Adoption of Electronic Health Record System: Multiple Theoretical Perspectives

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Abstract

This paper investigates the adoption of Electronic Health Record (EHR) systems by US health providers with multiple theoretical perspectives. In particular, it argues that the fit between EHR systems and clinical activities interacts with social contagion from peer healthcare providers, which influences the valence to EHR systems of focal provider, and organizational valence finally impacts the adoption intention of focal provider. The data analysis on the surveys on practitioners supported the research model.

1. Introduction

The reform in the U.S. healthcare sector has being undergoing for years and health information technology (HIT) is heralded to transform the U.S. healthcare sector, reducing costs and improving quality [1]. HIT is also found to have great potential to improve healthcare providers' efficiency and performance, patient safety, and patient satisfaction [2, 3]. For example, as one of the significant emerging HITs [4], EHR system is regarded as "the foundation for a safer and more efficient healthcare system" [5]. While prior research found clear benefits of HIT, adopting new information systems in the U.S. healthcare sector has proven difficult [6]. Historically, the U.S. healthcare sector has lagged behind other sectors in the adoption and use of IT [7], e.g. financial services, insurance, and etc. For instance, only 17% U.S. physician offices and 10% hospitals have adopted EHR systems in 2009 [8].

The gap between the expected benefits of HITs and the slow and low rate of adoption presents a good opportunity for researchers to understand how ITs are adopted in the U.S. This study examines the adoption of EHR system in the U.S from the perspectives of both task-technology fit (TTF) theory and social contagion theory. TTF theory is useful in explaining how technology interacts with tasks or activities of an organization and impacts its performance [9]. Fichman (2004) called for research that links IT and its impact on organization performance in explaining the adoption of ITs. On the other hand, in the context of EHR system adoption, physician resistance has been extensively discussed in the literature as an important barrier to EHR system adoption [10-12]. However, physician resistance would be mitigated by the influences from other physicians who have adopted HIT [13]. Social contagion theory, which depicts how ideas or opinions spread in a social network [14-16], can be used to explain the influences from other physicians.

This paper proceeds as follows. In the next section, the related literature was reviewed and hypotheses and research model were developed. Methodology and results of data analysis were then presented. In the end, the results and conclusions were provided.

2. Literature review

2.1 Task technology fit theory and EHR system

TTF theory postulates that when a technology has features that fit the requirement of a task, performance of the organization will be improved [9, 17].

Originally TTF was used to explain the individual task performance and extended to incorporate with other theories. For example, TTF has been used to explain user adoption of technology by combining such IS models as Technology Acceptance Model (TAM) [18]. TTF later has been extended to examine performance at other levels, such as group level [19], and organizational level [20].

TTF has been used to explain the adoption of various technologies including group decision support system [21], high speed data services [22], technology-mediated distance education [23], mobile commerce [24], mobile banking [25], and mobile location systems [26], to name a few.

EHR system provides many functionalities and involves with many clinical activities of healthcare organizations, and is vital to the business process of healthcare organizations. Business process is a set of activities to produce products or services, and is very similar to the concept of tasks in the TTF theory, which are actions that turn input into output. Organizations need to know how the changes to their business processes made by IT impact their performance. TTF is

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capable of explaining how technology meets the requirements of the business processes and impacts the performance. Therefore, TTF matches well with the characteristics of EHR system.

The adoption of an IT may be explained by the intention of the organization to improve organizational performance [27]. Performance is one of the most important underlying driving forces of the adoption of ITs. TTF focuses on the fit between IT and the requirements of the tasks and how the fit impacts performance while other theories have different focuses. In the context of EHR, the research on how EHR can be used and potentially improve the performance of healthcare providers is called for. TTF looks at the features of a technology, and additionally, how these features fit or meet the requirements of a task or tasks to achieve the organizational goal. Therefore, TTF is in a good position to explain the adoption of EHR system.

2.2 Social contagion theory and EHR system

Social contagion theory has long been used in the research of diffusion of innovations [14-16]. Social contagion is analogous to the spread of epidemic diseases. Simply speaking, different person has different immunity to the disease, and different disease carrier has different ability to infect others. The closer a person is to the disease carrier, the more likely he or she will be infected. Using the terminology of social contagion theory, organizations are different in susceptibility, which refers to the propensity to accept others' ideas or opinions. Organizations also are different in infectiousness, which refers to the ability to influence others. For example, an organization who has a high reputation is more influential than less reputable ones [28]. The influence from others also depends on the physical and social proximity. Physical proximity refers to the distance between the focal organization and other organizations. Social proximity refers to the social relationship between the focal organization and other organizations. For example, a hospital has a closer relationship with another hospital in the same hospital network than a third hospital that is outside of the hospital network.

A prominent finding in the research of HIT adoption is that the resistance to adopt HIT mainly comes from clinical professionals, e.g. doctors, nurses, specialists, and so on [29]. The administrators and IT professionals in the healthcare provider organizations, on the other hand, often advocate the adoption of ITs. Clinical professionals argue that they care more about treating patients, saving lives, rather than using new ITs which may disrupt their daily activities. As aforementioned, physician resistance has been found as an important barrier to EHR system and influences from other physicians could mitigate the resistance. However, it is more interesting in knowing how other physicians' adoption decisions influence the focal provider. Social contagion theory provides an answer to this question. It holds that an actor's behavior is a function of its exposure to others' behavior [15]. The social contagion is determined by the focal provider's susceptibility, its proximity to other providers, and the infectiousness of other providers. In this sense, social contagion theory matches well to the EHR adoption phenomena and can explain the fact that influences from the peers of the healthcare providers will be more effective in changing their adoption decisions.

Moreover, social contagion theory has been used to examine the adoption of EHR [14]. The organization's likelihood of adopting EHR is found to be "a function of its susceptibility to the influence of prior adopters, its proximity to prior adopters, and the infectiousness or potency of influence exerted by adopting [organizations]" (p. 1220). However, Angst et al. (2010) only revealed the dynamic social contagion process without considering other potential forces driving the adoption of EHR. The combination of social contagion theory and TTF will complement to their study and provides a more complete understanding toward EHR adoption. Although social contagion theory provides explanations toward how organizations are influenced by other organizations' behavior, it is hard to believe that an organization makes the decision mainly based on others' behavior; rather, it gives more weights on its own analysis on how the IT can improve its performance.

3. Hypotheses development

The adoption of EHR may be explained by the intention of the organization to improve organizational performance through the fit between task and technology. The characteristics of EHR system are perceived by not only one individual but many in the organization as a whole. Believing that EHR system will improve its performance, people in an organization would form a positive feeling toward the new IT [19]. The overall feeling (positive or negative) toward an IT in the organization refers to organizational valence [30]. Before healthcare providers' actual adoption of EHR, they would have a perception on if EHR fits their clinical activities. How exactly EHR can fit the providers' clinical activities? [17] designed detailed measures of TTF with eight broad dimensions: data quality, locatability, timeliness, usability, ease of use, authorization, compatibility, and system reliability. These dimensions measure the

degrees of fit between task and technology. If it is perceived that EHR fits the clinical processes of healthcare providers in these aspects and further the fit will improve their performance, it is more likely that the providers form a favorable valence toward EHR system. This leads to the following hypothesis:

Hypothesis 1: A healthcare organization's perception of the fit between EHR system and its clinical activities will be positively associated with the organizational valence toward EHR system.

People or organizations often update their believes about an IT depending on the influence of other people or organizations [31]. Organizations react to whether other organizations adopt an IT, who are adopters [15], and what the outcome of their adoption is [32]. Those adopter organizations who have seen performance improvement following adoption, and meanwhile are close to the focal organization present strong contagion to the focal organization [32, 33]. The contagion from them strengthens the focal organization's belief about the IT. On the other hand, when adopter organizations do not see performance improvement or even see worse performance, they present weak contagion to the focal organization and weaken the focal organization's belief about the IT [32]. In the context of EHR, the focal healthcare provider perceives a certain degree of fit between EHR system and its clinical activities and believes the fit would improve its performance. The strong contagion from its peers would strengthen the effect of fit on the overall organizational valence toward EHR system. Similarly, the weak contagion from its peers would weaken the effect of fit on the organizational valence toward EHR. The second hypothesis is stated as follows:

Hypothesis 2: The effect of the fit between EHR system and provider's clinical activities on the organizational valence toward EHR system will be higher when strong rather than weak social contagion presents .

The classic Theory of Reasoned Action (TRA) states that the individuals' attitude predicts his/her behavior intention [34]. In the organizational context, the organizational valence is found to be one of the most important predictors of the organizational adoption decision [35]. In most organizations, the adoption decision is not determined by only an individual, but a group of people. Not like an individual who makes adoption decision on his/her own, organizations need to have a consensus over the decision making. The adoption decision will be made if the IT is viewed positively by the organization as a whole [36]. The higher organizational valence (more positive) toward EHR system, the more likely the organization intends to adopt EHR system. Thus, hypothesis three is presented below:

Hypothesis 3: The organizational valence toward EHR system will be positively associated with its intention to adopt EHR system.

To sum up, the research model is presented in Figure 1.

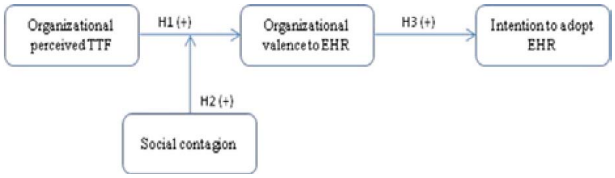

Figure 1. Research model

4. Methodology

4.1 Data collection

A survey was conducted to collect data to validate the research model and test hypotheses. The survey questionnaire items were based on existing literature. If there is a scale for the construct in the literature, it was adapted to the context of this study, and if there is none, new scale was then developed based on the related literature. First the preliminary survey questionnaire was pretested to a small group of academics and practitioners, including doctoral students, health organization management program faculty, and a few physicians. They were asked to examine the degree to which the preliminary questionnaire captured the constructs and how easy or difficult the preliminary questionnaire was to understand and complete. Based upon results from the preliminary questionnaire, questionnaire was revised and then the survey was conducted over the Health Organization Management (HOM) students who have registered the course of "Healthcare Network, System and Organizational Operations" at a University in Southwestern US in February of 2012. The surveys were administered in two classes, and the total number of participants is 57. There were 6 surveys that have missing responses and were removed. The final valid sample size is 51.

4.2 Measures

All the constructs used in the study were measured using multiple items. The measures were also identified as reflective or formative. The complete questionnaire can be available upon request.

The TTF construct measures were adapted from scales used in [17]. There are eight dimensions to reflect the task-technology fit, including quality, locatability, timeliness, relationship with IS personnel,

ease of use/training, authorization, compatibility, and system reliability. These eight dimensions are first order reflective constructs and TTF is the second order reflective construct. The wording of items has been modified to refer to the technology as "EHR system."

Social contagion effect is mainly investigated with quantitative methods in the literature. For example, Angst et al. (2010) used heterogeneous diffusion model to capture the social contagion effect on EHR system adoption. The advantage of such method is to capture the dynamic process of social contagion effect among organizations. However, this method only takes into consideration of organizational characteristics without looking at the characteristics of the technology. One disadvantage may be the inability to further investigate how people in the organization play the role in spreading ideas or opinions about EHR system and how the influences from peers interact with other factors in adoption decision. Therefore, this study did not examine the complex process of social contagion itself, but focused on how this source of influences interacted with other factors (TTF) on the adoption of EHR system. To this end, social contagion construct is operationalized to reflect the influences from peer organizations with regard to the adoption of EHR system. To the best of the author's knowledge, there are no existing scales to measure social contagion effects. Based on the related literature and the findings from first stage case study, the scales were developed to measure social contagion effect that a focal organization is subject to. The social contagion effect was measured in a way to reflect strong and weak influences from peers. The strong social contagion effect refers to the situation that a focal organization is subject to strong influences from the peers that have adopted EHR system. On the other hand, the weak social contagion effect refers to the situation that a focal organization is subject to weak influences from peers that have adopted EHR system. Social contagion is treated as a higher order formative construct with four first order reflective constructs: susceptibility, infectiousness, social proximity, and physical proximity [14]. The higher order construct of social contagion effect can then be referred to as strong social contagion effect on EHR system adoption when it has a high scale score implied by the four first order constructs scale scores, and weak social contagion effects when it has a lower scale score.

Organizational valence refers to the overall feelings of the organization toward a subject. The scale to measure organizational valence is widely used in the literature [35]. The existing scale was modified to accommodate this context.

Organization's intention to adopt EHR system is straightforward in meaning. Some of the participants' organizations have already adopted EHR system while others do not. Therefore, whether the respondent's organization has adopted EHR system or not was first asked. If the organization does not adopt EHR system yet, the organization's intention to adopt EHR system on a seven-point Liker scale with 1 being "least likely" and 7 being "most likely" was then asked directly.

4.3 The statistical model

The survey data were analyzed using partial least squares (PLS) structural equation modeling (SEM) techniques. PLS allows the modeling of both reflective and formative latent variables and the simultaneous evaluation of both measurement and structural models [37]. There are several reasons to choose PLS-SEM in analyzing the data and validating the research model in this study. First, the sample size in this study is relatively small. PLS-SEM method has been found to be a powerful method to analyze complex models using smaller samples in prior studies and overcomes problematic model identification issues [38]. Second, the research model in this study is complex with second-order constructs. TTF is the second order construct in this study and it consists of eight first-order constructs. In addition, social contagion is also a second order construct and consists of four first-order constructs. PLS has been reported to be suitable for modeling second-order constructs [39]. In this study, guidelines from prior studies were followed to operationalize the second-order constructs by using the repeated-indicators approach (i.e., the hierarchical component model) [39]. Furthermore, the research model in this study includes an interaction effect between TTF and social contagion. PLS has also been found to be powerful to handle complex models with interaction effect [38]. Third, PLS allows the modeling of both reflective and formative latent variables [37]. In this study, all first-order constructs are reflective in nature, however, social contagion is theoretically a second order formative latent construct which is a function of the four first order reflective latent constructs: susceptibility, infectiousness, social proximity and physical proximity.

5. Results of data analysis

Reliability, validity, and common method bias analyses were conducted to validate the measurement model. SmartPLS [40] was the major tool to evaluate the statistical significance and relative salience of the model.

As all the first order constructs in the model had latent indicators, the recommended guidelines for

assessing reliability with latent constructs with PLS technique was first followed [41]. Reliability was assessed based on composite reliability score. All constructs showed good reliability with composite reliability scores ranging from 0.733 to 0.955, exceeding the recommended threshold of 0.7 for internal consistency [42] as shown in Table 1.

Convergent validity was assessed by examining item loadings and the average variance extracted (AVE) for each construct. Table 1 shows that AVE values ranged from 0.511 to 0.886, which are above the threshold value of 0.5 [43]. The factor loadings of measurement items ranged from 0.677 to 0.948 and are all statistically significant at the $p < 0.01$ levels, strongly supporting the presence of convergent validity [44].

Discriminant validity was assessed by comparing the square root of the AVE for each first order construct against the inter-construct correlation estimates [43]. As seen in Table 2, all of the diagonal elements in bold italics (the square root of AVE) were found to be greater than any other corresponding rows or column entries (inter-construct correlation coefficients). These discriminant validity assessments suggest that the model constructs differ.

An assessment for common method bias was also conducted as all of the variables included in the structural model were measured through self-reported survey items. Harman's single factor test was conducted by running an exploratory factor with all variables included [45]. The exploratory factor analysis does not generate a single factor from the unrotated solution, suggesting that common method bias was not high.

The same procedure was used as in the measurement model to validate the structural model and test hypotheses, and also used SmartPLS to realize it. The interaction between TTF and social contagion was modeled following the procedure described in [37]. The t-values of the path coefficients which are used to assess the statistical significance were calculated through Bootstrapping with 1000 resamples [40].

Table 1. Measurement model statistics

Construct	Indicator	Factor loading	AVE	Composite Reliability	R^2
Data Quality	Q1	0.677	0.615	0.864	0.428
	Q4	0.849			
	Q5	0.858			
	Q6	0.739			
Locatability	Q7	0.712	0.511	0.806	0.527
	Q8	0.772			
	Q9	0.740			
	Q10	0.626			
Authorization	Q11	0.837	0.581	0.733	0.370
	Q12	0.680			
Compatibility	Q13r	0.823	0.635	0.838	0.033
	Q14r	0.849			
	Q15r	0.713			
Ease of Use	Q16	0.762	0.698	0.902	0.458
	Q17	0.846			
	Q18	0.862			
	Q19	0.868			
Timeliness	Q20	0.915	0.836	0.911	0.504
	Q21	0.914			
System Reliability	Q22	0.906	0.640	0.841	0.274
	Q23r	0.726			
	Q24r	0.756			
Relationship with IS	Q26	0.710	0.630	0.911	0.468
	Q27	0.830			
	Q28	0.788			
	Q32	0.755			
	Q33	0.831			
	Q34	0.840			
Susceptibility	S1	0.831	0.596	0.815	0.176
	S2r	0.680			
	S3	0.798			
Infectiousness	S4r	0.850	0.678	0.862	0.653
	S5	0.894			
	S6	0.716			
Physical proximity	S7	0.948	0.886	0.940	0.622
	S8r	0.935			
Social proximity	S11r	0.863	0.742	0.852	0.609
	S12	0.860			
Valence to EHR	V1	0.933	0.841	0.955	0.707
	V2	0.914			
	V3	0.902			
	V4	0.918			
Note: All factor loadings were significant at $p < 0.01$ level.					

Table 3 presents the results of path coefficients estimates, t-values, and R squares in the research model. The interaction between TTF and social contagion is represented by "TTF*social contagion." In addition, when interaction is included in the model, both the main effects are also included. As a rule of thumb, when t-value is greater than 2, the estimate is statistically significant at $p<0.05$ level.

Results of model testing indicate that the constructs included in the research model accounted for approximately 74.4 percent of the variance in intention to adopt EHR system (R square=0.744). This also

suggests that there is a good fit of the overall model. All the paths in the research model were found supported with associated t-values greater than 2, indicating statistically significant at $p<0.05$ levels. In fact, most of the path coefficients are statistically significant at $p<0.001$ levels.

In particular, the results provided support for the statistical significance of all three research hypotheses (H1, H2, and, H3). TTF, social contagion, and interaction between TTF and social contagion accounted for approximately 70.8 percent of the variance in organizational valence to EHR system (R square=0.708). TTF has been found to have a positive association with organizational valence to EHR system (coefficient estimate=0.358, t-value=6.845), indicating the statistical support for Hypothesis 1 at $p<0.001$level. In addition, the path coefficients estimates from TTF to its eight dimensions are all positive, ranging from 0.18 to 0.73; and t-values associated with these coefficients estimates are all above 2, ranging from 2.72 to 22.1. Similar results were found in the prior research [9].

The path coefficients estimates from the four dimensions to social contagion are all positive, ranging from 0.20 to 0.46; and t-values associated with these coefficients estimates are all above 2, ranging from 3.05 to 17.38.

The interaction between TTF and social contagion has been found to have a positive association with organizational valence to EHR system (coefficient estimate=0.614, t-value=10.165), indicating the statistical support for Hypothesis 2 at $p<0.001$level. The coefficient estimate of the interaction effect is greater than either that of the path from TTF to organizational valence or that of the path from social contagion to organizational valence, indicating that the interaction between TTF and social contagion is relatively more important than the main effects from TTF and social contagion. It suggests that when the prior EHR system adopter has a strong social contagion effect on the focal organization, the focal organization's perception of the fit between EHR system and its clinical activities will be reinforced and therefore will form a more favorable feeling toward EHR system, and vice versa.

Finally, organizational valence to EHR system has been found to have positive association with intention to adopt EHR system (coefficient estimate=0.863, t-value=62.101), indicating the statistical support for Hypothesis 3 at $p<0.001$level. This result is supported by prior research in that organizational valence was found to be one of the most important predictors of organizational intention to adopt ITs [35].

In summary, the statistical analysis on the survey data provides evidence and support to the proposed research hypotheses and research model.

Table 3. Summary of Path Coefficients, T-values, and R Square

Path	Coefficient	T value	R^2
TTF→Authorization	0.61	11.72	0.37
TTF→Compatibility	0.18	2.72	0.03
TTF→Data Quality	0.65	9.66	0.43
TTF→Ease of Use	0.68	16.36	0.46
TTF→IS relationship	0.68	11.94	0.47
TTF→Timeliness	0.71	22.10	0.50
TTF→Locatability	0.73	18.70	0.53
TTF→System Reliability	0.52	13.30	0.27
Infectiousness→ Social contagion	0.46	11.85	N/A
Susceptibility→ Social contagion	0.20	3.05	
Physical proximity→ Social contagion	0.38	17.38	
Social proximity→ Social contagion	0.31	12.66	
TTF→valence	0.36	6.85	0.71
Social contagion→ Valence	0.23	3.36	
TTF * Social contagion →Valence	0.61	10.17	
Valence→ Intention to adopt	0.86	62.10	0.74

6. Discussion and conclusion

6.1 Contributions

This study makes an important contribution to the EHR adoption literature. EHR system is regarded as the foundation to improve healthcare quality and efficiency. As a matter of fact, the adoption rate of EHR system in the U.S. is low, thus understanding what factors influence the organizations' EHR adoption decision is critical and has great theoretical and practical implications. The prior research had found that the social contagion among healthcare organizations played an important role in adopting EHR system [14]. Healthcare organizations were found to be influenced or infected by their peer organizations in the EHR adoption decision process. However, this is not the complete story. Even if an organization is subject to strong social contagion effect from its peer organizations, it also depends on how EHR fits its everyday activities as explained by the proposed research model in this study. This study examined the adoption of EHR systems from two theoretical perspectives (TTF and social contagion). The two theoretical perspectives provided better and more complete understanding of the EHR adoption phenomena, considering influencing factors from both within the organization and outside of the organization.

Table 2. Construct Correlations

Construct	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Authorization	***0.76***													
2. Compatibility	0.31	***0.80***												
3. Data Quality	0.40	0.12	***0.78***											
4. Ease of Use	0.30	-0.15	0.22	***0.84***										
5. IS Relationship	0.19	0.08	0.17	0.50	***0.79***									
6. Infectiousness	0.14	-0.18	0.06	0.40	0.37	***0.82***								
7. Locatability	0.66	0.09	0.43	0.41	0.29	0.09	***0.72***							
8. Intention to Adopt	0.35	0.10	0.37	0.41	0.40	0.06	0.37	***1.00***						
9. Physical proximity	0.17	-0.06	-0.06	0.27	0.27	0.40	0.09	0.09	***0.94***					
10. Social proximity	0.10	-0.23	-0.08	0.18	0.19	0.51	0.03	-0.08	0.54	***0.86***				
11. Susceptibility	-0.05	0.00	0.16	0.16	0.05	0.24	-0.08	0.15	0.24	0.10	***0.77***			
12. System Reliability	0.10	0.21	0.44	0.07	0.33	-0.11	0.24	0.57	-0.13	-0.27	0.09	***0.80***		
13. Timeliness	0.46	0.16	0.53	0.39	0.26	0.13	0.47	0.38	0.19	0.03	0.06	0.38	***0.91***	
14. Valence to EHR	0.32	0.02	0.41	0.55	0.51	0.08	0.45	0.86	0.12	-0.08	0.14	0.59	0.41	***0.92***

Note: The diagonal elements in ***bold italics*** are the square roots of the AVE. The off-diagonal elements are the correlations between constructs.

In addition, the two factors (TTF and social contagion) are not independent, but interact with each other. The interaction of them plays a more important role than either of them alone as suggested by the findings of this study. This study not only provided a new perspective on the adoption of EHR system as compared with prior research but also integrated two theories to form a deeper understanding of the problem. Thus, this study had added to the EHR adoption literature. This study also has several managerial implications. First, decision makers of healthcare organizations will benefit from the findings of this study. The findings of this study suggest that social contagion is not the only source of influences on the focal organization's adoption decision. Although decision makers of an organization may gain insights from their peer organizations in terms of adopting an IT, they have to be aware that the characteristics of their organization may be different from those of their peer organizations. The simple sign of adopting an IT in peer organizations will not guarantee the successful use of the IT in the focal organization. The decision makers need also to evaluate the fit between the IT and their everyday activities as suggested by findings of this study. More importantly, the decision makers need to gain more information from their peer organizations on how the IT is used in their organizations. This extra information (other than just who has adopted the IT) should be taken into consideration of evaluating the fit between the IT and their everyday activities. In addition, the decision makers should also be aware that users of the IT should play a role in adoption decision as the IT will be successfully used when the overall feeling of the organization toward the IT is favorable.

Second, the EHR system developers can also benefit from the findings of this study. The EHR system developers need to be aware that the differences in characteristics of healthcare organizations play an important role in organizations' adoption decision. The developers should understand the interaction between EHR system and the business processes of the organization and strive to make them fit. In this way, the developed EHR systems may have higher chances of being adopted by healthcare organizations.

Third, the findings of this study have direct implications for policy making. This study found the evidence that there were social contagion effects among healthcare organizations in the U.S. The EHR system adoption decision-making of a healthcare organization may be influenced by its peer organizations. More importantly, the influential prior organizational adopters have the most influences on the focal organization's adoption decision. As the U.S. government promotes the adoption of EHR systems in the healthcare sector, policies may be made in a way that more incentives are allocated to the most influential healthcare organizations in different regions for their adoptions of EHR systems, which may help the spread of EHR adoption nationwide.

6.2 Limitations

Although the findings of this study were supported by results of data analysis on survey data, this study still has the following limitations when generating the findings.

First, the survey study suffers the problem of small sample size. Although PLS techniques can handle the small sample size problem and provide relatively reliable results, larger sample size will improve the reliability of the study.

Second, the participants of the survey are the graduate students in the health organization management program in a U.S. university. Although some of these students had the working experience in healthcare organizations, caution should be exercised when generalizing the results.

6.3 Direction for future research

This study can be extended to examine the implementation and utilization of ITs, particularly on EHR system. The adoption of IT is the start of the life cycle of an IT in an organization. How will this IT be implemented and used to increase the organizational performance and gain organizational competitive advantage? The prior studies had found that failure rate for EHR system implementation is relatively high, thus it is an interesting opportunity to extend this study to examine the implementation and utilization processes of EHR system.

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