Adoption of Technology Applications in Healthcare: The Influence of Attitude toward Knowledge Sharing on Technology Acceptance in a Hospital

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Abstract. The use of different forms of technology has increased in healthcare profession recently. Clinical IT can change the practice patterns of healthcare professionals to improve the quality of health care delivery. When a new clinical IT is introduced in a hospital, healthcare professionals play an important role in the adoption and implementation process. But underutilization of clinical IT has emerged as a new challenge for the healthcare industry. So that healthcare professionals have not fully adopted the clinical IT systems. To improve overall acceptance of clinical IT in a hospital setting, this study (as a conceptual research) argues that unique feature of clinical IT can potentially affect healthcare professionals' adoption of new clinical IT system. This study proposes a modified technology adoption model (TAM) to incorporate both the special characteristic of healthcare professionals and unique feature of clinical IT. This study discuses that how attitude toward knowledge sharing affects healthcare professionals' intention to use the clinical IT system.

Keywords: Clinical IT, TAM, Perceived threat to professional autonomy, Attitude toward knowledge sharing, Healthcare professionals' involvement in decision making, Perceived usefulness, Perceived ease of use.

1 Introduction

User adoption of new technology has attracted the attention of a large number of researchers in Information Systems (IS) studies. As technology innovation can leave its mark on improving the productivity and performance (at different levels) of organizations [1], researchers have been trying to find out factors affecting the successful adoption of technological advancement among users. One of the most important determinants influencing the success of Information Technology (IT) adoption is that to what degree IT systems are accepted by users [2]. User acceptance is defined as the willingness of the users to use IT which is designed to support tasks [3]. Organizations invest in IT systems with the hope of cutting costs, increasing the quality of products or services [4]. But if users do not accept the systems, the organizations can not benefit significantly from the new systems. On the other hand, if users accept new IT systems they become more willing to make use of the new

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systems [5]. The usage of a newly introduced IT system can be a sign of the IT system success [6]. Therefore, finding the reasons that motivate people to use the new systems or understanding the source of resistance toward using new systems is important to both system designers and developers [7].

The use of IT in health care practices has increased recently [8]. A variety of IT systems such as clinical information systems, personal digital assistants, electronic patient records and other applications have gradually become established in the healthcare industry. Clinical IT applications in healthcare are regarded as a key element in improving the quality of medical care. However, factors affecting healthcare professionals' adoption behavior regarding the IT systems is not completely clear yet ([9],[10],[11]). The concern of having new clinical IT systems unused is still one of the biggest issues for the clinical IT developers ([2], [12]).

With reference to Walter and Lopez [11], two types of IT are available in medical care environment. The first one is Electronic Medical Records (EMR) systems which are computer systems that allow users to create, store, and retrieve patient charts on a computer. The second one is Clinical Decision Support (CDS) system that is classified as a decision support system. A CDS System is regarded as an application of Decision Support System (DSS), which takes patient data as input and generates decision- specific advice ([13], [14]). These systems are referred to as knowledge-based systems that use patient data and series of reasoning techniques to generate diagnostic and treatment options and care planning.

When a new clinical IT is introduced in a hospital, healthcare professionals play an important role in the adoption and implementation process. Thus, healthcare professionals need to use emerging clinical IT to reap the benefits of new systems otherwise the technology will remain underutilized. In other words, healthcare professional's acceptance is reported as an important need to the success of the clinical systems ([15], [2]). Once the users accept new IT, they are more likely to make changes in their existing work routines and incorporate the new IT into the flow of their everyday work practices [11].

According to King and He [16], in recent years there has been an increasing interest in the identification of factors that cause potential users to accept and take advantage of systems developed and implemented by others. With respect to individual intention to accept new technology, several studies have been conducted and eight theoretical models have been developed: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), a combined Theory of Planned Behavior/Technology Acceptance Model (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). Each model explains the user's individual readiness to accept new information systems and technology [17].

Despite the large volume of studies in technology acceptance research, very little work has been done in the health care context [9]. This is a sign of a significant gap in this area. Also, based on the studies conducted in health sector, it is shown that healthcare professionals have not fully adopted the new IT systems ([10],[11], [18], [19] [20], [21], [22],[23]).

Although TAM has been used as a useful tool to explain technology acceptance process in different fields, this model is not applicable for healthcare professionals

[19]. For instance, this model is still very general and is not designed for any particular profession [11]. Each profession has special contextual characteristics that may affect IT adoption behavior. For instance, unique characteristics of IT users should be included in IT adoption models in order to better explain their intention to accept new technology.

Little research has studied special characteristics of healthcare professionals and different features of clinical information systems in the field of healthcare professional adoption [11]. Furthermore, according to Moon and Kim [24], besides the important constructs embedded in technology adoption models, additional exploratory factors are needed to better account for the variance of accepting new technology such as the specific technology context.

2 Theoretical Background

2.1 Technology Acceptance Model (TAM)

Based on a body of literature, TAM is the most influential IT adoption model and is widely applied to explain the IT acceptance process in different contexts [25]. Davis developed TAM based on TRA in 1989 to mainly explain technology use in various situations and cultures in order to increase user acceptance of systems. Another reason for usefulness as well as popularity of TAM is its parsimony, simplicity, understandability and gaining empirical support within a variety of user groups [26].

The original TAM suggests that two beliefs namely, perceived usefulness and perceived ease of use play a pivotal role in underscoring individual acceptance of a new technology [27,28].The first variable, perceived usefulness, is considered as the degree to which a person believes that by using a particular system his/her job performance would be enhanced [29]. The second one, perceived ease of use, is operationally defined as the extent to which a person believes that using a particular system would be effortless [29]. These factors can be addressed during the system development stage to solve the users' acceptance problem [30]. These factors determine behavioral intention that is found by a wide number of studies [31], as a better predictor of actual system usage. In the field of social science, intention to use a new IT is defined as user willingness to actual behavior of using the new IT.

2.2 Theory of Professionals

According to Sharma [32], the holders of some occupations (such as medical practice) are defined professionals. The healthcare professionals who considered in this study consist of all kind of physicians and specialists from different medical specialty areas. This group can make use of clinical IT potentials to improve health care delivery and efficiency. Professionals have been attributed some unique and professional characteristics that make them different from other non-professionals. As stated by Brennan and Coles [33], healthcare professionals' professionalism is rooted in a set of values. The most important characteristic is healthcare professional autonomy and the other features are patient sovereignty, physician confidentiality, and habits of learning. According to Chau and Hu [34], the differences between healthcare

professionals and other user groups in terms of accepting new IT derive from a set of values such as:

- Specialized training which is obtained over a considerable period gives them the knowledge and expertise that is required in this profession [35].
- Professional autonomy is defined as the control that professionals have over the processes, conditions and content of their medical practice [36]. Literature states that professional autonomy is the most important professional value provided for healthcare professionals [37].
- The third characteristic is professional work arrangements where healthcare professionals are considered as health care providers, hospitals become health care facilities, and patient are both the product and the client in the healthcare environment [35, 38]. Beside professionals, there are two other occupational groups working in a hospital. The para-professional group, such as medical assistants, owns only partial professional knowledge and skill and assists healthcare professionals in their healthcare practices. The last group is non-professionals who are just prepared to engage in running clerical, office work and administrative duties.

Due to some privileges originate from professional autonomy, healthcare professionals have power over non-professionals and para-professionals and can control the tasks conducted by them [39]. Therefore, healthcare professionals try to support the factors that strengthen their professional autonomy and resist the factors that may erode their professional autonomy [11]. Despite the significant role of professional autonomy in healthcare professionals IT adoption behavior, less emphasis has been placed to explore whether and how this central characteristic influences healthcare professional's acceptance of new clinical IT [11].

Adams [40] has argued that previous studies highlighted some similar constructs like behavioral control and professional autonomy has not been studied as a central characteristic of healthcare professionals. Walter and Lopez [11], first introduced perceived threat to professional autonomy as a new construct in studying IT acceptance. This construct is operationally defined as "the degree to which a person believes that using a particular system would decrease his/her control over the conditions, processes, procedures, or content of his/her work".

2.3 Factor Affecting Perceived Threat to Professional Autonomy

A considerable amount of literature has been published to show that the autonomous practice of physicians and their independence in decision making are two distinct characteristics of medical profession [41]. In addition, like other professionals, healthcare professionals are highly committed to their own profession and their performance is evaluated based on a subjective peer review process. Yet, healthcare professionals believe that their professional autonomy is influenced by a technology that is supposed to change physicians' long-established practice pattern.

According to a rich body of literature, a feature of clinical IT can be considered as threatening factors to healthcare professional autonomy [11]. The factor is the level of knowledge codification and knowledge distribution conducted by a clinical IT system. Due to the possession of abstract and expert body of medical knowledge by healthcare professionals, they are less likely to accept the type of IT system that organize, codify

and distribute their knowledge which mainly makes them distinct from other occupational groups.

According to Walter and Lopez [11] different types of clinical IT (EMR and CDS), to some extent, involve knowledge codification and thus make physicians' analytical views and expert knowledge accessible to the subordinate group (such as non-professionals and paraprofessionals). Based on the existing literature on knowledge management, knowledge codification refers to converting tacit knowledge into explicit knowledge in a way that it can be usable by all the organizational members [42]. Therefore, knowledge codification will lead to more knowledge distribution and contributes to knowledge sharing in organizations.

According to Prasad and Prasad [43], the practice of knowledge codification enables para-professionals to get access to greater amount of knowledge in organizations. Therefore, more knowledge codification leads to more knowledge distribution in a hospital. Harrison et al. [44] have mentioned that knowledge codification abolishes the exclusive state of having abstract, expert and unshared medical knowledge, as well as the sole rights of having specialized competence and expertise possessed by healthcare professionals.

Moreover, measures for healthcare professionals' performance evaluation become more objective (rather than subjective) when their esoteric knowledge becomes more easily reachable to the subordinate group. Also due to the implementation of a clinical IT, the physicians' diagnostic decisions and any part of patient care practice is easily monitored by others such as physician assistants, paraprofessionals and non-professionals working in the health care environment and considered as the physicians' subordinates. Therefore, being monitored by others (especially from out of the profession) may increase the possibility of reviewing the physicians' prescriptions and revealing their patient care process. Consequently, monitoring the treatment options prescribed by physicians can intensify perceived threat to professional autonomy.

As a result, healthcare professionals can no longer claim exclusive possession of a body of specialized knowledge and might not have control over resources and the tasks done by the subordinate group. Kritzer [45] has supported the idea that exclusive ownership of esoteric body of knowledge leads to professional autonomy. This study has also carried out an investigation into the relationship between the exposure of physicians' abstract knowledge to subordinate groups and decreasing their professional autonomy. Therefore, drawing on the above arguments, perceived threat to professional autonomy is mainly intensified through the increased level of knowledge codification by means of clinical IT system. Mclaughlin and Webster [46] have published a case study in which they described the effect of IT on professional autonomy. They conclude that physicians' professional autonomy is reduced as their abstract knowledge is codified by the IT system. Also, they have stated that IT system can blur occupational boundaries among different occupational groups.

To sum up, healthcare professionals believe that clinical IT can codify their esoteric knowledge to a high extent and in turn distribute their knowledge to all physician assistants, non-professionals and para-professionals in a hospital setting. By doing so, healthcare professionals can no longer claim on having the abstract knowledge and they will lose their control over the tasks performed by the subordinate group. Therefore, if the features of a clinical IT contributes to knowledge codification and knowledge

sharing, more threat will be perceived by healthcare professionals to their professional autonomy and they become less likely to use the clinical IT system.

2.4 Knowledge Sharing in a Hospital Setting

Healthcare professionals are seen as knowledge-intensive employees working in a hospital. Due to the professional autonomy, physicians usually do not consider the subordinate group as their co-workers and they are less likely to share their knowledge with them. But it should be noted that other occupational groups working in a hospital (such as physician assistants and para-professionals) can help them better complete the process of disease diagnosis and treatments. The role of the subordinate group becomes more significant when knowledge sharing environment is built between professionals and this group. An issue on knowledge sharing between professionals and the subordinate group is related to the nature of knowledge sharing between subordinates and supervisors which is usually bounded by formal relationships [47]. Hence, healthcare professionals do not want their subordinate group (such as physician assistants and para-professionals) to access to their knowledge by using the clinical IT in order to maintain their professional autonomy.

However, according to Dexter et al. [48], in some cases it has been reported that CDS becomes more effective if other clinicians (such as nurses) receive and use the information delivered by the system. As a conclusion, if healthcare professionals share the required knowledge and expertise with the subordinate group, this group can work effectively and also they can better assist healthcare professionals in the competition of delivering health services.

To share knowledge with a hospital's members two issues are essential. First, ideas and insights should be presented in acceptable and understandable forms with the intention that they can be clearly received, interpreted and used by others. Second, individuals with ideas should be eager to practice knowledge sharing for the benefit of the entire organization [49].

Healthcare professionals' attitude toward knowledge sharing can improve the exchange of ideas and in turn collaboration with other occupational groups. Although healthcare professionals have command over medical knowledge, the most reliable personnel in terms of serving care-giving and nursing practices are para-professionals. Thus, healthcare professionals should consider other occupational groups as a team member and they can enhance the quality of treatment given to patients through a reciprocal relationship and collaboration [50]. As a result, if healthcare professionals have a positive attitude toward knowledge sharing with physician assistants and para-professionals and they perceive that shared knowledge is effective for their organizations (hospitals). In turn, it may reduce the threats they perceive from clinical IT on distribution of their knowledge to the subordinate group.

2.5 Level of Healthcare Professionals' Involvement in Decision Making

Literature indicates that one of the most important concerns in the development and implementation of an IT system is related to managerial point of view. According to a suggestion made by Hoslinger and Beaton [50], instead of requesting healthcare professionals to accomplish more in compressed schedules they should be asked to

manage the resources. Managing time and data with the aid of health information technology can help them to be successful in offering more tailored healthcare and diagnosis to increased number of patients. In a case study conducted by Kohli et al. [51], on the subject of hospital-physician collaboration, it is found that success of an IT project can be guaranteed with the help of a precise strategy to involve physicians both in planning and implementation. Further, trust between physicians and the hospital is found to be an important requirement contributing to changes in clinical practices on the hospital floors. It is reported that even well-designed information systems cannot succeed to show the conversion effectiveness due to the lack of system use or the failure of the users to make changes when is needed [51].

As a conclusion, according to the qualitative study by Kohli et al.[51], healthcare professionals are more likely to change their day-to-day work activities when they have the right of being involved in both planning and implementation of a web-based physician profiling system and such willingness leads to the success of this system. Moreover, Walter and Lopez [11] have suggested that although physicians are very vulnerable and reactive to the type of clinical IT facilitating knowledge dissemination, such concerns may be reduced by the degree of being involved in making relative decisions about the development of that IT.

3 Conceptual Framework and Hypotheses Development

In the proposed framework, the dependent variable is healthcare professionals' intention to use the clinical IT. The construct perceived threat to professional autonomy indicates the threat observed by healthcare professionals on their central characteristic that is autonomous practice. The factor affects this construct stems from special feature of the clinical IT. The factor is the level of knowledge codification and sharing with subordinate group (such as para-professionals and physician assistants). This factor provides a human-oriented stream. In human-oriented stream, healthcare professionals' attitude toward knowledge sharing is defined as the main construct. The following figure (Fig.1) depicts the conceptual framework of this study.

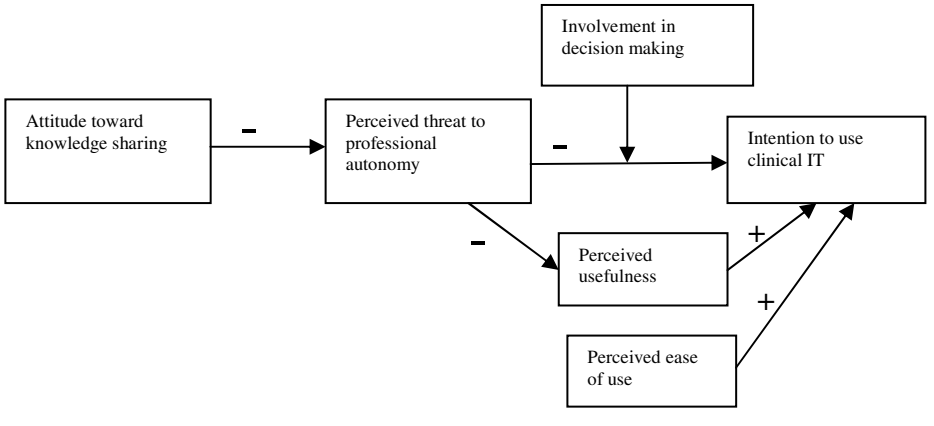

Fig. 1. Proposal framework

3.1 Perceived Threat to Professional Autonomy and Intention to Use Clinical IT

Intention to use new technology is the dependent variable which refers to individual intention or readiness to accept a new technology [29]. Also according to Walter and Lopez [11], perceived threat to professional autonomy is defined as "the degree to which a person believes that using a particular system would decrease his or her control over the conditions, processes, procedures, or content of his or her work". This study proposes that perceived threat to professional autonomy reduces healthcare professional intention to use clinical IT in a hospital setting. It implies that if healthcare professionals perceive the application of clinical IT as threatening to their professional autonomy, the possibility of using clinical IT by them will decrease. Therefore, the first proposition is developed as follows:

Proposition 1. *Healthcare professionals' intention to use clinical IT in a hospital setting is negatively related to perceived threat to professional autonomy.*

3.2 Perceived Usefulness and Intention to Use Clinical IT

Consistent with prior studies in the healthcare context, Yi et al. [18] have stated that perceived improved performance resulting from using IT strongly affects physicians' intention to use the system in the healthcare sector. The significant role of perceived usefulness among physicians in shaping their intention toward using a new technology might have been centered on physicians' utility-based point of view about using technology [34]. It means they accept a new technology when it possesses desired utility and becomes instrumental in their practices. According to Chang et al.[14], perceived usefulness exerts the most significant impact on physicians' intention to use CDS. Based on Kijsanayotin et al. [2], perceived usefulness is the most important determinant of intention to use health IT in a developing countries healthcare context. Therefore, as long as healthcare professionals perceive clinical IT as a source of performance enhancement, they become more willing to use the system. Thus, the next proposition is developed as follows:

Proposition 2. *Healthcare professionals' intention to use clinical IT in a hospital setting is positively related to their perceived usefulness.*

3.3 Perceived Threat to Professional Autonomy and Perceived Usefulness

As mentioned by Walter and Lopez [11], perceived usefulness gained from using an IT is not always what physicians are concerned about and if the clinical IT system erodes their professional autonomy performance expectancy becomes insignificant for healthcare professionals. In the healthcare context, if a clinical IT invalidates healthcare professional autonomy and changes their practice patterns, the system would not be fully used for the purpose of performance improvement expected from the clinical IT. This may occur to maintain professional autonomy instead of the new useful clinical IT that is perceived as threatening to their professional autonomy. Thus, the next proposition manifests this effect as follows:

Proposition 3. *Healthcare professionals' perceived usefulness is negatively related to perceived threat to professional autonomy in a hospital setting.*

3.4 Perceived Ease of Use and Intention to Use Clinical IT

In line with Davis [29], intention to use new IT systems is positively related to perceived ease of use. Chang et al. [14] have stated that effort expectancy is a significant predictor for physicians' intention to use CDS. As supported by Kijsanayotin et al. [2], effort expectancy is a key factor in shaping physicians intention to use technology. Therefore, if healthcare professionals find the new clinical IT easy to understand and use, they become more likely to use the system in their practice pattern. Thus, the next proposition states this idea as follows:

Proposition 4. *Intention to use clinical IT is positively related to perceived usefulness in a hospital setting.*

3.5 The Moderating Effect of Healthcare Professionals' Level of Involvement in Decision Making

Hoslinger and Beaton [50] have considered managerial roles for healthcare professionals. The literature states that if healthcare professionals involve in decision making process regarding the introduction and development of appropriate IT system in organizations, the threat perceived from clinical IT can be reduced and they become more willing to change their long-term practice pattern [51]. Therefore, this study proposes that healthcare professional's high level of involvement in decision making regarding the development and implementation of clinical IT can reduce the negative effect of threat they perceive from the system and consequently may improve their intention to use the system. Thus, the following proposition is developed as:

Proposition 5. *Healthcare professionals' level of involvement in decision making about the clinical IT moderates the relationship between perceived threat to professional autonomy and intention to use the system.*

3.6 Healthcare Professionals' Attitude toward Sharing Knowledge and Perceived Threat to Professional Autonomy

According to King [16], knowledge sharing occurs by distribution of knowledge through a system (repository) with individuals who are not usually familiar to the contributor. In this case, healthcare professionals' knowledge is shared by the clinical IT systems with the subordinate group (such as para-professionals, physician assistants and junior healthcare professionals). But in the light of claiming exclusive possession of esoteric bodies of medical knowledge, healthcare professionals are less likely to use this system. They perceive that this type of clinical IT can weaken their professional autonomy.

According to the new definition of professionalism suggested by Holsinger and Beaton [50], corporate values (professionalism and teamwork) should be applied in a hospital setting. It means collaboration and teamwork should be established within healthcare professionals and also between healthcare professionals and other occupational groups. Knowledge sharing is a sign of collaboration and inter-organizational relationship between occupational groups in a hospital [52]. Thus, once

healthcare professionals hold a positive attitude toward knowledge sharing and they perceive that shared knowledge is effective for their organization (hospital), they feel less threatened by the clinical IT system.

Healthcare professional's attitude toward knowledge sharing has been defined as the degree to which they have a favorable or unfavorable evaluation of knowledge sharing ([53],[54],[55], [56],[57],[58]). As mentioned by Kwok and Gao [59], an individual's attitude toward knowledge sharing can affect his/her intention to share knowledge and in turn influence actual behavior. As a result, one way to reduce the negative effects of perceived threat to healthcare professionals' autonomy can be associated with their attitude toward knowledge sharing in hospitals. When healthcare professionals hold a favorable attitude toward knowledge sharing in a hospital setting, they may perceive less threat by clinical IT that is supposed to distribute their knowledge among other organizational members. Consequently, they may become more likely to use the clinical IT system. Therefore, the related proposition is developed as follows:

Proposition 6. *There is a negative relationship between healthcare professionals' attitude toward knowledge sharing and the perceived threat to professional autonomy.*

4 Implications of the Study

4.1 Theoretical

From a theoretical standpoint and theory building, the research contributes to IT adoption theories explaining healthcare professionals' intention to accept new technology. Since the TAM is general and cannot address healthcare professionals' unique characteristics, this model has been improved to fit the healthcare context and better explain healthcare professionals' IT adoption behavior in a hospital setting. The influential constructs from the medical literature are perceived threat to professional autonomy and healthcare professionals' involvement in decision making in hospitals. The construct healthcare professional attitude toward knowledge sharing is borrowed from knowledge management related literature. To improve the overall healthcare professionals' IT acceptance, this study proposes to improve healthcare professionals' attitude toward knowledge sharing in hospitals. Besides, this study argues that level of healthcare professionals' involvement in decision making can reduce threat perceived form the clinical IT and improve their intention to use the IT system. In other words, a modified model is proposed to explain and predict use of new technology in the healthcare industry.

4.2 Practical

From a practical point of view, this study proposes that hospital management should devise a strategy to improve healthcare professionals' attitude toward knowledge sharing in hospitals. To do so, hospital management may focus on the development of

a social network and shared goals between healthcare professionals and the subordinate group. Besides, healthcare management may improve the level of healthcare professionals' involvement in decision making on development and implementation of the clinical IT systems. With this understanding hospital management can reduce the negative effects of perceived threat to professional autonomy and improve overall acceptance of clinical IT by healthcare professionals.

References

1. Orlikowski, W.J.: Using technology and constituting structures: A practice lens for studying technology in organizations. Organization Science 11(4), 404–428 (2000)
2. Kijsanayotin, B., Pannarunothai, S., Speedie, S.M.: Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model. International Journal Medical Informatics 79, 404–416 (2009)
3. Dillon, A., Morris, M.: User acceptance of information technology: theories and models. In: Williams, M. (ed.) Annual Review of Information Science and Technology, vol. 31, pp. 3–32 (1996)
4. Lederer, A.L., Maupin, D.J., Sena, M.P., Zhuang, Y.: The role of ease of use, usefulness and attitude in the prediction of World Wide Web usage. In: Proceedings of the 1998 Association for Computing Machinery Special Interest Group on Computer Personnel Research (1998)
5. Succi, M.J., Walter, Z.D.: Theory of user acceptance of information technologies: An examination of health care professionals. In: 32nd Hawaii International Conference on System Sciences. IEEE Computer Society, Hawaii (1999)
6. Pikkarainen, T., Pikkarainen, K., Karjaluoto, H.: Consumer acceptance of online banking: an extension of the technology acceptance model. Internet Research 14(3), 224–235 (2004), http://www.emeralinsight.con/researchregister
7. Mathieson: Predicting user intention: comparing the technology acceptance model with theory of planned behavior. Information Systems Research 2(3), 173–191 (1991)
8. Obstfelder, A., Engeseth, K.H., Wynn, R.: Characteristics of successfully implemented telemedical applications. Implement Sci. 2(25) (2007)
9. Aggelidis, V.P., Chatzoglou, P.D.: Using a modified technology acceptance model in hospitals. International Journal of Medical Informatics 78(2), 115–126 (2009)
10. Tung, F.C., Chang, S.C., Chou, C.M.: An extension of trust and TAM model with IDT in the adoption of the electronic logistics information system in HIS in the medical industry. Int. J. Med. Inform. 77(5), 324–335 (2008)
11. Walter, Z., Lopez, M.S.: Physicians acceptance of information technology: Role of perceived threat to professional autonomy. Decision Support Systems 46(1), 206–215 (2008)
12. Gagnon, M.P., Pluye, P., Desmartis, M., Car, J., Pagliari, C., Labrecque, M., Fremont, P., Gagnon, J., Nojya, M., Legare, F.: A systematic review of interventions promoting clinical information retrieval technology (CIRT) adoption by healthcare professionals. International Journal of Medical Informatics 79, 669–680 (2010)
13. Van Bemmel, J.H., Musen, M.A.: Handbook of medical informatics. Springer, NY (1997)
14. Chang, I.-C., Hwang, H.-G., Hung, W.-F., Li, Y.-C.: Physicians' acceptance of pharmacokinetics-based clinical decision support systems. Expert Systems with Applications 33(2), 296–303 (2007)

15. Payton, F.C.: Lesson learned from three interorganizational health care information systems. Information and Management 36(6), 311–322 (2000)
16. King, W.R., He, J.: A meta-analysis of the technology acceptance model. Information and Management 43, 740–755 (2006)
17. Davis, F.D., Bagozzi, R.P., Warshaw, P.R.: Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. Journal of Applied Social Psychology 22(14), 1111–1132 (1992)
18. Yi, M.Y., Jackson, J.D., Park, J.S., Probst, J.C.: Understanding information technology acceptance by individual professionals: Toward an integrative view. Information and Management 43(3), 350–363 (2006)
19. Chismar, W.G., Wiley-Patton, S.: Does the extended technology acceptance model apply to physicians. In: Proceedings of the 36th Hawaii International Conference on System Sciences (2003)
20. Dearne, K.: Health's tech bypass. In: The Australian, Sydney, p. 1, 4 (2003)
21. Murray, D.: Healthcare challenge. Australian Information Week 3, 10–18 (2002)
22. Wenn, A., Tantnall, A., Sellitto, C., Darbyshire, P., Burgess, S.: A sociotechnical investigation of factors affecting IT adoption by rural GPs'. In: Information Technology in Regional Areas. Using IT: Make IT happen, Online, Rockhampton, Queensland Australia (2002)
23. Western, M., Dwan, K., Makkai, T., del Mar, C., Western, J.: Measuring IT use in Australian General Practice. University of Queensland, Australia (2001)
24. Moon, J.W., Kim, Y.G.: Extending the TAM for a world-wide-web context. Information & Management 38(4), 217–230 (2001)
25. Hossain, L., de Silva, A.: Exploring user acceptance of technology using social networks. Journal of High Technology Research 20(1), 1–18 (2009)
26. Wang, Y.S., Wang, Y.M., Lin, H.H., Tang, T.I.: Determinants of user acceptance of Internet banking: an empirical study. International Journal of Service Industry Management 14(5), 501–519 (2003)
27. Anandarajan, M., Igbaria, M., Anakwe, U.P.: IT acceptance in a less developed country: A motivational factor perspective. International Journal of Information Management 22(1), 47–65 (2002)
28. Ghorab, K.E.: The impact of technology acceptance considerations on system usage and adopted level of technological sophistication: An empirical investigation. Journal of Information Management 17(4), 249–259 (1997)
29. Davis, F.D.: Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly 13(3), 319–340 (1989)
30. Taylor, S., Todd, P.A.: Assessing IT Usage: The Role of Prior Experience. MIS Quarterly 19(2), 561–570 (1995)
31. Venkatesh, V., Davis, F.D.: A model of the perceived ease of use: Development and test. Decision Sciences 27, 451–481 (1996)
32. Sharma, A.: Professionals as agent: knowledge asymmetry in agency exchanges. Academy of Management Review 22(3), 758–798 (1997)
33. Brennan, M., Coles, C.: Developing professional skills. The Lancet 362(9394), 362–1506 (2003)
34. Chau, P.Y.K., Hu, P.J.: Examining a model of information technology acceptance by individual professionals: an exploratory study. Journal of Management Information Systems 18(4), 191–229 (2002)
35. Watts, C.: Erosion of healthcare professional autonomy and public respect for the profession. Surgical Neurology 71(3), 269–273 (2008)

36. Raelin, J.: An anatomy of autonomy: managing professionals. The Academy of Management Executive 3(3), 216–228 (1989)
37. Zuger, A.: Dissatisfaction with medical practice. N. Engl. J. Med. 350(1), 69–75 (2004)
38. Montague, E.N.H., Kleiner, B.M., Winchester, W.W.: Empirically understanding trust in medical technology. International Journal of Industrial Ergonomics 39(4), 628–634 (2009)
39. Freidson, E.: Profession of Medicine: A Study of the Sociology of Applied Knowledge. The University of Chicago Press, Chicago (1988)
40. Adams, D.W.: Standards and the development of professions: Implications for educational evaluation. In: Paper presented at the 64th Annual Meeting of the American Educational Research Association (1980), http://eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/ (retrieved October 16, 2008)
41. Tanriverdi, H., Venkatraman, N.: Creation of professional networks: an emergent model using telemedicine as a case. In: 32nd Hawaii International Conference on System Sciences. IEEE Computer Society, Hawaii (1999)
42. Zack, M.H.: Managing codified knowledge. Sloan Management Review 40(4), 45–58 (1999)
43. Prasad, P., Prasad, A.: The ideology of professionalism and work computerization: institutionalist study of technological change. Human Relations 47(12), 1433–1458 (1994)
44. Harrison, S., Dowswell, G., Wright, J.: Practice nurses and clinical guidelines in a changing primary care context: an empirical study. Journal of Advanced Nursing 39(3), 299–307 (2002)
45. Kritzer, H.M.: The professions are dead, long live the Professions: Legal practice in a post professional world. Law & Society Review 33(3), 713–759 (1999)
46. Mclaughlin, J., Webster, A.: Rationalizing knowledge: IT systems, professional identifies and power. The Sociological Review 46(4), 781–802 (1998)
47. Yang, S.C., Farn, C.K.: Social capital behavioral control, and tacit knowledge sharing- A multi- informant design. International Journal of Information Management 29(3), 210–218 (2009)
48. Dexter, P.R., Perkins, S.M., Maharry, K.S.: Inpatient computer-based standing orders vs. physician reminders to increase influenza and pneumococcal vaccination rates: a randomized trial. JAMA 292(19), 2366–2371 (2004)
49. Jabr, N.H.: Healthcare professionals' attitudes towards knowledge transfer and sharing. International Business Journal 17(4), 248–260 (2007)
50. Holsinger, J., Beaton, B.: Physician professionalism for a new century. Clinical Autonomy 19(5), 473–479 (2006)
51. Kohli, R., Piontek, F., Ellington, T., VanOsdol, T., Shepard, M., Brazel, G.: Managing customer relationships through E-business decision support applications: a case of hospital–physician collaboration. Decision Support Systems 32(2), 171–187 (2001)
52. Bartunek, J.M.: Intergroup relationships and quality improvement in healthcare. BMJ Qual. Saf. 20, 62–66 (2010)
53. Ajzen, I.: Constructing a TPB questionnaire: conceptual and methodological considerations (2001a), http://www.unix.oit.umass.edu/tpb.htm (Retrieved March 24, 2009)
54. Ajzen, I.: Nature and operation of attitudes. Annales in Review of Psychology 52, 27–58 (2001b)
55. Ajzen, I.: The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes 50(2), 179–211 (1991)

56. Bock, G.W., Kim, Y.G.: Breaking the myths of rewards: an exploratory study of attitudes about knowledge sharing. Information Resources Management Journal 15(2), 14–21 (2002)
57. Chang, M.K.: Predicting unethical behavior: a comparison of the theory of reasoned action and the theory of planned behavior. Journal of Business Ethics 17(16), 1825–1834 (1998)
58. Chau, P.Y.K., Hu, P.J.H.: Information technology acceptance by individual professionals: a model comparison approach. Decision Sciences 32(4), 699–719 (2001)
59. Kwok, S.H., Gao, S.: Attitude toward knowledge sharing behavior. Journal of Information Systems 46(2), 45–51 (2006)