be able to implement an information system; however, individual perceptions will vary widely as employees may or may not be privy to such information.

This study seeks to understand the antecedents of perceived organizational readiness. The research focus is clearly at the individual level, as perceptions are formed within individuals. Our research question, how do individuals determine their organization's readiness for EHR implementation, is important insofar as we expect that it will influence their future actions.

METHODOLOGY

Within research that uses a process-based view of adoption, pre-implementation attitudes and organizational readiness have been demonstrated to influence the success of the adoption and implementation processes (Abdinnour-Helm, Lengnick-Hall, and Lengnick-Hall, 2003). However, the formation of these pre-implementation attitudes is an understudied topic. This research focuses on perceived organizational readiness, a single pre-implementation attitude. Qualitative inquiry is used to build knowledge toward theory.

This paper reports on a field study of EHR implementation within an ambulatory surgery center (ASC) in a mid-sized agricultural town in the southeast United States. The ASC is conceptualized as the personnel of the administrative and functional structure.

The ASC is attached to a physicians' practice. The physicians from the practice perform surgery there alongside outside anesthesiologists and surgeons with different specialties. The ASC has four main functional groups: pre-op, operating room (OR), recovery, and the business office (managers, front desk, billing, etc.). Most employees think of the surgery center as revolving around the first three groups, as these are the areas where the service is performed and from which the revenue flows. It was recently remodeled, increasing in size from two operating rooms to six, which is neither extremely small nor extremely large. Based on the Intellimarker (2009) report, specifically on the aspects of operating rooms and square feet, the facility is typical for an ASC.

The ASC was not without computerization before the implementation of EHR. The billing functions are performed on computers using NextGen's practice management system. This software handles scheduling patients and procedures, capturing some information on what services are rendered, and allows for patients and insurance companies to be billed. NextGen is also the vendor for the EHR being implemented.

This study uses a combination of purposive sampling strategies. The organization was selected as a typical case, one form of purposeful sampling (Patton, 2002: 236). A single organization is chosen rather than sampling across organizations to control for some effects that organizational characteristics may have on perceived organizational readiness. The design ensures that differences in perceptions of organizational readiness are not due to the characteristics of the organization itself.

The second purposeful sampling strategy used is the snowball sampling technique (Patton, 2002: 237). The first interview within the organization is with the top manager, who suggests the next participants who should be invited to participate. These interviewees also refer participants to the study.

Because the sampling strategy is purposive, this study makes no claims of generalizability in the traditional sense. As is typical in qualitative inquiry, this research seeks to understand a single organization at a greater depth rather than to generalize findings across all organizations. The insights and patterns learned from this case may be instructive to future research, but care must be taken to empirically verify the results with other organizations.

The study adopts an interpretivist framework. Instead of testing theories determined a priori, we interpret the results from the words of our subjects. Data were collected through three observations, five face-to-face interviews, four phone interviews, and several email exchanges. The interviews were all conducted while the participants were at work, but each interview was in a private or semi-private setting. Each participant was given a consent form to participate and was asked if she had any questions or concerns. No participant had any objections to being recorded, so all interviews were recorded. To help verify the veracity of the data, the participants were asked to look over the transcripts and suggest any clarifications or corrections they thought would be appropriate. None took advantage of this offer, suggesting that the transcripts reflected the substantive meaning of the conversations.

In the analysis, each participant is reported as a separate case, and then compared. The participants responded to the question: "Do you think your organization is ready [for EHR]? Why or why not?" The names of the employees are changed to preserve anonymity.

FINDINGS

Case 1: Betty is the top manager at the ASC. Betty seems sure that their organization is indeed ready. In an email exchange, she explains:

> *I believe we are mentally ready for the change (challenge, one might say). The majority of our staff are computer literate and not opposed to change. The difficulty we will face is being able to input the information as quickly as it will need to be input since a lot of our cases are around 4 to 5 minute cases.*

From this, it appears that two major factors in being ready for EHR are computer literacy and not being opposed to change. The only caveat mentioned in the discussion is that the technology must be able to keep up with the users, or that it will be designed in such a way that the users can keep up with the work when bringing technology into the equation. Her responses could be represented as seen in Figure 1:

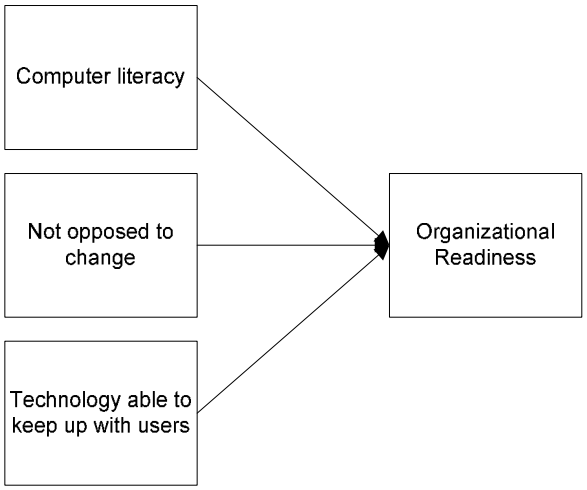

Figure 1 – Interpretation of Betty's view of organizational readiness at ASC

Case 2: Catherine is the director of nursing for the ASC, and the clinical staff answer to her. She has worked her way up from the front desk (and attended nursing school) over the last ten years. She prides herself in having worked in every area of the organization and being able to fill-in when needed. At the time of the interview, she has been in her current post for about six months.

Catherine has serious concerns about the organization's readiness from a managerial perspective. Catherine stated:

> *I feel like we had so many new employees, I'd rather them get comfortable and know what they're doing now. And we're redoing our paperwork; we are in the process of having that done. So we don't even have our system set yet for how we want to do our general paper. It changes each time they do a general case, it seems like we take away or add another sheet. So I want to be comfortable myself, in my position, and have more time to devote to the [EHR] stuff because since I've been in this position I haven't had time to go meet on it or make any kind of decisions on the issue.*

For Catherine, the organization needs to have stable processes (as codified in the paperwork) and then the staff must be familiar with those processes. In addition, many decisions must be made in how the system will be customized: who will perform the customization, what processes will be encoded into the templates for the system, and how will different opinions on processes be resolved? Answering these questions requires that enough slack time be available to carefully work through these issues. From her interview, she sees readiness as shown in Figure 2:

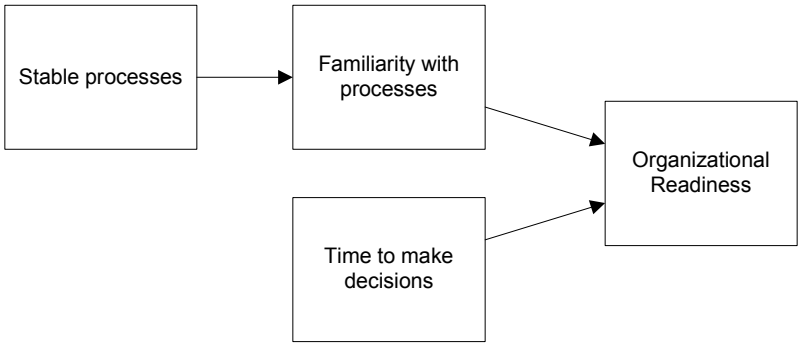

Figure 2 – Interpretation of Catherine's view of organizational readiness at ASC

Case 3: Dorothy is the pre-operation supervisor. She is responsible for working with the anesthesiologists to get the patients prepared for surgery. Her group reviews the health and physical forms and medication lists, as well as administering medications when needed. Her history is as a medical and surgical nurse. She joined the organization three months before her interview, after leaving a hospital surgical unit.

When asked if the organization is in a position to be able to implement EHR, she said:

> *No. No. They're a little, om… behind the times I think. I don't know if they would catch on as quickly here. … they don't like change. The change would be very hard for them… And you know our surgeries here go so quickly. You know, [one of our physicians will perform a surgery] in 10 minutes, and, you know, little stuff like changing up IV start kits and stuff like that throws them way off. So this might be a change for them, I think.*

Dorothy sees willingness to change, ability to learn quickly, and a system that can perform quickly enough to keep up with the fast pace of the ASC necessary for organizational readiness. Her view is represented in Figure 3:

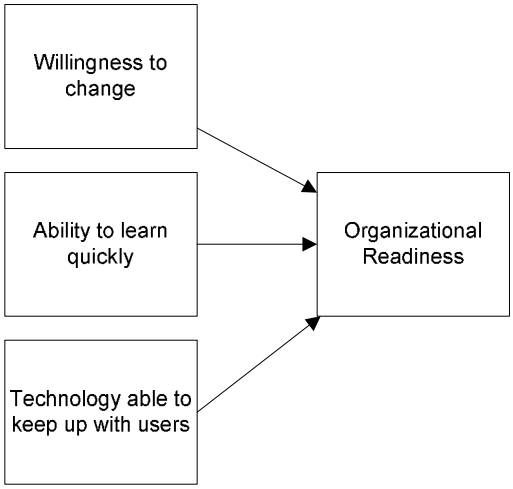

Figure 3 – Interpretation of Dorothy's view of organizational readiness at ASC

Case 4: Francine is the recovery supervisor. Her group watches over patients as they come out of anesthesia. They also review discharge instructions with the patients, which involves a heavy teaching role. While she had only been with the ASC for about five months at the time of her interview, she worked previously at the physician practice.

Francine expresses grave concerns about the organization's readiness:

> *Honestly, no. I don't. Our volume right now is just huge, and when we do 800 surgeries a month average, and like I said, it's going to be a very time-consuming process. I'm not sure the physicians will be ready for us to have to take the extra time right now.*
>
> *It's just going to have to be timed really well, or do a lot of training outside regular business hours to get everybody up to speed because you can't just put in the computers and say "OK here you go" and then, I mean, it won't work like that. So, if they're willing to take the time to have some training sessions after hours, and if everybody's willing to come in and train without patients being here, then maybe... I mean, we could make it work. But it would be difficult.*

Francine's concerns stem from the time required, both the lost time during the use of the system on a day-to-day basis, as well as the time required to train the staff before the system goes live. Thus, her view of organizational readiness is shown in Figure 4:

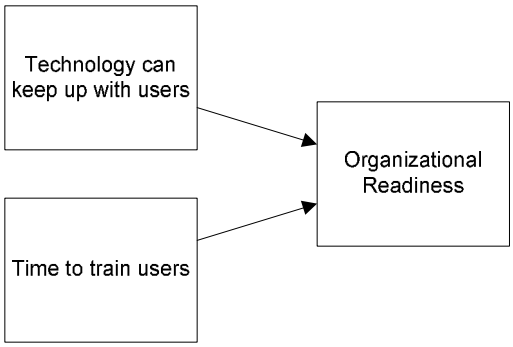

Figure 4 – Interpretation of Francine's view of organizational readiness at ASC

Case 5: Harold is the EHR analyst and a certified technician and has worked for both the ASC and the associated physician practice for more than six years. He is in charge of EHR implementation and customization for both the physician practice and the ASC. While he has performed every job on the clinic side, he has only observed the work that occurs in the ASC.

Harold stated with respect to organization's readiness:

> *Hmm. Good question. Ahh, Do they need [EHR]? Yes. Would they benefit from [EHR]? Yes. Are they ready for [EHR]? <whistles> maybe.*
>
> *I don't want to say yes, I don't want to say no. I'm really split down the middle. I could see where, just talking to some of the staff when we started trying to implement like a year ago, some of the staff was really enthusiastic about it, and really liked some of the stuff that it was going to present, that we presented to them as a helpful tool, to get their job done easier and more efficient. And they liked the idea. Whether they're ready or not, … I hope so.*
>
> *Some of them are ready. The older ones, we're gonna run into [problems]. The younger people who have either (a) used [EHR] or are familiar with computers, they're gonna love it. They are gonna see their work is done quicker and easier, and they have enjoyed using the computer for years, so this just makes it a whole lot simpler for them. The older crowd who has always had paper, always uses the pen in their hand, they're going to have the most difficulty to make the transition from paper to [EHR] because they're used to having a hard copy thing, something they can physically hold onto in their hand, they don't have to go look for it somewhere, it's right there in their hand, they don't want to have to move… that's going to be a challenge.*

Harold believes that the organization is ready insofar as its members have experience with EHR, experience with computers, and a willing to change. Thus, his view of organizational readiness is as seen in Figure 5:

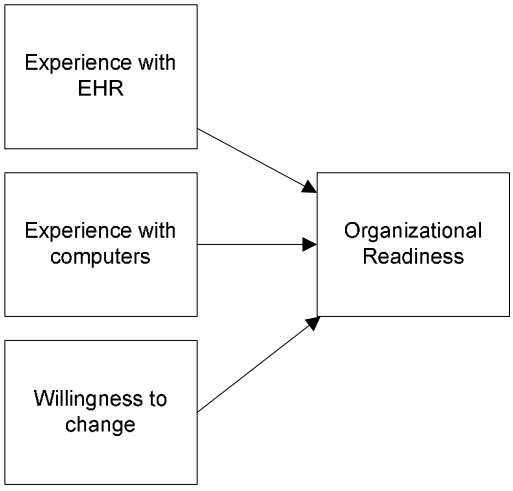

Figure 5 – Interpretation of Harold's view of organizational readiness at ASC

We can see from the differences in the views of the respondents that a consensus on whether the organization is ready is hard to reach. The reasons the respondents believe that the organization is (or is not) ready leads to an understanding of how each individual determines if the organization is ready.

While the respondents use different words to describe characteristics required for organizational readiness, several of the concepts overlap. For instance, Betty describes "not be opposed to change," which overlaps with Dorothy's concept of "willingness to change," and Betty describes "computer literacy," which is closely related to Harold's "experience with computers." When we triangulate the responses across the participants and aggregate the unique concepts identified, we put forward the following model (as shown in Figure 6):

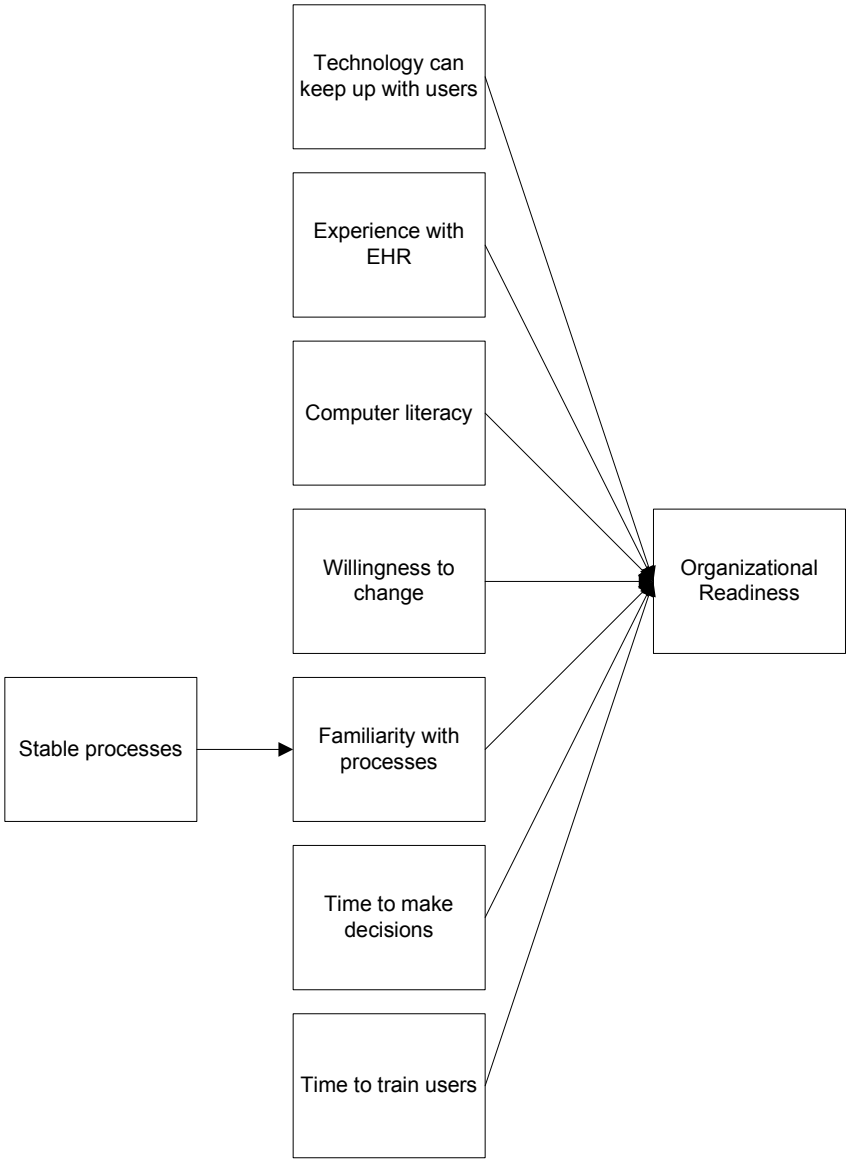

Figure 6 – Integrated model of organizational readiness at ASC

Some interesting patterns emerge. For instance, we can categorize the factors that influence organizational readiness as being technology-based (such as technology being able to keep up with the users), individual characteristics (such as experience with EHR, computer literacy, willingness to change, and familiarity with processes), and organization-based (such as providing stable processes, time to make decisions, and time to train the users). Some of these factors can be enhanced by the organization directly, while others require personal action by the potential users. It is interesting to note that, irrespective of individual factors and organizational resources, the technology must be able to meet the needs of the users for the users to perceive the organization to be ready.

DISCUSSION

Within organizations, individual perceptions of the organization's readiness can influence their willingness to perform the work required for the successful implementation of electronic health records (EHR). While different individuals have

different views of what makes an organization ready for EHR, interesting patterns emerge across cases. The users must understand that the technology can meet their needs, individuals must have characteristics such as computer literacy and a willingness to change, and organizations must provide certain resources, such as enough slack time for decisions in the implementation process and training.

Of particular interest is the lack of certain characteristics expected to emerge. For instance, financial resources are conspicuously absent from the model which emerged from the clinical staff. Technological sophistication of the organization is not in the model either, though experience with EHR and computer literacy may be related to technological sophistication in the minds of the clinical staff interviewed. Moreover, lack of partner readiness as an antecedent of organization readiness appears to indicate that data interchange, while an important benefit of EHR, may not be as important to the employees. These differences may indicate clear distinction between organizational readiness in pre-adoption and pre-implementation stages within individual mental models, or may be related to the perceptual measure of organizational readiness as opposed to a normative model.

Finally, while the organization has stated that implementation is a priority, the power of individuals to defy the mandated implementation shows that voluntariness of use has many shades of grey. In autocratic organizations, it would be expected that those who failed to implement the system would come into compliance or find alternative employment. In these relatively flat organizations, however, individuals appear to have far more control over the process. This may be related to the clinical staff being expected to customize the system while also generating revenue.

This research has several limitations which must be acknowledged. First, this research takes place over a short period of time, capturing only a snapshot of the organization and the individuals' perceptions of organizational readiness. Future work is needed to enhance our understanding of individual perceptions of organizational readiness by longitudinally studying the phenomenon, from pre-adoption attitudes, through pre-implementation attitudes, and ending with post-implementation attitudes. In addition, this study suffers from a small sample size. This small sample size may influence the findings of the study, and future work should broaden our understanding of perceived organizational readiness by using a larger sample.

Perceived organizational readiness is not sufficient to gain the benefits sought through EHR. For instance, interoperability of systems, security and privacy concerns, and economic factors can all impede realization of the advantages of EHR. This study only examines these factors insofar as they impact individual perceptions of organizational readiness, and future work should seek to determine how the influence of perceived organizational readiness may interact with that of interoperability, security and privacy concerns, and economic concerns.

Additionally, as is often the case with interpretivist research, the names of the concepts are imposed by the researchers. While the respondents' phrases were used where possible, the names are our conventions. Thus future empirical work should be undertaken to ensure that the label given to these concepts make sense in broader context.

Finally, it must be recognized that by focusing on a single organization, findings may be idiosyncratic. While such a challenge is not expected, it is conceivable that different organizational cultures lend themselves to different perceptions of organizational readiness. The choice to use a single site was done intentionally to limit cross organizational effects that can create noise when trying to determine the antecedents of perceived organizational readiness. However, future work across organizations should confirm the generalizability of the findings.

These limitations notwithstanding, this research makes several contributions to theory and practice. The theoretical contribution of this work is to move toward an understanding of the perceived antecedents of organizational readiness for EHR implementation. This exploratory research may contribute to the development of a model of how individuals form their perceptions of organizational readiness.

The practical contribution of this work is to help vendors, organizations, and other concerned stakeholders (e.g., governments) to understand how to help individuals involved in the customization process to perceive the organization as ready. It can be expected that such perceptions can influence an individual's willingness perform the work required to customize the system. This customization can then enhance the success of the system long-term to enable the benefits sought by implementing the EHR system.

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