

Management Issues in Healthcare Information Technology

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Electronic medical record (EMR) and clinical decision support systems (CDSS) are being increasingly adopted by hospitals in Korea with the evolution of healthcare information technology (HIT). The adoption rate of EMR had greatly increased from 21.4% in 2005 to 77.3% in 2010. The adoption of CDSS had also greatly increased from almost 0% in 2005 to 27.3% in 2010 [1]. The benefits of these systems include a reduction of the report turnaround time, fewer medication errors, a reduction of adverse drug effects, and many others [2]. As these systems can have a profound impact on the quality of patient care and the efficiency of hospital administration, management issues such as their acceptance and use by physicians, nurses, and managers became crucial.

Several theoretical models have been developed to explain user acceptance and other management issues in HIT. The most prominent model of user acceptance is the technology acceptance model [3]. This model states that a user's attitude towards a certain technology depends on the perceived usefulness of that technology and on its perceived ease of use. Attitude and perceived usefulness then jointly predict a user's intention to use that technology. Because physicians have a large degree of professional autonomy and are considered to make technology acceptance decisions independently, several studies have focused on physicians' acceptance of EMR [4], CDSS [5], and a picture archiving and communication system (PACS) [6]. Pynoo et al. [7] investigated physicians' PACS acceptance levels on three occasions (before, shortly after and one year after the introduction of PACS). They

used the unified theory of acceptance and use of technology model [8], which extended the technology acceptance model by adding social influence and facilitating conditions as direct predictors of user acceptance. Social influence refers to perceived norms in the social environment concerning the use of a technology; and facilitating conditions refer to objective factors that facilitate the use of a technology, such as training, support and compatibility between the new and existing systems.

Another related model for management issue is the information system (IS) success model by DeLone and McLean [9]. They included user satisfaction in addition to usage (including user acceptance) in their IS success model because user satisfaction is an alternative measure of system value in cases of obligatory use. They subdivided success measures of IS into six distinct categories: 1) system quality; 2) information quality; 3) usage; 4) user satisfaction; 5) individual impact; and 6) organizational impact. Within each category, several attributes could contribute to success. The information processing system itself is assessed with system quality attributes (e.g., usability, accessibility, ease of use). Information quality attributes (e.g., accuracy, completeness, legibility), concern the input and output of the system. Usage refers to system usage or information usage after user accepted the system. In their view, system quality and information quality individually and jointly affect usage and user satisfaction. Individual impact is a measure of the effect of the system or the information on users' behavior, and attributes can be information recall or the frequency of data retrieval or data entry. Organizational impact refers to the effects of the system on organizational performance. The IS success model has also been widely applied in HIT to identify the factors influencing user satisfaction in the areas of computerized physician entry system (CPOE) [10], clinical information

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systems (CIS) [11], enterprise resource planning (ERP) [12], hospital information systems [13], and CDSS [14]. DeLone and McLean [15] updated their success model by adding a service quality dimension. Service quality measure includes: up-to-date hardware and software, a dependable system, prompt user support, and user training. Since user support and user training are important factors for influencing physician acceptance, there is a need for more study on the updated IS success model for HIT.

The most frequent format in the related literature on management issues is a one-shot approach, in which user acceptance or satisfaction is typically assessed only at one moment in time. However, Rogers [16] suggested that individual adoption is not an instantaneous act, but it is a process, which occurs over time. In his diffusion of innovation theory, individual adoption can be conceptualized as a five-stage process involving knowledge, persuasion, decision, implementation, and confirmation. The diffusion process is influenced by the individuals' perceptions of the innovation at the persuasion stage: *relative advantage, compatibility, complexity*, etc. When a new IT is introduced, user must first be aware that an innovation exists and must be persuaded that the new IT is beneficial. At the decision stage, the individual decides whether adopt or reject. After the implementation stage, the individual then confirms whether to continue to adopt or to discontinue. Because physicians' acceptance is so important to the success of CIS, the diffusion of innovation theory has been applied to assess the adoption process of physicians before and after the introduction of healthcare IS such as PACS [7], CIS [17], and IS for a public health center [18].

As new ITs are introduced, these management issues also changed. In an effort to effectively respond to rapidly changing IT, the Society for Information Management (SIM) in the United States have conducted surveys on management issue changes due to the development of new IT every three years from early 1980s [19,20]. Based on the SIM survey framework, Kim et al. [21] identified management issues of HIT in Korea using the Delphi method in two surveys and interviewed managers of hospital information systems in 1999. Kwak et al. [22] also surveyed the management issues of HIT in 2005 and compared their results with those of 1999.

There are many benefits of such surveys in HIT management. IS managers can interpret trends in HIT and assess the impacts on their organization in the face of rapid changes in IT, such as u-health and mobile health technology. Researchers and educators can use the survey results to improve their understanding of critical managerial issues and to educate students in healthcare informatics. Accordingly, we encourage you to conduct such a survey on current managerial is-

ues and submit the related research papers to HIR.

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