Factors Associated with EHR User Satisfaction in Small Clinic Settings

Research-in-Progress

Afnan Afnan

C Ranganathan

University of Illinois at Chicago (UIC) University Hall, 601 S. Morgan St. 24th Floor, Chicago, IL 60607 Syiah Kuala University Jalan T. Nyak Arief, Darussalam Banda Aceh, Indonesia, 23111 aafnan2@uic.edu University of Illinois at Chicago (UIC) University Hall, 601 S. Morgan St. 24th Floor, Chicago, IL 60607 ranga@uic.edu

Abstract

The research on electronic health record (EHR) user satisfaction has been mainly studied in a complex work environment such as hospitals. Little is known about the EHR user satisfaction in small clinic settings. In this study, we investigate factors associated with EHR user satisfaction is small clinic settings. We use the absorptive capacity lens at an end-user level to understand how small clinics can effectively implement EHR systems and improve user satisfaction. We identify three important factors that are critical for EHR user satisfaction in small clinics: (i) Managerial IT knowledge as manifested in **clinical management support**, (ii) technological training (informal and formal) as indicated by **EHR training**, and (iii) IT infrastructure capability operationalized as **EHR quality**. We propose a research model and associated hypotheses for our research and present current status of our research project.

Keywords: Electronic Health Record, EHR user satisfaction, EHR user training, clinical management support, EHR quality, EHR impact, small clinic settings

Introduction

Users play a crucial role in information system (IS) implementation. They are the ones who learn the system, utilize it, and experience the impact of the IS. Studying and understanding user satisfaction are important since user satisfaction – along with the quality of the system, the utilization of the system by the user, and the support user receive during the system implementation – are all important aspects that influence IS success (DeLone & McLean 1992; DeLone & McLean 2002; Urbach & Muller 2012).

In healthcare sector, extant research have largely studied EHR satisfaction of physicians (Al Farsi & West 2006; Chiang et al. 2008; DesRoches et al. 2008; Edsall & Adler 2011; Hier et al. 2005; Holanda et al. 2012; Jones et al. 2013; Joos et al. 2006; Menachemi et al. 2009; Menachemi et al. 2010), followed by that of nurses (Moody et al. 2004; Otieno et al. 2007; Top & Gider 2012), patients (Freeman et al. 2009; Hassol et al. 2004; Ralston et al. 2007), and residents (O'Connell et al. 2004). Other researchers included a mixture of healthcare professionals in their studies on EHR user satisfaction (Alasmary et al. 2014; Boyer et al. 2011; Chang et al. 2012; Dastagir et al. 2012; Likourez et al. 2004; Magnus et al. 2009; Morton & Weidenbeck 2010; Pfoh et al. 2012). User utilization of EHR has also been studied along with the EHR user satisfaction (Pfoh et al. 2012; Top & Gider 2012). EHR use for completing various care management such as to write care plans, to enter care notes, to obtain information on treatment

procedures, to document patient's physical assessments, to review patient's problems, and to obtain results from new tests was reported to be positively correlated with nurse satisfaction (Otieno et al. 2007; Top & Gider 2012). The satisfaction of other types of healthcare providers like physicians, fellows and residents are also high with the use of EHR system to review patient's laboratory tests, to document allergies/physical examinations, and to work remotely (Pfoh et al. 2012). However, a different study which involves physicians who are the members of American Academy of Family Physicians (Edsall & Adler 2011) gives opposing results. The physicians consider the use of EHR as disruptive since it distracted their ability to focus on patient care. This fact played role in reducing their satisfaction with the EHR. Interestingly, when patients are asked similar questions, they think that the use of EHR system by their physicians is not intrusive; i.e. they believe the EHR does not draw their physicians' attention away from them (Freeman et al. 2009).

Besides investigating the association of EHR use and user satisfaction, prior studies have also analyzed EHR user satisfaction by assessing the impacts of the EHR technology (Al Farsi & West 2006; Alasmary et al. 2014; Edsall & Adler 2011; Hier et al. 2005; Joos et al. 2006; Likourezos et al. 2004; Moody et al. 2004), and by evaluating the quality of the EHR system (Hassol et al. 2004; Joos et al. 2006; Likourezos et al. 2006; Likourezos et al. 2004; Menachemi et al. 2010; Top & Gider 2012).

A number of studies look at the impacts of using the EHR by investigating the benefits of using the systems such as shorter time to complete tasks and improve quality of work. Most of the studies show that EHR user satisfaction increases along with the positive impacts of EHR in reducing time to document care (Edsall & Adler 2011; Hier et al. 2005; Joos et al. 2006), decreasing workload (Likourezos et al. 2004; Moody et al. 2004), and reducing user's effort to do various tasks such as reviewing patient's medical history, communicating with staff, and reviewing records when interpreting laboratory results (Joos et al. 2006). However, mixed results are shown in how the EHR impacts the quality of documentation. Some users think that it does not have a positive impact on the quality of documentation (Moody et al. 2004), while others do not agree that it makes patient document more legible, or patient record more complete, or they document correct patient record more often (Joos et al. 2006). Mixed results are also identified in how the EHR improve patient care, where some users report a positive association (Magnus et al. 2009; Moody et al. 2004), while others express the contrary (Likourezos et al. 2004).

With regards to patients, their satisfaction is reported high in a study that involves patients to evaluate the association of patient satisfaction and EHR impact (Freeman et al. 2009). Specifically the patients think that EHR provides more efficient and accurate interactions with their physicians. The results are not necessarily the same when physicians are asked about how they perceived the impact of EHR on patient satisfaction. For example, physicians have a neutral opinion on whether the use of EHR increases patient satisfaction (Joos et al. 2006).

Many studies mentioned above have examined EHR satisfaction in large hospital settings (Al Farsi & West 2006; Alasmary et al. 2014; Boyer et al. 2011; Chang et al. 2012; Dastagir et al. 2012; Hier et al. 2005; Joos et al. 2006; Likourezos et al. 2004; Moody et al. 2004; Morton & Wiedenbeck 2010; O'Connell et al. 2004; Otieno et al. 2007; Pfoh et al. 2012; Top & Gider 2012). Fewer researchers have examined it in the context of community clinics (Holanda et al. 2012) and smaller health centers (Magnus et al. 2009) where resources are scarce. Therefore, there is a need to know more about whether the factors which are/are not found to be related to EHR user satisfaction in large research settings, would stay consistent in smaller research settings, e.g. community clinics. This study aims to address this important gap.

This research seeks to make three important contributions to research and practice pertaining to electronic health records. First, we seek to throw light on small clinics and EHR issues, a relatively underresearched area within the healthcare IT domain. Second, we use the absorptive capacity perspective to examine three key constructs that could explain EHR user satisfaction in the context of small clinics. We fuse extant knowledge on user satisfaction with key tenets of the absorptive capacity framework, which we believe is a key theoretical contribution. Third, our research aims to provide a comprehensive view of EHR user satisfaction in small clinics by integrating the key determinants, with EHR user satisfaction and the ultimate outcome in terms of EHR impact.

The rest of this paper is organized as follows. We present a theoretical lens in the next section to understand how small clinics can effectively implement EHR systems and improve user satisfaction. We then propose a research model. Furthermore, in order to develop a better picture of the small clinic work

environment, we explore relevant research related to HIT implementations in this setting by considering barriers and motivators of the implementation. We then proceed to develop detailed hypotheses.

Theoretical Perspectives: Absorptive Capacity in Small Clinics

Absorptive capacity is a fundamental theoretical perspective that has emerged as a powerful concept in organizational and IS research (Lane, Koka & Pathak 2006; Roberts et al. 2012). It has its roots in the resource-based view of a firm, and its derivative, the knowledge-based view of the firm that place firmspecific resources and capabilities to be at the core of an organization's strategy and its ultimate performance. Absorptive capacity refers to an organization's "capacity to recognize the value of new external information, assimilate it and apply it to commercial ends" (Cohen & Levinthal 1990, p. 128). This concept is an allusion to the range of routines and organizational processes through which an organization acquires, assimilates, transforms and exploits knowledge in order to produce a dynamic organizational capability (Zahra & George 2002). Past research has recognized absorptive capacity as being one of the fundamentals of technical learning and technological innovations in organizations (Van den Bosch et al. 2005). For an organization to improve its absorptive capacity for IT assimilation, it needs to boost its ability to transform and implement external knowledge so as to enhance its internal competencies. The notion of absorptive capacity shows sufficient flexibility to be applied to different units of analysis and past research has used this lens to study firms, functional units, teams as well as end-users (Roberts et al. 2012). In this research, we use the absorptive capacity lens at an end-user level to understand how small clinics can effectively implement EHR systems and improve user satisfaction.

According to resource based view of the firm, small organizations may have to either develop internal capabilities or depend on external resources to compensate for size-inherent disadvantages. It becomes imperative for small organizations to invest in routines that will boost their absorptive capacity to effectively utilize new external resources and internally available capabilities. Small clinics' absorptive capacity constitutes a critical element that shapes their ability to effectively implement, assimilate and utilize information systems such as EHR systems that fundamentally alter their operations and organizational functions. We propose three theoretical arguments pertaining to absorptive capacity improvement in small clinics. First, small clinics can enhance their absorptive capacity by investing in specific learning processes and resources during or prior to EHR implementation. As learning is cumulative and dynamic process, the managerial IT knowledge (Boynton et al. 1994; Svaiful et al. 2013) within a clinic, manifested in terms of the clinician's understanding of the strategic value of EHR systems and their executive support to the assimilation of the system greatly enhances the overall absorptive capacity of the clinic to effectively deploy the EHR system. Second, technological training to organizational members can greatly also enhance the clinic's ability appreciate, understand and utilize the EHR system (Dastagir et al. 2012; Dillon & Morris 1996; Marshall et al. 2008). Past research has argued between the effectiveness of formal versus informal training in small firms (Hill & Stewart 2000; Stewart & Beaver 2003). Smaller clinics may not be able to afford the time and financial resources for formal training on EHR systems. On the other hand, informal and on-the-job training can prove to be ineffective in imparting required knowledge to medical staff. We argue that effective utilization of both formal and informal training can enhance absorptive capacity and hence result in better user satisfaction with EHR systems. Third, small clinics can also boost their absorptive capacity by investing in appropriate IT infrastructure resources that ensure superior systems quality and information quality that can result in better user satisfaction that is critical for EHR systems to make a meaningful impact (Palm et al. 2006). Several IS researchers have documented the importance of IT infrastructure and systems quality in enhancing the internal capabilities of organizations, including small businesses (Bhatt & Grover 2005; Nelson et al. 2005). From above discussion, we delineate three important factors that are critical for EHR user satisfaction in small clinics - (i) Managerial IT knowledge as manifested in clinical management support (ii) technological training (informal and formal) as indicated by EHR training and (iii) IT infrastructure capability operationalized as *EHR quality*. We summarize these factors in the following research model and then proceed to develop detailed hypotheses.



Figure 1. Research Model

HIT Implementation in Small Clinic Settings

Small clinics can be broadly defined as health care facilities which have fewer than 10 physicians (Kane et al. 2013; Menachemi et al. 2010) who provide outpatient care. In Florida, up to 65% of physicians work in small practice setting (Menachemi et al. 2010, while across the nation, this number is around 60% (Kane et al. 2013). Furthermore, approximately 53% of physicians were self-employed, and 60% worked in practices wholly owned by physicians (Kane et al. 2013). Clearly, a substantial portion of health care facilities are of small clinic settings.

HIT implementation in small clinic setting faces some challenges due to limited resources compare to bigger healthcare organizations. Small practices were late in making HIT investment (Middleton et al. 2005) and it was reported that practice size was strongly correlated with EHR adoption (Simon et al. 2007). Factors contributed to low and late HIT implementation are lack of financial resources (Fontaine et al. 2010a; Fontaine et al. 2010b; Lorenzi et al. 2009; Middleton et al. 2005). Limited human resources often forced the clinical and administrative staff in the small clinics to frequently share job responsibilities and to cover each other's work due to high workload (Carayon et al. 2009). Furthermore, the lack of administrative and clinical personnel with good training and technical expertise to develop a strategic HIT implementation plan could also hinder the implementation effort (Fontaine et al. 2010a).

The majority of small practices did not have financial ability to support important HIT implementation such as EHR (Middleton et al. 2005). The types of costs typically incurred in HIT implementation were start-up cost to purchase the hardware and software (Fontaine at al. 2010b; Lorenzi et al. 2009; Reardon et al. 2007; Simon et al. 2007), training cost (Reardon et al. 2007), ongoing cost for maintenance (Fontaine at al. 2010b; Simon et al. 2007), and cost of reduced productivity during the early stage of implementation (Fontaine at al. 2010b; Reardon et al. 2007; Simon et al. 2007). Among these three types of costs, the start-up cost or the cost of the system was the top barrier reported by physicians worked in small practices (Lorenzi et al. 2009; Simon et al. 2007). Lack of technical support has also been reported by previous studies as a barrier for HIT implementation in small clinic settings (Fontaine at al. 2010a; Fontaine at al. 2009; Simon et al. 2007), concerns about privacy (Fontaine et al. 2010a; Fontaine et al. 2007) and the fact that vendors were mostly accustomed to design EHR systems for large practice environments (Lorenzi et al. 2009).

Besides the barriers, researchers have also identified motivators for HIT implementation in small practice settings. The motivators can be external motivators which includes state and federal mandates (Fontaine et al. 2010b) and internal motivators which includes: provision of good training (Carayon et al. 2009), the anticipated positive impacts such cost savings, quality, patient safety, and efficiency (Fontaine et al. 2010b), and improved patient care (Lorenzi et al. 2009).

Successful implementation requires solutions for e.g. financial and technical barriers. Leaders need to address the financial barrier by providing solutions for financial support such as financial incentives (Fontaine et al. 2010b), and addressing the privacy issue by providing technical support (Fontaine et al. 2010a). However, successful implementation does not always call for the elimination of these kinds of barriers. A strong physician leader (Fontaine et al. 2010b) to champion the EHR implementation projects was also reported as one of the keys to a successful implementation (Caravon et al. 2009). It is important to identify a leader who could be a champion that served as an advocate of the benefits of EHR implementation and provide the direction as well as encouragement for the project implementation (Lorenzi et al. 2009). Some researchers used the term *clinical leaders* to refer to an expert in their field who has confidence and empowerment to improve the quality of health care (Stanton et al. 2010), and who could be accountable to managers but remain focus on their clinical role (Malcolm et al. 2003). Some characteristics of the clinical leaders are approachability, having clinical competence, being supportive, acting as mentors or role models, being visible in practice, directing and helping people, inspiring confidence, having effective communication skills and behaving with integrity (Stanley 2014). These people-based skills were considered to be as important as the quality of the technology being implemented (Lorenzi et al. 2009).

We have explored the various aspects related to HIT implementation – barriers, motivators, and leadership – in small clinic settings. We now proceed with developing detailed hypotheses for our research model.

Clinical Management Support

In general, leaders are followed by others because the followers could identify the match between the leaders' values and beliefs reflected in the leaders' actions (Stanley, 2014). Studies of leadership have been viewed from various aspects. This produces a wide scope of leadership theories, to name a few: situational leadership (Hersey 1985) which argues that there is no single best leadership style and that effective leaders are the ones who adapt their leadership styles according to the needs in the environment; charisma leadership (Adair-Toteff 2005) which describes that leaders are extraordinary individuals with certain quality of personality that set them apart from ordinary ones; transactional leadership (Hargis et al. 2011) which states that leaders act on the basis of rewards and punishments toward the followers; and traits leadership (Zaccaro 2007) which argues that leaders have personal characteristics which are unique and cannot be developed and can foster effective management across different groups and situations. In the context of clinical setting, people use clinical leadership (Malcolm et al. 2003; Stanley 2014 & Stanton et al. 2010) to refer to a type of leaderships preferred in and more suitable to clinical setting.

As discussed earlier, identifying the leader who could be a champion is important in healthcare context, particularly in small clinic settings and especially during HIT implementation. The role of the champion is not only to ensure proper resource allocation but also to be committed and actively involved in every aspects of the implementation. Without leadership and commitment the implementation of HIT will not be successful (Middleton et al. 2005). This is particularly true in a setting characterized by limited resources such as small clinics.

In the healthcare field, financial barrier is viewed as having the greatest effect on EHR adoption (DesRoches et al. 2008). Moreover, in the small clinic settings, resource constraints usually prevent the clinics to expand its capacity to cover increasing number of patients with their growing needs (Magnus et al. 2009). Clinical leadership is needed to help remove the obstacles that can prevent task completion, and provide necessary day-to-day support. In order to achieve this, clinical leaders need to possess certain characteristics such as confidence and empowered to improve the quality of care (Stanley 2014). Furthermore, they need to be supportive and attempt to meet other clinicians' needs. This is instrumental in achieving user satisfaction (Magnus et al. 2009; Stanley 2014). This understanding leads to our first hypothesis of this research:

H1: Clinical management support is positively associated with EHR user satisfaction in small clinic settings.

EHR Training

Social Cognitive Theory (SCT) states that an individual can acquire knowledge by observing others (Bandura 1977; Bandura & Locke 2003). Watching others' performance – which is called vicarious experience – can increase someone's capabilities in completing certain tasks. The results are most effective when both parties have a comparable skill set. Similarity in skill set can be found among peers who can be regarded as individuals in the same cohort or with the same profession. A group of physicians trained by another group of physicians – with a relatively advanced knowledge on the use of EHR – can be an example of vicarious experiences. The physician trainers are called super users who provide peer-led training which is proved to elevate the EHR proficiency of the less advanced physicians (Dastagir et al. 2012). This shows that training or profession development can boost knowledge of individual user (Lunenburg 2011).

Individuals who have been successfully completed tasks will be more likely to have high confidence in completing similar tasks in the future than those who have been unsuccessful (Bandura 1977). In relation to the peer-led training, improved performance of the less advanced physicians increases their confidence. This in turns will potentially increase their satisfaction with the EHR system. Prior research shows that when physicians' knowledge on EHR (gained through training) was used as an indicator for their satisfaction, it was shown that physicians with better knowledge about EHR were more satisfied with the system (Hollanda et al. 2012). Furthermore, besides increasing user confidence, the knowledge gained through training also increases user attitudes toward the adoption of EHR (Moody et al. 2004; Morton & Wiedenbeck 2010). Adoption of IS is the antecedent of satisfaction with the IS because only those who adopt the system could experience its benefits and be satisfied with it. With regards to EHR training, this shows that the EHR training correlates with user's EHR satisfaction (Alasmary et al. 2014).

In the context of small clinics – which characterized by limited financial resource, technical infrastructure, support, as well as limited human resources – the existence of super users who could train, assist and provide help to other users becomes imperative to mitigate the limitations. Furthermore, the provision of good training and other support – such as technical support – boosted the physician's knowledge and consequently enhanced their performance. Individual knowledge itself can be used as a determinant of job performance (Bandura & Locke 2003). In relation to the good support provided by the EHR super users, improved physician's performance in utilizing the EHR leads to increased satisfaction with the EHR system (Dastagir et al. 2012). This understanding leads our second hypothesis:

H2: The quality of EHR training is positively associated with EHR user satisfaction in small clinic settings.

EHR Quality and Impact

IS success model has been widely used to provide understanding on the successful implementation of IS. Initially the model contained six dimensions: system quality, information quality, system use, user satisfaction, individual impact, and organizational impact (DeLone & McLean 1992). System quality refers to the desired characteristics of the IS such as ease of use and the response time of the system; information quality refers to the desired characteristics of the information product such as timeliness and completeness of the content/information; system use and user satisfaction refer to the interaction of the information product with its recipient; and individual and organizational impacts refer to the effect of the information product on user/organization performance. In the earlier model, system quality and information quality are the antecedents of user satisfaction which in turn is the antecedent of individual impact (DeLone & McLean 1992). Later, another dimension: service quality (refers to the desired support received by the end user to use the system) was added to the model, and the two impact dimensions were combined into Net Benefit (DeLone & McLean 2002). The purpose of combining the two impact dimensions was to come up with a more parsimonious model in anticipating the ever growing entities – such as group, industry, and society - which could be affected by the IS activity. The use of the quality dimensions was flexible, depended on the context/level of the analysis (DeLone & McLean 2002). The most important quality component to measure the success of a single system could be the system or information quality, while service quality could be a more important variable to measure the success of an IS department.

Many researchers have utilized/studied the IS success model including mapping it with a model called IS-Net or IS nomological net (Gable et al. 2008). The net was developed to define and communicate the core properties of IS discipline such as the system technological capabilities, usage, and impact (Benbasat & Zmud 2003). It was argued that IT artifact was the center of IS discipline, and the core properties of the discipline were derived from how the artifact was constructed/implemented, used, and impacted by the context in which it was embedded. In the mapping, system quality and information quality were combined and used to measure the quality of IT artifact, while the individual impact and organizational impact were mapped into the measure of overall impact (Gable et al. 2008). Taking this into account, in the context of this paper, all of the qualities contained in the IS success model are referred as EHR system quality or simply EHR quality.

In the healthcare field, researchers associate the quality of the EHR system with its features that support various functionalities. Users are satisfied with good features that facilitate data entry, data access, and data view (Likourezos et al. 2004). Specifically physicians are satisfied with the feature that provides patient's lab results sooner than paper-based system, the feature to review patient's records when interpreting the lab results, the features that support remote messaging, and the features to access patients' medical histories as well as their new lab results (Joos et al. 2006).

Patients were also reported to have an increase satisfaction when they used a good quality EHR system. EHR systems with easy-to-use feature to store complete/accurate data increase patient satisfaction (Hassol et al. 2004), as well as systems which incorporates features for communicating with physicians (Freeman et al. 2009; Ralston et al. 2007), and systems with features to refill medication and view medical test results (Ralston et al. 2007). This shows that similar characteristics of EHR quality that satisfies physicians also satisfies the patients. In other words, users who use more robust EHR would more likely be satisfied (Menachemi et al. 2010).

The quality of EHR system is also associated with the quality of the data it keeps (Chang et al. 2012) and the information it produces (Hassol et al. 2004; Otieno et al. 2007; Top & Gider 2012). Correctness, timeliness, consistency, completeness, trustfulness, and usefulness of the data kept in the EHR system increase user satisfaction (Chang et al. 2012). Similarly, characteristics of information produced by the EHR system that promote information quality such as relevancy, easy to read, and comprehensiveness are also positively correlated with user satisfaction (Hassol et al. 2004; Otieno et al. 2007; Top & Gider 2012). The above explanation shows a positive relationship between EHR system quality and user satisfaction.

When the EHR systems are implemented in an environment characterized by limited resources like small clinics in which employees frequently have to share job responsibilities and cover each other because of high workload (Middleton et al. 2005), the quality of the systems becomes essential since reliable system can lessen the burden of the users, hence promotes user satisfaction. Satisfied EHR users are contented with the EHR system itself. User satisfaction influences the impact or the benefit provided by the EHR system as depicted in the early IS success model (DeLeon & McLean 1992). Based on the discussion presented above, we propose our last two hypotheses:

H3: EHR quality is positively associated with EHR user satisfaction in small clinic settings.

H4: EHR user satisfaction is positively associated with EHR system impact in small clinic settings.

Research Design and Current Status of the Research Project

Data for the study was collected through a carefully designed web-based survey where almost all of the items were adapted from prior studies in the literature. We chose to focus on the small ambulatory clinics in a mid-western US state. Our sample set included small clinics that implemented EHR system of a specific vendor so that system-specific differences are controlled. Our survey elicited over 250 usable responses that are currently being analyzed. We hope to share preliminary findings from our analysis with ICIS audience.

References

Adair-Toteff, C. 2005. "Max Weber's Charisma," Journal of Classical Sociology (5:2), pp.189-204.

- Al Farsi, M., and West Jr., D. J. 2006. "Use of Electronic Medical Records in Oman and Physician satisfaction," J. Med. Syst. (30:1), pp. 17-22.
- Alasmary, M., El Metwally, A., and Househ, M. 2014. "The Association between Computer Literacy and Training on Clinical Productivity and User Satisfaction in Using the Electronic Medical Record in Saudi Arabia," J. Med. Syst. (38), pp. 69-81.
- Ali, S., Green, P., and Robb, A. 2013. "Measuring Top Management's IT Governance Knowledge Absorptive Capacity," *Journal of Information Systems*, (27: 1), pp. 137-155.
- Bandura, A. 1977. Social Learning Theory, Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A., and Locke, E. A. 2003. "Negative Self-efficacy and Goal Effects Revisited," *Journal of Applied Psychology* (88:1), pp. 87-99.
- Benbasat, I., and Zmud, R. W. 2003. "The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties," *MIS Quarterly* (27:2), pp. 183-194.
- Bhatt, G. D., and Grover, V. 2005. "Types of Information Technology Capabilities and Their Role in Competitive Advantage: An Empirical Study," *Journal of Management Information Systems* (22:2), pp. 253–277.
- Boyer, L., Baumstarck-Barrau, K., Belzeaux, R., Azorin, J. M., Chabannes, J. M., Dassa, D., Lancon, C., Naudin, J., Poinso, F., Rufo, M., Samuelian, J. C., Loundou, A., Fieschi, M., and Auquier, P. 2011.
 "Validation of a Professionals' Satisfaction Questionnaire with Electronic Medical Records (PSQ-EMR) in Psychiatry," *European Psychiatry* (26:2), pp. 78-84.
- Boynton, A. C., Zmud, R. W., and Jacobs, G. C. 1994. "The influence of IT Management Practice on IT Use in Large Organizations," *MIS Quarterly* (18:3), pp. 115–151.
- Carayon, P., Smith, P., Hundt, A.S., Kuruchittham, V. and Li, Q., 2009, "Implementation of an electronic health records system in a small clinic: the viewpoint of clinic staff," *Behaviour & Information Technology* (28:1), pp. 5–20.
- Chang, C., Li, Y. C., Wi, T. Y., and Yen, D. C. 2012. "Electronic Medical Record Quality and Its Impact on User Satisfaction Healthcare Providers' Point of View," *Government Information Quarterly* (29:2), pp. 235–242.
- Chiang, M. F., Boland, M. V., Margolis, J. W., Lum, F., Abramoff, M. D., and Hildebrand, P. L. 2008. "Adoption and Perceptions of Electronic Health Record Systems by Ophthalmologists: An American Academy of Ophthalmology Survey," *Ophthalmology* (115:9), pp. 1591-1597.e5.
- Cohen, W. M., and Levinthal, D. A. 1990. "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly* (35:1), pp. 128–152.
- Dastagir, M. T., Chin, H. L., McNamara, M., Poteraj, K., Battaglini, S., and Alstot, L. 2012. "Advanced Proficiency EHR Training: Effect on Physicians' EHR Efficiency, EHR Satisfaction and Job Satisfaction," in *Proceedings of the AMIA Annual Symposium*, Chicago, IL, pp. 136-143.
- DeLone, W. H., and McLean, E. R. 1992. "Information Systems Success: The Quest for the Dependent Variable," *Information Systems Research* (3:1), pp. 60-95.
- DeLone, W. H., and McLean, E. R. 2002. "Information Systems Success Revisited," in *Proceedings of the* 35th Hawaii International Conference on System Sciences, Big Island, Hawaii, pp. 238-249.
- DesRoches, C. M., Campbell, E. G., Rao, S. R., Donelan, K., Ferris, T. G., Jha, A., Kaushal, R., Levy, D. E., Rosenbaum, S., Shields, A. E., and Blumenthal, D. 2008. "Electronic Health Record in Ambulatory Care – A National Survey of Physicians," *The New England Journal of Medicine* (359:1), pp. 50-60.
- Dillon, A., and Morris, M. 1996. "User Acceptance of New Information Technology: Theories and Models," in *Annual Review of Information Science and Technology*, Williams, M. (eds.), Medford NJ: Information Today, (31), pp. 3-32.
- Edsall, R. L., and Adler, K. G. 2011. "The 2012 EHR User Satisfaction Survey," *Family Practice Management*, July/August.
- Fontaine, P., Zink, T., Boyle, R. G., and Kralewski, J. 2010. Health Information Exchange. Participation by Minnesota Primary Care Practices," *Arch. Intern. Med.* (170:7), pp. 622-629.

- Fontaine, P., Ross, S. E., Zink, T., and Schilling, L. M. 2010. "Systematic Review of Health Information Exchange in Primary Care Practices," *The Journal of the American Board of Family Medicine* (23:5), pp. 655-670.
- Freeman, M. C., Taylor, A. P., and Adelman, J. U. 2009. "Electronic Medical Record System in a Headache Specialty Practice: A Patient Satisfaction Survey," *Headache* (49:2), pp. 212-215.
- Gable, G. G., Sedera, D., and Chan, T. 2008. "Reconceptualizing Information System Success: The ISimpact Measurement Model," *Journal of the Association for Information Systems* (9:7), pp. 377-408.
- Hargis, M. B., Wyatt, J. D., and Piotrowski, C. 2011. "Developing Leaders: Examining the Role of Transactional and Transformational Leadership across Contexts Business," *Organization Development Journal* (29:3), pp. 51–66.
- Hassol, A., Walker, J. M., Kidder, D., Rokita, K., Young, D., Pierdon, S., Deitz, D., Kuck, S., and Ortiz, E.
 2004. "Patient Experiences and Attitudes about Access to a Patient Electronic Health Care Record and Linked Web Messaging," J. Am. Med. Inform. Assoc. (11:6), pp. 505-513.
- Hersey, P. 1985. The Situational Leader, New York, NY: Warner Books.
- Hier, D. B., Rothschild, A., LeMaistre, A., and Keeler, J. 2005. "Differing Faculty and Housestaff Acceptance of an Electronic Health Record," *International Journal of Medical Informatics* (74:7-8), pp. 657-662.
- Hill, R., and Stewart, J. 2000. "Human Resource Development in Small Organizations," *Journal of European Industrial Training* (24: 2/3/4), pp. 105 117.
- Holanda, A. A., do Carmo e Sá, H. L., Vieira, A. P. G. F., and Catrib, A. M. F. 2012. "Use and Satisfaction with Electronic Health Record by Primary Care Physicians in a Health District in Brazil," *J. Med. Syst.* (36:5), pp. 3141–3149.
- Jones, C. D., Holmes, G. M., Lewis, S. E., Thompson, K. W., Cykert, S., and DeWalt, D. A. 2013. "Satisfaction with Electronic Health Records is Associated with Job Satisfaction among Primary Care Physicians," *Informatics in Primary Care* (21:1), pp. 18-20.
- Joos, D., Chen, Q., Jirjis, J., and Johnson, K. 2006. "An Electronic Medical Record in Primary Care: Impact on Satisfaction, Work Efficiency and Clinic Processes," in *Proceedings of the AMIA Annual Symposium*, Washington, DC, pp. 394-398.
- Kane, C. K., and Emmons, D. W. 2013. "New Data on Physician Practice Arrangements: Private Practice Remains Strong despite Shifts toward Hospital Employment," *American Medical Association*.
- Lane, P.J., Koka, B., and Pathak, S. 2006. "The Reification of Absorptive Capacity: A Critical Review and Rejuvenation of the Construct," *Acad Manag Rev* (31:4), pp. 833–863.
- Likourezos, A., Chalfin, D. B., Murphy, D. G., Sommer, B., Darcy, K., and Davidson, S. J. 2004. "Physician and Nurse Satisfaction with an Electronic Medical Record System," *The Journal of Emergency Medicine* (27:4), pp. 419-424.
- Lorenzi, N. M., Kouroubali, A., Detmer, D. E., and Bloomrosen, M. 2009. "How to Successfully Select and Implement Electronic Health Records (EHR) in Small Ambulatory Practice Settings," *BMC Medical Informatics and Decision Making* (9:15), pp. 1-13.
- Lunenburg, F. C. 2011. "Self-efficacy in the Workplace: Implications for Motivation and Performance," International Journal of Management (14:1), pp. 1-6.
- Magnus, M., Herwehe, J., Andrews, L., Gibson, L., Daigrepont, N., De Leon, J. M., Hyslop Jr., N. E., Styron, S., Wilcox, R., Kaiser, M., and Butler, M. K. 2009. "Evaluating Health Information Technology: Provider Satisfaction with an HIV-specific, Electronic Clinical Management and Reporting System," *AIDS Patient Care and STDs* (23:2), pp. 85-91.
- Malcolm, L., Wright, L., Barnett, P., and Hendry, C. 2003. "Building a Successful Partnership between Management and Clinical Leadership: Experience from New Zealand," *British Medical Journal* (326:7390), pp. 653–654.
- Marshall, B., Mills, R., and Olsen, D. 2008. "The Role of End-User Training in Technology Acceptance," *Review of Business Information Systems* (12:2), pp. 1-8.
- Menachemi, N., Powers, T., and Brooks, R. G. 2009. "The Role of Information Technology Usage in Physician Practice Satisfaction," *Health Care Management Review* (34:4), pp. 364-371.
- Menachemi, N., Powers, T., Au, D. W., and Brooks, R. G. 2010. "Predictors of Physician Satisfaction among Electronic Health Record System Users," *Journal for Healthcare Quality* (32:1), pp. 35-41.
- Middleton, B., Hammond, W. E., Brennan, P. F., and Cooper, G. F. 2005. "Accelerating U.S. EHR Adoption: How to Get There from Here," recommendations based on the 2004 ACMI retreat, *Journal of the American Medical Informatics Association* (12:1), pp. 13–19.

- Moody, L. E., Scolumb, E., Berg, B., and Jackson, D. 2004. "Electronic Health Records Documentation in Nursing: Nurses' Perceptions, Attitudes, and Preferences," *Computers, Informatics, Nursing* (22:6), pp. 337-344.
- Morton, M. E., and Wiedenbeck, S. 2010. "EHR Acceptance Factors in Ambulatory Care: A Survey of Physician Perceptions," *Perspect. Health Inf. Manag.* (7:Winter), pp. 1-17.
- Nelson, R. R., Todd, P. A., and Wixom, B. H. 2005. "Antecedents of Information and System Quality: An Empirical Examination within the Context of Data Warehousing," *Journal of Management Information Systems* (21:4), pp. 199-235.
- O'Connell, R. T., Cho, C., Shah, N., Brown, K., and Shiffman, R. N. 2004. "Take Note(s): Differential EHR Satisfaction with Two Implementations under One Roof," *Journal of the American Medical Informatics Association* (11:1), pp. 43-49.
- Otieno, O. G., Toyama, H., Asonuma, M., Kanai-Pak, M., and Naitoh, K. 2007. "Nurses' Views on the Use, Quality and User Satisfaction with Electronic Medical Records: Questionnaire Development," *JAN Research Methodology* (60:2), pp. 209-219.
- Palm, J.-M., Colombet, I., Sicotte, C., and Degoulet, P. 2006. "Determinants of User Satisfaction with a Clinical Information System," in *Proceedings of AMIA Annual Symposium*, pp. 614-618.
- Pfoh, E. R., Abramson, E., Zandieh, S., Mstat, A. E., and Kaushal, R. 2012. "Satisfaction after the Transition between Electronic Health Record Systems at Six Ambulatory Practices," *Journal of Evaluation in Clinical Practices* (18), pp. 1133-1139.
- Ralston, J. D., Carrel, D., Reid, R., Anderson, M., Moran, M., and Hereford, J. 2007. "Patient Web Services Integrated with a Shared Medical Record: Patient Use and Satisfaction," *Journal of the American Medical Informatics Association* (14:6), pp. 798-806.
- Reardon, J. L., and Davidson, E. 2007. "An Organizational Learning Perspective on the Assimilation of Electronic Medical Records among Small Physician Practices," *European Journal of Information* Systems (16), pp. 681-694.
- Roberts, N., Gallunch, P., Dinger, M., and Grover, V. 2012. "Absorptive Capacity and Information Systems Research: Review, Synthesis, and Directions for Future Research," *MIS Quarterly*, (36:2), pp. 625-648.
- Simon, S. R., Kaushal, R., Cleary, P. D., Jenter, C. A., Volk, L. A., Poon, E. G., Orav, E. J., Loc, H. G., Williams, D. H., and Bates, D. W. 2007. "Correlates of Electronic Health Record Adoption in Office Practices: A Statewide Survey," *Journal of the American Medical Informatics* Association (14:1), pp. 110–117.
- Stanley, D. 2014. "Clinical Leadership Characteristics Confirmed," *Journal of Research in Nursing* (19:2), pp. 118-128.
- Stanton, E., Lemer, C., and Mountford, J. 2010. *Clinical Leadership: Bridging the Divide*, London, UK: Quay Books Division, MA Healthcare Ltd.
- Stewart, J., and Beaver, G. (eds.) 2003. *Human Resource Development in Small Organisations: Research and Practice*, London: Routledge.
- Top, M., and Gider, O. 2012. "Nurses' Views on Electronic Medical Records (EMR) in Turkey: An Analysis According to Use, Quality and User Satisfaction," *J. Med. Syst.* (36), pp. 1979-1988.
- Urbach, N., and Muller, B. 2012. "The Updated DeLone and McLean Model of Information Systems Success," in *Information Systems Theory: Explaining and Predicting Our Digital Society,* Dwivedi, Y. K., Wade, M. R., & Schneberger, S. L. (eds.), New York: NY: Springer Science+Business Media, LLC., Integrated Series in Information Systems, (28:1), pp. 1-18.
- Van den Bosch, F. A. J., Van Wijk, R., and Volberda, H. W. 2005. "Absorptive Capacity: Antecedents, Models, and Outcomes," in *Handbook of Organizational Learning and Knowledge Management*, Easterby-Smith, M., and Lyles, M. (eds.), Oxford: Blackwell Publishing, pp. 278–301.
- Zaccaro, S. J. 2007. "Trait-based Perspectives of Leadership," American Psychologist (62:1), pp. 6-16.
- Zahra, S. A., and George, G. 2002. "Absorptive Capacity: A Review, Reconceptualization, and Extension," Academy of Management Review, (27:2), pp. 185–203.