



Information privacy compliance in the healthcare industry

Information
privacy
compliance

Allen C. Johnston

*Department of Accounting and Information Systems,
University of Alabama, Birmingham, Alabama, USA, and*

Merrill Warkentin

*Department of Management and Information Systems,
Mississippi State University, Mississippi State, Mississippi, USA*

5

Abstract

Purpose – The Health Insurance Portability and Accountability Act (HIPAA) is US legislation aimed at protecting patient information privacy, but it imposes a significant burden on healthcare employees, especially since the privacy provisions are still evolving and healthcare organizations are still struggling to meet compliance criteria. This study seeks to illuminate characteristics of both the environment (organization) and the individual (healthcare professional) and their relevant influence on compliance intentions by leveraging theories from the domains of social psychology, management, and information systems.

Design/methodology/approach – A study of 208 healthcare professionals located at healthcare facilities throughout the USA were surveyed as to their perceptions regarding HIPAA compliance and the underlying organizational and individual factors that influence said compliance.

Findings – The findings indicate that perceptions of organizational support and self-efficacy (SE) leading to HIPAA compliance vary based on organizational and occupational characteristics. Furthermore, these perceptions of organizational support and SE explain some of the differences in their intent to comply with this legislation.

Research limitations/implications – For healthcare managers, the findings of this research may serve to validate HIPAA compliance initiatives. Through increased attention and resources dedicated to providing a supportive environment for HIPAA compliance, healthcare managers can increase the likelihood of compliance success by improving employee SE.

Originality/value – This paper represents the first empirical study to account for environmental factors and their influence on individual intentions to comply with HIPAA.

Keywords Privacy, Health services sector, Legislation, Communications technologies, United States of America

Paper type Research paper

Introduction

Within the past decade, many gains have been made in the area of information privacy. Once a mere afterthought of client relations or an unintentional byproduct of computer security, information privacy is now frequently mandated by legislative acts imposing strict regulations on how client information is protected. Additionally, it appears that nearly every industry and sector of the economy is affected by emerging privacy legislation. For instance, within the financial sector, the Gramm-Leach-Bliley Act of 1999 sets strict guidelines and incentives for financial services firms to protect their clients' personal financial information. California's Security Breach Notification Act, the Children's Online Privacy Protection Act, the Fair Credit Reporting Act, and the Family Education Rights and Privacy Act are just a few other examples of privacy



legislation in the USA, and similar laws are emerging in Europe and Asia. So, it should come as no surprise that the healthcare industry is also undergoing a transformation of processes used to collect, transfer, process, store, and disseminate the personal information of their patients.

Few legislative events have revolutionized the healthcare industry like the Health Insurance Portability and Accountability Act (HIPAA). Originally signed by President Clinton in 1996, HIPAA is US regulation designed to protect the privacy and confidentiality of medical patients. This legislation includes both security and privacy provisions (Fedorowicz and Ray, 2004; Robinson, 2005; Dantu *et al.*, 2007). Whereas the security component of HIPAA is intended to stipulate those mechanisms necessary to protect patient information, the privacy element addresses the issues of limitations, responsibility, and access and control.

The privacy provisions, the focus of our investigation, took effect on April 14, 2003, a time at which all payers and providers were expected to be compliant. The HIPAA privacy provisions require covered entities to protect protected health information (PHI), also defined as individually identifiable health information. Although HIPAA pertains to all forms of PHI (verbal, paper, and electronic), currently only the electronic formats are addressed in the *Security Standards Final Rule* published in February 2003 (Mercuri, 2004). These provisions result in managerial and behavioral modifications that transcend mere technical controls – they impact the day-to-day routine of every US healthcare organization. In fact, the changes required in business processes may exceed the technical challenges associated with HIPAA's standards. The implications of the provisions are that all healthcare employees must alter the processes they have employed to create, handle, store, manipulate, and convey all data about patients. Unfortunately, the dynamics of the healthcare industry make such a progression a challenging one.

The global healthcare industry is rapidly growing; and as western economies experience demographic maturity, the industry is expected to continue its steady growth. By 2010, the healthcare industry is predicted to account for \$2.6 trillion of the United States' gross domestic product (Wilson and Lankton, 2004). But, the healthcare industry is often viewed as a laggard in terms of technology adoption (Kaplan, 1987; Connell and Young, 2007). Information systems (IS) were not widely adopted in the healthcare community until the late 1980s (Kilroy, 2000). However, faced with HIPAA's privacy mandates, some companies embrace the use of IS to control their electronic records. Others, however, either procrastinate or simply ignore the legislation as evident by the reporting of violations and privacy-related problems at numerous healthcare provider facilities in the USA (Mercuri, 2004; Thomas, 2005). In fact, surveys conducted by Phoenix Health Systems and Healthcare Information and Management Systems Society indicate that a little more than 80 percent of healthcare facilities have implemented the necessary technology and processes to comply with HIPAA (Fogarty, 2006). The remaining 20 percent remain non-compliant due to issues ranging from regulation misinterpretation to employee competence with the appropriate information technology.

As is the case with most regulatory compliance issues, the onus of responsibility often falls on the individual to reform his or her practices to be consistent with the goals and objectives of his or her employer. Yet, this movement toward compliance does not occur in a vacuum and, as such, is influenced by characteristics of both the environment (organization) and the individual (healthcare professional). This study seeks to illuminate these characteristics and their relevant influence on compliance behavior by

leveraging theories from the domains of social psychology, management, and IS. What follows is a description of the conceptual framework for this study and the research hypotheses to be tested. Next, the methods used for testing the hypotheses are discussed. This discussion includes a description of the study's context, data sample, and construct operationalization. Finally, the results are discussed and conclusions of this research are presented for both the academic and professional communities.

Conceptual background and hypotheses

The conceptual framework for this research is formed from an amalgamation of several research foundations, including the theory of planned behavior, the technology acceptance model, the unified theory of the acceptance and use of technology, models of self-efficacy (SE), and perceived organizational support (POS) literature. The primary dependent variables of interest are POS, SE and behavioral intent (BI). These outcomes are the focus of numerous previous research efforts (as indicated below); however, when considered within the context of legislative requirements to protect information privacy, a unique perspective is warranted. POS measures employees' beliefs "concerning the extent to which the organization values their contributions and cares about their well-being" (Rhoades and Eisenberger, 2002, p. 701). POS is also viewed as "assurance that aid will be available from the organization ... to carry out one's job effectively" (Rhoades and Eisenberger, 2002, p. 698). SE expectations (Bandura, 1977) refer to one's beliefs in one's capabilities to successfully perform an explicit area of behavior (or attitude). BI to perform some specific behavior (Ajzen, 1980) is partially determined by attitude toward performing the behavior, which is influenced by beliefs and motivations. And BI has been shown to be an antecedent of actual behavior, given the right facilitating conditions (Ajzen, 1985).

Shown in Figure 1, this theoretical framework, based on existing literature, suggests that an organization's status and size directly impact an individual employee's POS and SE regarding his or her interaction with IS under the auspices of HIPAA privacy regulations. Occupational type effects SE and POS; and SE, in turn, impacts the user's BI to engage in system use behavior consistent with HIPAA privacy requirements

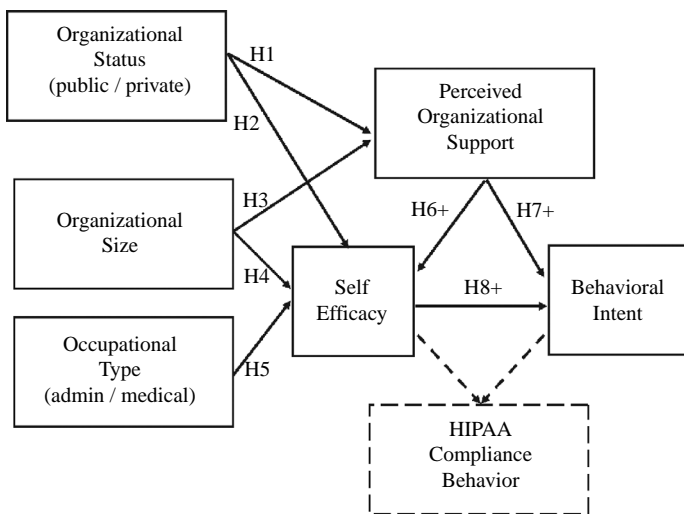


Figure 1.
HIPAA compliance model
(HCM) (a priori)

(referred to as “HIPAA compliance behavior”). Further, POS, SE, and BI are posited to be antecedents of HIPAA compliance behavior. This study does not include a direct measure of actual HIPAA compliance behavior; rather, the authors attempt to relate the influence of perceptions of a firm’s status, size, and an employee’s occupational type on those antecedents of compliance behavior.

The unit of analysis for this research project is the individual employee of a healthcare organization, termed a “healthcare professional,” who may interact with patients or patient data. Such individuals include nearly all staff (employees) of organizations that provide healthcare services to individuals (patients). They may include medical personnel (physicians, physician’s assistants, nurses, lab technicians, specialists, and other medical personnel) and administrative (non-medical) staff members (managers, clerks, insurance specialists, administrative assistants, and other non-medical personnel).

Organizational status

Public healthcare administrators are more likely than their private sector peers to be familiar with the impacts of compliance issues on their organization (Myer, 1979). Stated another way, public healthcare managers are accustomed to bureaucratic red tape (Bretschneider, 1990). Studies by Rainey (1979, 1983) showed that the large number of rules and regulations facing public sector employees made them perceive a high level of organizational control, thereby raising their perceptions of organizational support. Moreover, high levels of POS have been shown to be related to organizational commitment (Setoon *et al.*, 2002). Employees are likely to be committed to organizations that they perceive are committed to them, and are more likely to act accordingly. Therefore, the following hypothesis is offered:

H1. In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of POS.

Compared with their private sector peers, public healthcare professionals have been shown to perceive a higher level of job security (Smith and Nock, 1980). Moreover, job security was listed as one of the most important aspects of job satisfaction and, in turn, SE (Karl and Sutton, 1998). An employee who feels secure in his job has high SE (Holzer, 1986; Richardson *et al.*, 2005). It could logically be expected that public healthcare employees would have higher perceptions of SE than their private sector counterparts. Accordingly, the following hypothesis is posited:

H2. In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of SE regarding the protection of patient medical information privacy.

Organizational size

The literature of organizational and professional commitment suggests that phenomena influencing organizational commitment are job meaningfulness, gender, and other factors that have a positive relationship with POS, while organization size has a negative influence on organizational POS (Kwon and Banks, 2004). In his survey of nurses, Burke (2001) found that as the hospital grew, the nurses felt they had less organizational support. Another study conducted in a large hospital showed that as the organization grew, employee perception of organizational support declined (Yoon *et al.*, 1996). Based on this insight, the following hypothesis is offered:

-
- H3.* Organizational size will influence healthcare professionals' perceptions of organizational support such that employees of large facilities will perceive lower organizational support than employees of smaller firms.

SE can be promoted within an organization by empowerment (Zimmerman, 1995). Studies of organizational decline have shown that as the size of an organization increases, individual employee SE decreases (Mueller *et al.*, 2001; Mone *et al.*, 1998). Organizational size diminishes SE because, generally, the employees feel as though they are not being empowered and valued in their jobs (Wiley, 1997). Based on this background, the following hypothesis is presented:

- H4.* Organizational size will influence healthcare professionals' SE such that employees of large facilities will report lower SE than employees of smaller ones.

Occupational type

Medical staff are defined as personnel who are educated to serve in patient care by providing direct medical services. These include physicians, nurses, therapists, and certain technicians. Most of these professionals hold MDs or Masters degrees in the biological health sciences. A medical staff member's SE hinges on several factors, many of which are within the organization's control. An organization may influence perceptions of empowerment, job satisfaction, adequate training, and other factors. However, a medical staffer also bases SE on patient care, outcome expectancy, patient response to treatment, addiction recovery, and other medical factors (McCaughan and Parahoo, 2000), which are generally beyond the organization's control.

In contrast, administrative staff members provide managerial, clerical, and support services to the healthcare organization – they do not directly interact with patients by providing medical services, but they frequently interact with sensitive patient data. These include managers, clerks, secretaries, and other office support individuals who manage records, accounts, finances, and other nonmedical resources. An administrative employee bases SE on factors which are similar to those which influence employees outside of the healthcare industry (Spil *et al.*, 2005). As such, federal guidelines for patient medical information privacy may be perceived by administrative staff as consistent with other federal, state, or local mandates that govern administrative staff members in other industries. It is with this understanding that the following hypothesis is offered:

- H5.* Regarding the protection of medical patient information privacy, administrative staff will report significantly higher levels of SE than medical staff.

Perceived organizational support

POS has been shown in the literature to determine the organization's readiness to compensate an increased effort by individuals with greater rewards. Employees form a general perception concerning the extent to which the organization values their assistance and are concerned about their well-being and happiness (Eisenberger *et al.*, 2002; Lu *et al.*, 2006). Since, SE depends on individual perceptions, one can infer that as employees perceive a higher level of organizational support (Rhoades *et al.*, 2001), their SE will increase. In fact, Maurer *et al.* (2002) determined that certain qualities of organizational support, such as supervisory support and professional development opportunities, enhanced perceptions of SE. As such, the following hypothesis is presented:

- H6. Healthcare professionals' perceptions of organizational support are positively related to their perceptions of SE regarding the protection of patient medical information privacy.

Koslowsky *et al.* (1988) conducted a study that showed POS to be directly linked with BI. In terms of POS – the more that employees feel the organization is providing a supportive environment, the higher their compliance behaviors and attitudes become (Bruning *et al.*, 2006). Additionally, the types of leadership, training and support employees are provided involve organizational support, and eventually lead to increased positive BI (Jago and Vroom, 1978). Accordingly:

- H7. Healthcare professionals' perceptions of organizational support are positively related to their perceptions of BI to protect patient medical information privacy.

Self-efficacy and behavioral intent

Higher levels of SE are postulated to lead to approach versus avoidance behavior. SE expectations are behaviorally specific (rather than general), so each type of SE must be discussed in reference to a specific behavioral domain (a "behavioral referent") in order to be meaningful. (Bandura, 1977) The concept has been applied to computer skills, learning skills, social skills, and others, such as mathematics, science, healthcare, repair, computers, and investing (Marakas *et al.*, 1998; Mathieu *et al.*, 1993; Torkzadeh and Van Dyke, 2002). Within the context of this study, SE (or "HIPAA compliance SE") is defined as "individual judgment of one's capability to safeguard and protect patient information privacy."

High levels of SE have been shown to be associated with high levels of empowerment or achievement. As such, we posit that high levels of SE actually lead the employee to have higher levels of BI to comply:

- H8. Healthcare professionals' perceptions of SE regarding the protection of patient medical information privacy have a significant positive influence on their reported BI to protect patient medical information privacy.

Methodology

The following section describes the research methodology involved in this study, including the sampling procedure, the development of our constructs and scales, and the two-stage analytical procedure.

Study context and sample

The focus of this study is on the individual employee who must maintain compliance with personal information privacy policies or regulations. As such, we surveyed employees at various healthcare facilities located in Texas, Alaska, Louisiana, Mississippi, Virginia, Alabama, Arizona, Michigan, Pennsylvania, and Florida. The facilities included a large public hospital, a large private hospital, a mental healthcare facility, a physical therapy facility, two large military hospitals, and a few small- to medium-sized physician clinics. All facilities were HIPAA covered entities and were required by legislation to provide some form of HIPAA privacy awareness initiative for their employees.

Construct operationalization

This study involved the measurement of three constructs: POS, SE, and BI. Each of these constructs was measured using multi-item scales drawn from rigorously validated measures previously published in IS and social psychology, and articulated to relate specifically to the context of HIPAA compliance. In addition to the constructs mentioned above, the survey instrument also contained items to differentiate respondents on the basis of organizational status, organizational size, and occupational type. Organizational status refers to the status of the respondent's facility as either public or private, while organizational size refers to the number of employees of the hospital, clinic, or other medical practice organization. Occupational type refers to the role of the employee as either administrative (non-medical) or medical staff. The instrument was subjected to content validation in a pilot test of 12 healthcare employees from six different hospitals and healthcare clinics over a period of one week. Based on the results of this pilot test, the instrument was revised, producing a final survey consisting of 22 items, including descriptive demographic information such as gender, age, and experience.

The eight-item scale used to measure an individual's SE regarding the protection of patient medical information privacy was adapted from (Bandura, 1977) to reflect the context of this study. Similarly, the scale used to capture BI to protect patient medical information privacy was adapted from the Venkatesh and Davis' (2000) BI ion scale for measuring intent for technology adoption. POS was measured via a scale derived from the work of Eisenberger *et al.* (1986). Construct validity and reliability tests of this scale, as well as SE and BI, are described in the following section.

Results and findings

To facilitate data collection, an e-mail invitation to voluntarily complete an online version of the survey instrument described above was distributed to medical organization leaders, authority figures such as CIOs, and other administrative personnel. These individuals then forwarded the e-mail invitation to their entire staff, including medical and administrative (non-medical) staff members. A total of 234 healthcare professionals located at healthcare facilities throughout the USA completed the survey. The survey did not include any questions that would identify the individual respondent and included a statement assuring the respondent of anonymity. Of the 234 obtained responses, 202 responses were complete and usable for analysis. A majority (57 percent) of the respondents were female, while 36 percent were between the ages of 26 and 39. Most of the respondents were employed in either public hospitals (37 percent) or private hospitals (28 percent), with 70 percent of them employed at facilities with 250 or more employees. Also, 46 percent of the respondents have been healthcare professionals for at least 10 years.

To ensure that the instrument items were a reasonable operationalization of their respective constructs, construct validity tests were conducted. In doing so, the psychometric properties of the scales were assessed through factor loadings, convergent validity and discriminant validity. For this study, POS, SE, and BI were regarded as formative as opposed to reflective. As formative scales, the indicators do not account for observed variances and collectively serve to "form" their respective constructs. Consequently, formative scales require a different approach to construct validity test than reflective scales. This study pursues a construct validation approach consistent with Loch *et al.* (2003) in which a modified multi-trait, multi-method (MMTM) analysis is used to test for both convergent and discriminant validity.

A preliminary step in the MMTM analysis is the creation of a composite score for each construct based on a weighted score for each of their respective indicators. From these composite scores, a correlation matrix is formed that provides both inter-item and item-to-construct correlations (Table I).

Convergent validity is demonstrated if items belonging to the same construct are significantly correlated with their corresponding composite construct (item-to-construct correlation) (Loch *et al.*, 2003; Campbell and Fiske, 1959). Based on the results of the MMTM analysis (Table I), this condition has largely been met, with a few exceptions to be expected when working with normal distributions in a large matrix (Campbell and Fiske, 1959). Discriminant validity can also be assessed from the results of the MMTM analysis (Loch *et al.*, 2003). If item-to-construct correlations are higher with each other than with other construct measures and their composite values, discriminant validity is established. Based on this understanding, the results of this analysis indicate an acceptable level of discriminant validity.

ANOVA analyses – stage one tests of HCM

Between subjects analysis of variance (ANOVA) tests were conducted to determine if perceptions of organizational support (POS) and SE vary based on organizational status, organizational size and occupational type. The purpose of this analysis was not to determine causal relationships, but rather to determine if respondents differ in their perceptions of POS and SE based on categorical organizational and occupational characteristics.

As depicted in Table II, the ANOVA results revealed public healthcare employees report a higher level of POS (5.94) than their privately employed counterparts (5.22). The difference in perceptions between the two groups is significant ($p < 0.05$), thereby indicating support for *H1*. ANOVA tests also revealed the two groups differ significantly ($p < 0.001$) in terms of reported SE regarding the protection of patient medical information privacy, which public healthcare professionals (4.40) reporting a higher level of SE than the private sector healthcare professionals (3.58). These results indicate support for *H2*.

For tests involving organizational size, ANOVA results indicate that there is no difference among employees of small (less than 50 employees), medium (51-249 employees), or large (250 or more employees) facilities in terms of how they perceive organizational support. As a result, *H3* is not supported. ANOVA results indicate that while employees of larger facilities reported lower levels of SE than those of both small- and medium-sized facilities, the difference was not statistically significant. Therefore, *H4* is not supported.

Also demonstrated in Table II, ANOVA tests indicate that administrative staff (4.08) report significantly ($p < 0.05$) higher levels of SE regarding the protection of patient medical information privacy than medical staff (3.59). This suggests support for *H5*. Interestingly, physicians report the highest level of perceived SE (4.54), significantly different than both medical staff ($p < 0.001$) and administrative staff ($p < 0.05$).

Structural equation modeling analysis – stage two tests of HCM

PLS Graph 3.00 (build 1126) was used to test HCM. PLS was selected for this analysis due to the presence of formative constructs; thereby requiring a component-based structural equation modeling technique (Gefen and Straub, 2005; Chin, 1998).

As shown in Figure 2, the results of the model analysis indicate significant support ($p < 0.001$) for the relationships between POS and its dependent variables, SE and BI.

	BINT 1	BINT 2	BINT 3	BINT	SEFF 3	SEFF 4	SEFF 6	SEFF 8	SEFF	POS 1	POS 2	POS 3	POS 4	POS 5	POS 6	POS 7	POS 8	POS	
BINT 1	1																		
BINT 2	0.84	1																	
BINT 3	-0.53	-0.54	1																
BINT	-0.31	-0.36	0.97	1															
SEFF 3	0.22	0.12	0.12	0.20	1														
SEFF 4	0.18	0.14	0.14	0.21	0.73	1													
SEFF 6	0.26	0.16	0.08	0.16	0.83	0.80	1												
SEFF 8	0.15	0.06	0.17	0.23	0.79	0.80	0.83	1											
SEFF	0.21	0.13	0.15	0.22	0.88	0.94	0.92	0.93	1										
POS 1	0.21	0.18	0.16	0.24	0.51	0.63	0.53	0.56	0.62	1									
POS 2	0.00	-0.04	0.34	0.38	0.42	0.42	0.42	0.44	0.46	0.38	1								
POS 3	-0.03	-0.09	0.41	0.45	0.52	0.57	0.50	0.58	0.60	0.54	0.84	1							
POS 4	0.20	0.16	0.18	0.26	0.40	0.52	0.40	0.49	0.51	0.77	0.30	0.45	1						
POS 5	-0.14	-0.18	0.51	0.53	0.06	0.00	0.05	0.03	0.03	-0.12	0.37	0.30	0.30	1					
POS 6	0.21	0.15	0.03	0.10	0.46	0.55	0.45	0.50	0.55	0.67	0.36	0.44	0.44	-0.15	1				
POS 7	0.00	-0.04	0.35	0.40	0.51	0.60	0.53	0.57	0.61	0.38	0.80	0.87	0.38	0.33	0.43	1			
POS 8	0.19	0.13	0.12	0.18	0.54	0.57	0.42	0.58	0.59	0.66	0.37	0.49	0.74	-0.17	0.77	0.45	1		
POS	0.07	0.01	0.43	0.50	0.59	0.65	0.57	0.64	0.68	0.66	0.82	0.89	0.61	0.41	0.64	0.88	0.66	1	

Notes: BINT – behavioral intent; SEFF – self-efficacy; POS – perceived organizational support

Table I.
Inter-item and
item-to-construct
correlation matrix

Hypothesis	Dependent variable	Comparison (mean value)	Test result (significance)
H1. In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of POS	POS	Organizational status public (5.94) private (5.22)	Supported ($p < 0.05$)
H2. In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of SE regarding the protection of patient medical information privacy	Self-efficacy	Organizational status public (4.40) private (3.58)	Supported ($p < 0.001$)
H3. Organizational size will influence healthcare professionals' perceptions of organizational support such that employees of large facilities will perceive lower organizational support than employees of smaller facilities	POS	Organizational size small (5.13) medium (5.84) large (5.46)	Not supported
H4. Organizational size will influence healthcare professionals' level of SE (to comply with HIPAA requirements) such that employees of large facilities will report lower levels of SE than those of smaller facilities	Self-efficacy	Organizational size small (4.18) medium (4.26) large (3.77)	Not supported
H5. Regarding the protection of medical patient information privacy, administrative staff will report significantly higher levels of SE than medical staff	Self-efficacy	Occupational type administrative staff (4.08) medical staff (3.59)	Supported ($p < 0.05$)

Table II.
ANOVA results

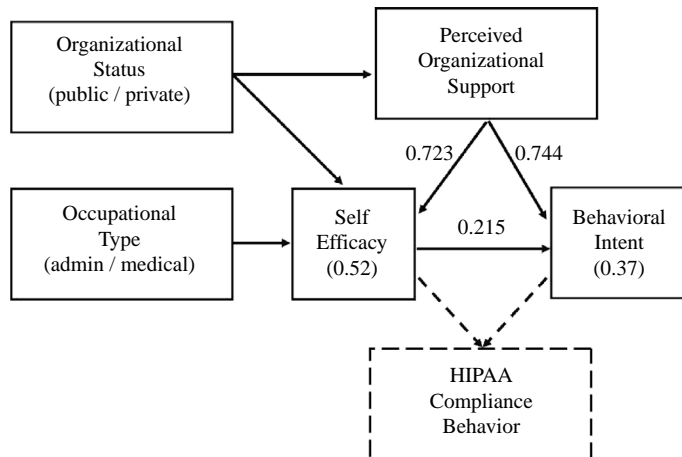


Figure 2.
HIPAA compliance
model (as tested)

The relationship between SE and BI is also significant ($p < 0.001$). POS demonstrates strong path coefficients with both SE ($\beta = 0.723$) and BI ($\beta = 0.744$) and is able to explain 52 percent of the variance in SE. These results indicate support for both *H6* and *H7*. Combined, POS and SE are able to explain 37 percent of the variance in BI and lend support to *H8*. The results of the analysis are displayed in Table III.

Conclusions

Limitations

The current study provides strong support for establishing the antecedents of HIPAA compliance behavior by individual employees. Although conducted among healthcare professionals, its findings can easily be generalized to other employees who must observe protocols to protect the privacy of individual-level information. However, several opportunities for improvement can be identified.

This study was based on a cross-section of healthcare employees from a variety of organizations in the USA. An improvement for future research would be to sample a larger number of individuals from a larger number of facilities drawn from a statistically stratified cross-section of organization types from the entire nation. Another limitation of the study is the lack of any measure for inherent SE, inherent intent to comply with rules, and other inherent attitudes and beliefs that may impact those that are specific to this study.

Finally, a limitation is found in the reliance upon a single source for both independent and dependent variable data. Although a common characteristic of IS behavioral security research, such a dependence could introduce common method bias into the study. Future research would benefit from the use of a longitudinal research design in which there would be latency between the collection of the independent and dependent variables.

Discussion

Previous literature has established a strong link between BI and actual behaviors, provided that facilitating conditions are present. Therefore, actual compliance with HIPAA regulations is presumed to convey from higher levels of employee BI. Our findings indicate that POS and SE are considerable influences on BI, and also that POS is a strong precursor to SE. In this light, it is illustrative to identify antecedents of POS and SE. Doing so may indicate conditions under which patient privacy is being safeguarded more effectively, and could lead to improved compliance in the future.

Employees of public healthcare facilities report higher levels of perceived organization support than those of private facilities. Further, public healthcare professionals reported higher level of SE than private sector healthcare professionals. The results suggest that administrative and medical staff members at the nation's public hospitals, clinics, and other facilities will be more capable at protecting private health information. Further, the findings of this study did not indicate any statistically

Hypothesis (<i>p</i> -value) independent variable	Dependent variable	Path coefficient	Explained variance (percent)
<i>H6</i> . (supported, <i>p</i> -value < 0.01) POS	Self-efficacy	0.723	52
<i>H7</i> . (supported, <i>p</i> -value < 0.01) POS	Behavioral intent	0.744	37
<i>H8</i> . (supported, <i>p</i> -value < 0.01) SE	Behavioral intent	0.215	37

Table III.
PLS analysis results

significant differences between employees of small, medium, or large facilities with regard to their POS or SE, so no conclusions can be drawn. The theoretical evidence suggests a relational effect, so further research is warranted to establish or counter this study's finding.

This study indicated that administrative staff members report significantly higher levels of SE regarding the protection of patient medical information privacy than medical staff members, perhaps because they are not exposed to medical factors that may influence the medical staff perceptions. An exception is the SE of the physicians themselves, which was the highest of all groups. This may be a reflection of the status of the physician within the medical environment and of biases resulting from the selection process for physicians. Given that SE is presumed to be a strong antecedent of compliance behavior, this may mean that administrative staff members feel more capable of defending patient privacy than most medical staff members.

Implications for researchers and for practice

For researchers, the results of this study serve to both confirm and extend theories of POS and SE, their determinants, relationships, and influence on intentions to comply with HIPAA mandates. Only recently have researchers begun to investigate the direct relationship between POS and SE (Maurer *et al.*, 2002; Lu *et al.*, 2006) with little consensus on the results. Applied within the HIPAA regulatory compliance context, the findings of this research indicate that these important antecedents of BI are significant; thereby lending support to their applicability to other policy compliance contexts.

For healthcare providers, the findings of this research may serve to validate HIPAA compliance initiatives. Through increased attention and resources dedicated to providing a supportive environment for HIPAA compliance, healthcare managers increase the likelihood of compliance success by improving employee SE. Healthcare providers can also point to the findings of this study, which indicate administrative personnel report higher levels of efficacy regarding their ability to protect patient privacy, as motivation for balancing their training programs to boost medical staff efficacy levels.

References

- Ajzen, I. (1980), *Understanding the Attitudes and Predicting Social Behavior*, Prentice-Hall, Englewood Cliffs, NJ.
- Ajzen, I. (1985), "From intentions to actions: a theory of planned behavior", in Kuhl, J. and Beckman, J. (Eds), *Action-control: From Cognition to Behavior*, Springer, Heidelberg, pp. 11-39.
- Bandura, A. (1977), "Self-efficacy: toward a unifying theory of behavioral change", *Psychological Review*, Vol. 84 No. 2, pp. 191-215.
- Bretschneider, S. (1990), "Management information systems in public and private organizations: an empirical test", *Public Administration Review*, Vol. 50 No. 5, pp. 536-45.
- Bruning, S.D., DeMiglio, P.A. and Embry, K. (2006), "Mutual benefit as outcome indicator: factors influencing perceptions of benefit in organization-public relationships", *Public Relations Review*, Vol. 32 No. 1, pp. 33-40.
- Burke, R.J. (2001), "Restructuring stressors and perceived hospital effectiveness", *Nursing Leadership*, Vol. 14 No. 1, pp. 21-6.

-
- Campbell, D.T. and Fiske, D.W. (1959), "Convergent and discriminant validation by the multitrait-multimethod matrix", *Psychological Bulletin*, Vol. 56 No. 2, pp. 81-105.
- Chin, W. (1998), "The partial least squares approach to structural equation modeling", in Marcoulides, G.A. (Ed.), *Modern Methods for Business Research*, Lawrence Erlbaum Associates, Mahwah, pp. 295-336.
- Connell, N.A.D. and Young, T.P. (2007), "Evaluating healthcare information systems through an enterprise perspective", *Information & Management*, Vol. 44 No. 4, pp. 433-40.
- Dantu, R., Oosterwijk, H., Kolan, P. and Husna, H. (2007), "Securing medical networks", *Network Security*, Vol. 6, pp. 13-16.
- Eisenberger, R., Huntington, R., Hutchinson, S. and Sowa, D. (1986), "Perceived organizational support", *Journal of Applied Psychology*, Vol. 71 No. 3, pp. 500-7.
- Eisenberger, R., Stinglhamer, F., Vandenberghe, C. and Sucharski, I. (2002), "Perceived supervisor support: contributions to perceived organizational support and employee retention", *Journal of Applied Psychology*, Vol. 87 No. 4, pp. 565-73.
- Fedorowicz, J. and Ray, A.W. (2004), "Impact of HIPAA on the integrity of healthcare information", *International Journal of Healthcare Technology and Management*, Vol. 6 No. 2, pp. 142-57.
- Fogarty, K. (2006), "Stitching up health records: privacy compliance lags", *eWeek*, available at: www.eweek.com/article2/0,1896,1949646,00.asp (accessed April 26, 2006).
- Gefen, D. and Straub, D. (2005), "A practical guide to factorial validity using PLS-Graph: tutorial and annotated example", *Communications of the AIS*, Vol. 16 No. 5, pp. 91-109.
- Holzer, M. (1986), "Workforce reduction and productivity", *Public Administration Quarterly*, Vol. 10, pp. 86-98.
- Jago, A.G. and Vroom, V.H. (1978), "Predicting leader behavior from a measure of behavioral intent", *Academy of Management Journal*, Vol. 21 No. 5, pp. 715-23.
- Kaplan, B. (1987), "The medical computing 'lag': perceptions of barriers to the application of computers to medicine", *International Journal of Assessment Health Care*, Vol. 3 No. 1, pp. 123-6.
- Karl, K.A. and Sutton, C.L. (1998), "Job values in today's workforce: a comparison of public and private sector employees", *Public Personnel Management*, Vol. 27 No. 4, pp. 515-30.
- Kilroy, J. (2000), "Triple play – company operations", *Health Management Technology*, Vol. 21, pp. 36-7.
- Koslowsky, M., Kluger, A.N. and Yinon, Y. (1988), "Predicting behavior: combining intention with investment", *Journal of Applied Psychology*, Vol. 73 No. 1, pp. 102-6.
- Kwon, I-W.G. and Banks, D.W. (2004), "Factors related to the organizational and professional commitment of internal auditors", *Managerial Auditing Journal*, Vol. 19 No. 5.
- Loch, K.D., Straub, D.W. and Kamel, S. (2003), "Diffusing the internet in the Arab world: the role of social norms and technological cultururation", *IEEE Transactions on Engineering Management*, Vol. 50 No. 1, pp. 45-64.
- Lu, L., Leung, K. and Koch, P.T. (2006), "Managerial knowledge sharing: the role of individual, interpersonal, and organizational factors", *Management and Organization Review*, Vol. 2 No. 1, pp. 15-41.
- McCaughan, E. and Parahoo, K. (2000), "Medical and surgical nurses' perceptions of their level of competence and educational needs in caring for patients with cancer", *Journal of Clinical Nursing*, Vol. 9, pp. 420-8.

- Marakas, G.M., Yi, M.Y. and Johnson, R.D. (1998), "The multilevel and multifaceted character of computer self-efficacy: toward clarification of the construct and an integrative framework for research", *Information Systems Research*, Vol. 9 No. 2, pp. 126-63.
- Mathieu, J.E., Martineau, J.W. and Tannenbaum, S.I. (1993), "Individual and situational influences on the development of self-efficacy: implications for training effectiveness", *Personnel Psychology*, Vol. 46, pp. 125-47.
- Maurer, T.J., Pierce, H.R. and Shore, L.M. (2002), "Perceived beneficiary of employee development activity: a three-dimensional social exchange model", *Academy of Management Review*, Vol. 27 No. 3, pp. 432-44.
- Mercuri, R.T. (2004), "The HIPAA-potamus in health care data security", *Communications of the ACM*, Vol. 47 No. 7, pp. 25-8.
- Mone, M.A., McKinley, W. and Barker, V.L. III (1998), "Organizational decline and innovation: a contingency framework", *Academy of Management Review*, Vol. 23 No. 1, pp. 115-32.
- Mueller, G.C., McKinley, W., Mone, M.A. and Barker, V.L. III (2001), "Organizational decline – a stimulus for innovation?", *Business Horizons*, Vol. 44 No. 6, pp. 25-35.
- Myer, M.W. (1979), *Change in Public Bureaucracies*, Cambridge University Press, London.
- Rainey, H.G. (1979), "Perceptions of incentives in business and government: implications for civil service reform", *Public Administration Review*, Vol. 39 No. 5, pp. 440-8.
- Rainey, H.G. (1983), "Public agencies and private firms: incentive structures, goals and individual roles", *Administration and Society*, Vol. 15 No. 2, pp. 207-42.
- Rhoades, L. and Eisenberger, R. (2002), "Perceived organizational support: a review of the literature", *Journal of Applied Psychology*, Vol. 87 No. 4, pp. 698-714.
- Rhoades, L., Eisenberger, R. and Armeli, S. (2001), "Affective commitment of the organization: the contribution of perceived organizational support", *Journal of Applied Psychology*, Vol. 86 No. 5, pp. 825-36.
- Richardson, M., Tailby, S., Danford, A., Stewart, P. and Upchurch, M. (2005), "Best value and workplace partnership in local government", *Personnel Review*, Vol. 34 No. 6, pp. 713-28.
- Robinson, T. (2005), "Data security in the age of compliance", *netWorker*, Vol. 9 No. 3, pp. 24-30.
- Settoon, T., Muldrow, T.W., Buckley, T. and Schay, B.W. (2002), "Creating high-performance organizations in the public sector", *Human Resource Management*, Vol. 41 No. 3, pp. 341-54.
- Smith, M.P. and Nock, S.L. (1980), "Social class and the quality of life in public and private organizations", *Journal of Social Issues*, Vol. 36 No. 4, pp. 59-75.
- Spil, T., Katsma, C., Ligt, E. and Wassenaar, A. (2005), "IT based innovation success in healthcare: the art of implementation and use of an electronic patient record", *Proceedings of the International Conference on the Management of Healthcare & Medical Technology, Aalborg, Denmark*.
- Thomas, J. (2005), "Common HIPAA violations for providers", *Health Care Biller*, Vol. 14 No. 5, pp. 10-11.
- Torkzadeh, G. and Van Dyke, T.P. (2002), "Effects of training on internet self-efficacy and computer user attitudes", *Computers in Human Behavior*, Vol. 18 No. 5, pp. 479-94.
- Venkatesh, V. and Davis, F.D. (2000), "A theoretical extension of the technology acceptance model: four longitudinal field studies", *Management Science*, Vol. 46 No. 2, pp. 186-204.
- Wiley, C. (1997), "What motivates employees according to over 40 years of motivation surveys", *International Journal of Manpower*, Vol. 18 No. 3, pp. 263-80.

-
- Wilson, E.V. and Lankton, N.K. (2004), "Interdisciplinary research and publication opportunities in information systems and healthcare", *Communications of AIS*, Vol. 14 No. 17, pp. 332-43.
- Yoon, J., Han, N. and Seo, Y. (1996), "Sense of control among hospital employees: an assessment of choice processes, empowerment, and buffering hypotheses", *Journal of Applied Social Psychology*, Vol. 26 No. 8, pp. 687-716.
- Zimmerman, M.A. (1995), "Psychological empowerment: Issues and illustrations", *American Journal of Community Psychology*, Vol. 23 No. 5, pp. 581-92.

Further reading

- Gefen, D., Straub, D. and Boudreau, M. (2000), "Structural equation modeling techniques and regression: guidelines for research practice", *Communications of AIS*, Vol. 4 No. 7, pp. 1-78.
- Lankton, N.K. and St Louis, R.D. (2005), "Information systems in health care VIII – using paper-based scenarios to examine perceptions of interactive communication systems", *Communications of AIS*, Vol. 16 No. 33, pp. 687-704.
- Lim, K.H., Ward, L.M. and Benbasat, I. (1997), "An empirical study of computer system learning: comparison of co-discovery and self-discovery methods", *Information Systems Research*, Vol. 8 No. 3, pp. 254-73.
- Smith, S.W. (2003), "Humans in the loop: human-computer interaction and security – group of 3", *IEEE Security & Privacy Magazine*, Vol. 1 No. 3, pp. 75-9.
- Straub, D.W., Boudreau, M.C. and Gefen, D. (2004), "Validation guidelines for IS positivist research", *Communications of AIS*, Vol. 13 No. 24, pp. 380-427.
- Wilson, E.V. (2003), "Asynchronous health care communication", *Communications of the ACM*, Vol. 46 No. 6, pp. 79-84.

Corresponding author

Allen C. Johnston can be contacted at: ajohnston@uab.edu