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IT in Healthcare: an Integrative Study of Organizational Change

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ABSTRACT

Research on Healthcare IT is a highly multidisciplinary field. Each stream of research brings a certain focus and contributions to our understanding of the role of technology in healthcare. However, this high multidisciplinary can be confusing as the results and implications of the different streams may look incommensurable. This paper looks at various streams of research on health IT and presents an integrative framework that utilizes organizational change to understand how different research streams on health IT interrelate and contradict in terms of their focus, contributions and implications. We argue that such an integrative understanding is the key to capture the complexity of health IT projects and ensure their success.

Keywords

Health IT; organizational change; culture; politics and power; institutional studies; workplace studies; professional practices; electronic medical records; health economics; health operations management.

INTRODUCTION

The high failure rate of health IT projects is alarming. A recent article estimated its rate in the US at around 40% (Kaplan et al., 2009). In addition, adoption rates of health IT in North America are low. Only 4% of physicians in the US reported having a fully functional electronic record (EMR) system and 13% have reported having a basic system (DesRoches et al., 2008a). The situation in hospitals is even worse. A recent study reported that only 1.5% of US hospitals have a comprehensive system and only 7.6% have a basic system (Jha et al., 2009).

Researchers in many domains are contributing to solving this puzzle. The high degree of multidisciplinarity in the research on health IT is a blessing and a curse at the same time. While various ideas are presented from a large pool of expertise, connections between these ideas are seldom made. In this paper, we advocate a synthesis approach that draws lessons from various research streams and argue that such an integrative approach is the key for a better understanding and planning of health IT projects.

AN INTEGRATIVE APPROACH FOR STUDYING HEALTH IT

Given the voluminous amount of research on health IT in various disciplines, it would be a very ambitious goal to synthesize this research in one paper. Our goal in writing this paper is rather to present a model that provides a meaningful classification of research on health IT and can be used to integrate this research. The model, presented in Figure 1, draws its components from perspectives and theories of organizational change and technology development. We decided to adopt this view because implementing IT in healthcare is not only a technical question but also a substantial change in the structure and the processes of healthcare.

The upper part of the model covers sociological-oriented research focused on the role of social entities when implementing health IT. This *sociological* perspective studies the role of different social entities including cultures, organizations and individuals. The lower part of the model brings technological-oriented research that looks into the structure, applications and impact of healthcare technology. Although both the sociological and technological perspectives span different levels of analysis, they do not explain the micro-level relations between technology and social actors. The sociological and technological perspectives meet at the workplace perspectives where research focuses on the interaction between users and technology. Workplace studies aim at understanding the ways in which technology is used in daily organizational conduct and interaction rather than how technology changes societies and organizations (Heath et al., 2000).

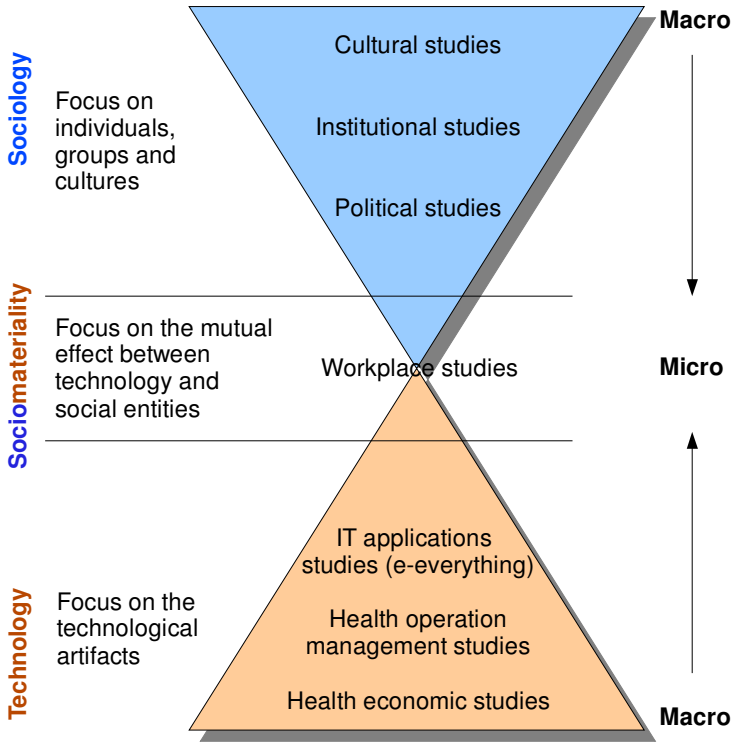

Figure 1: the Hourglass Model, how different research focus on health IT

SOCIOLOGY STUDIES

Culture perspective

Implementing IT in the hospital or the clinic brings change into a long established profession. Medicine is perhaps the oldest profession on earth with practices rooted in a long human tradition. For example, the Hippocratic Oath is still employed in many medical schools. Although medicine has benefited and changed a lot due to scientific progress and technological development (Clarke et al., 2003), the social aspect has not been deeply affected by these innovations. Culture-oriented research in health IT focuses on how technology fits and interrelates with the social norms and the culture symbols inside the medical institution, usually concluding that more care should be paid to these issues for a successful implementation.

In their study of the sociological aspect of medical records, Berg and Bowker (1997) argue that the implementation of EMRs is not merely a technical problem of designing and implementing the appropriate interface: "*When it is acknowledged that the medical record is interwoven with the structure of medical work in fundamental ways, and that different medical record systems embody different notions of how work is organized, different modes of configuring patient bodies and so forth, we are in a position better to understand and intervene upon the issues at stake*" (Berg et al., 1997, p. 532). Rivard, Lapointe, and Kappos (2011) show that difficulty of implementing an EMR system depends on its effects on the different cultural values in the hospital. They identified four values: quality of care, efficiency of clinical practices, medical dominance, and professional autonomy. Then they classified these values using Martin's three dimensions of a culture: integration, differentiation, and fragmentation (Martin et al., 1987). Quality of care and clinical practices are integrative values—their interpretation is shared across all medical workers. Medical dominance and professional autonomy are differentiating values—they differ depending on the subgroup (doctors, nurses, and technicians). Implementation is facilitated when it is consistent with the four values. One of the main problems about health IT systems is that they are developed and used by two different groups with different cultural backgrounds (Safadi et al., 2010a). Developers are tech-savvy, progressive and passionate about the role of technology in producing change. Users, mainly doctors, usually are not interested in technology and they do not like their status to be touched nor do they have time and interest to change their practices.

These studies shed light on the importance of respecting cultural norms when introducing a technological change in the workplace. This criterion is often overlooked by technology-focused research of health IT as we will discuss later.

Institutional perspective

Moving one level from cultures to organizations, we find institutional research of organizational change that studies how institutions change and acquire new structures. The new stream of institutional research—i.e. neo-institutionalism—argue that institutions adopt new structures not because of increased efficiency gained from these structures, but rather because the new structures look trendy and increase the legitimacy of the acquiring institution (Meyer et al., 1977). For example, waves of standardized practices such as total quality management (TQM) and business process reengineering (BPR) were adopted by many businesses for legitimacy purposes without taking other considerations into account (Demers, 2007).

This phenomenon is studied extensively in information systems research. Some organizations may implement IT "mindlessly" (Swanson et al., 2004) just to jump into the bandwagon and imitate competitors. Contrast to mindless innovation, mindful innovation with IT happens when the organization considers its context and particular characteristics when acquiring and implementing IT (Swanson et al., 2004). This trend of acquiring the "hottest" IT in the market is referred to as IT "fashion" (Akhlaghpour et al., 2010). A recent study on this topic shows that companies that invest in IT fashion do not have higher performance than other companies. However, IT-fashionable companies tend to have better reputation and higher executive compensation in the short term (Wang, 2010).

"Health IT fashion" is quite common in healthcare organizations. Indeed, institutional change in healthcare is sometimes induced by legal requirements, economic incentives and competition. While it is understood that organizations seek to attain legitimacy by adopting new practices and norms (DiMaggio et al., 1983), we think that this is problematic particularly in the context of health IT because mindless implementation of technology will limit and even inhibit its promised advantages. Given that health IT technology is quite expensive, it is a pity if they are acquired for their symbolic character. A recent study by Trudel et al. (2010) studied two hospitals that decided to invest in the same technological innovation, digital medical imaging, at the same time. The hospital that was mindful fostered a successful implementation of the technological project, while the hospital that was mindless failed in implementing the project. This research shows that institutional forces, while pertinent and important, do not guarantee successful implementation of a health IT project.

Political perspective

We have discussed the cultural and institutional aspects organizational change when implementing health IT. We now shift our attention to the individual level and look at how individual actions and behaviors play a role in the implementation process. We discuss relevant research by using the political perspective of organizational change. The political perspective looks at organizational interactions as dialectical processes in which individuals with divergent interests compete (Demers, 2007). The political perspective is also unique in recognizing the role of power in organizations. Power results from the asymmetric possession and exercise of resources, processes, meanings, and systems (Hardy, 1995).

The political theme is relevant in the context of health IT because the implementation of health IT systems incorporates several groups with different interests such as medical practitioners, management, staff, insurers, and even patients and politicians (Mintzberg, 2002). The recent debate about healthcare reforms during the last US elections exemplifies this point. Research in health IT is sometimes biased in paying attention to one group in particular and missing the complex interrelations with other groups and stakeholders. Physicians have the lion's share of attention especially that they themselves provide a great deal of contribution to the research in health IT. For example, Baron et al. (2005) highlighted several key decisions they made when implementing an EMR system in their clinic. One key decision was to minimize the IS impact on physician-patient interaction. To achieve this goal, tablet computers with wireless connection were chosen. Another key decision was not to impose any additional requirement on the physicians because of the new system. "*We operate under the assumption that the physician is the most skilled, and most expensive, person in the office and should only do what no one other than a physician could do.*" (Baron et al., 2005, p. 223).

The dominance and importance of physicians' support for the success of health IT implementation has been confirmed by IS researchers. Lapointe and Rivard (2005) studied the implementation of three EMR systems in three hospitals. In one case, they found that physicians' resistance to the system was triggered by its slowing down their process of carrying out medical procedures. Physicians' resistance was passive at the beginning but started to become active when the distribution of power between physicians and nurses was affected—physicians felt that the system is making them do more clerical tasks.

Power and politics can be used for inducing organizational change. As an example in health IT, Brown (1995) describes the case of a health information support system (HISS) whose legitimacy and support resulted from a large marketing campaign that utilized both rational arguments and political processes to promote the adoption of the system. Different stakeholders in the hospital were given, depending on their interests, different information and explanations regarding the motivations which prompted investment in the system and its likely implications for them and the organization. This political process manipulated how different people understood the role of the system in the hospital. Related to the previous argument about

the crucial role of the doctors, the implementation team hid information that could discourage junior doctors to adopt the system: "*The activities of the implementation team can thus be interpreted as moves in a micropolitical game in which the understandings of significant individuals were manipulated so that they had more favourable opinions of the HISS than might otherwise have been the case. This crucially involved not just the specific tailoring of communications to meet the concerns of those influenced, but the withholding of key information regarding the implications the HISS had for control over individual and departmental discretion and its potential for 'de-skilling' junior doctors*" (Brown, 1995, p. 962).

While we do not endorse manipulation as a way to promote project success, it is certainly a fact that power can be used as a motor for organizational change (Pettigrew, 1985). Another option it to ensure that the interests of various groups are collectively taken into account, however, this requires central planning. As an example, discussing the required step for implementing a national health IT infrastructure in the US, Stead et al. (2005) identify three dimensions of such infrastructure that correspond to government level (EHR), institution level (EMR) and personal level (PHR). It is important to address these three levels in an integrative framework to ensure compatibility. Otherwise conflicts of interests may arise around many issues such as patients' consent, information sharing and reporting, accessing the system for public services and national statistics, system inspection and others.

The role of technology under the sociology perspective

Orlikowski and Iacono (2001) proposed a classification scheme for the role of the IT artifact in research on technology and information systems. This deemed necessary as researchers have different notions and definitions when they talk about the IT artifact. These definitions include the context within technology operates, the processing capabilities of the IT artifact, and the impact of the IT artifact when it is used. We will be using this classification for showing how the different perspectives discussed in this paper tend to view technology differently.

The cultural perspective utilizes the "proxy view" of technology. This view "focuses on one or a few key elements in common that are understood to represent or stand for the essential aspect, property, or value of the information technology" (Orlikowski et al., 2001, p. 124). The perception of technology by social actors is what matters in cultural studies. This view is shared by the institutional and political perspectives, however, these two perspectives sometimes neglect the IT artifact and put it in the background of the study as an incidental component. They therefore, fall under the "nominal view" of technology.

To sum up, the sociological-oriented research of health IT looked at why and how people and organization use technology. However, the conceptualization of technology in this research is rather general. Technological details that are omitted here are picked up by other streams of research.

TECHNOLOGY PERSPECTIVE

Research on the technology side of health IT focuses on the impact and applications of technology when used in healthcare. Again, the goal of this section is not to be comprehensive in covering all research about the usage of technology in healthcare, rather we will be discussing three streams of research that present different angles in dealing with the IT artifact in healthcare. These are: the economics of health IT, healthcare operations management, and the research on the various applications of IT in healthcare.

Economics of health IT

The research on the economics of health IT focuses on the benefit realized by implementing various health IT applications versus the cost associated with these systems. Cost-benefit analysis is commonly performed in health IT economics. Given the low adoption of such systems, especially in North America, this research argues that the implementation of health IT is beneficial and should be a priority for healthcare decision makers.

Hillestad et al. (2005) estimate that, by improving health care efficiency and safety, the widespread adoption of EMR systems in the US can save more that $81 billion annually. This figure could double if advanced functionalities of EMR systems such as enabled prevention and management of chronic disease are realized: "*the adoption of interoperable EMR systems could produce efficiency and safety savings of $142–$371 billion*" (Hillestad et al., 2005). Walker et al. (2005) argue that the huge benefits associated with the implementation of health IT systems are overestimated. They report that the value of fully standardized health care information exchange and interoperability among providers and consumers could be more than $77 billion per year. Nonstandardized implementations yield smaller positive returns as well.

As evident in the short overview of research on health IT economics, the focus is on the macro impact of health IT system. Following the taxonomy of Orlikowski and Iacono (2001), it seems that the economics studies of health IT fall into the nominal view of the IT artifact where the "IT artifacts are not described, conceptualized or theorized; technology is

essentially absent from these articles. Constituting neither an independent nor a dependent variable, technology here is the omitted variable" (Orlikowski et al., 2001, p. 128).

Healthcare operations management

Research in healthcare operations management (OM) aims at improving the outcomes of healthcare practices at different levels by optimizing the usage of resources, the arrangement of processes, and the structure in which healthcare processes are performed. Research in health OM can be grouped into two broad areas: healthcare planning and organizing, and healthcare delivery (Brandeau et al., 2004). Healthcare planning and organizing research covers several high level planning topics such as deciding the optimal locations for healthcare facilities (Verter et al., 2002) and increasing the effectiveness of staffing and operations in emergency departments (Channouf et al., 2007; Green et al., 2006b; Sinreich et al., 2005). Research in healthcare delivery touches the daily operations and practices of healthcare practitioners. The stream includes topics such as optimizing patients' scheduling and appointment acceptance (Green et al., 2006a), managing the length of stay and flow of patients in hospitals (Marshall et al., 2005), and assisting physicians when making complex treatment decisions (Kucukyazici et al., 2009).

Research in healthcare operations management utilizes mathematical modeling techniques such as linear and integer programming, Markov decision processes, and simulations. This perspective, therefore, subscribes to the computational view of the IT artifact according to Orlikowski and Iacono (2001)'s taxonomy. Technology is used as a computational tool for modeling, optimizing, and restructuring medical process. Once the optimization or the simulation is done, the role of IT is over. Moreover, such a computational view stereotypes the social entities as sharing predefined characteristics. This limits the capability of these models to capture the complexity of the social entities and interactions as we will see later.

Applications of IT in healthcare

The third stream of research that deals exclusively with IT in healthcare is research on the various applications of IT in healthcare such as electronic medical and health records, hospital management systems, computerized order entry systems, electronic prescribing electronic medical imaging. The research studies the structure and the impact of IT applications in healthcare.

DesRoches et al. (2008b) show that in the United States physicians who use electronic health records are happy with their systems and believe that these systems help in improving the quality of care. Yet, only 4% of physicians reported having a fully functional EMR system and 13% have reported having a basic system. Garrido et al. (2005) studied the impact of EMR systems on the number of visits in ambulatory care clinics. The study found that an EMR system helped in reducing the number of visits that are unnecessary or marginally productive by 9%. One particular study shows some of the advantages of implementing a computerized physician order entry (CPOE) system (Davidson et al., 2007). The implementation of the system was associated by significant reductions of medication errors, significant increase in the effectiveness of medication uses, an increased compliance to clinical standards, and improved clinical administration. Finally, Tamblyn et al. (2006) studies the implementation of an integrated electronic prescribing and drug management system in primary care clinics. They found that physicians believed that the system would improve the continuity of care, and that they are more willing to adopt it in more complex, fragmented situations.

In contrast to the passive role of IT in the research on healthcare OM, the role of IT in the applications' research is active. Information systems and the communication infrastructure hold the medical data and allow for its interchange. In a way, information and communication technology is the "nervous system" of healthcare in a fully computerized context. This corresponds to the tool view of the IT artifact. The information processing capabilities of IT technology contribute to change and improve the ways that humans and organizations store and process information (Orlikowski et al., 2001).

Concluding the discussion of technology-oriented research of health IT, we have demonstrated that this research focuses on the technological artifact with little or no reference to the social context in which the IT artifact is employed. The last perspective will serve in bringing the social and technological aspects together.

WORKPLACE PERSPECTIVE

So far we have classified research on health IT into sociological-oriented and technological-oriented research. We have seen that these two perspectives have different foci on the technological artifact and the social entities interacting with it. While such a dualism allows for focused and bounded research, in reality however, this dichotomy does not exist. Moreover, one-sided research cannot provide a fine-grained description of the phenomenon because it misses the interaction between technology and social actors that happens all the time. These interactions happen all the time whether a change is happening or not. Indeed the practice perspective is unique in its focus on continuity rather than change when looking at organizational development (Orlikowski, 1996).

The workplace perspective[1] aims at bridging this gap between technology and social entities. The term *sociomateriality* refers to the idea that the social and the material are entangled in everyday life (Orlikowski, 2007). Research in the workplace perspective studies social practices and routines as they enfold overtime, how practices and routines interrelate with technology, and how technology evolves due to social practices. Orlikowski (1996) put the accent on studying practices as a medium for studying organizations. She illustrated how the adoption of the same technology (lotus notes) in four different contexts led to different outcomes depending on users' actions, organizational conditions, and technological properties (Orlikowski, 2000). Feldman et al. (2003) suggest that routines have two dimensions: an ostensive dimension, and a performative dimension. While the ostensive dimension is important, it is at the same time static as it describes the idea of the routine. The performative dimension is what renders the routine in reality in the action of enactment. Enactment is never perfect; it is like performing a musical score. The accumulation of divergence between the ostensive definition of the routine and its performing creates change.

In health IT literature, the most visible workplace study is of Barley (1986) who studied the structural changes that the implementation of identical CT scanners triggered in two similar hospitals. He found that those changes were different in the two hospitals. At one hospital the implementation caused a significant change in the distribution of power in the work process, whereas at the other hospital the power relationships between radiologists and technicians did not differ after the implementation of the technology. Safadi et al. (2010b) studied how medical users work around an electronic medical record system because of the lack of certain features in the system. They found that the technology appropriation process involved the evolving of number of non-trivial workarounds in order to match the EMR to medical work. Furthermore, some workarounds transformed to standardized system practices in the clinic.

Workplace and practice-based approaches are unique in their conceptualization of change as an incremental continuous process rather than a discrete event. Indeed we perceive change because of our inability to follow that process while it unfolds. Nicolini (2007) took a practice approach tailored to describing change in medical practices due to the introduction of telemedicine. He focused on the redistribution of work between humans and non-humans, the accountability of the medical work, and the adjustment of the relationships in the work setting. "*Much more than a simple redistribution of what was already there and it triggers profound changes which included the reframing of the object and content of the activity, the emergence of new artefacts and new identities, and the modification of the geography of the power positions between all those involved*" (Nicolini, 2007, p. 889).

In workplace studies, technology is viewed with an ensemble lens following Orlikowski and Iacono's framework. The ensemble view of the IT artifact focuses on focusing on "the dynamic interactions between people and technology—whether during construction, implementation, or use in organizations, or during the deployment of technology in society at large" (Orlikowski et al., 2001, p. 126). This view covers both the structural aspects of technology and the agency roles of its users.

IT IN HEALTHCARE: REVOLUTION OR EVOLUTION

The huge impacts of technology on healthcare, as predicted by health IT economics research, prophesies a revolution. Indeed, medicine has changed dramatically since the discovery of the modern germ theory of disease. However, we should be careful before sheering up for this revolution or even just accepting its happening. Organizational change research shows that the results of such revolutions are likely to create new organizations that will overtake the current ones. Miller and Friesen (1982) suggest that quantum change may better describe organizational change than incremental change. They suggest that inertial forces build momentum which drags the organization into its current configuration allowing only for small changes. Radical changes occur infrequently and result into a quantum change of organizational configurations. The idea of structural inertia (Miller et al., 1982) suggests that organizations stick with what they know because change is detrimental for them. Indeed, structural inertia inhibits large organization from making change and reduces their strategic choices (Hannan et al., 1984), on the other hand, young organizations such as startups usually have more agility and flexibility in taking strategic decisions. For example, Huygens et al. (2001) documents long term changes in the music industry. In this industry, companies with different core competencies (phonograms, radio, catalogues, CD-ROM and may be now online distribution) succeeded over the thrown of the music industry without surviving more than one period of change. Companies in the music industry were highly inertial and underestimated the risks that technological and environmental changes pose. They, therefore, missed the opportunities of keeping ahead and lost their positions to new entrants.

[1] We are using the term workplace studies loosely to refer to practice-center approaches including practice-based and situated studies

This is sad news in the context of bringing IT into health because radical changes in a critical and overloaded sector such as healthcare are painful if not dangerous. Fortunately, not all researchers agree on the radical nature and revolutionary characterization of organizational change; some organizational change theories propose that change is gradual and evolutionary.

In the 1990s the evolutionary school of organizational change gained tractions arguing that organizations do indeed change and adapt. Researchers have posited different mechanisms of this change including planned management, external environment pressures and internal growth (Demers, 2007). As an example of planned management of change from the inside, Burgelman (1991) describes the interesting case of Intel in the 1980s where Intel changed its position from the "memory company" to the "microprocessor company". Although, most of the staff at Intel believed of the "memory company" motto, the management was flexible enough to accommodate new direction and change its inertia. The company gradually unlearned the previous routines, competencies and products (DRAM memory) and successfully shifted toward a venue (the microprocessor). This case illustrate that an organization is not doomed to inertia, if it has the capability of unlearning and adapting from inside. We believe that a gradual change is desirable in healthcare. However, an understanding of sociological and technological aspects of health IT and healthcare practices is crucial for mindfully planning a gradual change and for avoiding being trapped in organizational inertia.

SYNTHESIS AND LESSONS LEARNED

High failure rate of information systems projects puzzled many researchers to investigate the causes in order to avoid them in subsequent projects (Hirschheim et al., 1988; Wallace et al., 2004). Despite the breadth of generated research and the prevalence of IT in other fields, we are still observing failures in adopting and implementing medical information systems (Blumenthal et al., 2007). In this paper, we presented how different research perspectives approach the question of implementing health IT. We advocate a synthesis approach that draws lessons from all of the perspectives and we argue that such integrative approach is the key for a better understanding and planning of health IT projects.

The cultural perspective highlights the role of values, symbols, and norms in clinical work. Bringing an organizational change to the clinical culture calls for respecting its values, symbols and norms. For example, Rivard et al. (2011) classified the cultural values in the hospital context. This classification allows for a better treatment of cultural values by the implementers of health IT projects.

The institutional and political perspectives unveiled many irrational factors in rational-looking projects and initiative. At the same time, they remind us to take these factors into account. The research of Trudel et al. (2010) illustrates that mindful planning for health IT projects is a key for their success. This does not eliminate all of the side benefits such as institution legitimacy and public image. On the contrary, a successful project reinforces these side benefits. Brown (1995) cites the case in a hospital where the implementation team of new IT system played around with the politics of the hospital and manipulated how various groups understood the system. While we do not advocate this manipulative approach, we call for a better consideration of interests of various groups that are involved in the implementation and usage of the system such as demonstrated by Stead et al. (2005).

Technology oriented research on health IT looked more closely at the role and impact of technology on the healthcare sector omitting often the complex social web that health IT projects are embedded in. In short, healthcare economics of IT looked at the cost benefit analysis of health IT projects and drew a rosy picture of the advantages and the need of such systems. Healthcare operation management used technology to optimize and enhance the planning and daily operations of healthcare, and research on the applications of IT advocated the digitization of health-related information and communication.

Workplace studies stress the importance of interaction between technology and its users. The success of a health IT project may greatly depend on the nuances of these interactions as research indicates. The complexity of the medical work and the inability of software to tailor to the diverse medical practices may explain the limited diffusion of health information systems especially in North America (Blumenthal et al., 2007; DesRoches et al., 2008a). In studying the workaround behavior of EMR users, Safadi et al. (2010b) found that the richness and diversity of medical practices demand high customizations to the medical information system to match users' needs at the implementation site. In the absence of such customizations, dissatisfaction and resistance toward the system arise. Workplace studies offer a "high-zoom" lens that enables us to look into the finer details of the implementation of health IT projects. While such studies are context-depended, their interpretation carries out essential knowledge and lessons that can be generalized beyond the original contexts.

Table 1 summarizes the differences among various streams. Different research perspectives tend to view the IT artifact differently. We have used the classification of Orlikowski and Iacono (2001) to demonstrate the different conceptualizations of the IT artifact.

Research stream	Conceptualization of the IT artifact	Focus
Cultural perspective	Proxy view	IT is tied with the norms and values. The change is gradual.
Institutional and political perspective	Proxy and nominal views	Organizations change gradually adopting new IT to achieve legitimacy
Healthcare economics	Nominal view	Focuses at the cost-benefit analysis of acquiring new technology
Healthcare operations management	Computational view	Optimization of health processes
Healthcare applications of IT	Tool view	Focuses solely at the technology artifact and how it is used to automate health processes
Workplace perspective	Ensemble view	The recurrence of social practices in the organizational context leads to reproduction and change (Demers, 2007, p. 209)

Table 1: classification of the different research streams

IMPLICATIONS FOR FUTURE RESEARCH

While we are certain that the implementation of technology can bring huge benefits to healthcare, we also think that these studies overestimated the benefits of IT because they underestimated the social aspect of the systems. After all, if hundreds of billions of dollars can be saved annually by the introduction of wide scale health IT systems, why do not such systems exist? And sure optimizing healthcare operations is beneficial. However, at the same time social entities—i.e. as medical workers—cannot be modeled as material resource that have specific capacities and share predefined properties, as it is often done in operation management research. Moreover, optimizing a system can make it less robust because of the continuous utilization of all resources; this is an outcome that should be avoided in healthcare. We think that brining sociological insights into technology-oriented research is essential to deal with these shortcomings.

Finally, because implementing comprehensive health IT system is projected to have considerable organizational impacts in healthcare, it is important to anticipate and predict these consequences. We have demonstrated the two competing point of views: radical change (revolution) and gradual change (evolution). A well rounded understanding of organizational change theories will permit to avoid the painful path of a radical change in healthcare. This paper advocates for such a comprehensive understanding of various theories in spite of the apparent conflict of interests and perhaps incommensurability among them.

CONCLUSION

In this paper, we have shown how different research streams looked differently at the implementation of health IT projects. We argue for an integrative approach that draws lessons from various perspectives. The metaphor of an hourglass (Figure 1) is suitable for planning and studying the implementation of health IT projects. A functional hourglass should always be turned so that sand keeps flowing via its different parts. A functional understanding and planning of health IT requires a constant consideration of all of the cultural, institutional, political, technological, and practice issue surrounding the implementation of the system. Such integrative perspective is the key to capture the complexity of health IT projects and ensure their success.

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