

Communications of the Association for Information Systems

Volume 26

Article 7

3-2010

Information Systems and Healthcare XXXIII: An Institutional Theory Perspective on Physician Adoption of Electronic Health Records

Susan A. Sherer

Lehigh University, sas6@lehigh.edu

Follow this and additional works at: <https://aisel.aisnet.org/cais>

Recommended Citation

Sherer, Susan A. (2010) "Information Systems and Healthcare XXXIII: An Institutional Theory Perspective on Physician Adoption of Electronic Health Records," *Communications of the Association for Information Systems*: Vol. 26 , Article 7.

DOI: 10.17705/1CAIS.02607

Available at: <https://aisel.aisnet.org/cais/vol26/iss1/7>

This material is brought to you by the AIS Journals at AIS Electronic Library (AISeL). It has been accepted for inclusion in Communications of the Association for Information Systems by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Communications of the Association for Information Systems

CAIS 

Information Systems and Healthcare XXXIII: An Institutional Theory Perspective on Physician Adoption of Electronic Health Records

Susan A. Sherer
Lehigh University
sas6@lehigh.edu

Abstract:

With the recent legislation providing financial incentives to physicians who acquire electronic health record systems, we will be afforded an opportunity to study incentivized adoption of technology coupled with the threat of future penalties for non-adoption. This research uses institutional theory to propose factors that are expected to influence the adoption of electronic health records (EHRs) by independent physician practices in the coming years. The study presents a model describing the role of coercive, mimetic, and normative forces on adoption intent. Payer incentives/penalties as well as dominant healthcare delivery partners will exert coercive pressures on physician practices. Additionally, since physicians identify with their own specialties, it is expected that they will also be subject to mimetic forces resulting from successful adoption by similar specialists, particularly given their concerns about expected benefits from these systems. Finally, normative forces resulting from the successful interoperation of electronic health records among regional providers should influence physician adoption. The ability to partner with other physicians and healthcare providers or vendors adopting the same system should increase individual practice adoption intent in the presence of coercive, mimetic, and/or normative forces.

Keywords: IT adoption, electronic health records, electronic medical records, collaboration systems, networks and communities

Volume 26, Article 7, pp. 127-140, March 2010

The manuscript was received 7/27/2009 and was with the authors 3 months for 2 revisions.

I. INTRODUCTION

Electronic health records and physician use of health information technology have been touted as important ways to decrease healthcare costs and improve quality. In fact, a 2005 RAND study suggested that the adoption of interoperable electronic medical records systems in the U.S. could produce efficiency and safety savings of \$142–371 billion [Hillestad et al., 2005].

The terms *electronic medical records* (EMRs) and *electronic health records* (EHRs) have traditionally been used interchangeably both in research and practice. Both are electronic records of health-related information on an individual basis that can be created, gathered, managed, and consulted by authorized clinicians and staff. In 2008, the National Alliance for Health Information Technology (NAHIT) proposed that the term *EMR* signify standalone systems that are shared only within a single organization involved in an individual's health and care (e.g., a physician's office) whereas *EHRs* should refer to interoperable systems that are shared across more than one healthcare organization [Amatayakul, 2009].

On February 17, 2009, The American Recovery and Reinvestment Act was signed into law, providing \$36 billion for health information technology. The U.S. government anticipates savings of \$15 billion between 2016 and 2019 if adoption rates increase to 90 percent [Health Research Institute, 2009]. Physicians who contract with Medicare can receive up to \$44,000 each in higher reimbursements for adopting certified EHR systems that are “meaningfully used.” The definition of *meaningful use* has not yet been finalized, but at a minimum, certified systems must be capable of providing clinical decision support, supporting physician order entry, capturing and querying information relevant to healthcare quality, and exchanging electronic health information from other sources [Health Research Institute, 2009]. This suggests that the government will be providing incentives for interoperable electronic health records, not standalone electronic medical records. In 2017, the government can begin to reduce Medicare payment rates to noncompliant physicians.

With all the touted benefits of electronic health records, adoption rates in the U.S. for both standalone EMR and interoperable EHR systems have thus far been abysmally low. A 2005 RAND study reported that 15–20 percent of U.S. physicians' offices and 20–25 percent of hospitals had adopted electronic record systems [Fonkych and Taylor, 2005]. However, in 2008, a national survey of almost 3000 physicians reported that only 13 percent of physicians had even a basic electronic records system and only 4 percent had a fully functional system with some inter-operation for prescriptions and images [DesRoches et al., 2008].¹ In any case, adoption rates have remained low and, in fact, the U.S. adoption of electronic record systems trails European countries, substantially behind Scandinavian [Taylor and Leitman, 2002] and Asian countries such as Taiwan [Chang et al., 2009]. These differences have been attributed primarily to the multi-payer system in the United States [Taylor and Leitman, 2002].

This research is an attempt to understand the role of institutional forces on the adoption of interoperable electronic health record systems by independent physician practices that currently play an essential role in the healthcare delivery system in the United States. Half of all U.S. physicians in 2004–2005 worked in practices with less than nine physicians; one third of these in solo and two physician practices [Reardon and Davidson, 2007]. The Medicare reimbursements will not cover the overall costs for physicians who adopt these systems [Health Research Institute, 2009]. It is expected that those with systems already in place are more likely to receive the most funding because they are closer to interoperability standards [Health Research Institute, 2009].

This paper develops some propositions regarding the expected impact of institutional forces on physician practice adoption of interoperable electronic record systems. Section II describes the current drivers and inhibitors to adoption. Section III reviews the information systems (IS) literature on adoption of health information technology. Section IV presents an institutional perspective and discusses some propositions regarding external forces that are expected to impact adoption of electronic health records by independent physician practices within the coming years. Section V concludes with implications for practice.

¹ Basic systems include patient information such as demographics, problem lists, medications, and clinical notes; orders for prescription; and viewing lab and imaging results. Fully functional systems also include patient notes with medical history and follow-up, orders for lab and radiology tests, sending prescriptions and orders electronically, returning electronic images; and clinical decision support.

II. DRIVERS AND INHIBITORS TO ADOPTION OF EHRS

A 2008 RAND study suggested three categories of proposed benefits from extensive adoption of electronic record systems. These benefits include efficiency improvements in (1) outpatient care including transcription, chart pulls, lab tests, drug usage, and radiology, (2) inpatient nursing time, lab test, drug usage, length of stay, and medical records, and (3) potential safety and health benefits from reducing adverse drug events, short term preventative care, and near term chronic disease management. Interoperable electronic health records systems that support **communication, coordination, measurement, and decision support** require widespread adoption in order to accrue full value [Hillestad et al., 2005].

More than 80 percent of 117 early physician adopters who have fully functional EHRs rated positive effects on timely access to medical records, prescription refills, communication with other providers, delivery of long term and preventative care, avoidance of medication errors, and quality of clinical decisions [DesRoches et al., 2008]. Positive effects among 330 practices with only basic systems were not rated as strongly, although timely access to medical records, quality of communications with other providers, prescription refills, and avoiding medication errors were at the top of the list [DesRoches et al., 2008].

A key benefit, quality of communications and communications with other providers, is enhanced if more healthcare providers participate. Prescription refill capabilities are enhanced by online interfaces to more pharmacies. Decision support is enhanced with more participants providing additional data for analysis. Thus, greater participation of healthcare participants adopting interoperable EHRs rather than standalone EMRs should increase the benefits from adoption.

Through literature review and interviews with ten practitioners, a list of factors that have been suggested as inhibitors to adoption of electronic record systems is shown in Table 1.² These factors can be organized into three concerns: (1) Cost/Benefit; (2) Physician Work Practices; and (3) External Relationships both with software vendors and other providers in the healthcare delivery system, which change as information becomes more readily available to different participants, including consumers, payers, hospitals, labs, and pharmacies.

III. LITERATURE REVIEW: ADOPTION OF HEALTH INFORMATION TECHNOLOGY

Medical informatics literature has a large body of research pertaining to electronic records adoption and use, but much of this work is descriptive, lacking theoretical underpinnings [Klein, 2007]. The IS field has used several theories to test factors that contribute to or impede adoption of electronic record systems. Most of the research considers physician acceptance of hospital implemented systems where the system is provided by the hospital for physician use rather than at the physician practice implementation level where the practice bears the primary cost for software/hardware acquisition. Studies of electronic record systems generally do not distinguish between standalone electronic medical record systems and interoperable electronic health record systems. For some representative studies in the IS literature, see Table 2.

Quite a few of these studies use TAM as a theoretical basis. One concern with reliance on TAM is that its key factors, perceived ease of use and usefulness, do not account for external influences on the adopting organization. The UTAUT model attempts to address this with the addition of the social influences factor which was found to have a more important role in the context of mandatory use [Brown et al., 2002; Venkatesh et al., 2003]. While EHRs are not currently mandated, it is expected that the incentivized participation, followed by the threat of loss of income, as well as pressures from others, will influence adoption, such that the adoption will not be as “volitional” as the adoption of other technologies studied using TAM.

Another concern with the use of traditional acceptance models is that these typically assume that benefits accrue to adopters. For electronic health records, the physicians adopting the systems will not receive all the benefits, even though their beliefs will influence adoption. While they may receive some benefits if properly implemented, it is healthcare payers who stand to benefit primarily from the widespread use of EHR systems [Middleton et al., 2005]. The 2005 RAND study estimated that of the \$77 billion per year in estimated savings when electronic health records adoption reaches 90 percent, \$23 billion would go to Medicare and \$31 billion to private payers [Hillestad et al., 2005]. A recent study on the value of computerized order entry systems for clinical use found that only 11 percent of the ROI goes to the provider [Mitchell, 2008].

² Interviews focused on current and projected usage of electronic records systems, including factors impacting decision to adopt, advantages/disadvantages of using these systems, and benefits/costs of implementing them.

Table 1: Inhibitors to Adoption of Electronic Health Records		
Factor	Type of concern	Source
Investment cost (software and hardware, training)	Cost/Benefit	[DesRoches et al., 2008; Hillestad et al., 2005; Reardon and Davidson, 2007]; Physician interviews
Lack of financial incentives	Cost/Benefit	[Reardon and Davidson, 2007]; Physician interviews
Benefits not demonstrated or clear	Cost/Benefit	[Jaan, 2006; Koppel et al., 2005; Spetz et al., 2009]; Physician interviews
Productivity loss	Physician work practices	[Reardon and Davidson, 2007] Physician interviews
Physician resistance to change	Physician work practices	[Bhattacharjee and Hikmet, 2007]
Perceived incompatibility with work processes	Physician work practices	[Bhattacharjee and Hikmet, 2007]; Physician interviews
Limited exposure to similar systems	Physician work practices	[Bhattacharjee and Hikmet, 2007]
Physician threat to autonomy	Physician work practices; External Relationships	[Walter and Lopez, 2008]; Physician interviews
Not able to find a system that meets needs	Physician work practices	[DesRoches et al., 2008]
Concern that system would become obsolete	External relationships (vendor)	[DesRoches et al., 2008]; Physician interviews
Immaturity in the EMR/EHR software market	External relationships (vendor)	Physician interviews
Insufficient support services for practices implementing EHRs	External relationships (vendor)	Physician interviews

Government incentives are targeted at easing the burden on physicians. However, costs will still substantially exceed the incentive payments; for example, the cost for a three-person practice is estimated to range between \$174,000 and \$296,000 [Health Research Institute, 2009]. This situation is similar to adoption of EDI in which full benefit required widespread adoption and full implementation; yet small companies resisted adoption, since perceived benefits accrued primarily to the EDI champions [Iacovou et al., 1995]. Those smaller suppliers that needed to meet customer requirements implemented EDI in minimal ways, with the result that functions other than purchasing and billing were not aggressively implemented [Son et al., 2005].

Beyond concern that benefits will accrue to others, lies physician concerns regarding loss of autonomy [Walter and Lopez, 2008] that can occur when information is shared with outsiders, particularly payers and hospitals. It is expected that power structures will change as information becomes more readily available to other parts of the healthcare delivery system. The structure of the healthcare delivery system with many small independent physician practices introduces institutional forces that can affect adoption.

Finally, due to the high implementation and maintenance costs and the value from interoperation within the office, decisions to adopt the systems by independent physicians typically require participation of most, if not all the physicians as well as all staff (nurses, medical assistants, office manager, and other administrative staff) in a practice. While large physician offices may depend upon a committee to make adoption recommendations, the decision typically requires participation from most, if not all, members of the practice. Therefore, the practice makes an organizational decision to adopt. Little theoretically motivated research has addressed small physician practices at the organizational level of analysis [Davidson & Chaisson, 2005].



Table 2: Representative Studies in the IS Literature on Adoption of Health Information Technology

Study	Type of technology	Level	Theoretical Basis	Factors
[Angst and Agarwal, 2009]	Electronic record system	Patient	Elaboration likelihood model Information privacy	Argument framing Issue involvement Attitude Concern for privacy
[Bhattacharjee and Hikmet, 2007]	Physician order entry system	Hospital	TAM Resistance to change	Perceived usefulness, ease of use Perceived threat—resistance to change
[Chang et al., 2006]	PACS (picture archiving and communication system)	Hospital	Organizational and environmental dimensions and characteristics of IT	High level manager support Governmental policy Expected benefits
[Chang, et al., 2009]	Cross hospital exchange of electronic records	Hospital	Social exchange theory Transaction cost theory	Trust, influence, perceived benefits Asset specificity, uncertainty, reciprocal investments
[Davidson and Chaisson, 2005]	Electronic record system	Hospital	Technology use mediation	TUM actions Organizational size Institutional environment
[Davidson and Chismar, 2007]	Physician order entry	Hospital	Role and network based model for technology and structure alignment	Management initiation; changes in role networks; changes in technology; changes in roles
[Hennington and Janz, 2007]	Electronic record system	Physician	UTAUT	Performance expectancy Effort expectancy Social influence Facilitating conditions Moderators: gender, age, experience, voluntariness of use
[Hu et al., 1999]	Telemedicine	Hospital	TAM	Perceived usefulness, perceived ease of use
[Iii et al., 2009]	Electronic record system	Hospital	TAM	Physical and logical accessibility
[Jensen and Aanestad, 2007]	Electronic patient record	Hospital	TAM Organizational implementation	Hospitality Hostility (interactions between users and technology)
[Reardon and Davidson, 2007]	Electronic records in small physician practices	Physician	Organizational learning	Learning related scale, related knowledge, diversity
[Tulu et al., 2006]	Online submission system of medical exams for disability evaluations	Hospital	TAM Work practice compatibility	Perceived usefulness, perceived ease of use Work practice compatibility
[Walter and Lopez, 2008]	Clinical decision support systems, Electronic records	Physician	TAM	Perceived threat to professional autonomy

This suggests that we need to consider how external forces will influence adoption of electronic records. We focus on adoption of interoperable health records since these will provide most value and appear to be consistent with the government proposed definition of “meaningful use.” We focus on the independent physician practice that will make a decision to adopt based not only on technology acceptance factors, such as ease of use and usefulness, but also on the influence of external factors. This leads to a new way of theorizing about the adoption of electronic health records using institutional forces.

IV. INSTITUTIONAL PERSPECTIVE AND HEALTHCARE

Institutional theory is a collection of ideas related to the mechanisms supporting and restricting social behavior [Bjorck, 2004]. Institutions are social structures based on taken-for-granted, formal or informal rules that restrict and control (or support) social behavior [Bjorck, 2004]. These social structures are made up of “symbolic elements, social activities, and material resources” [Scott, 2001, p. 49]. The institutional approach has led to significant insights into the importance of institutional environments to organization structures and actions [Teo et al., 2003]. As organizations compete, institutional theories posit that they face pressures to conform to shared notions of appropriate forms and behaviors.

Institutional effects are diffused throughout a group of organizations by coercive, mimetic, and normative mechanisms [DiMaggio and Powell, 1983]. Coercive isomorphism results from both formal and informal pressures exerted on organizations by other organizations upon which they are dependent and by societal cultural expectations. Mimetic isomorphism involves modeling the behavior of others. This is prevalent when organizational technologies are poorly understood, goals are ambiguous, or the environment creates symbolic uncertainty. The third source of isomorphic organizational change is normative and stems from learning from others in professional networks [DiMaggio and Powell, 1983].

It has been suggested that institutional theory offers a conceptually rich source to observe the nonlinear routes of IT adoption and assimilation across organizations [Currie, 2009]. “An institutional perspective would offer IT researchers a vantage point for conceptualizing the digital economy as an emergent, evolving, embedded, fragmented, and provisional social production that is shaped as much by cultural and structural forces as by technical ones” [Orlikowski and Barley, 2001]. Institutional theory has recently been applied to EDI and ERP adoption at the organizational level [Teo et al., 2003; Urgin, 2009], and Internet banking adoption at the individual level [Shi et al., 2008]. Findings indicate that organizations are embedded in institutional networks and that institutional based variables are good predictors of adoption intention.

Healthcare is a complex industry with physician practices embedded in various institutional networks. Most medical practices cannot operate independently. Physicians interact with external labs, hospitals, nursing homes, and other specialists to provide comprehensive patient care. They must interact with insurers in order to receive payment for their services. It is expected that decisions to adopt electronic records will increasingly be influenced by institutional forces resulting from these relationships. Insurers in the U.S. have played a major regulatory role in establishing fees for physicians. The percentage of U.S. residents covered by government insurance rose from 24.5 to 29 percent from 1999 to 2008, increasing price pressures on the physicians [U.S. Census]. It is expected that the recent stimulus from government payment agencies, followed by the potential for reimbursement penalties, provides significant coercive pressures on physicians. However, given concerns about expected benefits from this technology, it is also anticipated that mimetic forces will impact adoption rates. Physicians trained in specific specialties are linked with others in their own specialty through professional organizations and journals. Given uncertainty about individual benefits, their adoption decisions may be influenced by the success of others in their specialties. Finally, as regional networks begin to adopt technology, it is expected that independent physician practices will experience normative pressures from partnering organizations. Patient information must be shared with other regional providers, including hospitals, nursing homes, labs, pharmacies, and other consulting specialties. If the norm in a region is electronic sharing, independent physicians will be pressured to participate. It is expected that institutional theory can, therefore, be a good lens through which we can understand the coming adoption of electronic health records. In the next few sections, this paper discusses the model shown in Figure 1, which shows how institutional forces will affect the adoption of electronic health records by independent physician practices.

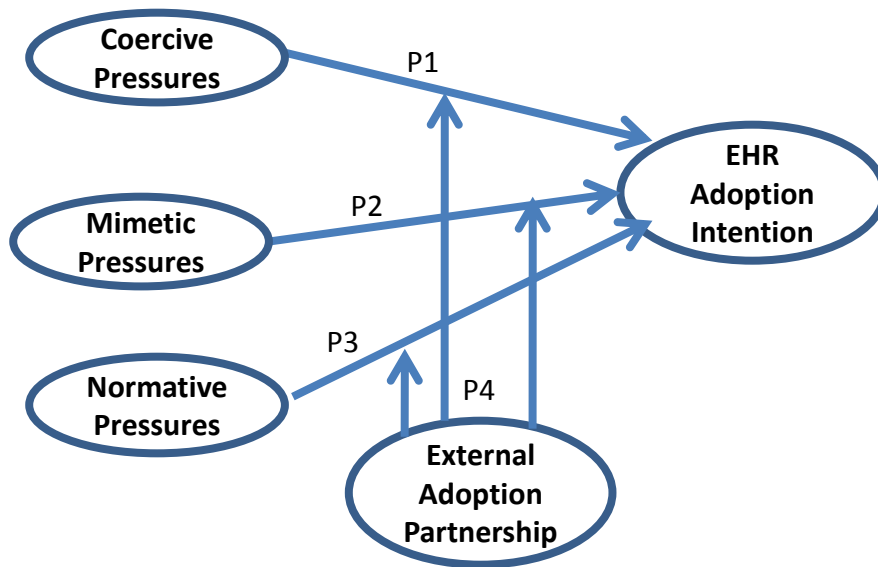


Figure 1. Research Model: Institutional Forces Affecting Electronic Health Record Adoption by Independent Physician Practices

Coercive Forces in EHR Adoption

Coercive pressures are defined as formal or informal pressures exerted by other organizations upon which they are dependent [DiMaggio and Powell, 1983]. Coercive pressures can come from resource-dominant organizations, regulatory bodies, and parent corporations. This is the foundation for resource dependency theory where a dominant actor controlling resources demands that dependent organizations adopt mechanisms that serve its interests and resource dependent organizations comply to secure their own survival [Pfeffer and Salancik, 1978]. If physicians are subject to coercion from organizations upon which they are dependent, they will be more likely to adopt electronic health records.

P1: Greater coercive pressures will lead to greater intent to adopt electronic health records.

It is expected that the major coercive forces today will come from payer incentives/penalties, as well as dominant adopting partners. Since payers control access to resources, they are the most dominant sources of coercion today for the independent physicians. Since some physicians also rely on dominant healthcare partners, such as hospitals, to deliver care, they may also be subject to coercion by a dominant partner. In the future, if consumer health records become widely available, it is possible that consumers can be a source of coercion. However, at this time, this is not a dominant coercive force for electronic records.

Health insurers today are a dominant force in controlling physician resources as they set the reimbursement rates. The government's tying of incentives and penalties for adoption of electronic health records to Medicare and Medicaid payments is creating coercive pressures for physicians dependent on these payers for their primary resources. While the incentives are decreasing one of the impediments to adoption—the costs to the physicians—they are also increasing the coercive pressures on physicians by altering the resources available to them. It is expected that greater incentives and/or penalties will lead to greater adoption intent. The extent of coercion is partially a function of the power of the dominant actor. Trust on the part of physicians toward the payers, particularly at the level of the individual physician is low [Gillette, 2006]. Some physicians are concerned that additional payer monitoring of their activities will further minimize their power, potentially impacting not only their profit margins, but their professional autonomy in treating their patients. However, physician power in relationship with payers has begun to erode. Powerful external payers such as Medicare control access to payment for services, and, as a result, have been able to demand some level of information sharing with the physicians. It is expected that physicians who rely primarily on Medicare will be more inclined to adopt EHRs than those who rely more on private insurance. While no relationship between payer mix and adoption of electronic health records was reported prior to the establishment

of the incentives/penalties [Menachemi et al., 2007], the addition of the new incentives/penalties is expected to change this. Moving forward, it is expected that the greater the proportion of the practice's patients on Medicare, the greater the intent to adopt. Moreover, physicians who work with reduced numbers of payers that provide the greatest incentives/penalties for adoption will have greater intent to adopt due to the high power of these payers in establishing fees for these physicians.

If a physician admits patients to a single hospital or works primarily with a single dominant laboratory or nursing home and that partner adopts electronic health records, the physician will be more intent to adopt as a result of coercive forces. The benefits of communication and information sharing among more partners in the healthcare delivery system who adopt interoperable systems will result in increased network externalities. It is expected that hospitals will encourage more physicians to adopt systems that interoperate with their own. In electronic banking, Kauffman et al. found that banks in markets that can generate a larger effective network size and a higher level of externalities tend to adopt early [Kauffman et al., 2000]. IS researchers proposed that coercive influences are stronger in EDI relationships where there is greater supplier dependence on buyer resources, e.g., a greater percentage of sales revenue comes from a buyer or the supplier pool is very large [Hart and Saunders, 1997]. Chwelos found that enacted trading partner power led to greater intent to adopt EDI [Chwelos et al., 2001]. If a doctor is more autonomous and admits to multiple hospitals or works with multiple labs, it is expected that she will not be subject to as strong coercive forces if only a single hospital or lab adopts as the hospital (buyer) power is reduced. In fact, physicians may be less likely to adopt if they do not feel that one system can interact with all the hospitals to which they admit.

Mimetic Forces in EHR Adoption

Mimetic forces exist when an organization imitates the actions of other structurally equivalent organizations because these organizations occupy a similar economic network position in the same industry. Social actors face pressures to conform to shared notions of appropriate structure, attitudes, and behaviors, subject to pressure to be compatible with the shared notions. By imitating actions of successful and high status actors, they can economize on search costs and minimize experimentation costs [Shi et al., 2008; Teo et al., 2003]. Mimetic forces are more pronounced when it is perceived that the benefits of adoption are difficult to quantify [Urgin, 2009].

Physician transaction costs have traditionally been high for electronic record adoption with the plethora of proprietary vendor offerings [Mitchell, 2008]. High search costs exist because physicians are faced with choosing from more than 400 different EMR software vendors; few physicians have time to choose from all [Lynn, 2008] and many different specialties require specific support for their own functionality needs. Many of the physicians interviewed for this study expressed concerns about long-term vendor viability and reliability. And there is the question of adaptability. Given the proprietary nature of most electronic record software today, high asset specificity currently leads to high transaction risk. If a physician adopts a system today and later wants to communicate with a lab, pharmacy, or hospital adopting another system, physicians are currently concerned that the cost to either replace that system or enable it to interoperate could be too high. High search costs, adaptability concerns, and uncertainty suggest that some physicians will be strongly influenced by what other physicians in their specialties choose to do.

P2: Greater mimetic pressures will lead to greater intent to adopt electronic health records.

Mimetic forces manifest themselves by the prevalence of a practice in the focal organization's industry and the perceived success of organizations within that industry [Haveman, 1993]. Decisions to engage in particular actions depend on the perceived numbers of similar others who have already done so [Mansfield, 1961]. Today almost all physicians in the U.S. consider themselves specialists, even those in primary care practices, and most join the medical professional organization (MPO) in their practice specialty. These MPOs become the focus of their postgraduate education and their advocates on behalf of the specialty. They become the key groups to provide professional identity for each specialty [Grouse, 2008]. Thus, physicians will most likely be influenced by activities among their peers in these professional organizations, although an individual physician practices' level of involvement with these groups could mitigate this effect.

Organizations are especially apt to imitate successful behaviors. Second-mover advantages can allow physicians to observe which systems worked best for others in their specialty and what actions they took in order to be successful during implementation [Teo et al., 2003]. The MPOs sponsor continuing education courses and journals, and hold annual meetings where physicians present progress in both basic and clinical research and become aware of government and professional decisions affecting their practices [Cafferata, 1979]. It is expected that transfer of knowledge regarding successful systems among physicians within that specialty will influence decisions to adopt, especially if there is greater perceived success.

Normative Forces in EHR Adoption

Organizations with direct or indirect ties to other organizations that have adopted an innovation learn about that innovation and are persuaded to behave similarly [Burt, 1987]. Sharing norms through relational channels among members of a network facilitates consensus. This increases the strength of norms and their potential influence on organizational behavior [DiMaggio and Powell, 1983]. Normative forces are more pronounced when a system integrates firms [Urgin, 2009].

Decisions to engage in a particular behavior depend in part on the sheer number of similar others in the environment that have already done likewise [Granovetter, 1978; Krassa, 1998]. It is expected that physicians operating in regional networks will be influenced by the adoption of electronic health records at hospitals to which they admit. While the physician-hospital relationship can be difficult [MacNulty and Reich, 2008], today there is a trend toward closer physician-hospital working relationships, particularly if hospitals recognize that flexibility and control remain important to the independent physician [Popely, 2009]. Moreover, hospitals may initially be more apt to adopt EHRs than independent physicians because they have greater network externalities and economies of scale due to greater numbers of initial participants.³ More participants will enable them to achieve greater benefits from communications among hospital users. However, once the hospitals adopt, they will establish a norm within the community, which will influence independent physician adoption. Thus independent physicians who have admitting privileges to hospitals that have adopted electronic health records systems will be more likely to adopt their own medical records systems than those admitting to hospitals that do not. Likewise, other partners, such as labs, pharmacies, nursing homes, and physicians in other specialties in their region, will influence adoption decisions by independent physicians as electronic records become the norm in their regions such that greater adoption among healthcare partners in the region will lead to greater intent to adopt electronic health records.

P3: Greater normative pressures will lead to greater intent to adopt electronic health records.

Organizations will be more likely to adopt if they observe successful use of electronic health records among their partners. Within a single small practice, physicians who install standalone EMRs can improve communication within their offices, but their communication value will not be as great as those that begin to communicate more broadly with other healthcare delivery providers through interoperable EHRs. While electronic records can be used in isolation to support direct or indirect mediation, greater quality of healthcare and lower costs accrue with higher collaboration and shared direct mediation [Raghupathi and Tan, 2008]. If a hospital successfully implements a records system, it is expected that independent physicians who admit to that hospital may have greater interest in adopting a system that interoperates with the hospital system. It is, therefore, expected that normative pressures will increase with greater interoperability, which will increase perceived success.

Interoperability is expected to increase within the next few years due to the development of standards which are currently at the forefront of the national healthcare agenda. Historically there have been loose and overlapping technical standards and poor interoperability among different types of health information systems sold by hundreds of vendors [Mitchell, 2008]. But standards are beginning to evolve. The HL7 **Clinical Document Architecture** (CDA) is an XML-based markup standard intended to specify the encoding, structure, and semantics of clinical documents for exchange. The Certification Commission for Healthcare Information Technology (CCHIT) has been charged with certifying that EMRs comply with appropriate standards. Transaction costs will decrease as more systems are certified and become more interoperable. However, the timeframe may not be aligned with the government incentives. In fact, CCHIT has expressed concern that current targets may be achievable only by a small group in the early years and recommends that proposed meaningful use measures be either simplified for 2011 or postponed until 2013. Currently, only about 75 EHR products for ambulatory, inpatient, and emergency departments fully support evolving meaningful-use objectives with the most recent CCHIT certification [Leavitt and Ray, 2009]. The presence of interoperability standards will decrease complexity and can increase relative advantage of electronic health records. This could be a signal of the entrenchment and legitimacy of electronic health records, which could further contribute to adoption.

Industry Structure and Relationships

It is anticipated that the forces on independent physicians may lead to some new industry relationships. Independent physicians may seek partnerships with other providers, including other physicians, as well as labs and hospitals, in order to minimize costs and uncertainty. Both physician power and the development of standards will impact these industry relationships.

³ Similar to physician incentives, hospital incentives are front loaded for hospitals that achieve compliance in 2011 through 2013 with funding dependent not on what is spent on the technology, but on Medicare, Medicaid, and charity care volumes. A study by PwC projects that an average 500-bed hospital would receive \$6.1 million in incentives (Health Research Institute, 2009).

As a profession, physicians have traditionally emphasized autonomy and independence, exercising independent judgment, with primary responsibility for the patient's treatment [Wholey and Burns, 1991]. Information about patient care is a critical resource, which, in addition to the physician's specialized expertise, is a resource that independent physicians have long controlled, maximizing their power in the healthcare delivery system. However, in order to deliver care, they need to share information with others, including labs, pharmacies, hospitals, and other physicians.

Since opening up access to information that physicians currently control will require giving up power, physicians will seek partners who will either not threaten their control or provide them some advantages. One such advantage is the lowering of knowledge barriers through external expertise. External consultants or vendors have been shown to be important in the successful implementation of information technology in small business [Attewell, 1992; Cragg and King, 1993; Thong and Yap, 1997]. It is expected that partners who have already implemented EHRs can also provide external expertise to the independent physicians. Partnering with other physicians through the support of a healthcare delivery provider, such as a hospital or lab, to acquire the same system could also provide the advantages of sharing the costs and risks and also provide greater potential network externalities. In August 2006, the Department of Health and Human Services (HHS) published rules that provide an exception under the physician self-referral prohibition law (Stark Law), as well as safe harbor under the anti-kickback act (AKA), for the donation of interoperable EHR technology to physicians and other healthcare practitioners or entities.⁴ An "external adoption partnership" is defined as a group of practices who join forces to adopt the same electronic records systems, supported by an external organization, such as a hospital, lab, or vendor, who provides financial and perhaps technical resources to assist implementation.

P4: The ability to join an external adoption partnership will modify the relationship between institutional forces and intent to adopt, leading to greater intent to adopt in the presence of either mimetic, normative, or coercive pressures.

These partnerships may become more exclusive, at least until more open standards evolve. As physicians learn the new systems and find value in communicating and sharing information with others using their own systems, they will be less likely to engage in multiple relationships. Currently many physicians have admitting privileges in multiple hospitals. In order to maintain their independence, physicians typically maintain an average of 2.4–4.1 hospitals where they can admit, although they may not use all of them [Wholey and Burns, 1991]. For non-primary care specialists, the economic effect on independent physicians increases up until three to four admitting privileges [Rizzo and Goddeeris, 1998]. If these hospitals have different systems, physicians will not be as apt to work with as many of them. If specific healthcare partners help them acquire systems, they might not be as apt to continue relationships with others. Of course, this will change if the systems interoperate seamlessly. Completely interoperable systems will greatly change the landscape. But the industry has a long way to go to get to this point, since currently only a few systems meet these criteria [Leavitt and Ray, 2009]. Thus, depending on the time period to reach interoperability, one outcome may be that independent physicians will decrease their number of independent relationships, for example, number of admitting hospitals or labs that they work with in the short term until systems become truly interoperable.

Other Factors

Any study of adoption practices will need to control for other factors that might influence adoption. Given the high transaction costs and value of network externalities, larger physician practices should be more able and willing to adopt electronic systems. Records will be able to be shared with more individuals, enabling better communication and coordination within practices. At the hospital level, we have seen that smaller hospitals owned by larger healthcare systems have a higher rate of EMR adoption, possibly because of the greater availability of capital, access to shared HIT capacity, and other resources including technical expertise [Li et al, 2008]. In a recent study, physicians who practiced in groups of more than fifty were found to be three times as likely to have a basic electronic records system and more than four times as likely to have a fully functional electronic records system as were physicians in groups of three or fewer [DesRoches et al., 2008].

Additionally, it has been found that younger physicians (measured as years since graduation) are more apt to adopt electronic medical records [DesRoches et al., 2008] since these physicians are generally more comfortable with information technology in general. It has also been found that physicians in primary care practices are more apt to adopt electronic medical records than those in specialty practices [DesRoches et al., 2008].

⁴ <http://www.cchit.org/node/898>

In a study of small business adoption of information technology, the two determining factors of success were IS/IT competencies and management attitudes toward IS/IT adoption and use [Mario and John, 2003]. It is expected that those physician offices that have installed information systems for other functions (billing, purchasing, scheduling, etc.) would have higher IS competencies and stronger management attitudes toward IS, suggesting greater propensity to adopt electronic health records.

V. CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

The recent legislation supporting adoption of electronic health records provides an opportunity to anticipate technology adoption that is assisted by incentives and mandates. It is expected that this adoption may differ from technology adoption driven primarily by factors such as perceived ease of use and usability given that benefits will not accrue primarily to the adopter and will be incentivized/mandated by external forces. The government regulations may lead to increased usability, but they will also decrease transaction costs and vendor lock in risks. The latter is critically important particularly for the small independent physicians. Moreover, it is expected that these incentives/mandates will alter relationships within the healthcare delivery value chain.

Drawing on the theory of institutional forces, this paper has developed some propositions about the adoption of electronic health records in the next few years. Coercive forces from the government payers as well as dominant partners will encourage physicians to adopt in the next few years as they anticipate looming penalties. As more hospitals and large healthcare partners adopt, there will be increased normative pressures on independent physicians. Finally, as other physicians in their specialty are successful with these systems, mimetic forces will also drive adoption. Thus, coercive, normative, and mimetic forces will play a role in influencing adoption by independent physician practices in the coming years, especially if external adoption partnerships are available. These propositions have implications for the different healthcare delivery stakeholders.

For the government, it is suggested that incentives be strengthened to insure that standards are in place quickly and that hospitals are assisted in their efforts to implement EHRs. Since hospitals have larger potential for network externalities and greater economies of scale, they can reap interoperability benefits within their systems. By focusing on implementations with higher network externalities (e.g., hospitals with large numbers of participants), value from communication can be more quickly achieved. Currently the standards are still evolving; yet there is strong impetus to move adoption quickly. If physicians respond to this impetus quickly to reap the larger up-front rewards, their costs may end up increasing as systems are retrofitted or revamped to interoperate. Partners such as labs and hospitals can help speed the introduction of electronic health records through partnerships with physicians. Some of the new relationships based on shared technology may limit competition (for example, physicians admitting to multiple hospitals or using competitive labs). This has the potential to drive noncompetitive business practices and increase total costs unless interoperability can be reached at low cost.

Physicians and decision makers should be aware that institutional factors exist and should not let these factors override systematic analysis. Change agents either within physician offices or regional health organizations can utilize success stories within health communities or among professional societies to promote adoption. In fact, government change agents can go beyond coercive pressures and use success stories to promote mimetic and/or normative forces as well. These successes can lower risk for adopters. Vendors should concentrate their efforts on hospitals, large practices, and labs or other healthcare delivery providers serving multiple physician practices. This will not only enable higher network externalities, but lower transaction costs. These partners will provide strong normative forces on the independent physicians. Additionally, mimetic forces suggest that physicians in same specialties will be looking for success of systems in their specialties. By observing success among their peers, adoption risk can be lowered. Vendors who focus on specific specialties and are successful with these efforts may find that mimetic forces will contribute to increased business as a result of this focus. Thus, vendors can use institutional factors as tools to aim their efforts to market these systems at specific specialties or within specific healthcare communities with objectives of increasing mimetic or normative forces, using a “network marketing approach.”

REFERENCES

Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that:

1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. The author(s) of the Web pages, not AIS, is (are) responsible for the accuracy of their content.

4. The author(s) of this article, not AIS, is (are) responsible for the accuracy of the URL and version information.

- Amatayakul, M. (2009) "EHR versus EMR: What's in a Name?" *Healthcare Financial Management* (63)3, p. 24.
- Angst, C., and R. Agarwal (2009) "Adoption of Electronic Health Records in the Presence of Privacy Concerns: The Elaboration Likelihood Model and Individual Persuasion", *MIS Quarterly* (33)2, pp. 339–370.
- Attewell, P. (1992) "Technology Diffusion and Organizational Learning: The Case of Business Computing", *Organization Science* (3), pp. 1–19.
- Bhattacharjee, A., and N. Hikmet (2007) "Physicians' Resistance Toward Healthcare Information Technology: a Theoretical Model and Empirical Test", *European Journal of Information Systems* (16), pp. 725–737.
- Bjorck, F. (2004) "Institutional Theory: A New Perspective for Research into IS/IT Security in Organisations", *Proceedings of the 37th Hawaii International Conference on System Sciences*.
- Brown, S., et al. (2002) "Do I Really Have To? User Acceptance of Mandated Technology", *European Journal of Information Systems* (11), pp. 283–295.
- Burt, R.S. (1987) "Social Contagion and Innovation: Cohesion versus Structural Equivalence", *The American Journal of Sociology* (92)6, pp. 1287–1335.
- Cafferata, G.L. (1979) "Member and Leader Satisfaction with a Professional Association: An Exchange Perspective", *Administrative Science Quarterly* (24)3, p. 472.
- Chang, I., et al. (2009) "Factors Affecting Cross-Hospital Exchange of Electronic Medical Records", *Information and Management* (46)2, pp. 109–115.
- Chang, I., et al. (2006) "Critical Factors for Adopting PACS in Taiwan: Views of Radiology Department Directors", *Decision Support Systems* (42), pp. 1042–1053.
- Chwelos, P., I. Benbasat, and A. Dexter (2001) "Research Report: Empirical Test of an EDI Adoption Model", *Information Systems Research* (12)3, p. 304.
- Cragg, P., and M. King (1993) "Small-Firm Computing: Motivators and Inhibitors", *MIS Quarterly* (17)1, pp. 47–60.
- Currie, W. (2009) "Contextualising the IT Artefact: Towards a Wider Research Agenda for IS Using Institutional Theory", *Information Technology and People* (22)1, pp. 63–77.
- Davidson, E., and M. Chaisson (2005) "Contextual Influences on Technology Use Mediation: A Comparative Analysis of Electronic Medical Record Systems", *European Journal of Information Systems* (14)1, p. 6.
- Davidson, E., and W. Chismar (2007) "The Interaction of Institutionally Triggered and Technology-Triggered Social Structure Change: An Investigation of Computerized Physician Order Entry", *MIS Quarterly* (31)4, pp. 739–758.
- DesRoches, C., et al. (2008) "Electronic Health Records in Ambulatory Care—A National Survey of Physicians", *New England Journal of Medicine* (359)1, pp. 50–60.
- DiMaggio, P., and W. Powell (1983) "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields", *American Sociological Review* (48)2, pp. 147–160.
- Fonkych, K., and R. Taylor (2005) *The State and Pattern of Health Information Technology Adoption*, Santa Monica, CA: RAND Corporation.
- Gillette, B. (2006) "Physicians Plus Payers", *Managed Healthcare Executive* (16)10, p. 26.
- Granovetter, M. (1978) "Threshold Models of Collective Behavior", *American Journal of Sociology* (83)6, pp. 1420–1443.
- Grouse, L. (2008) "Physicians for Sale: How Medical Professional Organizations Exploit Members: MPOs in the United States", *Medscape Today* (10), p. 7.
- Hart, P., & C. Saunders (1997) "Power and Trust: Critical Factors in the Adoption and Use of Electronic Data Interchange," *Organization Science* (8)1, pp. 23–41.
- Haveman, H. (1993) "Follow the Leader; Mimetic Isomorphism and Entry into New Markets", *Administrative Science Quarterly* (38)4, pp. 593–627.
- Health Research Institute (2009) *Rock and a Hard Place*, PriceWaterhouseCoopers.
- <http://www.pwc.com/us/en/healthcare/publications/rock-and-a-hard-place.jhtml> (current January 2010).

- Hennington, A., and B. Janz (2007) "Information Systems and Healthcare XVI: Physician Adoption of Electronic Records: Applying the UTAUT Model in a Healthcare Context", *Communications of the Association of Information Systems* (19)5.
- Hillestad, R., et al. (2005) "Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, and Costs", *Health Affairs* (24)5, pp. 1103–1117.
- Hu, P.J., et. al. (1999) "Examining the Technology Acceptance Model Using Physician Acceptance of Telemedicine Technology", *Journal Management Information Systems* (16)2, pp. 91–112.
- Iacovou, C., I. Benbasat, and A. Dexter (1995) "Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology", *MIS Quarterly* (19)4, pp. 465–506.
- lii, V., et.al. (2009) "Paper Versus Electronic Medical Records: The Effects of Access on Physicians' Decisions to Use Complex Information Technologies", *Decision Sciences* (40)2, pp. 213–241.
- Jaan, S. (2006) "It Ain't Necessarily So: The Electronic Health Record and the Unlikely Prospect of Reducing Health Care Costs", *Health Affairs* (25)4, p. 1079.
- Jensen, T.B., and M. Aanestad (2007) "Hospitality and Hostility in Hospitals: A Case Study of an EPR Adoption Among Surgeons", *European Journal of Information Systems* (16), pp. 672–680.
- Kauffman, R., J. McAndrews, and Y.Wang (2000) "Opening the 'Black Box' of Network Externalities in Network Adoption", *Information Systems Research* (11)1, pp. 61–82.
- Klein, R. (2007) "An Empirical Examination of Patient–Physician Portal Acceptance", *European Journal of Information Systems* (16)6, p. 751.
- Koppel, R., et. al. (2005) "Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors", *JAMA* (293), pp. 1197–1203.
- Krassa, M.A. (1998) "Social Groups, Selective Perception, and Behavioral Contagion in Public Opinions", *Social Networks* (10)1, pp. 109–136.
- Leavitt, M., and A. Ray (2009) Letter From CCHIT to HIT Policy Committee Meaningful Use Comments, CCHIT, <http://hitechanswers.net/wp-content/uploads/2009/07/cchitcomments.pdf> (current January 2010).
- Li, P., et. al. (2008) "Role of Multihospital System Membership in Electronic Medical Record Adoption", *Health Care Management Review* (33)2, pp. 169–177.
- Lynn, J. (2008) "Choosing an EMR", *Medscape Today*. Retrieved from <http://www.medscape.com/viewarticle/571849> (current September 2009).
- MacNulty, A., and J. Reich (2008) "Survey and Interviews Examine Relationships Between Physicians and Hospitals", *Physician Executive* (34)5, p. 48.
- Mansfield, E. (1961) "Technical Change and the Rate of Imitation", *Econometrica* (61), pp. 741–766.
- Mario, M., and M. John (2003) "Using Resource-Based Theory to Interpret the Successful Adoption and Use of Information Systems and Technology in Manufacturing Small and Medium-Sized Enterprises", *European Journal of Information Systems* (12)2, p. 127.
- Menachemi, N., et. al. (2007) "The Influence of Payer Mix on Electronic Health Record Adoption by Physicians", *Health Care Management Review* (32)2, pp. 111–118.
- Middleton, B., et. al. (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.
- Mitchell, R. (2008) "e-Medical Records: What Seems to Be the Problem?" *Computerworld* (27) July 14.
- Orlikowski, W., and S. Barley (2001) "Technology and Institutions: What Can Research on Information Technology and Research on Organizations Learn from Each Other?" *MIS Quarterly* (25)2, pp. 145–165.
- Pfeffer, J., and G. Salancik (1978) *External Control of Organizations: A Resource Dependence Perspective*. New York: Harper and Row.
- Popely, D. (2009) "Partners in Change: Physicians and Hospitals Aligning for Success", *Healthcare Executive* (24)4, p. 9.
- Raghupathi, W., and J. Tan (2008) "Information Systems and Healthcare XXX: Charting a Strategic Path for Health Information Technology", *Communications of the Association for Information Systems* (23)28.

- Reardon, J., and E. Davidson (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.
- Rizzo, J., and J. Goddeeris (1998) "The Economic Returns to Hospital Admitting Privileges", *Journal of Health Politics, Policy, and Law* (23)3, p. 483.
- Shi, W., N. Shambare, and J. Wang (2008) "The Adoption of Internet Banking: An Institutional Theory Perspective", *Journal of Financial Services Marketing* (12)4, pp. 272–286.
- Son, J., S. Narasimhan, and F. Riggins (2005) "Effects of Relational Factors and Channel Climate on EDI Usage in the Customer-Supplier Relationship", *Journal Management Information Systems* (22)10, pp. 321–353.
- Spetz, J., D. Keane, and S. Curry (2009) "Information Technology Implementation in a Rural Hospital: A Cautionary Tale", *Journal of Healthcare Management* (54)5, p. 337.
- Taylor, H., and R. Leitman (2002) "European Physicians, Especially in Sweden, Netherlands, and Denmark, Lead U.S. in Use of Electronic Medical Records", *Harris Interactive* (2)16.
- Teo, H.H., K.K. Wei, and I. Benbasat (2003) "Predicting Intention to Adopt Interorganizational Linkages: an Institutional Perspective", *MIS Quarterly* (27)1, pp. 19–50.
- Thong, J., and C. Yap (1997) *Effects of Resource Constraints on Information Technology Implementation in Small Businesses*, London: Chapman & Hall.
- Tulu, B., R. Burkhard, and T. Horan (2006) "Information Systems and Health Care XIV: Continuing Use of Medical Information Systems by Medical Professionals: Empirical Evaluation of a Work System Model", *Communications of the Association of Information Systems* (18), pp. 641–656.
- Urgin, J. (2009) "The Effect of System Characteristics, Stage of Adoption, and Experience on Institutional Explanations for ERP Systems Choice", *Accounting Horizons* (23)4, pp. 365–389.
- Venkatesh, V., et. al. (2003) "User Acceptance of Information Technology: Toward a Unified View", *MIS Quarterly* (27)3, pp. 425–477.
- Walter, A., and M. Lopez (2008) "Physician Acceptance of Information Technologies: Role of Perceived Threat to Professional Autonomy", *Decision Support Systems* (46), pp. 206–215.
- Wholey, D., and L. Burns (1991) "Convenience and Independence: Do Physicians Strike a Balance in Admitting Decisions?" *Journal of Health and Social Behavior* (32)3, pp. 254–272.

ABOUT THE AUTHOR

Susan A. Sherer is the Kenan Professor of Information Technology Management and Chair of the Department of Management at Lehigh University. Her research interests include IT investment and risk management, inter-organizational information systems, and electronic health records. She is the author of *Software Failure Risk: Measurement and Management*. Her research has been published in *Communications of AIS*, *Information and Management*, *Information Systems Frontiers*, *Journal of Global Information Management*, *Journal of Information Systems*, *International Journal of Electronic Commerce*, *International Journal of Electronic Business*, and *Supply Chain Management*. She received Ph.D. in Decision Sciences from the Wharton School of the University of Pennsylvania, M.S. Industrial Engineering from SUNY Buffalo, and B.S. Mathematics from SUNY Albany.

Copyright © 2010 by the Association for Information Systems. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and full citation on the first page. Copyright for components of this work owned by others than the Association for Information Systems must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists requires prior specific permission and/or fee. Request permission to publish from: AIS Administrative Office, P.O. Box 2712 Atlanta, GA, 30301-2712, Attn: Reprints; or via e-mail from ais@aisnet.org.



Communications of the Association for Information Systems

ISSN: 1529-3181

EDITOR-IN-CHIEF
Ilze Zigurs
University of Nebraska at Omaha

CAIS SENIOR EDITORIAL BOARD

Guy Fitzgerald Vice President Publications Brunel University	Ilze Zigurs Editor, CAIS University of Nebraska at Omaha	Kalle Lyytinen Editor, JAIS Case Western Reserve University
Edward A. Stohr Editor-at-Large Stevens Institute of Technology	Blake Ives Editor, Electronic Publications University of Houston	Paul Gray Founding Editor, CAIS Claremont Graduate University

CAIS ADVISORY BOARD

Gordon Davis University of Minnesota	Ken Kraemer University of California at Irvine	M. Lynne Markus Bentley College	Richard Mason Southern Methodist University
Jay Nunamaker University of Arizona	Henk Sol University of Groningen	Ralph Sprague University of Hawaii	Hugh J. Watson University of Georgia

CAIS SENIOR EDITORS

Steve Alter University of San Francisco	Jane Fedorowicz Bentley College	Jerry Luftman Stevens Institute of Technology
--	------------------------------------	--

CAIS EDITORIAL BOARD

Michel Avital University of Amsterdam	Dinesh Batra Florida International University	Indranil Bose University of Hong Kong	Ashley Bush Florida State University
Evan Duggan University of the West Indies	Ali Farhoomand University of Hong Kong	Sy Goodman Georgia Institute of Technology	Mary Granger George Washington University
Ake Gronlund University of Umea	Douglas Havelka Miami University	K.D. Joshi Washington State University	Michel Kalika University of Paris Dauphine
Julie Kendall Rutgers University	Nancy Lankton Michigan State University	Claudia Loebbecke University of Cologne	Paul Benjamin Lowry Brigham Young University
Sal March Vanderbilt University	Don McCubbrey University of Denver	Fred Niederman St. Louis University	Shan Ling Pan National University of Singapore
Jackie Rees Purdue University	Thompson Teo National University of Singapore	Craig Tyran Western Washington University	Chelley Vician Michigan Technological University
Rolf Wigand University of Arkansas, Little Rock	Vance Wilson University of Toledo	Peter Wolcott University of Nebraska at Omaha	Yajiong Xue East Carolina University

DEPARTMENTS

Global Diffusion of the Internet Editors: Peter Wolcott and Sy Goodman	Information Technology and Systems Editors: Sal March and Dinesh Batra
Papers in French Editor: Michel Kalika	Information Systems and Healthcare Editor: Vance Wilson

ADMINISTRATIVE PERSONNEL

James P. Tinsley AIS Executive Director	Vipin Arora CAIS Managing Editor University of Nebraska at Omaha	Copyediting by Carlisle Publishing Services
--	--	---

