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**Exploring Health Information Exchange (HIE) through Collaboration Framework:
Normative Guidelines for IT Leadership of Healthcare Organizations**

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Abstract

Health Information Exchanges (HIEs) hold the promise to integrate patient data residing across disparate information systems in various hospitals to improve care coordination, patient engagement and provisioning of real-time information to physicians. This research posits that collaboration is the key to HIE's success. Drawing from the extant literature on collaboration, we discuss collaboration related challenges that healthcare IT leaders are facing and provide normative guidelines that they can implement during the HIE initiation phase as well as the maintenance phase.

Keywords: Health information exchange, Health care IT leadership, Normative guidelines for HIEs

Introduction

Healthcare IT leaders' roles have become more complex and challenging in recent years with the introduction of Electronic Health Records (EHR) and programs aimed at the *meaningful use* of EHR. *Meaningful use* refers to a set of standards defined by the Centers for Medicare & Medicaid Services (CMS) Incentive Programs that governs the use of electronic health records and allows eligible providers and hospitals to earn incentive payments by meeting specific criteria (Shrestha, 2013). Hospitals have placed significant emphasis on the use of information technology (IT) in healthcare, forcing healthcare IT leaders to determine the best course of action for implementation. Healthcare industry is plagued by slow adoption of healthcare IT solutions owing to a myriad of barriers such as economic, technical (e.g., system interoperability), and cultural issues, and concerns about privacy and confidentiality (Angst & Aggarwal, 2009; Baker, 2008; Hersh, 2004). Prior research has adequately documented the resistance of various stakeholders such as hospitals, medical practices, physicians, nurses, administrative staff, and patients (Hennington & Janz, 2007; Thompson & Dean, 2009; Fichman, Kohli & Krishnan, 2011). Despite these impediments, healthcare organizations are well underway to EHR compliance and the next hurdle for IT leadership is to determine how to effectively organize, construct, and join health information exchanges (HIEs) (Furukawa et al., 2014).

“Electronic health information exchange (HIE) allows doctors, nurses, pharmacists, other health care providers and patients to appropriately access and securely share a patient’s vital medical information electronically” (“What is HIE?,” 2016). The information technology component of HIE supports the electronic transfer of patient data across healthcare organizations. The process component of HIE involves bringing together healthcare stakeholders generally within a defined geographic area and governing the electronic sharing of health information among them for the purpose of improving healthcare in that community (Vest, Zhao, Jasperson, Gamm & Ohsfeldt, 2011). The HIE, as an organization, is responsible for establishing the functional and governance structure, processes, and technology required to provide the capability to move patient information among disparate health information systems of the participating members (“What is Health Information Exchange?,” 2010)

The exchange of patient information has become a prioritized aspect of overall healthcare policy (Williams, Mostashari, Mertz, Hogin & Atwal, 2012). Each HIE organization belongs to a

Regional Health Information Organization (RHIO). RHIOs have been defined by the federal government as organizations that support state or other regional projects to help harmonize the health care organizations' concerns and develop business rules for electronic HIE (Thompson & Brailer, 2004). For example, HealthBridge is a not-for-profit corporation located in Cincinnati, Ohio that supports health information technology (HIT) adoption, the setting up of health information exchange (HIE) organizations, and the innovative use of information for improved health care outcomes. At the federal level, support of HIE is most pronounced in the Meaningful Use program, which provides incentives for the adoption of EHRs with exchange capabilities in Stage 1. The Stage 2 criteria moved expectations towards actual usage of HIE for transition of care or referrals (Center for Medicare & Medicaid Services, 2014). Meaningful Use Stage 2 began to loom on the horizon starting in 2014, so providers have begun contemplating the next major hurdle, connecting electronic health records residing in disparate hospital systems to begin better coordination of patient care (Hripcsaket al., 2013). However, technological progress does not automatically fix the problems in healthcare information sharing (Vest & Gamm, 2010). To-date, most healthcare literature is presented from the healthcare exchange perspective, without consideration of the organizational factors that could influence a hospital involvement in HIE. This research argues that the health care organizations need to be willing and able to collaborate as a meaningful participant (a participant who follows the guidelines of the HIE, collaborates and contributes in necessary ways) in the HIE. For that, the healthcare IT leader needs to implement specific processes and procedures, which is the focus of this paper. In this research, we draw from the empirically validated collaboration framework developed by Thomson, Perry, and Miller (2009) to discuss the various collaboration related challenges that HIE participants face and recommend normative guidelines that the participants can adopt to become meaningful participants.

Enrolling in an RHIO involves a complex web of decisions and investments for any organization. RHIO is responsible for setting up the governance structure including data governance, creating a shared vision, and identifying a technology that ensures data integration. However, we argue that organizations must also plan, prepare and execute in a set of steps at the time of joining the HIE (phase 1: initiation phase) and subsequently (phase 2: maintenance phase) to ensure that they are meaningful participants in the HIE, participants who are willing and able to collaborate with the other members in the HIE in the long run. First, organizations should ensure

all HIE stakeholders within the organization gain an understanding of the HIE initiative and foster collaboration within the organization. Such an understanding will promote inter-organizational collaboration, which will in turn create sustainable HIEs. RHIOs have failed in the past because of lack of stakeholder buy-in, stakeholder engagement and scant governance structure (Dimitropoulos, 2007; Yi et al., 2011). Our normative guidelines will assist healthcare IT leaders on how to successfully deal with multiple stakeholders and provide transparency throughout the process.

“Participation in HIE requires collaboration among competitors and the healthcare industry has difficulties with this prospect” (Vest & Gamm, 2010, p. 290). Collaboration is defined as a process “through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible” (Gray 1989, p. 5). Collaboration tends to be the central problem in any collective undertaking (Vangen & Huxham, 2003). “While notable exceptions exist, reluctance to engage in widespread information sharing is nearly ubiquitous among health care providers, extending from small medical practices to large hospital systems” (Vest & Gamm, 2010, p. 290). Healthcare IT leaders are responsible for creating a health care community that is willing to collaborate and manage an interoperable system that will allow advanced EHR functionalities to support the functions of the HIE. However, collaboration is a fairly new concept for healthcare in general and HIEs in particular (Chiocchio & MC Richer, 2015). The current health care literature offers little guidance to health IT leaders on the importance and ways of fostering collaboration. Hence, drawing from the collaboration framework by Thomson et al. (2009), this research (i) discusses five important dimensions of collaboration: governance, administration, mutuality, trust, and organizational autonomy; (ii) identifies and discusses current issues in healthcare organizations with regards to the five dimensions of collaboration; and (iii) proposes normative guidelines that healthcare IT leaders can implement to become participants who are willing and able to collaborate in the HIE. We argue that organizations that are willing and able to collaborate are more likely to work well with other members of the HIE¹.

This research has important implications for future research as well as practice. Given the federal government’s vision of creating a nationwide connected healthcare system through HIEs,

¹ Theory of planned behavior (Ajzen 1991) states that intention to behave (willingness to behave) in a particular way is an immediate and most important antecedent to actual behavior.

it is important for healthcare organizations to understand how to successfully initiate an HIE effort within their own organization. The initiation of HIEs is particularly challenging because of the complexity of dealing with multiple stakeholders, public policy guidelines, and the public good. In spite of many recognized challenges, the extant literature has paid scant attention to the factors that influence the success of HIE initiatives at an organizational level. Our work, for the first time in HIE literature, uses Collaboration framework to shed light on the collaborative processes that can contribute to successful implementation. Using the lens of collaboration framework, we theorize how different dimensions of collaboration – governance, administration, autonomy, mutuality, and trust – can be applied within a healthcare setting to lay strong foundations for a successful implementation of an HIE initiative. Furthermore, based on the collaborative framework, we recommend several normative guidelines to healthcare IT leaders in both the HIE initiation and maintenance phases. Thus, we contribute to the HIE literature by highlighting how collaboration, with its different dimensions, can set the stage for a healthcare organization to prepare for a successful HIE initiative, and showcase the role required to be played by the healthcare IT leaders. The normative guidelines prescribed in this paper also form a rich context for future empirical research.

The rest of the paper is organized as follows. The next section provides a brief history of HIEs. The third section presents a review of the relevant literature followed by normative guidelines for healthcare IT leaders. The fourth section focuses on the implications of this study, followed by the conclusion.

History of HIEs

HIEs have been a key goal of healthcare since the advent of the modern computer (Wen, Kreps, Zhu & Miller., 2010). Limited, closed exchange networks emerged in the late 1980s. The 1990s saw the establishment of Community Health Management Information Systems (CHMIS) funded by grants from the Hartford Foundation to seven states to implement large centralized databases for use in assessment activities and billing procedures (Vest & Gramm, 2010). Later came the establishing of community health information networks (CHINs), which were largely commercial ventures focused on cost savings associated with moving data between providers. CHINs relied on a transactional network model that allowed each provider to maintain their own database and avoided the need to centralize data (Kass-Hout et al., 2007). Both models ultimately

failed due to a variety of challenges, including technical issues, a lack of reliable, high-speed internet connections, lack of stakeholder cooperation, competitive and privacy concerns, a lack of standards for integrating data from multiple sources, and a lack of financial sustainability once initial funding ran out (Shapiro et al., 2007).

In the 2000s, the concept of the RHIO emerged as a platform for governance and convener of multiple, normally competing healthcare stakeholders. RHIOs have been defined by the federal government as organizations that support state or other regional projects to help harmonize the privacy and business rules for electronic HIE (Thompson & Brailer, 2004). One of the most notable examples is Santa Barbara Hospital. Despite its closure in December 2006, the Santa Barbara County Care Data Exchange helped focus national attention on the value of HIE (Frohlich, Karp, Smith & Sujansky, 2007). This in turn led to the federal government's plan to establish RHIOs. The Office of National Coordinator for Health Information Technology (ONC) was established in 2004 by the U.S. Department of Health and Human Services. ONC was designed to be "a resource to the entire health system to support the adoption of health information technology and the promotion of nationwide health information exchange to improve health care" ("About ONC," 2014). The Health Information Technology for Economic and Clinical Health (HITECH) portion of the American Recovery and Reinvestment Act (ARRA) was signed in 2009 allocating over \$19 billion to increase the use of electronic health records (EHRs) by physicians and hospitals, including more than \$500 million in funding for state-level HIE ("State HIE ONC," 2014).

Despite two decades of HIE failures across the country, the United States government has incorporated HIEs into Meaningful Use Stage 2, which in turn, have sparked renewed healthcare IT leader's attention in HIEs. The electronic transition to sustainable HIE operations is still in its infancy, with the majority of the established entities still being tied to independent or government grant funding for operational expenses. As more communities arise, each will need to find a way to be self-sustainable in order to be successful.

From 2010 to 2015, the number of HIEs fluctuated, but overall their numbers increased by 41% (Conn, 2016). The most successful exchanges are often located in rural markets as they can attract provider participants because they share the common dilemma of having sparse health IT infrastructure (Conn, 2016). Rural organizations are more prone to base their decision to participate on a core value proposition and are less likely to have competing health IT priorities (Prybil et al., 2014). The Office of the National Coordinator for Health Information Technology

at HHS (2015) found that the number of healthcare organizations exchanging clinical data, such as lab test results, radiology reports, clinical-care summaries and medication lists rose from 41% in 2008 to 62% in 2013. Organizations attempting to facilitate the use of HIE are working within a complex and challenging environment, and are aggressively seeking strategies to build sustainable HIEs.

Progress with regards to building sustainable HIEs has not been as expected. Research on HIE failures indicates technological (unavailability of the required technological infrastructure; islands of incompatible data), economic (unavailability of self-sustaining revenue streams), and organizational factors (security and privacy concerns, lack of stakeholder cooperation, concerns about autonomy, mutuality, control, and usage) as major roadblocks to sustainable HIEs (Vest, 2009; Vest & Gamm, 2010; Rudin, Simon, Volk, Tripathi & Bates, 2009; Walker, Pan, Johnston & Adler-Milstein, 2005). In Iowa, for example, physicians acted on these concerns and resisted the local HIEs by successfully lobbying in the state legislature to stop the spread of HIE (Vest & Gamm, 2010). In this research, we use the dimensions of collaboration (Thomson et al., 2009) as a framework to recommend ways to overcome organizational barriers and facilitate meaningful participation in HIEs. In the next section, we draw from the literature on collaboration to define collaboration and discuss its five dimensions.

Literature Review

Collaboration has been studied in multiple disciplines (Gray, 1989; Hellriegel, Slocum, & Woodman, 1986; Reddy, Gorman & Bardram, 2011). Collaboration has a variety of definitions and is referred to by different names but generally refers to two or more entities cooperatively working together toward a shared goal. The criticality of collaborative interactions among businesses and the corresponding dynamics has been explored in the business management and networking literature (e.g., Buckley & Casson, 1988; Todeva & Knoke, 2005). In healthcare literature, collaboration is defined as a complex phenomenon that brings together two or more individuals, often from different professional roles, who work to achieve shared objectives (Houldin, Naylor, & Haller, 2004). However, the healthcare literature has failed to examine the role of collaboration in the context of organizational/inter-organizational efforts formed through grant-funded initiatives and other public service efforts (Gajda, 2004; Todeva & Knoke, 2005). For the purpose of this research, collaboration is a process in which multiple internal stakeholders interact through formal and informal negotiation to jointly create rules and structures that govern

their relationships and the ways to act or decide on the issues that brought them together (Wood & Gray, 1991). Given the dearth of collaboration literature in healthcare, we look to the management literature for research on collaboration that can guide this current research.

Management literature has several theoretical models of collaboration that focus on levels and stages of collaboration. For instance, Todeva and Knoke (2005) argued that levels of collaboration vary with increasing levels of integration and formalization. Arsenault (1998) provided a similar description of moving from loose integration to greater consolidation in collaborative alliances between government and nonprofits. Preliminary models of collaboration within social-service-oriented alliances have also been presented (Bailey & Koney, 2000; Gajda, 2004; Hogue, 1993). These models commonly focus on stages of collaboration through which interagency initiatives might move. Gajda (2004) argued that groups would pass from lower to higher stages of collaboration before they can be effective. Peterson (1991) proposed three types of agency interaction: cooperation, coordination, and collaboration. Hogue (1993) suggested five levels of community linkage: networking, cooperation or alliance, coordination or partnership, coalition, and collaboration. The levels differ by purpose, the structure of decision-making, and the nature of leadership. Bailey and Koney (2000) offered a model similar to these, with four steps ending with complete unification: cooperation, coordination, collaboration, and coadunation. The level-of-integration model has five ordered steps: networking, cooperating, partnering, merging, and unifying. The steps differ on purpose, tasks and organizational strategies, leadership and decision-making, and type and frequency of communication (Hogue, 1993).

Despite the extant research on collaboration, few empirically tested and tractable models of collaboration exist (Thomson et al., 2009). Thomson et al. (2009) provide an empirically validated framework of collaboration, one that can inform both theory and practice, and argue for a systematic approach toward understanding the meaning and measurement of collaboration. They offer scholars and practitioners a model that contributes to the broad research agenda of mapping the landscape for models on collaboration. Specifically, Thomson et al. (2009) identify five major dimensions of collaboration: governance, administration, mutuality, trust, and autonomy. Understanding and addressing these five dimensions is the key to fostering collaboration. Our research utilizes Thomson et al. (2009) collaboration framework as its foundation since it (i) was developed using a multidisciplinary approach, (ii) has been empirically validated, and (iii) offers validated measurement scales for future empirical research. Leveraging Thomson et al.'s

collaboration framework (2009), this research discusses the current issues and proposes normative guidelines that can help healthcare IT leaders cultivate internal collaboration required to become meaningful participants in the HIE. Future research on HIE can use these guidelines to generate testable hypotheses and validate them. We now briefly discuss the five dimensions of the collaboration framework.

Governance

Fostering collaboration entails the setting up of an appropriate governance mechanism. In essence, governance is a set of norms/rules for coordinating and monitoring collective decision making, behaviors, activities, and relationships of the stakeholders (Bryson, Crosby, & Stone 2006; O'Leary & Bingham, 2007; Ostrom 1990; Stoker 2004). Given that most collaborative efforts involve stakeholders with conflicting personal goals, who have to engage in making joint decision and sharing resources, having an appropriate governance structure is the key to the survival of the collaborative partnership (Stoker, 2004). Governance provides the mechanisms for stakeholders to make choices on how to solve shared problems and is a key dimension of collaboration (Thomson et al., 2009). Even though the federal government recommends governance mechanisms, often they are either not implemented or not correctly implemented by organizations (Sullivan, 2013). An absence of governance structure restricts the ability of individual organizations to meaningfully participate in HIE initiatives (Blair, 2000).

Administration

An administrative structure must materialize to move the governance plan to action to achieve its original purpose (Thomson et al., 2009). An administrative structure differs conceptually from that of governance because the focus is less on institutional supply and more on implementation and management in achieving goals (Soloman, 2007). Administration refers to clarifying roles and responsibilities, creating a communication channel, and monitoring new initiatives (Mattessich & Monsey, 1992). Collaborations are not self-administering enterprises (Thomson & Perry, 2006). Research has shown that joint decision making is complicated because participation is voluntary and because traditional coordination systems such as hierarchy, standardization, and routinization are less viable in situations where actors are autonomous (Huxham, 1996; Huxham & Vangen, 2005; O'Toole, 1997; Powell, 1990; Wood & Gray, 1991). Collaboration is more effective with a formal administrative structure. In the context of HIE

initiatives, an administrative structure will allow stakeholders to recognize that there is a neutral party involved to guide the HIE initiative and resolve conflicts as they arise.

Mutuality

Mutuality refers to resource and information sharing which leads to stronger relationships and mutual respect when dealing with conflicting interests (Hellriegel, Slocum, & Woodman, 1986). Mutuality in collaboration is seen as a win-win problem-solving technique that addresses the conflicts inherent in differing interests. “Organizations that collaborate must experience mutually beneficial interdependencies based either on differing interests (Powell, 1990) or on shared interests based on homogeneity or an appreciation and passion for an issue that goes beyond an individual” (Thomson et al., 2009, p. 27). Stakeholders must agree to relinquish their own self-interest to realize the goal of the organization. Such exchange relationships are well documented in inter-organizational relations (Van de Ven, Emmett, & Koenig, 1975) and are supported by resource dependence theory (Pfeffer, 1997; Pfeffer & Salancik, 1978). Collaboration can transpire if stakeholders can satisfy one another’s differing interests without hurting themselves (Wood & Gray, 1991). The primary purpose of HIEs is to share information. In order for stakeholders to share information in HIEs, each one needs to be willing to share and capable of sharing equally. Current research suggests that health care stakeholders resist sharing information (Fichman, Kohli, & Krishnan, 2011). Therefore, health care leaders need to take necessary actions to encourage their internal stakeholders to be willing to share information to become effective participants in HIEs.

Reciprocity and Trust

Reciprocity and trust are conceptually closely related. Ostrom (1990) argued that collective action depends upon the three key core relationships: trust, reciprocity, and reputation. Reciprocity refers to the practice of exchanging things with others for mutual benefit (Thomson & Perry, 2006). Individuals often demonstrate a willingness to interact collaboratively only if other partners demonstrate the same willingness. Parties will assume reciprocity in the beginning of the collaboration relationship meaning “you will if I will.” Reciprocity is closely related to the second facet of norms, identified as trust. Research shows that the more trust and reciprocity in the network, the greater the ability of the network to accomplish shared goals (Milward & Provan, 2006). In the HIE context, reciprocity is important because once a stakeholder agrees to participate in the HIE, they can only assume that data will be shared equally. This means that most stakeholders can only rely on the notion that “if I provide data to the exchange then I will receive

data in return.” However, we will discuss later that this is not always the case. Reciprocity is important to the formation of trust.

Trust refers to an expectation held by one stakeholder about another that the other will act in a mutually acceptable manner (Sako, 1991). Ostrom (1990) argued that collective action depends upon the three key core relationships: trust, reciprocity, and reputation. Trust is a common belief among a group of individuals that another group will: (1) make “good-faith efforts to behave in accordance with any commitments both explicit and implicit,” (2) “be honest in whatever negotiations preceded such commitments,” and (3) “not take excessive advantage of another even when the opportunity is available” (Cummings & Bromiley, 1996, p. 303). Research has shown that trust takes time and time implies the need for repeated interaction among partners to build commitment (Axelrod, 1997). Huxham and Vangens’ (2005) research on collaboration and trust concluded that trust is a critical component of collaboration, but trust building takes time and nurturing. However, trust has been found to be influential in reducing transaction costs, improving investments and stability in relations, and stimulating learning, knowledge exchange, and innovation (Koppenjan & Klijn, 2004). Trust empowers stakeholders to go beyond self with regard to understanding others’ interests, needs, values, and constraints (Bardach, 1998; Ring & Van de Ven, 1994; Thomson & Perry, 2006). In the context of HIEs, trust is crucial to stakeholder participation. For instance, it is important that stakeholders such as physicians, nurses, and staff members trust that the participation in the HIE will not result in issues such as privacy concerns, patient poaching, loss of ancillary business, loss of data, diminished data quality, etc. (Siegal, 2012).

Autonomy

Autonomy refers to independence of stakeholders and freedom from external controls (Wright & Orberg, 2008). Therefore, autonomy as a dimension of collaboration refers to a stakeholder’s ability to reconcile the difference between self and shared interest (Thomson & Perry, 2006). Autonomy depicts the tension between self and collective interest (Thomson, Perry & Miller, 2008). If stakeholders desire high levels of autonomy, it creates tension between self and collective interest, which in turn reduces the organizations’ ability to achieve positive collaboration outcomes. Huxham (1996) refers to this tension as the dilemma between autonomy and accountability. Individual control is sought in collaboration to maintain individual identities. Logsdon (1991) found that reconciling private interests with collective interests became possible

only when partners began to understand the problem in terms of the high stakes of not engaging in a shared solution. Stakeholders are concerned about losing while participating in a collaborative effort (Selsky, 1991). Research has shown that collaboration is successful when stakeholders are able to forge the commonalities out of differences in order to yield highly satisfying results (Thomson et al., 2008). Healthcare research has repeatedly documented that physicians have a very high need for autonomy (Chau & Hu, 2002). Therefore, healthcare IT leaders need to ensure that they educate the stakeholders about the tradeoffs between autonomy and collective information sharing and assure that any conflict of interest will be addressed appropriately.

In sum, collaboration is the act or process of shared creation or discovery (Thomson et al., 2009). The process involves the creation of new worth by doing something new or different. Collaboration harvests its benefits from differences in perspectives, knowledge, and approaches while solving problems and simultaneously offering benefits to all those involved in the process (Lozano, 2007). Inherently, potential conflicts will arise amongst various stakeholders. Nonetheless, collaboration is about using information, divergent insights and spontaneity to solve problems and develop new understandings (Denise, 1999). Collaboration creates stability amongst the different stakeholders (Hall, 1999), and lessens the challenges, offers benefits, and reduces or removes conflicts (Fadeeva, 2004). In the context of HIE initiatives, HIEs' ability to achieve sustainability in adversarial climates that often exist among hospitals, physicians, clinicians and other stakeholders requires these parties to collaborate by sharing patient-related information (Grossman, 2008). Hence, healthcare IT leaders play a critical role in fostering collaboration through leadership, governance, and education. In the following section, we present normative guidelines that healthcare IT leaders can implement to foster an internal environment that is conducive to external collaboration, which in turn is crucial to the creation of sustainable HIEs. We use the five dimensions of collaboration discussed earlier as a framework to develop our normative guidelines.

Normative Guidelines for Healthcare IT Leaders

Based on the five dimensions of collaboration, the current literature on health care IT in general and HIEs in specific, literature in organizational science, and research on project management and relationship management, we develop several normative guidelines that

healthcare IT leaders can implement to foster collaboration while participating in HIEs. We divide our guidelines into phase 1 and phase 2. Phase 1 (or the initiation phase) guidelines refer to the activities that the IT leaders need to engage in at the time of joining an HIE while phase 2 (or maintenance phase) guidelines focus on activities that the healthcare IT leaders should engage in long term to be meaningful participants in the HIE. We recognize that for some healthcare organizations an HIE initiative might be part of their broader healthcare IT portfolio, while for others EHR and HIE might be their priority even though they may lack infrastructure like the former organizations. Therefore, we caution that while the guidelines apply to all healthcare organizations participating in HIEs, the scale or the extent to which these guidelines need to be implemented will vary depending on a variety of factors such as size of the organization, organization's current infrastructure, internal organizational environment, organizational structure, etc. Also, some of the guidelines that we recommend are already in practice by some healthcare organizations, but the application seems to be inconsistent. Finally, the guidelines deal with organizational factors, specifically fostering collaboration, and not on other factors such as technological factors and financial factors.

HIEs are often seen as technological innovation in healthcare that requires immense expertise in technology and clinical practice, with complex organizational dimensions (Cresswell et al., 2013). Common healthcare information technology (HIT) failures often trace back to social and organizational barriers to technology design and use, ineffective rollout of redesigned workflow support, lack of organizational leadership, and failure to conduct ongoing assessment of HIT as available resources evolve (Lorenzi et al., 2003; Ludwick et al., 2009). Despite this recognition and HIEs becoming a priority for both the government and healthcare organizations, there is a lack of understanding with regards to what healthcare IT leaders do to become meaningful participants in HIEs and contribute towards building sustainable HIEs. Technical performance is a vital element in information exchange between organizations, the success of inter-organizational collaborations and information exchanges often centers on other factors, such as inter-organizational alignment and shared leadership (Geels, 2004; Kern et al., 2009; Markus, 1983; Schooley & Horan, 2007). Two recent examples of public-private collaboration for health information sharing, one in New York and one in California, demonstrate the importance of effective and efficient organizational decision-making in these alliances (Kern et al., 2009;

Feldman & Horan 2011). We now present normative guidelines that address the aforementioned issue. Table 1 provides an overview of the normative guidelines.

Dimension	Definition	Recommendations - Phase One: Project	Recommendations - Phase Two: Maintenance
Governance	Governance refers to a set of coordinating and monitoring activities that enables the survival of the collaborative partnership (Bryson, Crosby, & Stone, 2006).	#1: Healthcare IT leaders should review, implement, and communicate HIE IT governance structure to their stakeholders.	#2: Healthcare IT leaders should be responsible for managing, providing feedback to HIE, and monitoring the governance structure for HIE.
Administration	Administration refers to clarifying roles and responsibilities, creating a communication channel, and developing a procedure for monitoring new initiatives (Mattessich & Monsey, 1992)	#3: Healthcare IT leaders should appoint an enterprise HIE administrator.	#4: Enterprise HIE administrator should monitor both internal as well as external HIE practices, report findings to stakeholders and make necessary changes to the current processes. #5: Enterprise HIE administrator and the healthcare leaders in the organization should bring the HIE initiative under the purview of the EHR and Meaningful Use Program.
Mutuality	Mutuality refers to resource and information sharing which leads to stronger relationships and mutual respect when dealing with conflicting interests (Hellriegel, Slocum, & Woodman, 1986).	#6: Healthcare IT leaders should conduct stakeholder meetings to gain feedback on any changes that are being proposed by the HIE.	#7: Healthcare IT leaders should create and maintain program metrics to demonstrate the value of HIE to the organization.
Reciprocity & Trust	Reciprocity refers to the practice of exchanging things with others for mutual benefit (Thomson & Perry, 2006). Trust refers to an expectation held by one stakeholder about another that the other will act in a mutually acceptable manner (Sako, 1991).	#8: Healthcare IT leaders should conduct regular inter-organizational as well as intra-organizational meetings for stakeholders as well as provide periodic updates to all stakeholders to ensure transparency and in turn build reciprocity and trust within the organization.	#8: Healthcare IT leaders should conduct regular inter-organizational as well as intra-organizational meetings for stakeholders as well as provide periodic updates to all stakeholders to ensure transparency and in turn build reciprocity and trust within the organization. #9: Healthcare IT leaders should identify a physician champion for internal trust-building purposes.
Autonomy	Autonomy refers to a stakeholder's ability to reconcile the difference between self and shared interests (Thomson & Perry, 2006).	#10: Healthcare IT leaders should implement a change management plan to address the challenges that might arise due to the conflicting professional roles in the healthcare environment.	#11: Healthcare IT leaders should implement a review board to handle any issues related to HIE (i.e. data issues, security and privacy issues).

Table 1: Summary of the normative guidelines for healthcare IT leaders planning to engage in HIE initiative.

Governance

Phase One:

#1: Healthcare IT leaders should review, implement, and communicate HIE IT governance structure to their stakeholders.

RHIOs are responsible for creating a governance structure for HIEs (Bakalar, 2007). Healthcare IT leaders are responsible for implementing the necessary steps for adhering to the governance structure (probably as a part of their own IT governance structure) prescribed by the HIEs. In doing so, the leaders also need to review and communicate relevant governance related policies and procedures to different internal stakeholders. Educating the stakeholders about governance structures that are relevant to them will help them in understanding their decision rights and accountability, which in turn will encourage desirable use of the technology (Ross & Weill, 2004). It is important to note that no single IT governance form universally fits the needs of all organizations, and the organization may decide to implement HIE governance (which may be part of their general IT governance) in different structures such as centralized, decentralized, or federated (hybrid) structures depending on the organizational preferences (Samabamurthy & Zmud, 1999). Irrespective of the governance structure, the benefits of setting up IT governance structures are well documented. Research has shown the positive effects of IT governance in leveraging IT to achieve organizational goals and increasing stakeholder confidence (Doll & Torkzadeh, 1987; Vadapalli & Mone, 2000). Therefore, we recommend that an organization planning to be part of an HIE initiative set up an HIE specific governance structure as a part of their general IT governance structure. In doing so, with inputs from other stakeholders, the health care leaders need to articulate an IT governance charter, a purpose statement for each committee, roles and responsibilities of each member, and processes for governance and administration (Health Care IT Advisor, 2014).

We provide one example of an IT governance structure that can work for the HIE initiative in Figure 1 (Health Care IT Advisor, 2014). The executive IT steering committee, comprised of C-level executives of the company, should align the management of an HIE initiative along with other HIT initiatives with the organizational strategy and, only by exception, get involved in project details. The executive IT steering committee is responsible for decisions related to budget requests, scope changes, and timely implementation and management of the HIE project, etc. The

IT project steering committee, comprised of CIO, chief medical officer, nursing director, and representatives from other stakeholder groups should monitor the HIE project execution and refer only the issues it cannot solve to the executive committee. They are also responsible for promoting a culture of transparency and collaboration, and approving performance measures (Wiedower, 2016). The PMO and project teams should be responsible for implementing the overall HIE project work plan, and deliver the communication strategy to all the stakeholders. Examples of project/governance teams include: data governance team, applications team, compliance team, etc.

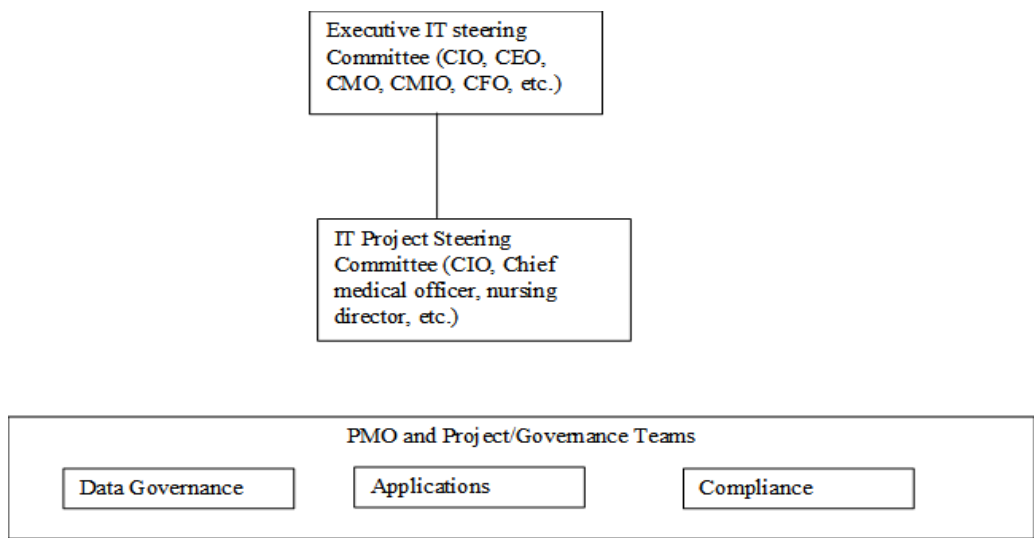


Figure 1. IT governance structure for an HIE initiative (Healthcare IT Advisor, 2014)

RHIO is also responsible for defining standards for data sharing, protection of data, and business practices to ensure patient protection during data exchange (Castro, 2007). “Data governance is the process by which responsibilities of stewardship are conceptualized and carried out” (Rosenbaum, 2010, p. 1445). “Data governance establishes the broad policies for access, management, and permissible uses of data; identifies the methods and procedures necessary to the stewardship process; and establishes the qualifications of those who would use the data and the conditions under which data access can be granted” (Rosenbaum, 2010, p. 1445). Setting up a data governance structure would be part of the organization’s overall IT governance structure or HIE governance structure. Again, healthcare IT leaders have many options with regards to implementing data governance. For example, effective use of data governance structure by Mayo Clinic resulted in the creation of an enterprise data trust (Chute, Beck, Fisk, & Mohr, 2009). The Mayo enterprise data trust is a collection of data from internal and external systems, aggregated

and organized using data warehousing practices. This data is subject-oriented, integrated, time-variant (all data identified with time), and non-volatile and is optimized for ad hoc delivery and business intelligence. This effort was overseen by a data governance committee comprised of 15 members including CIO, CMIO, executive dean for practice, etc. The operational aspects of a data governance committee were implemented by a data stewardship committee, comprised of ten members responsible for data modeling, standardization, and quality of data and metadata (Chute et al., 2009). Establishment of this data trust is an important achievement for Mayo Clinic, and when implemented right, data governance can ensure and/or enhance data quality.

While data governance is critical to the collaboration of HIEs, it can only function if stakeholders are willing to share quality data. Data sharing is one of the major concerns for most HIE stakeholders because there is a fear of data misuse (Grossman, Kushner, & November, 2008). Stakeholders play key roles in HIEs as data providers, data users and data funders (Grossman, 2008). Hripcsak (2007) argues that stakeholder data issues include lack of completeness, lack of timeliness, inaccurate data transfer, lack of success in matching patients, and confidentiality breaches. In the instance of CareSpark and Tampa Bay RHIO, the stakeholders' decision to participate as data providers, data users and/or funders was only considered after the stakeholder organizations reported weighing the benefits and costs of business, legal, and technical issues (Grossman, 2008). To be sustainable, HIEs must have health care providers contributing enough clinical data to make data exchange services valuable to physicians or other users. If healthcare providers make a decision not to enter patient data into the EHR system, HIEs can no longer be viable for other stakeholders. Healthcare IT leaders must create appropriate data governance structures and create a shared understanding across the organization by communicating data governance standards to all major stakeholders. Health care leaders need to realize that data sharing has a different impact on different stakeholders. For example, greater data sharing could lead to reductions in redundant testing and imaging; the resulting cost savings would benefit health plans and employers, but they threaten the income of laboratories, some hospitals and imaging centers, and certain specialists (Malepati et al., 2007). Therefore, creating a communication strategy that explains how appropriate data sharing can be a win-win situation in the long run should be an important consideration for healthcare IT leaders.

Phase Two:

#2: Healthcare IT leaders should be responsible for managing, providing feedback to HIE, and monitoring the governance structure for HIE.

Since HIE initiatives are new to most healthcare organizations, we argue that monitoring, controlling, and evaluating the different components of the HIE governance structure (including the data governance structure, policies, and procedures) is critical to the success of the HIE initiative. We recognize that most healthcare organizations do not spend sufficient time on monitoring, controlling, and evaluating since it appears to be more effective to “stop the talk and get on with the work”. However, the project management literature provides many examples of organizations that have incurred great expenses and major losses due to inadequate monitoring and controlling (Meredith & Mantel Jr., 2011). Monitoring and controlling is designed to mitigate poor performance, demonstrate accountability, and promote organizational learning (Crawford & Bryce, 2003). However, RHIOs have not clearly defined monitoring and control as well as feedback channels for stakeholders (Detmer, Bloomrosen, Raymond & Tang, 2008). Further, there are no guidelines on how HIEs should manage and monitor activities for reporting. Healthcare IT leaders should put in place a monitoring system that includes (i) developing relevant metrics, (ii) gathering data from multiple relevant sources, (iii) identifying deviations, (iv) reporting back to appropriate stakeholders, and (v) taking corrective actions. The healthcare IT leaders should set up ways to report through an organizational structure, which is an important method by which information can flow, and when done well can become the basis for assigning accountability (Crawford et al., 2003). In implementing the monitoring system, it is also important to determine the frequency with which different components of the HIE governance structure will be assessed.

Administration

Phase One:

#3: Healthcare IT leaders should appoint an enterprise HIE administrator.

In today’s technology dominant healthcare industry, healthcare IT leaders need to govern and lead a variety of IT programs in the health IT portfolio. Therefore, it is important that they appoint an enterprise HIE administrator who can focus on the coordination and implementation of the policies and procedures determined as a part of the HIE governance structure. Further, the enterprise HIE administrator would be responsible for keeping up with the HIE related policies,

legal requirements as well as current and upcoming HIE related issues facing the organization. The enterprise HIE administrator would also be responsible for balancing the delicate trust among members, reinforcing the mission and goal of the program, justifying funding and incentives, and rallying community support. He or she would also act as an information conduit responsible for keeping open lines of communications with all the relevant stakeholders. The HIE administrator should be the go-to person for stakeholders facing issues with the requirements of the HIE implementation as well as the organization's interface with the RHIO. Further, the HIE administrator should be responsible for rallying support for the HIE initiative at all levels of the organization. The HIE administrator's ability to appropriately engage representatives from all key stakeholder groups can be critical to the success of the HIE initiative (Zimlichman et al., 2012).

Phase Two:

#4: Enterprise HIE administrator should monitor both internal as well as external HIE practices, report findings to stakeholders and make necessary changes to the current processes.

Enterprise HIE administrator would be responsible for implementing the metrics set by the governance body, collecting data, analyzing, and taking remedial actions. He/she would also be responsible for communicating the current practices, issues with current practices, changes to the current practices, and justifications for the changes to the relevant stakeholders. The administrator would also be responsible for monitoring the changing requirements of the RHIOs, its current best practices, and progress made by other health care organizations as well as bringing back implementable solutions to the organization.

#5: Enterprise HIE administrator and the healthcare IT leaders in the organization should bring the HIE initiative under the purview of the EHR and Meaningful Use Program.

Research has shown that most RHIOs have failed to implement effective project management principles (despite the known benefits) or even treat HIEs as projects (Adler-Milstein & Bates, 2010). In an organizational context, Project Management Office (PMO) is an organizational body or entity assigned various responsibilities related to the centralized and coordinated management of multiple projects (Hobbs, 2007). The rising number of large-scale

projects and the complexity of the healthcare system have necessitated the use of project management principles, tools, and techniques in the healthcare context (Lavoie-Tremblay et al., 2012). Effective project management of the various IT initiatives of healthcare organizations will enable them to become agile and implement new services, improve the existing ones, and facilitate the integration of evidence-based innovations (McLaughlin & Hays, 2008). This requires healthcare organizations to create a PMO dedicated to the administration of their various IT initiatives. We argue that one of the most important programs in most healthcare organizations' portfolio is the Meaningful Use program (given the legal ramifications that organizations face if they don't meet the meaningful use requirements). Given that the HIE initiative is often undertaken to meet the requirements of Meaningful Use, the HIE initiative should be brought under the purview of the meaningful use program in the long run. Also in the long run, the enterprise HIE administrator is recommended to work with the other leaders in the organization to integrate the HIE initiative with the various initiatives taken under the meaningful use program.

Mutuality

Phase One:

#6: Healthcare IT leaders should conduct stakeholder meetings to gain feedback on any changes that are being proposed by the HIE.

HIEs cannot sustain if their participants are unwilling and unable to share quality information. Hence, healthcare IT leaders need to focus on two important areas: ability and willingness to provide quality information. Ability depends on the availability of the technology, appropriate data governance structures and the education of the data creators about the use of technology as well as the importance of quality data. Therefore, the first step to achieve mutuality is training the users (data creators as well as users) on the technology. With the implementation of HIEs' requirements, data must be entered in different mediums and formats and it may be needed from different sources. If the users find the technology cumbersome, they will work around it and even if they use it, the quality of the data is likely to suffer. The second step to achieving mutuality would be to create a willingness to provide quality information. This step would entail conducting stakeholder meetings to gain feedback on their concerns with the proposed changes and then creating and implementing an action plan to mitigate such concerns. HIE stakeholders become discontent and unwilling to participate when they are not a part of the decision making process

(Zwaanswijk & Verheij, 2011). Despite its simplicity, this step is probably the hardest to complete and critical to the success of the HIE initiative (Frisse, 2010). Research on implementation of clinical information systems and EHRs provides broad guidance for effective stakeholder engagement strategies and these strategies can be leveraged during HIE implementation (Hartzler et al., 2013). For instance, Mayo Clinic and Mayo Clinic Health System leveraged the concept of equal partnership to create a sense of ownership among all stakeholders (Johnson & Ambrose, 2006). Stakeholder inputs are used to address key challenges such as determining the clinical implications of approved changes across departments, keeping current with rapidly growing medical changes, and managing the privacy, security, and confidentiality of personal data (Mostashari, Tripathi & Kendall, 2009). In the absence of such engagement at an organizational level, stakeholders are unlikely to collaborate with external participants on the HIE.

Phase Two:

#7: Healthcare IT leaders should create and maintain program metrics to demonstrate the value of HIE to the organization.

Metrics are defined as a standard of measurement by which efficiency, progress, performance, productivity, quality of a deliverable, process, and project can be assessed (Geisler, 2002). To date, RHIOs have only concentrated on quality and performance metrics to measure success (Steckler & Fielding, 2009). The National Health Information Infrastructure (NHII), a cluster of RHIOs, have advocated for various measurements such as progress in creation, deployment and adoption of health information management, and communications technology in support of the healthcare delivery process (Steckler & Fielding, 2009). Metrics assist in building predictability, improving organization's decision-making ability, and laying out what is working and what is not working within the organization (Ulrich & Beatty, 2001). The goal of the metrics is to measure HIE performance as well as progress of the project against predetermined baselines. Further, metrics specific to data quality, benefits accrued due to the HIE initiative, participation levels, and projections made based on current data should be reported to relevant stakeholders. This information, especially if favorable or optimistic, can encourage further participation from users. If the information is unfavorable, the healthcare IT leaders and/or the enterprise HIE administrator should bring back the stakeholders to the table to identify strategies to improve current performance. Such an approach (establishing metrics, gathering data and engaging

stakeholders) is key to achieving mutuality, which in turn is key to fostering a collaborative sharing environment. Given the importance of sharing the metrics and other relevant data, healthcare IT leaders should also consider implementing a program-wide dashboard to demonstrate the current status of the program, highlight successes, and identify areas of improvement.

Collaboration between the Social Security Administration, a public agency, and Beth Israel Deaconess Medical Center (BIDMC), a private health-care organization exemplifies the dimension of mutuality and inter-organizational value propositions. Martinez and Bititci (2006) found that inter-organizational value propositions can have both “hard” elements (economic gain, technological mastery, etc.) and “soft” elements (brand identity, trust, relationships, etc.). The case study paid special attention to business dimension and identified the need for metrics to understand success. From the business perspective, it is important to develop metrics by which to gauge performance, improvement, and progress. The case study sought opportunity to develop metrics in the area of transmission and mean case processing. The metrics demonstrated the organizations’ ability to identify the status of HIE. The information created strategic advantages and value and improved the efficiency in the use of available EHR information. This efficiency can result in fiscal benefits that influence sustainability (Nguyen, Bosch & Maani, 2007).

Reciprocity and Trust

Phase One & Two (the same set of guidelines is valid for both phases):

#8: Healthcare IT leaders should conduct regular inter-organizational as well as intra-organizational meetings for stakeholders as well as provide periodic updates to all stakeholders to ensure transparency and in turn build reciprocity and trust within the organization.

Most stakeholders that have agreed to participate in an HIE initially rely on reciprocity. This means that stakeholders assume that all parties are willing to share data equally. Stakeholders rely on the quid pro quo theory, “if I provide data to the exchange other stakeholders will do the same.” However, this is not always the case because HIEs create competition among stakeholders. Competition can create conflict and lack of trust, which in turn leads to difficulties for most HIEs (Marchibroda, 2007). Competition between providers continues to negatively affect HIEs centralized data repositories and network approach to exchange (Vest & Gamm, 2010). By

definition, HIE “requires competing and adversarial parties to collaborate and share their most valued asset: patients and their data” (Grossman, Bodenheimer, & McKenzie, 2006, p. 1638). Currently exchanging information is not mandated for every patient record. Distrust and questions about control over information may not scuttle an HIE, but it may limit what data are available, who is allowed to see the information, or for what populations data will be included in the exchange; any of these conditions may limit the effectiveness of the exchange currently and in the future (Vest & Gamm, 2010). But, trust can be formed if stakeholder perceptions of reciprocity are positive. The importance of reciprocity (equal data sharing) in an HIE exchange network is to develop trust among stakeholders.

Mutuality, the willingness to share resources and information, greatly depends on trust between the parties engaged in the sharing of resources. Research has shown that trust builds over time and through repeated interactions (Axelrod, 1997). Hence, it is important to engage stakeholders both at an inter-organizational level as well as intra-organizational level. Regular face-to-face meetings with stakeholders working in other participating organizations is key to building trust. For instance, when physicians from various participating organizations meet, they can discuss their concerns and viewpoints as well as understand how others are contributing in their respective organizations. With this new understanding, physicians can overcome some of their concerns, especially regarding how patient data may be used or misused, and understand how their actions are being reciprocated by other physicians in other organizations. Understanding the reciprocity in the process and the good faith effort undertaken by external parties is key to a stakeholder’s willingness to collaborate. In addition to such inter-organizational meetings, we recommend cross sectional stakeholder meetings within the organization so that individual stakeholders understand their role in the initiative and how others’ endeavors rely on their own performance.

Healthcare IT leader’s communication can set the tone of the project, confer projected steps and link HIE to the overall vision of the hospital. Communication is an essential tool for gaining stakeholder buy-in. Healthcare IT leaders should use every mechanism to communicate with stakeholders (i.e. newsletters, emails, intranets, focus groups, and town hall and smaller meetings). Open lines of communication will promote transparency and honesty (Bertot, Jaeger, & Grimes, 2010). Healthcare IT leaders should be upfront and honest and address other stakeholders’

concerns. Healthcare IT leaders should create an effective communication plan that will address various stakeholders over the entire span of Phase One & Phase Two. It is important that communication continues after implementation to address stakeholder concerns and issues. Further, providing periodic updates about the organization's processes and performance with regards to the HIE as well as other organizations' HIE related performance to all stakeholders will provide transparency to the process, increase the stakeholders' confidence in the initiative, and hence generate trust.

The Community Tracking Study, conducted with more than 1000 semi-structured interviews in 12 US hospitals, found that competition was a main barrier to HIE participation and community-wide data sharing (Grossman, Bodenheimer, & McKenzie, 2006). When asked about collaborative efforts to share data, respondents in most sites noted that the barriers are not just financial and technological. A community-wide effort requires competing and adversarial parties to collaborate and share their most valued asset: patients and their data. The study found that many HIEs have attempted to deal with the issue of equal data sharing, however, most HIEs are still looking for ways to mandate equal data sharing. The study also found that the majority of hospitals were implementing portals for clinical data sharing with affiliated physicians. Hospital executives see portals (which offer a platform for reciprocity, transparency, and trust) as a competitive strategy that is appealing to stakeholders. More recent community-wide data-sharing activities in Indianapolis and Boston have attempted to address the competition and lack of trust issues. Respondents in this market remarked on the willingness of all parties to make the calculated decision to participate in the process assuming every stakeholder would contribute data and put collaboration over competition for the HIE endeavors.

#9: Healthcare IT leaders should identify a physician champion for internal trust-building purposes.

RHIOs literature does not make any references to the use of physician champions. Literature on health IT implementations, including EHR implementations, shows that physician champions play a critical role in implementation (Ash, 1997; Greenhalgh et al., 2004; Damschroder et al., 2009; McAlearney et al., 2012; Adler, 2007; Miller & Sim, 2004). Physician champions are vital to transforming the initiative from a vision to actual implementation, as physician attitude is a critical factor for a successful healthcare implementation (Handel &

Hackman, 2007). Physician champions make a decisive contribution to the innovation process by actively and enthusiastically promoting the innovation, building support, overcoming resistance, and ensuring that the innovation is implemented (Ash, 1997). Some studies include factors such as ‘physician champion’ actions, as part of the intervention, others separate these as conditions, which may help or hinder implementation (Ludwick & Doucette, 2009).

We extend this approach to the HIE literature and recommend recruiting physician champions to generate trust and increase acceptance of the HIE initiatives. Given that physicians are major stakeholders, IT leaders would benefit from identifying one or more physician champions for the HIE initiative. Physicians are known to have a group culture based on factors such as professional autonomy. Therefore, we recommend using techniques such as social network analysis (SNA) to identify champions (champions with formal and/or informal authority) who are likely to influence a number of other stakeholders similar to them or who follow them. SNA provides a method for mapping and exposing the hidden channels of communication and information flow, collaboration and disconnects between people in strategically important groups within an organization (Cross & Parker, 2004). SNA views the structure of social interactions as networks composed of nodes (physicians) interconnected by edges (social relations) and is an ideal approach for delineating interaction patterns to study how social influence is transmitted among physicians and how it affects their contingent behavior such as technology adoption (Zheng, K., Padman, Krackhardt, Johnson, & Diamond, 2010). The champions identified using SNA are likely to take creative ideas (which they may or may not have generated) and bring them to life (Howell and Higgins, 1990). Through their proclivity to talk and share their experiences with others, physician champions can help other physicians mentally process the perceived advantages and disadvantages and make sense of the big picture to move toward HIE use. Given that physicians are known to have a group culture based on factors such as autonomy, privacy concerns, etc., we argue that physicians are likely to trust the initiative more when the recommendations come from one of their own rather than someone from the IT department.

Autonomy

Phase One Recommendation

#10: Healthcare IT leaders should implement a change management plan to address the challenges that might arise due to the conflicting professional roles in the healthcare environment.

RHIOs and HIEs literature rarely mention the need for change management. However, research has documented that physicians in particular value their autonomy, and health information technologies such as EHR and HIE pose a major challenge to their autonomy (Appari & Johnson, 2010). Physicians are required to input relevant patient data, use new workflows, and sift through the large amount of data the HIEs provide before making their decisions (Lorenzi, 2003). Care must now be clinically-focused (patient-centered and evidence-based), comprehensive, integrated, coordinated, outcome-oriented, and technology-aided (Shaller, 2007). All of these are major shifts from physicians' traditional ways of functioning. Further, physicians can use information inputted by other physicians to make diagnoses. Moreover, other stakeholders both internal and external to the physician's organization can now scrutinize each physician's work. Such a situation is a direct threat to a physician's autonomy. As there is no way for physicians to avoid sharing information, effective change management can address the concerns of the physicians and start rebuilding the physician group's culture in the organization.

In order to initiate the change management process, we recommend using change management tools such as force field analysis (helps in understanding forces that are blocking movement towards a goal) (Burnes & Cooke, 2013) to engage the stakeholders in a discussion about their concerns and prepare for changes accordingly. Depending on the characteristics of the organization, healthcare IT leaders can pursue one of the following change management strategies (Miles, Snow, Meyer & Coleman, 1978): (i) transparency-based strategy where current behaviors or norms are changed by the openness and inclusiveness of the organizational leadership. In this approach, HIE is positioned as the key to HIE transformation and complete transparency is provided to stakeholders about the approach of the organization which results in stakeholder buy-in (Des Jardins, 2014); (ii) incentive-based strategy where rewards encourage conformance, though it will remain uncertain if conformance will continue once rewards are discontinued. This strategy is implemented in the hope that the initial period, during which incentives are offered, will help in changing the current behaviors of the stakeholders in such a way that they will not revert back to an older way of doing things (Freeman, 2010); (iii) sanction-based strategy where non-

conformance is penalized. While this strategy may be effective, it may not do much good to address the current concerns and boost interest in the initiative. It is also important to realize that change management efforts can result in stakeholders accepting (happily or unhappily) or actively promoting or actively resisting or passively resisting the initiative (Salerno & Brock, 2008). Therefore, we contend that change management should start with the visioning phase (earlier stakeholder engagement will result in greater buy-in) of the initiation stage and continue into the maintenance phase.

Memphis HIE, governed by the non-profit MidSouth eHealth Alliance Exchange in metropolitan Memphis, Tennessee, is a collaboration among all large health care providers in a three-county area that has a combined population of one million (Frisse et al., 2012). While formal change management is not prevalent among exchanges, the Memphis exchange leveraged John Kotter's change management framework to achieve success early in the project. Several factors Kotter identified were found to be relevant to this project: establishing a sense of urgency, forming a powerful guiding coalition, creating and communicating a vision, empowering others to act on the vision, creating short-term wins, producing ongoing change, and institutionalizing approaches (Frisse et al., 2012). Consequently, the exchange focused their efforts on culture rather than technology.

Phase Two Recommendation

#11: Healthcare IT leaders should implement a review board to handle any issues related to HIE (i.e. data issues, security and privacy issues).

RHIOs oversee HIE by setting up regulatory guidelines. Nonetheless, stakeholders need a mechanism to report issues within an organization. Review boards can be helpful in resolving issues without stopping the progress of the initiative. An HIE review board should be established as a board responsible for addressing stakeholder issues. Healthcare organizations have used review boards in various capacities in the past (e.g., to improve quality). The HIE review board should act as a separate entity and function with the goal of being a neutral party between the stakeholders and resolve any issue that might arise. The HIE review board should ensure there is a formal mechanism for addressing stakeholder issues outside the scope of the traditional PMO and the RHIO's review board. The review board will ensure that stakeholders feel confident about having their concerns voiced and resolved by an independent board while not having to escalate it

to the RHIO. Such a set up will help in easing the stakeholders' concerns about completely losing autonomy over the processes that they engage in, making them more willing to collaborate.

Implications for Future Studies

Our research has several implications for research and practice. We explored the sustainability of HIEs from the collaboration framework developed by Thomson et al. (2009). Despite the actionable, normative guidelines for practice, our research provides strong foundations for future research and practice. Specifically, Meaningful Use Stage 2 rules are a step forward in advancing the secure exchange of information between providers and patients to support better care across the nation. Getting the right information to the right person at the right time can be a matter of life and death. Stage 2 of Meaningful Use marks the beginning of the Infrastructure Wave (Allison, 2012). HIE is an important part of the infrastructure wave. HIE adoption rates are not as high as expected. Although the federal government has taken numerous steps to incentivize the formation of HIEs and support them through their nationwide HIE strategy, there are stakeholders who are yet to buy into the value of HIEs and ultimately fear competition. Nonetheless, many healthcare organizations are actively preparing to join HIEs and it is predicted that additional investment and increased collaboration efforts can be expected in the near future (Glaser, 2016). HIEs have the potential to improve care coordination, patient engagement, provisioning of real time information to physicians as well as provide analytics that draws information from multiple sources of clinical and administrative data (Tang et al., 2006). The HIEs can also provide key information to individuals to promote health and wellness, and can be used to support research, public health, emergency response, and quality improvement. However, HIEs' success is predicated on the willingness of the HIE participants to collaborate. While participating organizations have been viewed as important stakeholders, it is also important to recognize that each participating organization has a variety of stakeholders, such as clinicians, lab technicians, pharmacists, payers, patients, etc. who have not been required to collaborate in the past. More recent research has examined organizational factors at the HIE level. Sicotte & Paré (2010) conducted a longitudinal multiple case study of two large HIE projects in Quebec, Canada. The study looked at how an organization supports the HIE process across an organization. Pevnick (2010) conducted a study to better understand the perceived costs and benefits of joining a nascent HIE from the perspective of potential providers and organization participants. This research focuses on the importance of willingness and ability to collaborate at the organizational level since

it is the key to a successful HIE. Further, most research on HIEs has been atheoretical in nature. This research provides a novel lens (collaboration readiness at an organization level) grounded in extant literature to understand the concerns relating to participating in HIEs and recommends theoretically grounded strategies to overcome those concerns.

While failed HIEs have noted governance issues and governance has emerged as an important concept in determining HIEs ability to be successful, collaboration (a concept that includes governance) has received scant theoretical attention by researchers. Using the theory of collaboration as an organizing lens, this research has recommended several normative guidelines that healthcare IT leaders can implement to foster collaboration within the organization both at the time of implementation and during the subsequent maintenance phase. Each one of the five major dimensions of collaboration (governance, administration, trust, mutuality and autonomy) discussed in the paper is an important stream of research for HIE researchers. Each one of the guidelines made in this paper is strongly grounded in theory and literature. Future research can use our guidelines to create testable propositions and gather data to validate our normative guidelines.

This research highlights that healthcare IT leaders can play an immeasurable role in creating collaboration amongst stakeholders and offers practical guidelines for the leaders to implement in two phases (initiation phase and maintenance phase). We argue that facilitating collaboration can inspire stability amongst different stakeholders, create a willingness to contribute in the HIE, and eventually contribute to a successful HIE.

Conclusion

Though many HIEs still continue to face challenges, there is great potential for HIE to be a significant factor in improving the quality, accessibility, and cost effectiveness of healthcare (Silow-Carroll, Edwards, & Rodin, 2012). There has been a great deal of talk about the future of HIEs, with full implementation and sustainability expected not to occur until many years into the future. There is no question that stakeholders recognize the importance of HIEs, and realize that in combination with EHR, the HIE will transform the practice of medicine. This research argues that researchers have overlooked the theoretical aspects of organizational factors impacting HIE. Nonetheless, organizations are looking for the right strategies for the implementation of HIEs. In this environment, we argue that the healthcare IT leaders' scope of responsibilities should expand to include this new set of challenges. Our research paper provides recommendations that would

benefit healthcare IT leaders as they embark on HIE adoption and eventually to the continued use of HIE.

True partnership and collaboration represents a process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible (Gray, 1989). The decision to collaborate cannot be determined in a rational way by the purpose itself, nor by the current environmental pressures that compel them to cooperate (Todeva & Knoke, 2005). A decision to cooperate is not a responsive action, but is fundamentally a strategic intent, which aims at improving the future circumstances for each partnership as a whole (Todeva & Knoke, 2005). Healthcare IT leaders should position themselves to drive participation and foster collaboration in these complex arrangements. We believe collaboration can lead to HIE sustainability when there is clarity, direction, and dialogue between all stakeholders.

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