

# Misunderstandings and Misjudgments about Security: A Dialogical Narrative Analysis of Global IT Offshoring

*Full paper*

**Gurpreet Dhillon**

Virginia Commonwealth University  
gdhillon@vcu.edu

**Dan Harnesk**

Luleå University of Technology  
Dan.Harnesk@ltu.se

## Abstract

This paper explores the patterns of technology use in a global enterprise. We use the concept of narrative networks to understand interactions between technology and organizations and the emergent implications. The paper is based on empirical work undertaken in the context of offshoring electronic medical records and billing systems from a group of US physician practices to service providers in India. Findings from our research suggest technology, represented as information security and privacy, as playing a central role in determining outcome of actions and the performances thereof. The narratives in technology in use and enactment of organizational forms display multiple third men, with features that modify the initial understandings of an agreement to implement technical systems.

## Keywords

*Information security, Narrative networks, Dialogical research, Global IT.*

## Introduction

The relationship between technology, people and organizational forms has always intrigued researchers and practitioners alike. However with the increased dependence of enterprises on information technology (IT), the interconnections amongst technology, people and organizations have come under the microscope. The motivation for doing so may be purely economic (e.g. increased profitability because of inherent efficiencies); anthropological (e.g. for ensuring equality) or sociological (e.g. need to study human behavior in societies because of the interconnections). With a focus on the context of developing countries and emerging economies, previous research have suggested a number of ICT related issues that may have impact on the success of technology based collaboration (Van Reijswoud 2009). One exemplar is Walsham and Sahay (2006) who identified that alignment of actors together with use of particular technologies are central to the positive outcome of cross-cultural initiatives. It is however clear in this literature stream that security and privacy is a second-hand concern as most contributions preferably pay attention to stakeholder interests, such as innovation and infrastructure development (Avgerou 2008).

In this paper we use *Narrative Networks* (Pentland and Feldman 2007) and *Dialogical Research* (Bakhtin 1981) as an analytical tool to describe patterns of technology in use and enactment of organizational forms in the case of an Electronic Medical Records and Medical Billing system offshoring project. We argue that while patterns of technology in use and enactment exist in various contexts, their stability and integrity is typically a function of a third man (Bardini 2000). In some instances it may be the user, as postulated by Bardini (2000), while in others it may be a technical or a regulatory artifact enacted by two collaborating businesses, as was the case in our research. Our research further suggests that patterns of technology use and its enactment are closely related to ensuring security and privacy in any enterprise.

## Informing theoretical elements

Drawing on the rich theoretical tradition of actor network and structuration theory, Pentland and Feldman (2007) introduces the concept of a *narrative network*. They use the term "narrative" to emphasize actions and events and "networks" to suggest the interconnected nature of the actions and events. We adopt the notion of *narrative networks* to conceptualize and discuss 1) how *intentionality* of stakeholders takes shape; 2) how *technology* gets enacted and 3) what role a *third man* might be in defining the *narrative network*.

### **Intentionality**

Intentionality refers to the collective intent of the stakeholders in achieving or not achieving a certain action. Swanson and Ramiller (2004) have considered intentionality in terms of *positional* and *transitional* properties with respect to the implementation processes. Positional intentionality indicates *what* organizations want to achieve, and transitional intentionality point at the change process itself, i.e., organizations ascribing to mutual commitments in the change process. Appreciation of intentionalities is important when transforming organizational processes, because they reveal contextual dependencies among different stakeholders, e.g., how different the technology enabled work activities might be (*viz.* Orlikowski's technological frames). The literature contains plausible action oriented conceptions of transforming organizational work practices with information technology. To this end, conceptualizations such as the role of 'technological features' (Jonsson et al. 2009), 'technology as material' (Scolai 2008), and 'performativity' Orlikowski and Scott (2008), have advanced our understanding of the subject matter. However the purpose of change, intentions, and their shifting character during change processes, have mainly been addressed in terms of *technology acceptance* (Venkatesh et al. 2003), with little emphasis on intentionality and sense perception of contextual frames (Becker and Niehaves 2007). Clearly, organizations act on different socio-organizational premises, and the different requirements influencing the stakeholders can be analyzed by drawing clear descriptions of the processes under examination (Pettigrew et al. 2001).

### **Enactment**

Enactment conceptualizes the way in which social actors use IT to achieve organizational change by expressing their need in response to local prerequisites. Viewing enactment as a non-technical determinant of change, (Boudreau and Robey 2005; Robey and Sahay 1996) IT seems to constrain human agency by requiring particular patterns of use. This is also implied in Latour (1987) original view on computer systems and organizations, that there exists a mutual interdependence between computer systems and organizations. This mutual interdependency produces outcome as a result of temporal sequence of events performed by social actors. To understand such courses, actor network theory suggests that characteristics of constitutive actors, and their interplay emerges, develops, and diminishes over time (Callon 1991), following a particular "recipe" involving external directional forces and probabilistic events. We regard the enrolment of actors and actions as constituents for what Orlikowski (2000) refers to as enactment and *technology in practice*, which is important for how diverse interpretations shape stable structures of technology artifacts. In particular we consider stability as a series of events containing: *partnership* (collective intention), *tension* (action and conflict), and *ultimatum* (success or failure) as representation of a *third man* (discussed below) affecting project outcome.

### **Narrative network and the third man**

The narrative network is an analytical device for describing, visualizing, and comparing patterns of technology in use (Pentland and Feldman 2007). The narrative network offers a way to unfold 'plot structures' (Abbott 1992), 'raising awareness of structural elements of network dynamics', (Braa et al. 2004; Orlikowski 2000) 'mobilize heterogeneous interests', (Czarniawska 2004; Walsham 1997) 'reconstructing technological innovation', (Bardini and Horvath 1995) and 'displaying the third man affecting the narrative' (Bardini 2004). As a method, the narrative network allows a review of episodes of transition from pre-existing stages, incorporating patterns of technology in use and enactment. In order to be told, the narrative is often constructed in a chronological series of events, where all events and effects must unfold in an ordered sequence (Sternberg, 1990). The dynamics of events, actors and state of

affairs in the ongoing narrative is what forms the narrative network (Pentland and Feldman 2007). As Pentland & Feldman (2007) argue, the term network evokes the image of many interconnected elements, a maze of potential pathways from which particular performances can be identified and constructed (p.790). Often the narrative network can only be stabilized, or its integrity assured, through a *third man* (Bardini 2004).

The unfolding of a narrative not only clarifies the interactive relationship between actors and the story they tell, but it may also display interventions that could be conceptualized because of the third man. Viewing the third man as source of noise, Bardini (2004) explains that "to hold a dialogue is to suppose a third man and to seek to exclude him". As is evidenced in our research, Bardini emphasizes the position of actors holding the dialogue as united against interference and confusion, or against individuals with some stake in interrupting communication. Bardini realized that the exclusion of the third man results in successful negotiation between two interlocutors, and that the competences of both are seen in the process of ascribing delegation and inscription to concerned parties. We argue that the exclusion of a third man is the result of identifying collective intentions regarding the subject matter of collaboration.

## **Narrative dialogues and their interpretation**

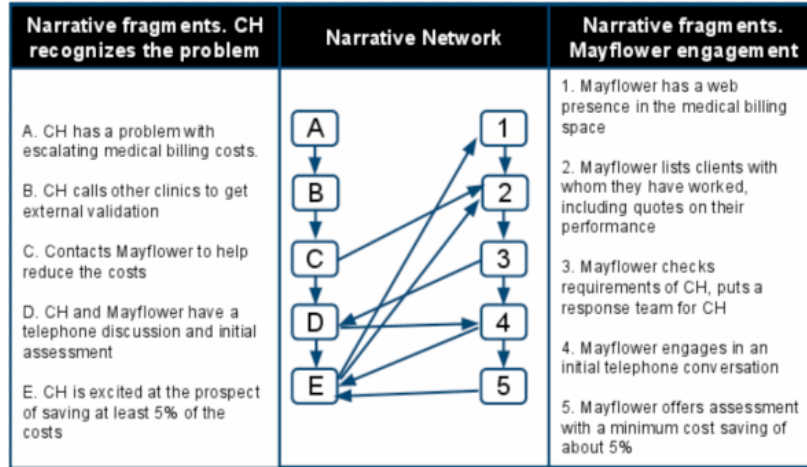
The case of Electronic Medical Records and Medical Billing system offshoring is based amongst a US based physician group, Colonial Hospitals (CH), and the vendor firm based in India (Mayflower Healthcare). Mayflower aspired to market their services largely based on cost savings in the medical billing business. In the US, medical billing constitutes anywhere between 5-7% of a clinic's cost. Most of the expenses are related to errors in coding (e.g. wrongly classifying ailments/diagnosis), denials by insurance companies and reconciliation of accounts. Since these are all labor intensive processes, there could be possible savings by getting an offshore firm to do the work at a lower cost.

CH is a specialist orthopaedic clinic. With offices in 4 locations and over a dozen partner physicians. At the time of this research, CH had an in house team, which took care of their medical billing needs. Electronic Medical Records (EMR) were also managed in house through a home grown system. While the medical billing and EMR functionalities seemed to work, CH was certainly not happy with the manner in which these two very important aspects of the practice were managed. There had been various internal discussions and at one stage the partners had considered Acrendo Medical Software as a possible solution.

Mayflower Healthcare specializes in medical coding, medical billing and accounts receivable services. The starting point for Mayflower, in the medical billing value chain, is the 'Superbill' or the 'Encounter' form. Procedures performed by the provider are described as a CPT4 code (Current Procedural Terminology). Diagnosis is recorded as per ICD codes (International Classification of Diseases). The possibility of errors in codification on Superbills is a real problem. For instance code 847 refers to Cervical Sprain/Strain. 847.1 refer to Thoracic Sprain/Strain. 847.2 refer to Lumbar Sprain/Strain. A small error and wrong combination of the codes can lead to rejection of a claim by the insurance company. Through proper quality assurance, Mayflower helps prevent such. The diagnosis and procedural codes are then used to fill form HCFA-1500, which gets billed to an Insurance company.

### ***The First Dialogue***

Clearly CH had recognized the problem. They had come to appreciate the fact that cost of billing was becoming formidable and that something had to be done in order to contain the costs. At this time one of the authors approached CH for access to the organization so as to engage in a narrative between CH and Mayflower. As Pentland and Feldman (2007) notes, narrative networks are "action nets", which sequentially describe the progression of an action and how it may interact with other nodes. In our example the column on the left hand side in Figure 1 identifies a set of narrative fragments of how CH identified their problem.



**Figure 1. The First Dialogue between CH and Mayflower**

On right hand side column, the narrative fragments of Mayflower are identified. Presentation of the two narratives side by side illustrates the differing purposes of the two organizations. Using two examples from Figure 1, we see:

C -> 2. The fact that Mayflower is able to illustrate how they have helped other clinics in saving costs is a positive indication for CH in considering Mayflower

4 -> E. The fact that Mayflower proactively makes a telephone call to engage with CH helps building trust between the two parties, besides the prospect of saving up to 5% of the costs

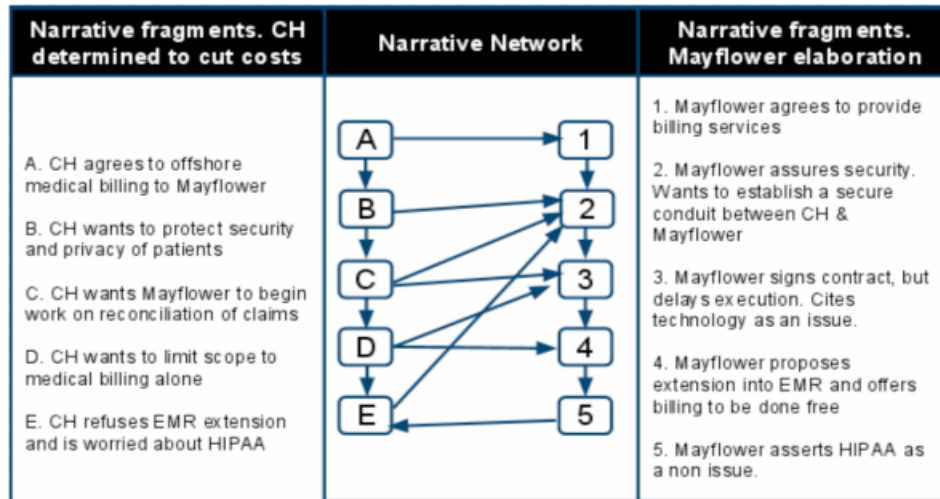
As is evident, a narrative network helps with visualizing the pattern of actions. The intent is not to understand the ontology of actions, but more so to develop a better appreciation of the flow of actions.

**Partnership**

In the first dialogue, partnership between CH and Mayflower slowly begins to take form along an array of pre-conceived ideas, but so far, the outcome is unclear to both organizations. In the action net of the first dialogue, both organizations accept becoming part of the network. There is excitement between the CH and Mayflower on the prospect of doing business. This leads to organizations intending to form a coalition, which is central to the way both organizations inscribe common intentionality into its respective space, which, in turn, stretches out and aligns with the mutual interest in collaboration. The initial stage of trust developed between CH and Mayflower emerge via the interplay to result in the constitution of intentionality between the actors. Clearly, trust is important to stabilize the identity of the actors (Callon 1991). Typically, coalition as a third man assures that forming the alliance is an adequate means to sustain the agreement between the two parties. However, the third man has not yet indicated the misalignment of intentionality that appears in the background due to unclear definition of project outcome (Almusharraf et al. 2015).

**The Second Dialogue**

In the second dialogue between CH and Mayflower the narrative suggests the emergence of a different intent in Mayflowers' dealings. While the CH maintained its line of inquiry and its pursuit of saving costs, Mayflower shows intent to use the basis of discussions to do more. They want to sell their EMR services and have more access to patient encounter data. This intent seems to make CH uncomfortable, largely because of increased scope and security and privacy implications (see Figure 2).



**Figure 2. The Second Dialogue between CH and Mayflower**

Two interesting conflicts emerge from the narrative as described in Figure 2:

C -> 3. CH is interested in progressing with medical billing. Mayflower delays execution because of hidden intent as depicted in narrative [4] in the figure.

E -> 2. CH is not interested in the EMR part of the offshoring. Mayflower is assuring security. This narrative depicts departure of the two organizations in their intent

The differing intents illustrates the subtle emergence of Bardini's (2000) third man and the power that might reside in it. As will be seen later, the differing intentionalities and dominance structures because of inherent power vested in the third man, leads to a range of implications. The second dialogue also suggests lack of communication and appreciation of the role of the third man.

**Tension**

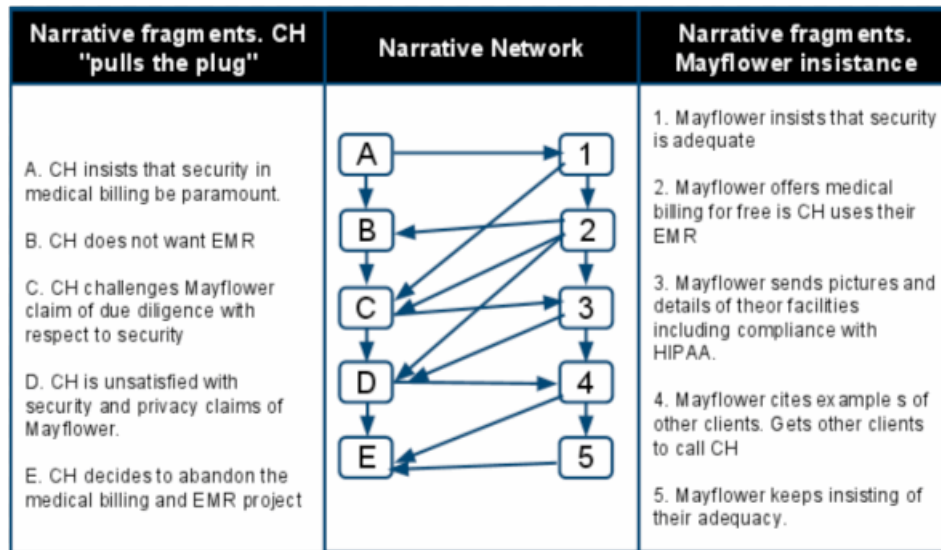
In our research, openness to progression of medical billing is contrasted with hidden intentions that slowly make the organizations disperse. This is one example of prevailing identities that eventually can become institutionalized and thus a frozen discourse of tension. One of the foundations of actor network theory is that emerging networks act like a unit, in which each actor is empowered, through association, with others, in the network (Latour 2005 ). However, if actors don't comply with intended unified actions, each actor maintains its unique position through the exercise of power and dominance. Thus, in our case, the action net is blurred with lack of understanding for what it commonly represents to the organizations. The third man commences to interfere with initial project ambitions. The lack of communication and misconception of intentionality inevitably lead to one form of stable identity between CH and Mayflower. It is a kind of stabilization in progress, but it is a false indication of security since the conflict undertones remain unforeseen. In particular, the different views on the medical record issue imposed implications for data privacy. Mayflower could not present a designated control system, except verbal assurance about records remaining anonymous.

**The Third Dialogue**

The third dialogue (Figure 3) between CH and Mayflower represents the emergence of two issues, which had never been considered by either of the two parties at the onset. First deals with scope creep. CH never had any intent of moving ahead with the EMR. Surely the US Federal Government was offering incentives to small practices and hospitals to adopt EMRs, yet there were practically no guidelines on how the new technological adoptions would impact practices. Organizations such as CH were left to wonder as to how they could derive significant benefits from their IT investments. There were also unanswered questions as to what constitutes 'meaningful use'.

Second deals with security and privacy issues as these related to HIPAA (Health Insurance Portability and Accountability Act). While CH continued to insist that Mayflower demonstrate how HIPAA compliance

was instituted, Mayflower seemed to overlook the request. An analysis of the interactions suggests that this was perhaps because of a miscommunication between the two parties - something



**Figure 3. The Third Dialogue between CH and Mayflower**

that never got addressed. The US Department of Health and Human Services (DHHS), which is responsible for enforcing HIPAA, does not require any certification. At best the evaluation standard § 164.308(a)(8) requires entities to undertake a periodic review. Clearly Mayflower had undertaken such a review, but it did not satisfy CH. Any HIPAA violation can potentially result in a felony charge with an up to a 10 year prison sentence. CH felt this to be a risky proposition. The Chief Medical Officer at CH commented:

*“There is no doubt that we want to save money. At the same time we are extremely worried about medical records being shipped overseas. The vendor does claim that they will make all record anonymous, but that defeats the purpose when the main reason for outsourcing is to save money in reconciliation and managing denials. Anyone calling up the insurance company would need the patient identifiable information. I am also uncomfortable with legal jurisdiction. If something goes wrong, the buck stops with me. I am not prepared to go to prison.”*

The third dialogue identifies three conflicts, which are worth considering:

2 -> C; D. From the narrative it seems that Mayflower does not seem to appreciate the CH's concerns for privacy. they seem to be more interested in selling their EMR and offer billing for free.

C -> 3. CH largely ignores Mayflower's calls for EMR adoption and instead explicitly expresses their security and privacy concerns.

D -> 4. In response to CH's dissatisfaction, Mayflower at best cites example of how happy their other clients were.

In a meeting with the CEO of Mayflower it became obvious that there was clearly a lack of appreciation by Mayflower of CH's concerns. The CEO commented:

*“I am not sure what CH wants. Our site is secure. We have shown pictures of security guards and pure protocols. We have offered billing to be done free, only if they adopt our EMR. Even that will be very cost effective since the federal government is offering up to \$50,000 for such adoptions. It is a win-win for both of us.”*

The narrative between CH and Mayflower clearly suggests a lack of communication, differences in intent and how important the issue of security and privacy may be. In the literature Leezenberg (2002) argues that intentionality is a feature of the mind that shapes individuals actions. In the case of Mayflower, the collective intentionality resulted in the creations of a 'social fact' (Leezenberg 2002), i.e. CH was solely interested in cost savings. On the other hand, the social fact at CH centred around HIPAA and

preservation of security and privacy. Hence HIPAA and the related security and privacy aspects, emerged as a 'third man' (Bardini 2000) for ensuring integrity in use of technology and enactment.

## Ultimatum

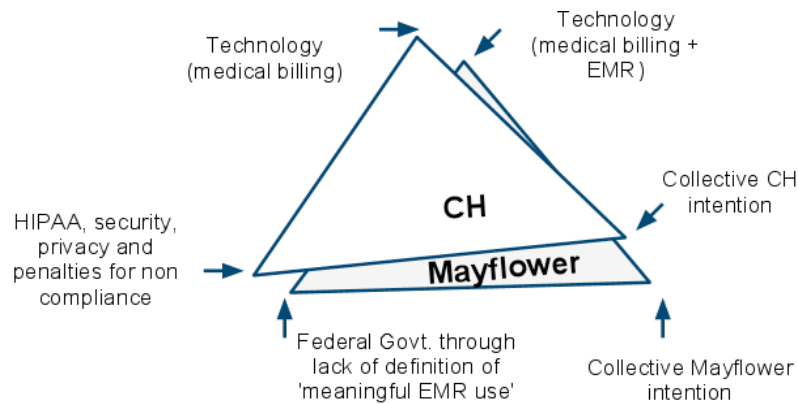
In our study we identify issues that affect performance of the project from both attributive and relational viewpoints. Our research reveals elements that are internal to each organization as well as obstructive to exchanges between the parties. What was at first a common intention to collaborate developed into a tense situation that separated the two organizations, and established difference in opinions of the underlying project facts. These elements, with properties of irreversibility, were finally displayed in the different appreciations of the HIPAA framework, which, in turn, became the ultimate measure for the uncertainty as how to finalize the project. This is one example of what actor network theory refers to as an element of immutable mobile (Walsham 1997). In our study, the immutable mobile displays the inability to evaluate on-going activities and agreeing on common actions and leaves imprints on project outcome because these elements transcend time and space (Shoib et al. 2006). Thus the situation evolves into obstructive entities to enactment (i.e., disputing meaningful use).

## Discussion

Research presented in this paper suggests that in order to ensure integrity of technology use in organizations, there is a need to ensure congruence between Bardini's *third man*, the collective intentions among partners and the nature and scope of technology use. The flow of actions between CH and Mayflower can be described as a process of inscribing their respective intentions into a collective whole. However, the pathways are not entirely straightforward. Instead, instances of human actors influence the a priori intention with the EMR and medical billing system differently. Also, technology, represented as security and privacy, plays a central role in determining outcome of actions and the performances thereof. Clearly, the narratives display multiple *third men* with different features that modify the initial understandings of the agreement to implement the technical systems.

One feature of the *third man*, influencing the narrative between CH and Mayflower, is the '*lack of definitions of meaningful use of EMR*' as there were no guidelines for how the new technological adoptions would impact practices. One key tenet of narrative networks is that they do not contain any a priori distinction between human and non-human actors. Both are viewed as active participants of actor networks and are included in the unifying actant concept. Furthermore, networks are changed through translation. A translation is the establishment of a new or changed relation between actants, and can be described as coexisting in a network to achieve a common goal. Such coexistence ideally emerges from a state of cognitive consensus among participants, and does not necessarily relate to the process of problematization. However problematization, not only means the definition of the problem, but also to establish roles and identities to others in the network. Clearly, the different initial purposes between CH and Mayflower restrained an agreed upon definition of the EMR, and blocked actors to form a stable network.

Further, *misunderstandings and misjudgements* also obstruct progress. In our study we found that as the dialogue progressed, there was inherent *tension* throughout the narrative. CH tried to exert power by implicating vulnerability and hence the stability of the security structures. Mayflower on the other hand neglected the issue as they considered HIPAA security and privacy as less important issues and ones they foresaw to manage properly if ever addressing the issue - clearly a conflict of the respective intentionalities. Based on our study we believe that intention and power may defy the level of trust, and eventually steer participants (CH and Mayflower in this case) away from each other as one party elaborates on new intentions with technology. The different 'social facts' that the case displays are examples of what Callon (1991) defines as social meaning, which could be inscribed into virtually any media including corporate formal discussions. If inscriptions are stable and become routine, they represent a frozen discourse that when embedded in artifacts may resist change. During the events of discussing HIPAA, and despite flaws in communication, a frozen discourse emerged as CH continued to express concerns about security and privacy, while at the same time Mayflower kept contending their security level as adequate. As noted previously, Bardini (2000) refers to this situation as the role of a *third man*. In our case it happens to be the frozen discourse because of the complex interplay between technology, collective intention and the HIPAA-EMR use (Figure 4).



**Figure 4. Technology, Intention, Third Man triad**

The stability and integrity of technology enactment (medical billing implementation) comes under threat when the third man is not carefully understood. In our study problems occurred at two levels. First, there was misunderstanding as to what the *third man* might be. CH interpreted it to be HIPAA and the associated security and privacy concerns, particularly the penalties with non-compliance. Mayflower considered 'meaningful use' as the *third man*. For Mayflower, the offer of a free billing system for adopting EMR was literally a no brainer. The confusion and the need to identify the 'proper' *third man* got exasperated when there were differences in the nature of the technology to be used. This in turn shaped the collective intentions of CH and Mayflower respectively. However, reference to intentionality has been usually with respect to alignment of stakeholder interests. While such alignment is important, more importantly formation of collective intentionality is critical, particularly where organizations are detached culturally and geographically. The social facts that lead to Mayflower's collective intentionality can in many ways be attributed to a lack of appreciation of the subtleties that exist in the healthcare and legal domains in the US. Mayflower, which for all practical purposes was an Indian firm, could not come to terms with CH's insistence of HIPAA compliance and further assurances for security and privacy.

In the literature it has been argued, that beyond a simple compliance, sustainable security and privacy is only possible if emphasis is on developing a security culture (see Dhillon 1997; Gaunt 2000). It is interesting to note, that one of the reasons why CH was hesitant to go ahead with the offshoring of medical billing was the careless attitude of Mayflower with respect to security and privacy. When asked repeatedly about security, the top officials simply kept stating:

“We have addressed all HIPAA requirements” (CEO's statement)

“IT aspect has been taken care of” (IT Director's statement)

“We have physicians on our staff who do the coding ... and they are..” (Engagement Manager's statement)

Matter of fact the statement by the Engagement Manager left the Practice Manager at a CH facility wondering - why would a physician be involved in coding? While Mayflower considered a physician's involvement in the process to be a unique selling point, it was interpreted wrongly by the CH. It was perhaps because of this reason that Mayflower was concentrating on cross-selling and possible extensions into EMRs. In contrast CH felt, that Mayflower was not giving adequate attention to HIPAA and meaningful use of EMR was an allusive concept, with many in the industry being wary of it. Such misconceptions and lack of alignment and integrity in the collective intentions led to not only failure in offshoring, but can also potentially be a cause of security and privacy problems.

## Conclusion

In this paper we have used concepts grounded in structuration and actor network theory and employed narrative networks in a dialogical manner. Epistemologically the concepts have a similar founding. And our contribution is in the successful use of these theoretical elements in understanding a given situation.



Empirically the study is based on a global offshoring project, which resulted in complete failure and abandonment. One of the emerging reasons for the failure can be attributed to the lack of understanding of the *third man*, a conceptual construct that seems to wield a lot of power and authority. The narrative networks, in combination with dialogical research indeed provide a sound basis for investigating technology use in organizations.

## References

- Abbott, A. 1992. "From Causes to Events Notes on Narrative Positivism," *Sociological Methods & Research* (20:4), pp. 428-455.
- Almusharraf, A., Dhillon, G., and Samonas, S. 2015. "Mismatched Understanding of Is Security Policy: A Reprigid Analysis," in *Proceedings of the Twenty-first Americas Conference on Information Systems*. Puerto Rico.
- Avgerou, C. 2008. "Information Systems in Developing Countries: A Critical Research Review," *Journal of Information Technology* (23:3), pp. 133-146.
- Bakhtin, M. M. 1981. *The Dialogic Imagination: Four Essays by Mm Bakhtin*. Austin: University of Texas Press.
- Bardini, T. 2000. *Bootstrapping: Douglas Engelbart, Coevolution, and the Origins of Personal Computing*. Stanford University Press.
- Bardini, T. 2004. *Hypertext*. Blackwell Publishing.
- Bardini, T., and Horvath, A. T. 1995. "The Social Construction of the Personal Computer User," *Journal of communication* (45:3), pp. 40-66.
- Becker, J., and Niehaves, B. 2007. "Epistemological Perspectives on Is Research: A Framework for Analysing and Systematizing Epistemological Assumptions," *Information Systems Journal* (17:2), pp. 197-214.
- Boudreau, M.-C., and Robey, D. 2005. "Enacting Integrated Information Technology: A Human Agency Perspective," *Organization science* (16:1), pp. 3-18.
- Braa, J., Monteiro, E., and Sahay, S. 2004. "Networks of Action: Sustainable Health Information Systems across Developing Countries," *MIS Quarterly* (28:3), pp. 337-362.
- Callon, M. 1991. "Techno-Economic Networks and Irreversibility," in *A Sociology of Monsters. Essays on Power, Technology and Domination*, J. Law (ed.). pp. 132-161.
- Czarniawska, B. 2004. "On Time, Space, and Action Nets," *Organization* (11:6), pp. 773-791.
- Dhillon, G. 1997. *Managing Information System Security*. Macmillan.
- Gaunt, N. 2000. "Practical Approaches to Creating a Security Culture," *International Journal of Medical Informatics* (60:2), pp. 151-157.
- Jonsson, K., Holmström, J., and Lyytinen, K. 2009. "Turn to the Material : Remote Diagnostic Systems and New Forms of Boundary Spanning," *Information and Organization* (19:4), pp. 233-252.
- Latour, B. 1987. *Science in Action: How to Follow Scientists and Engineers through Society*. Harvard university press.
- Latour, B. 2005 *Reassembling the Social: An Introduction to Actor-Network Theory*. Oxford: Oxford University Press.
- Leezenberg, M. 2002. "Power in Communication: Implications for the Semantics-Pragmatics Interface," *Journal of Pragmatics* (34:7), pp. 893-908.
- Orlikowski, W. J. 2000. "Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations," *Organization Science* (11:4), pp. 404-428.
- Orlikowski, W. J., and Scott, S. V. 2008. *The Entangling of Technology and Work in Organizations*. Information Systems and Innovation Group, Department of Management, London School of Economics and Political Science.
- Pentland, B. T., and Feldman, M. S. 2007. "Narrative Networks: Patterns of Technology and Organization," *Organization Science* (18:5), pp. 781-795.
- Pettigrew, A. M., Woodman, R. W., and Cameron, K. S. 2001. "Studying Organizational Change and Development: Challenges for Future Research," *Academy of management journal* (44:4), pp. 697-713.
- Robey, D., and Sahay, S. 1996. "Transforming Work through Information Technology: A Comparative Case Study of Geographic Information Systems in County Government," *Information systems research* (7:1), pp. 93-110.
- Scolai, P. 2008. "Materialising Materiality," in *Proceedings of the Twenty Ninth International Conference on Information Systems*, Paris, pp. 1-10.
- Shoib, G., Nandhakumar, J., and Jones, M. 2006. "Using Social Theory in Information Systems Research: A Reflexive Account," in *Proceedings of QualIT2006: Quality and Impact of Qualitative Research*, Brisbane, Australia, Griffith University.

- Swanson, E. B., and Ramiller, N. C. 2004. "Innovating Mindfully with Information Technology," *MIS quarterly* (28:4), pp. 553-583.
- Van Reijswoud, V. 2009. "Appropriate ICT as a Tool to Increase Effectiveness in ICT4D: Theoretical Considerations and Illustrating Cases," *The Electronic Journal of Information Systems in Developing Countries* (38), pp. 1-18.
- Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. 2003. "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly* (27:3), pp. 425-478.
- Walsham, G. 1997. "Actor-Network Theory and IS Research: Current Status and Future Prospects," in *Information Systems and Qualitative Research*, A.S. Lee, J. Liebenau and D. J.I. (eds.). New York: Chapman & Hall, pp. 466-480.
- Walsham, G., and Sahay, S. 2006. "Research on Information Systems in Developing Countries: Current Landscape and Future Prospects," *Information technology for development* (12:1), pp. 7-24.