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ABSTRACT

This study presents a conceptual model to investigate technology management competency required by healthcare IS professionals and its impacts on IT-healthcare partnerships. Technology management competency, at the broad level, comprises the business strategic thinking, external knowledge resources linkage, healthcare technology integration capability as well as management and interpersonal skill/knowledge possessed by IS professionals. Such competency is hypothesized to be instrumental in increasing the intentions of IS professionals to develop and reinforce the partnerships with healthcare people. The empirical results support the proposed conceptual framework for technology management related skills/knowledge of IS professionals and indicate that the competency would significantly influences the intentions of IS professionals to develop collaborative relationships with their healthcare partners. The findings of this study not only can provide useful suggestions to help IS professionals review their technology management competency, but also serve as instrumental guidelines for the technology management competency training to strength the IT-healthcare partnership.

Keywords:

Technology management competency, IS professionals, IT-healthcare partnership.

INTRODUCTION

Today, the healthcare industry and healthcare system have encountered dramatic changes in information and communication technology (ICT) that will influence the way that healthcare services are delivered and the relationship between healthcare provider and consumers. The rapid progress in ICT provides both opportunities and challenges for providing high-quality and efficient health care, curbing the scourge of medical errors, providing point of care computing, improving health outcomes, and streamlining workflow, while reducing costs and improving the patient-physician relationships. The application of Internet and other related information technologies in the healthcare industry becoming more and more critical to improve the access, efficiency, effectiveness, and quality of clinical and business processes utilized by healthcare organizations, practitioners, patients, and consumers in an effort to improve the health status of patients. Influence of E-healthcare will increasingly affect the very roots of our current health care system such as medicine, public health, and health care informatics (Englebardt and Nelson, 2002).

As healthcare innovation relies more strongly on ICT, information system (IS) professionals in the healthcare organization should be more entrepreneurial in focusing on innovation through information technology (IT). In addition, the complexity of IS/IT implementations in healthcare integrated delivery systems requires the coordination of diverse efforts including manpower, medical materials, and relevant technical components. Therefore, it is critical for healthcare organization to figure out how to create effective team relationships between the IS departments and medical units to enhance capabilities and maintain competitiveness. An effective relationship between IS professionals and their business partners is a primary determinant of success in gaining advantage through IT in today's business environment. The relationship-building ability of IS professionals can thus be a core capability of organizations (Feeny and Willcocks, 1998). In order to develop such partnerships, it is necessary for IS professionals to understand, participate, and support their healthcare partners' critical professional activities.

With accelerated healthcare competition and the popularity of ICT usage, there is a need to understand what factors are most important in enabling healthcare IS professionals to develop collaboration with healthcare professionals. Comprehending

these factors with respect to the intentions of IS professionals to develop partnerships, can potentially provide management insights in determining effective strategies to enable health care organizations to be competitive and better able to retain their customers or patients (Payton and Ginzberg, 2001). Also, the need to effectively communicate with healthcare professionals requires that IS professionals develop some commonality of vocabulary and conceptual knowledge, as well as experience working with healthcare professionals. However, little attention has been paid to investigating the technology management-related skills/knowledge required by healthcare IS professionals and the impact of such skills/knowledge in gaining strategic advantages through IT by development of partnerships with people from different divisions of healthcare organizations. The purpose of this research is therefore, to address two research questions: (1) What are the areas of knowledge/skills that characterize technology management competency of IS professionals; and (2) what is the contribution of technology management competency in IS professionals to improving their relationships with healthcare professionals?

LITERATURE REVIEW

Technology Management Competency in IS Professionals

Information systems and IT have been recognized as the value of entry for running a healthcare organization and for being connected to other healthcare organizations in a network economy. The trends of IS/IT applications in the healthcare organization require IS professionals to learn new skills/knowledge, to adjust quickly to the changing healthcare environment, and to simultaneously maintain and further improve overall organizational performance. In today's healthcare organization, appropriate technology helps make processes easier to execute, facilitates timely information sharing, and enables consistent coordination between elements and layers of the organization. IS professionals might have to equip themselves with fundamental healthcare knowledge other than their own specialties to deal with the challenges of changing environment. We suppose implementing these capabilities successfully will move healthcare organization closer to the goal of business and technology unification. This progress accelerates as each additional capability is realized and continuously improved. In this study, technology management competency in IS professionals, adopted from Bassellier and Benbasat (2004) was defined as the set of business strategic thinking (BST), external knowledge networking (EKN), healthcare technology integration (HTI), and management and interpersonal (M&I) skills/knowledge possessed by IS professionals that enable them to understand the healthcare domain, speak the language of healthcare, and interact with healthcare professionals. This knowledge is beyond that of the IS professional's own domain of expertise.

The Influence of Technology Management Competency on IT–Healthcare Partnerships

For healthcare organizations to effectively develop core IT capabilities such as forming IT-healthcare partnerships, IS professionals must possess strong healthcare technology integration capability, external knowledge networking skills, business strategic thinking, management and interpersonal skills/knowledge. However, no empirical study has been reported on investigating the relationship between the capability and intentions to develop IT-healthcare partnerships. IS professionals should be willing to share certain responsibilities during the processes of developing and executing the project with other staffs in healthcare organizations, and undertake the professional risks emerging from the process of introducing innovative IT expertise for executing the project effectively and efficiently. The technology management competency required by IS professionals in the healthcare organization and their willingness of partnership development will affect the success of project, that is to say, the higher level of the technology management competency possessed by IS professionals, the more they would like to develop partnership with other healthcare staffs (Caro, 2005). Based on the foregoing discussion, we proposed a conceptual model (Figure 1) which suggested that the technology management competency in IS professionals influences their intention to develop partnership with their healthcare clients.

Scope of the Technology Management Competency and Hypotheses Development

Because IS professionals are often assigned to projects involving different organization functional areas in the healthcare context, it is important to develop a broad competency framework and not just one designed for a specific set of tasks. The new technology management competency concept and the relationships between the construct and associated skills/knowledge have not been clearly identified in previous research. In this study, we induced four broad categories of skills/knowledge, including (1) business strategic thinking (BST), (2) external knowledge networking (EKN), (3) healthcare technology integration (HTI) capability and (4) management and interpersonal (M&I) skills and knowledge, from prior studies (e.g., Robbins et al., 2001; Reich and Benbasat, 2000; Wu et al., 2004). The components of IS professionals' technology management competency are discussed next.
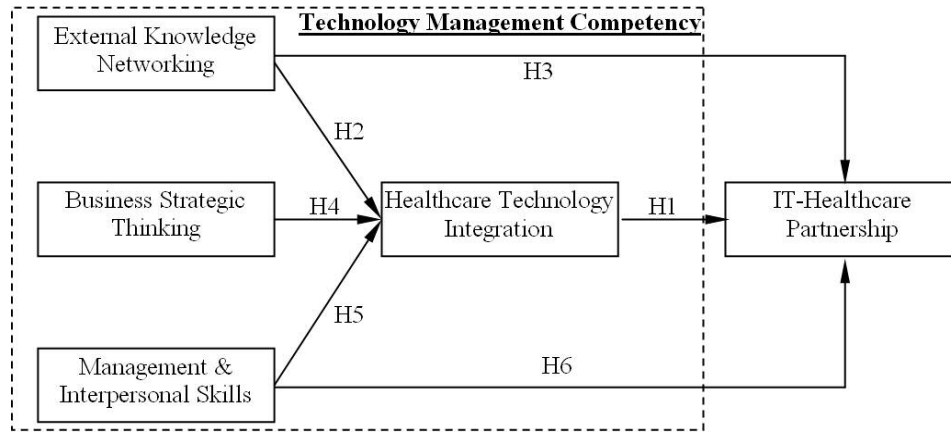
Figure 1. Conceptual Model

Healthcare technology integration capability

Healthcare IS professionals may support the executive management level to establish the information policies and procedures to ensure integration of data transmission or interfacing among individual information systems (Austin et al., 2000). Rockart et al. (1996) argued eight imperatives for the IT organization. The first imperative they claimed is a two-way alignment between IT and business strategy. Thus, IS professionals should spend more efforts on management thinking by identifying the organization threats and opportunities that IT creates (Arlotto, 2006). Feeny and Willcock (1998) also proposed that business systems thinking is a critical IS capability for IS personnel to understand connections and interdependencies in business activities. IS professionals in healthcare facilities have to develop and communicate holistic views of their organization activities for envisioning potential new patterns.

Healthcare technology integration capability refers to IS professionals' ability to visualize the ways in which IT can contribute to healthcare performance and to look for synergies between IT and healthcare. The business-driven IT capability articulates required business integration abilities and the technology plans to enable them. This allows an organization to translate business strategy into specific required business technology management capabilities (Hoque, et al., 2006). In this study, we define the related skills/knowledge of healthcare IS professionals to guide decisions on IS applications and IT infrastructure and supports healthcare services. This capability is influenced by other three domains of skills/knowledge including external knowledge networking, business strategic thinking, management and interpersonal skill /knowledge in the structure of technology management competency. IS professionals need to act as healthcare problem solvers and to integrated healthcare development with IT capability.

We assume that IS professionals with healthcare technology integration capability will have a better sense to apply these technologies to support the existing or to create the new healthcare delivery service. This capability can help them to effectively build sound collaborative relationships with their healthcare partners. In this study, whether IS professional has adequate experience on recognizing potential ways to exploit new business opportunities by using IT, analyzing healthcare organization problems in order to identify IT-based solutions, and evaluating the impacts of IT solutions were explored. IS professionals should not only based on their IT skills but also have to equip themselves with specific domain knowledge of healthcare environments to effectively converge healthcare and technology spaces (Major and Turner, 2003). Thus, healthcare IS professionals' knowledge levels of the development of a technical platform, the way innovative IT contributes to the value, and the alignment should be considered fairly. Based on the foregoing discussion, the following hypothesis is proposed:

H1. Higher levels of healthcare technology integration capability possessed by IS professionals will positively associate with a higher level of IT–healthcare partnerships with their healthcare clients.

External knowledge networking

External knowledge networking is an important personal capability which is necessary for IS professionals in today's healthcare environment. It refers to the understandings of where the internal and external knowledge concerning the medical organizations is originated and how it is acquired (Guo, 2003). IS professionals in healthcare settings should effectively

develop their own social network concerning technology management competency to enhance the critical abilities for acquiring related information while necessary. Drawing on a resource-based view, in order to support various sorts of healthcare processes effectively and efficiently, IS professionals need to develop unimpeded knowledge linkage networks. Doing this can help them to obtain initial aid easily, to facilitate timely information sharing, and to enable consistent coordination between different functional divisions. This knowledge includes understanding the healthcare delivery processes supported by IT and the connections and interdependencies among different divisions.

The other issue is that IS professionals need to understand the healthcare environment as workers in other functional areas would, and participate in making functional areas successful in the same way. This knowledge is linked to the specific organization, as it not only refers to a more active role taken by IS professionals, but also to a sense of commitment, empowerment, personal involvement, and organizational pride (Burke and Menachemi, 2004). In this study, the confidence of IS professionals in finding the right internal and external contacts and the relevant sources of information possessed by IS professionals were examined. Therefore, the following hypotheses are proposed:

H2. Higher levels of external knowledge networking skills/knowledge possessed by IS professionals will positively associate with a higher level of healthcare technology integration capability, and

H3. Higher levels of external knowledge networking skills/knowledge possessed by IS professionals will positively associate with a higher level of IT–healthcare partnerships with their healthcare clients.

Business strategic thinking

Business strategic thinking stands for the understanding of the holistic healthcare organizational strategies by IS professionals in which information technologies are deployed and of the connections between IT and the healthcare organizations. This knowledge represents the capability for IS professional enables them to see the whole picture of IT in their healthcare organization as well as to make linkages from external environment and between different organization divisions and tasks. It can also help them to ensure benefit from the potential fit between the IT and the specific healthcare organizational strategies (Wallick, 2002).

From external environment to internal management, IS professionals need to possess the capabilities and knowledge pertaining to the competitive strategies of their organizations, including their specific objectives and processes problems and the strategic role they play. Therefore, it is necessary for healthcare IS professionals to increase their knowledge about the main challenges in achieving their objectives, the languages used in other units, the work processes and interdependencies between various divisions to achieve the common goals of their own organizations (Smaltz et al., 2006). In addition, it is critical to inspire IS professional's understanding about organization strategic developments, willingness to adopt technology in healthcare related activities that are not directly related to IT and the knowledge about the overall performance of their institutions.

In today's business environment, business processes are more likely to succeed when they are supported by appropriate organizational structures based on clear understanding of roles, responsibilities, and decision rights (Hoque et al., 2006). Therefore, knowledge of business strategic thinking in healthcare organizations implies knowing the organization's goals, objectives, core capabilities, and critical success factors (Garman et al., 2006). It also includes knowledge about its environment and the constraints imposed on it by its customers (patients), government, suppliers, and competitors (other hospitals). Thus, it is necessary to evaluate whether a healthcare IS professional has sufficient knowledge concerning the external environment, the objectives of his or her own institution, the core capabilities and the critical successful factors about the healthcare organization (Wu et al., 2007). As a result, the following hypothesis is proposed:

H4. Higher levels of business strategic thinking skills/knowledge possessed by IS professionals will positively associate with a higher level of healthcare technology integration capability.

Management and interpersonal skills/knowledge

As the key figures for healthcare information delivery and the change agents around healthcare organization-wide, IS professionals should equip themselves with effectual management and interpersonal skills/knowledge for effective negotiation. Austin et al. (2000) argued seven IT management responsibilities for healthcare organizations to manage the information resources effectively. Feeny and Willcocks (1998) proposed a framework of nine core IS capabilities for managing the IS function and keeping up with the pace of technological change for IS professionals to exploiting IT. Other studies (e.g., Robbins et al., 2001; Wallick, 2002; Guo, 2003; Shewchuk et al., 2005) also argued the requirements of the managerial competencies to achieve effective healthcare administration practice. The capability establishes overall strategy

and tactics for creating broad-based understanding and getting actionable information throughout the organization (Preston, 2005).

Managerial skills/knowledge required by IS professionals could be diversified. The practical knowledge required for dealing with organizational renovation and risk management could be part of the leadership competency required by IS professionals (Feeny and Willcocks, 1998). In this study, this category of skills/knowledge for healthcare IS professionals includes whether IS professionals can play the role as a leader when being involved in organizational activities or the achievement of organizational goals. It is critical to evaluate the effectiveness of an IS professional in the role playing as a leader, dealing renovation, and offering problem-solving solutions based upon his or her experience when the organization or department is mired in emergences.

Previous research like Goleman (1998) presented five components of emotional intelligence (EI) and pointed out that social ability is one of the most important management skills. Longest (1998) claimed that interpersonal competency is a skill/knowledge about how to motivate other people, articulate the visions and preferences and communicate them to others, handle negations with other people and manage conflicts. Team building is often a critical skill to get better communication. Therefore, it is necessary to examine how effective IS professionals can work in a team environment, communicate in non-technical language within a healthcare context. Based on the above discussion, the following hypotheses are proposed:

H5. Higher levels of management and interpersonal skills/knowledge possessed by IS professionals will positively associate with a higher level of healthcare technology integration capability, and

H6. Higher levels of management and interpersonal skills/knowledge possessed by IS professionals will positively associate with a higher level of IT–healthcare partnerships with their healthcare clients.

METHODOLOGY

Instrument Development

At the outset, we developed the constructs of technology management competency and the associated measures. A number of prior relevant studies were reviewed to ensure that a comprehensive list of measures was included. For constructing a deliberate questionnaire to achieve the research goal, initial design and subsequent refinement of the instrument were done by researchers via several rounds of in-depth personal interviews with IS practitioners in healthcare organizations and academic experts in healthcare management departments of universities/colleges in Taiwan using the questionnaire to structure their questions. This process was continued until no further modifications to the questionnaire were necessary. Feedback from the in-depth personal interviews served as the basis for refining the experimental scales of the survey instrument. The researchers tested and revised the questionnaire several times before starting to gather the large-scale survey data.

To generate a sample of items, the first step was to identify as many items as possible from existing scales that fit the construct definitions of the current study. Additional items were added to improve the quality of the scales. Then the instrument was submitted to a panel of healthcare IS managers, as well as IS academics, to obtain their comments and suggestions on which items are appropriate to include. This version of the technology management competency measure contained 28 items and the seven-point Likert-type scale was used with all the items. We measured intentions for healthcare IS professional to build partnerships with his or her healthcare clients. This rationale is adopted from the theory of reasoned action according to which intentions are the most important determinant of behavior. The scale for the intentions to develop IT-healthcare partnerships contained three items.

Finally, the formal survey instrument contained two major parts including respondent's basic data portion and the responses to our research constructs. The basic data portion requested IS professionals to give the names of their hospitals/healthcare institutes and main tasks, their own demographic characteristics and job title. The second part contained 28 questions include 25 items relating to the four skills/knowledge constructs in accordance with the skills/knowledge classifications and three scale items for measuring healthcare IS professionals' intentions to develop IT-healthcare partnership with their healthcare clients.

Pilot Study

Once the preliminary list of questions in our survey instrument was generated, an iterative process involving personal interviews with domain experts in healthcare organizations was conducted to refine the instrument. To make the results more generalizable, several IS professionals at different sorts of healthcare institutions such as medical centers and regional hospitals were also interviewed by using the critical incident method in the stage of pilot study. Each subject was asked to recall past and current important events they encountered, how they handled the event, and what technology management

competency was needed to do this successfully. The interviews were recorded to improve the quality of data collection. Feedbacks from this pilot study also served as the basis for correcting, refining, and enhancing the instrument. For instance, scales were eliminated if they represented the same aspects with only slightly different wording or modified if the semantics were ambiguous.

Sample Characteristics

Data was collected using questionnaire survey administered in Taiwan. The sample frame encompassed all medical centers and regional hospitals to form the initial mail-out list of questionnaires. The IS department of each healthcare institution received an initial phone call explaining the purpose of our project and inquiring whether the organization would be willing to participate in the study. A contact person was identified at each organization; this person was asked to distribute the self-administered questionnaires to IS professionals/managers. We sent out 528 questionnaires and 182 completed questionnaires were returned. Thirty-three responses were considered incomplete and had to be discarded. This left 149 valid responses for the statistical analysis, and a valid response rate of 28.22% of the initial sample. The profile of respondents is shown as in Table 1.

Variable	Classification	Freq.	%	Variable	Classification	Freq.	%
Organizational position	Executive level	12	8	Level of hospital	Medical center	71	48
	Middle level	21	14		Regional hospital	78	52
	Supervisory level	27	18	Education level	Senior High School	2	1
	Technical level	89	60				
Major	Information Mgmt.	57	38		College/University	102	68
	Software Engineering	23	15				
	Computer Science	27	18		Graduate School	45	31
	Others	42	29				
Types of Jobs	IS maintenance and management					35	23
	Programming/SA&D/Implementation					81	54
	Strategic Planning/Needs Assessment					33	23
Average years of work experience						8.18 Years	

Table 1. The Profile of Respondents

RESULTS

The empirical data collected were analyzed using the partial least squares (PLS) method, which places minimal restrictions on measurement scales, sample size, and residual distributions. It is more suitable for explaining complex causal relationships as it avoids the problems of inadmissible solutions and factor indeterminacy (Chin, 1998). The hypotheses, proposed for the predictive and nomological structure of technology management competency and the influences on healthcare IS professionals' intentions on partnership development, are validated at the same time. The PLS method allows the validation of the measurement model and the estimation of the structural model. The virtual questionnaire administered in the large-scale field survey included items worded with proper negation and a shuffle of the items to reduce monotony of questions measuring the same construct. The statistical analysis strategy involved a two-phase approach in which the psychometric properties of all scales were first assessed through confirmatory factor analysis (CFA) and the structural relationships were then validated by the bootstrap analysis.

Measurement Properties

All of the constructs in the conceptual framework were modeled as reflective and were measured using multiple indicators. The measurement model relating the nomological network of healthcare technology management competency and intentions to develop IT-healthcare partnership constructs is analyzed by PLS-Graph 3.0. The assessment of item loadings, reliability, convergent validity, and discriminant validity is performed for the latent constructs through a CFA. Reflective items should be uni-dimensional in their representation of the latent variable, and therefore correlated with each other. Item loadings should be above .707, showing that more than half of the variance is captured by the constructs. As shown in Table 2, all items of the instrument have significant loadings higher than the recommended value of .707.

As the results shown in the Table 3, the composite reliability coefficients of all constructs in the proposed conceptual framework (Figure 1) are more than adequate, ranging from 0.88 to 0.94. To assess discriminant validity, (1) indicators should load more strongly on their corresponding construct than on other constructs in the model and (2) the square root of

the average variance extracted (AVE) should be larger than the inter-construct correlations (Chin, 1998). The percent of variance captured by a construct is given by its average variance extracted (Fornell and Larcker, 1981). Overall, the values for reliability are all above the suggested minimum of 0.7 (Hair et al., 1998). In short, all constructs display adequate reliability and discriminant validity. All constructs share more variance with their indicators than with other constructs. Thus, the convergent and discriminant validity of all constructs in the proposed conceptual framework can be assured.

Construct	Code	Scale Items	Load	Mean
Healthcare Technology Integration (HTI)	TBI1	How experienced are you at recognizing potential ways to exploit new business opportunities using IT?	0.79	4.24
	TBI2	How experienced are you at analyzing business problems in order to identify IT-based solutions?	0.82	4.48
	TBI3	How experienced are you at evaluating the impacts of IT solutions on your institution?	0.81	4.34
	TBI4	Rate your knowledge level concerning the development of a technical platform that responds to current and future organization needs	0.84	4.55
	TBI5	Rate your knowledge level concerning the integration IS and new work flow of your institution	0.82	4.46
	TBI6	Rate your knowledge level concerning the way IS contributes to the value of your institution	0.81	4.72
	TBI7	Rate your knowledge level concerning the alignment between healthcare organization goals and information systems goals in your institution as a whole	0.85	4.61
External Knowledge Networking (EKN)	EKN1	If you have a question or problem in practice that you cannot solve alone, how confident are you about finding the right person to contact in your institution?	0.80	4.74
	EKN2	If you have a question or problem in practice that you cannot solve alone, how confident are you about finding the right contacts outside your institution?	0.79	4.27
	EKN3	If you have a question or problem in practice that you cannot solve alone, how confident are you about finding other relevant sources of healthcare information?	0.78	4.67
	EKN4	To what extent do you take actions to stay informed about your institution developments not directly related to IT?	0.76	4.21
	EKN5	How much do you participate in healthcare related activities that are not directly related to IT?	0.75	3.98
Business Strategy Thinking (BST)	BST1	Rate your knowledge level concerning the overview of healthcare environment (eg., government, competitors, healthcare systems, and customers) around your institution.	0.82	4.43
	BST2	Rate your knowledge level concerning the objectives of your institution as a whole.	0.80	4.67
	BST3	Rate your knowledge level concerning the core capabilities of your institution.	0.87	4.46
	BST4	Rate your knowledge level concerning the critical successful factors for your institution.	0.81	4.40
	BST5	Rate your knowledge level concerning the main challenges that different divisions in the healthcare organization face in achieving their objectives.	0.80	4.17
	BST6	Rate your knowledge level concerning the overall performance of your institution.	0.73	4.17
Management and Interpersonal Skill/ knowledge (M&I)	IMP1	In general, how effective do you think you are at communicating with people at different levels of your institution (e.g., with your subordinates, peers, superiors)?	0.79	4.74
	IMP2	How effective are you at working in a team environment?	0.76	4.69
	IMP3	How well can you communicate about IT matters in non-technical language and within a healthcare context to non-IT specialists?	0.81	4.61
	IMP4	In general, how effective do you think you are at managing projects?	0.81	4.40
	IMP5	In general, how effective do you think you are at acting in a leadership role?	0.83	4.27
	IMP6	Rate your knowledge level concerning the existing practices for the management of change in your institution	0.79	4.26
	IMP7	Rate your knowledge level concerning the risk management practices that can be applied in your institution	0.71	3.91
IT-Healthcare Partnership (ITHP)	IDP1	To what extent are you willing to commit to the sharing of responsibilities with your colleagues for the development and implementation of future projects?	0.91	4.74
	IDP2	How comfortable would you be to getting involved with your colleagues on the projects that may require more innovative technologies, with the risk it may imply?	0.92	4.82
	IDP3	In the future, to what extent do you intend to develop strong partnerships with your colleagues in different divisions?	0.80	5.04

Table 2. Descriptions and Factor Loadings of Scale Items

Construct	# of Items	Composite Reliability	Construct				
			BST	EKN	M&I	HTI	ITHP
BST	6	0.92	0.81*				
EKN	5	0.88	0.77	0.79			
M&I	7	0.92	0.75	0.78	0.79		
HTI	7	0.94	0.79	0.77	0.77	0.82	
ITHP	3	0.91	0.58	0.61	0.62	0.62	0.88

*Diagonal elements are the square roots of average variance extracted (AVE).

Table 3. Inter-correlation among Constructs.

Test of the Structural Model

As mentioned previously, all of the constructs in this study were modelled as reflective and were measured using multiple indicators, rather than summated scales. T-statistics and standard errors were generated by applying the bootstrapping procedure with 200 samples. A test of the structural model is used to assess the nomological structure of technology management competency and its effects on the construct of IT-healthcare partnership. As can be seen from Figure 2, the direct and indirect effects from the technology management competency constructs including business strategic thinking, external knowledge networking, healthcare technology integration and management and interpersonal skills/knowledge totally account for 44.7% of the variance explained in IT-healthcare partnership. For the intrinsic part of technology management competency, the constructs of business strategic thinking, external knowledge networking and management and interpersonal skills/knowledge together explain 71.3 % of the variance explained in the construct of healthcare technology integration. An F test is further applied to test the significance of the effect size of the overall model. Both of the two dependent variables are significant. Therefore, the model has strong explanatory power for both dependent variables.
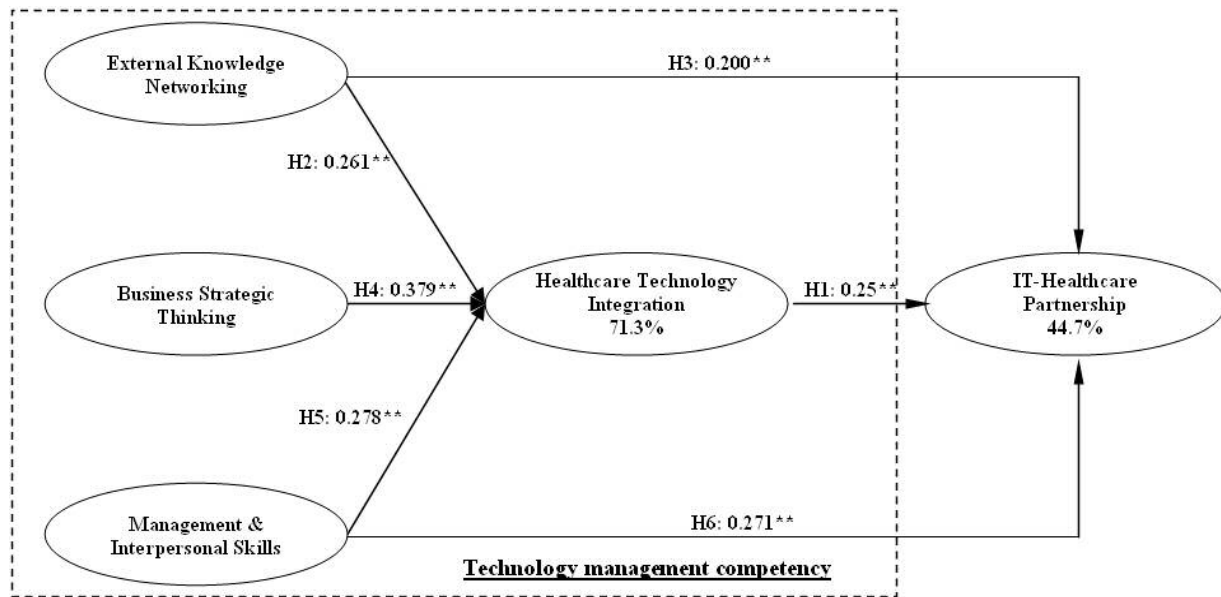

Figure 2. PLS Results

The paths linking from business strategic thinking, external knowledge networking, and management and interpersonal skills/knowledge to healthcare technology integration and linking from business strategic thinking, external knowledge networking, healthcare technology integration and management and interpersonal skills/knowledge to IT-healthcare partnership imply the total impacts on IS professionals' intention to develop IT-healthcare partnership. The results provide strong empirical evidence for the nomological validity of the constructs of technology management competency and the effects on IT-healthcare partnership. The estimate of 0.71 on the construct of healthcare technology integration for these paths provides good support for the hypothesized impact of competency on the dependent variable, healthcare technology integration. In addition, the estimate of 0.45 on the construct of IT-healthcare partnership denotes that the proactive intentions to develop IT-healthcare partnership as perceived by IS professionals are directly and indirectly mediated by the construct of healthcare technology integration, influenced by all of the knowledge levels of the four technology management competency

constructs. Overall, the proposed conceptual model has strong explanatory power for the construct of IT-healthcare partnership. The significant path coefficients, effect size, and the value of the R2 reinforce our confidence in the results of hypotheses testing and provide support for the structure of technology management competency and the association with IT-healthcare partnership.

CONCLUSIONS

This study proposed a conceptual model of technology management competency of healthcare IS professionals, identified four broad categories of constructs concerning IT-healthcare related skills/knowledge of IS professionals in the healthcare industry, developed measures of these constructs, and validated the conceptual model through a rigorous PLS analysis. The nomological structure of healthcare IS professionals' technology management competency encompassing the four skills/knowledge domains, namely, business strategic thinking (BST), external knowledge networking (EKN), healthcare technology integration (HTI), and management and interpersonal (M&I) skills/knowledge, are well validated by the empirical data. All the four major components of IS professionals' technology management competency are found to be directly and indirectly influential in contributing to IS professionals' intentions to develop sound collaborative relationships with their healthcare clients.

Although our study provides interesting insights into the IS professionals' technology management competency and its influences on the IT- healthcare partnership, it has some limitations. First, the sample appears to provide balanced coverage of a wide spectrum of healthcare IS professionals. The sample with a bias toward the Taiwan area may limit our contributions and the findings may not be applicable to other countries. Second, IS professionals' technology management competency is still in its infancy and its implications are limited. More research is needed to assess the efficacy and utility of the proposed conceptual model. However, the inferences from our empirical results make logical sense in indicating that insufficient proficiency of IT-healthcare related skills/knowledge will attenuate IS professionals' intentions to collaborate with their healthcare partners. Finally, our subjects were those who that voluntarily reported measures. There may be sample selection bias, in that the sample may not be fully representative of the entire population. Also, individuals at various levels of IT managerial responsibility need to be studied to determine how factors such as their skills, training, responsibility, and opportunity to make collaboration decisions affect their intentions toward IT-healthcare partnership building. The findings of this current study can provide useful suggestions to help IS professionals review their technology management competency and also serve as instrumental guidelines for the healthcare competency training to strengthen IT-healthcare relationship building. Given that healthcare organizations invest substantial amounts of money in advanced technologies and depend on IT to gain competitive advantages, they need to educate and train their IS professionals to be more healthcare-oriented. This study aims at improving such education by giving managers insights for further development of the healthcare competency of IS professionals.

By and large, the conceptual model of IS professionals' technology management competency is of particular value to those concerned with skills/knowledge training and competency development for IS professionals in healthcare organizations. It provides an instrumental structure to help training program instructors identify the necessary skills/knowledge for their trainees. Healthcare organizations can further develop IS professionals' technology management competency profiles that accurately account for the tailored set of knowledge and skills required for individual IS professionals in accordance with their own organization contexts. Once the profiles for the IS professionals have been identified, a systematic program of required training responses can be identified. The resulting portfolios of IS professionals' technology management competency requirement can then guide the relative training activities. Executive management in the healthcare industry can also take advantage of such technology management competency profiles to assist in making succession-planning decisions by evaluating the competency levels and development needs of their IT employees.

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