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Abstract

The organizational consequences of IT has long been a central topic of interest in IS research. However, findings from this research stream have been inconsistent, limiting their value to both theory and practice. Attempting to address this discrepancy, we build upon prior research to propose a structurational framework that integrates four theoretical perspectives of IT-induced organizational change: political theory, organizational culture, organizational learning, and institutional theory. Housed under the framework based on structures, modalities and actions, the pertinent elements in the four theoretical perspectives are explicated through the lens of structuration theory. Further, the inter-relationships among these elements from the four perspectives are brought to light. In particular, organizational learning is seen as the focal mechanism through which IT-induced change takes place. By constructing such an analytical framework, we aim to provide a more holistic understanding of the IT-induced organizational change phenomenon. The framework may also serve as a sensitizing device for practitioners to better manage the complex organizational change processes induced by IT implementation.

Keywords: IT-induced organizational change, structurational framework, political theory, organizational culture, organizational learning, institutional theory

Introduction

The topic of organizational change induced by information technology implementation has long been a major research theme in both management and information systems literature. However, the study of IT-induced organizational change is still considered far from mature (Pettigrew et al. 2001), and has become increasingly complex with rapid advancements in IT and more turbulent organizational environments (Orlikowski and Hofman 1997). Findings from this research stream are often inconsistent, making attempts to generalize results difficult if not impossible. As Markus and Robey (1988, p. 596) noted: "It is no secret that research on IT and organizational change has produced conflicting results and few reliable generalizations."

Attempting to address this discrepancy, researchers have called for a multifaceted perspective into the inquiry of the IT-induced organizational change phenomenon. For instance, Markus (1983) presents an emergent perspective that sees IT-induced organizational change as an indeterminate process. According to this perspective, both IT and organizational actors interact in a web of inextricably mutual influencing relationships. Such a premise is considered more realistic than the overly optimistic technology-imperative perspective (e.g., Carter 1984) and the overly rational agency-centered perspective (e.g., Meyer and Goes 1988). By extending the emergent perspective, an improvisational model was proposed (Orlikowski 1996) that sees organizational change as a process involving an iterative series of anticipated, emergent, and opportunity-based changes that can hardly be

preplanned. In sum, the more recent perspectives on IT-induced organizational change reject the cause-and-effect treatment in favor of a more flexible process-based approach to study the phenomenon.

In line with this general direction, Robey and Boudreau (1999) considered four theoretical perspectives to investigate IT-induced organizational change: political theory, institutional theory, organizational culture, and organizational learning. The four theoretical perspectives focusing on different and complementary organizational aspects are believed to be able to account for contradictory findings often encountered in change studies. Specifically, a logic of opposition is deemed useful in bringing to light the opposing forces derived from the four perspectives that both promote and impede IT-induced change. They argue that, "The identification of opposing forces allowed researchers to make sense of changes that might otherwise have been unexplained" (p. 179). However, Robey and Boudreau confine their discussion to within the four theoretical perspectives and do not attempt to explore the possible interplay among them. Yet, inter-relationships among the theoretical perspectives are evident. For instance, previous research illustrates the need to take organizational learning into account when considering the impact of organizational culture on a firm's performance (Sørensen 2002) or the impact of institutional conditions on organizational change (Newman 2000).

Based on the need for a multifaceted perspective to investigate the phenomenon and the inter-relationships between the four theoretical perspectives (political theory, organizational culture, organizational learning, and institutional theory) used to explain the phenomenon, we propose a structurational framework of IT-induced organizational change that integrates the four perspectives. The reasons for using structuration theory (Giddens 1979) as a lens to integrate the four perspectives are discussed in a later section. Such an analytical framework draws attention to relevant elements from all four theoretical perspectives, thus avoiding selective bias toward a single favored perspective. In the next section, we will provide a discussion of each of the four perspectives to set the context for our subsequent framework development effort.

Theoretical Background

IT and Organizational Change

The implementation of new technology has long been recognized as an intervention that can induce organizational change (Szulanski 2000). In fact, change is required with implementation of IT in order to fully capitalize on the benefits that IT can offer. For example, computer-aided design and manufacturing (CAD/CAM) systems, implemented to shorten development cycle times and improve product quality, require new modes of communication and information sharing among engineers using the systems (Black et al. 2004). Unfortunately, many organizations struggle to bring about intended change and consequently fail to reap the full benefits of the new IT (Robey and Boudreau 1999). Through understanding how various organizational elements interact during the process of IT implementation, intended organizational change can be better managed and attained.

Political Theory

Political theory revolves around the notion of power (Sillince and Mouakket 1997) and the related concept of power relations, in which power entails in relationships between two or more actors (Hall 1999). Power has been known to carry a diverse array of meanings. As noted by Jasperson et al. (2002, p. 398): "Power is a messy, elusive concept that not only has surface or visible characteristics, but also hidden characteristics that are difficult to define and grasp." Previous research has identified three distinct modes in which power operates: episodic, systemic, and social integration (Lawrence et al. 2001; Silva and Backhouse 2003). Episodic mode of power refers to discrete, strategic political acts initiated by self-interested actors, which can be facilitated by formal authority and having access to scarce resources (e.g., expertise). Systemic mode of power works through the routine, ongoing practices of organizations, such as through the information system and discipline. Discipline involves an ongoing, systematic engagement with the target of power and affects the actions of organizational members by shaping their experience and understanding (e.g., compensation, training, and teamwork) (Townley 1993). Last, the social integration mode of power is the capacity for one to influence others' behavior and operates through rules that govern meaning and membership in organizations. Both systemic and social integration modes of power may form the basis for exercising the episodic mode of power through provision of facilitating conditions and dispositional rules (Silva and Backhouse 2003). Taken as a whole, power and power relations are inseparable from organization life, as organizations are essentially political arenas, oriented around the pursuit and display of power (Pfeffer 1981). In IS research, it has been seen that IT implementation is infused with organizational actors' interests (e.g., Sillince and Mouakket 1997) and may become a source of political conflict between IS professionals and users

(e.g., Markus 1983). Political theory has been employed to shed light on how IT implementation influences power relations, and how organizational actors embrace or resist IT in order to fulfill or protect their own political interests (e.g., Markus 1983).

Organizational Culture

Organizational culture focuses on patterns of basic values and assumptions that unconsciously guide the behavior of organizational members (Schein 1992). Culture manifests itself through the fundamental elements of artifacts, values, assumptions, and symbols (Hatch 1993; Schein 1990). Recognizing that culture may not be always coherent in nature, Martin (1992) articulates three different perspectives for interpreting culture: integration, differentiation, and fragmentation. The integration perspective sees culture as a unified whole that holds an organization together and helps define its distinctive features (Robey and Boudreau 1999). The differentiation perspective portrays culture as a collection of potentially contradicting values and manifestations (Meyerson and Martin 1987). Such a perspective acknowledges the existence of subculture, which is a broad description of the existence of subgroups within an organization who share sets of meanings that perpetuate their distinctive character within the organization as a whole (Walsham 1993). While the first two perspectives ignore the existence of ambiguity to varying extents, the fragmentation perspective views ambiguity as inevitable to the nature of culture. According to this perspective, culture is seen as an ambiguous social setting where paradoxes and contradictions abound (Robey and Boudreau 1999). Despite their differences, the perspectives can be used together to unveil rich insights about organizational phenomena. For instance, the three perspectives were employed in a complementary manner to study software development practices and seek insights that would necessarily be excluded by the use of only one perspective (Dubé and Robey 1999). Past studies of IT-induced change that involve organizational culture (e.g., Dubé and Robey 1999) have mainly focused on how IT facilitates cultural change or preserves existing culture, and how existing culture can facilitate or impede IT implementation.

Organizational Learning

Organizational learning considers organizations as cognitive entities capable of observing their own actions, experimenting to discover the effects of alternative actions, and modifying their actions to improve performance (Fiol and Lyles 1985). Organizations are seen as learning through a number of processes that create new knowledge or modify existing knowledge. Particularly, there is constant tension between exploration that captures search, risk taking, experimentation, discovery, and innovation, and exploitation that captures refinement, efficiency, selection, and execution (March 1991). Previous research has highlighted two types of organizational learning: first-order learning, which refers to incremental change in routines within the existing schema and is related to exploitation; and second-order learning, which involves the search for new routines and schemas that is related to exploration (Argyris and Schön 1978). Routines include an organization's ideologies, strategies, systems, technologies, and conventions that define the way in which it undertakes activities, whereas schemas are mental maps that determine how information is interpreted (Newman 2000).

Organizational learning is a multilevel phenomenon (Levitt and March 1988) that occurs through individuals who are the active learning agents. However, organizations, unlike individuals, develop and maintain learning systems that not only influence their immediate members, but also are then transmitted to others by way of organization histories and norms (Lawrence and Dyer 1983). Hedberg (1981) wrote, "Organizations do not have brains, but they have cognitive systems and memories….Members come and go…but organization memories preserve certain behaviors, mental maps, norms, and values over time" (p. 6). This statement highlights the role of organizational memory, which refers to "stored information from an organization's history that can be brought to bear on present decisions" (Walsh and Ungson 1991, p. 61). Organizational memory is a double-edged sword. On one hand, it serves as the stock of knowledge that guides organizational members' actions. On the other hand, it may result in "competency traps" that prevent an organization from adapting to environmental changes (Miller 1993). The ability of an organization to improve is thus linked to its aptitude to revise organizational memory. Organizational learning perspective has informed a substantive amount of IS research (Robey et al. 2000). It has been employed to explain and resolve the problems of IT implementation (e.g., Argyris 1977), and how IT may support or impede learning.

Institutional Theory

Institutional theory focuses on the notion of the institutional environment surrounding an organization. Institutional theory argues that in modern societies where organizations are typified as systems of rationally ordered rules and activities, organizations are driven to incorporate the prevailing rules and practices in the institutional environment in order to increase their legitimacy and

survival prospects (Meyer and Rowan 1977). Such conformance to the institutional environment, or isomorphism, may go against an organization's efficiency goals. Three types of isomorphic pressures have been distinguished: coercive, mimetic, and normative (DiMaggio and Powell 1983). Coercive pressures refer to formal or informal pressures exerted on an organization by others upon whom they are dependent (e.g., government regulations). Mimetic pressure results from standard responses to uncertainty. An organization may model itself after other organizations that are perceived to be successful, or it may adopt certain practices because they are prevalent in the industry. Last, normative pressure is associated with professionalization and results from the collective struggle of members of an occupation to define the legitimate conditions and methods of their work (DiMaggio and Powell 1983).

The traditional emphasis of institutional theory has been on the need of organizations to conform to the institutional environment, which often leads to persistence of existing institutionalized rules and practices (Buchko 1994). In other words, institutions act to stabilize by resisting change through providing the institutional logic from which individuals' thoughts and actions are constructed (Hargadon and Douglas 2001). There is, however, another strand of institutional theory that highlights the possibility of organizations to compromise, avoid, defy, and manipulate the institutional environment as well as acquiesce to its demands (Oliver 1991). Organizations may hypocritically conform to institutional pressures, or they may seek to actively shape the institutional environment. Institutional theory applied in the context of IS research (e.g., Kling and Iacono 1989) explicates how institutional pressures affect IT implementation that subsequently leads to organizational change or persistence. The theory also informs about the role of IT in helping an organization to shape its institutional environment.

Structuration Theory as an Integrative Lens

Structuration theory was proposed by Giddens (1979) as an attempt to reconcile the fundamental division between two established schools of ideologies in social sciences: those who overtly focus on the role of human agents in producing social phenomena through their subjective interpretations of the world, and those who stress the influence of the objective, exogenous social structures on social phenomena (Jones 1999). The reconciliation is achieved by conceptualizing structure and agency as mutually interacting duality, instead of independent and conflicting elements. Structure refers to the rules and resources upon which human agents draw in their interactions, which both enable and constrain their actions. Action is defined as "stream of actual or contemplated causal interventions of corporeal beings in the ongoing process of events-in-the-world" (Giddens 1979, p. 55), which emphasizes the transformative capacity of human agents in bringing about interventions to events surrounding them. Structure is thus both the medium drawn by human agents in their actions and also the outcome of those actions, a nature termed by Giddens as "duality of structure." The duality of structure encompasses three fundamental dimensions—signification, domination, and legitimation—which respectively interact with human actions of communication, power, and sanctions through modalities of interpretive schemes, resources, and norms. Modalities are "lines of mediation" through which structure is realized in human action (Baert 1998). To illustrate, individuals *communicate* through *interpretive schemes* that inform and define communication on the basis of shared meanings, which produce and reproduce *structures of signification*. Individuals *exercise power* through mobilizing *resources*, which produce and reproduce *structures of domination*. Individuals impose *sanctions* through *norms* (e.g., organizational rules), which produce and reproduce *structures of legitimation*.

Structuration theory has been widely employed in IS research (e.g., DeSanctis and Poole 1994; Orlikowski 1992, 2000). Particularly, Orlikowski (1992) developed a structurational model of technology that conceptualizes IT as part of the structuration process. The model holds that IT has the nature of duality, in that IT is the social product of subjective human actions and is simultaneously an objective set of rules and resources involved in mediating human actions. DeSanctis and Poole (1994) proposed an adaptive structuration theory to investigate the appropriation process of IT by organizational actors. The model posits that IT can be faithfully or unfaithfully appropriated by organizational actors with respect to the original design intents of the IT. The main argument from these structurational models of IT is that IT can be seen as embodying structures such as rules of certain work procedures (Walsham 1993). However, structure is, if we follow structuration theory closely, instantiated in human actions and is not something that exists independent of human actions. This is acknowledged by Orlikowski (2000), who proposes a practice-lens of technology. In this IT-structurational model, human actions are placed at the center and structure only emerges when technologies are "enacted" through human's repeated and situated interaction with technologies (Orlikowski 2000). This re-conceptualization of IT, called technologies-in-practice, reinstates the dynamic, emergent nature of structure that only exists as traces of human memory.

Several factors make structuration theory an especially relevant organizing device to integrate the four theoretical perspectives of interest. First, being a meta-theory (Gregson 1989), structuration theory is particularly apt for organizing and making sense of elements from the four perspectives that are relevant to IT-induced change (Jones 1999). Second, structuration theory has been

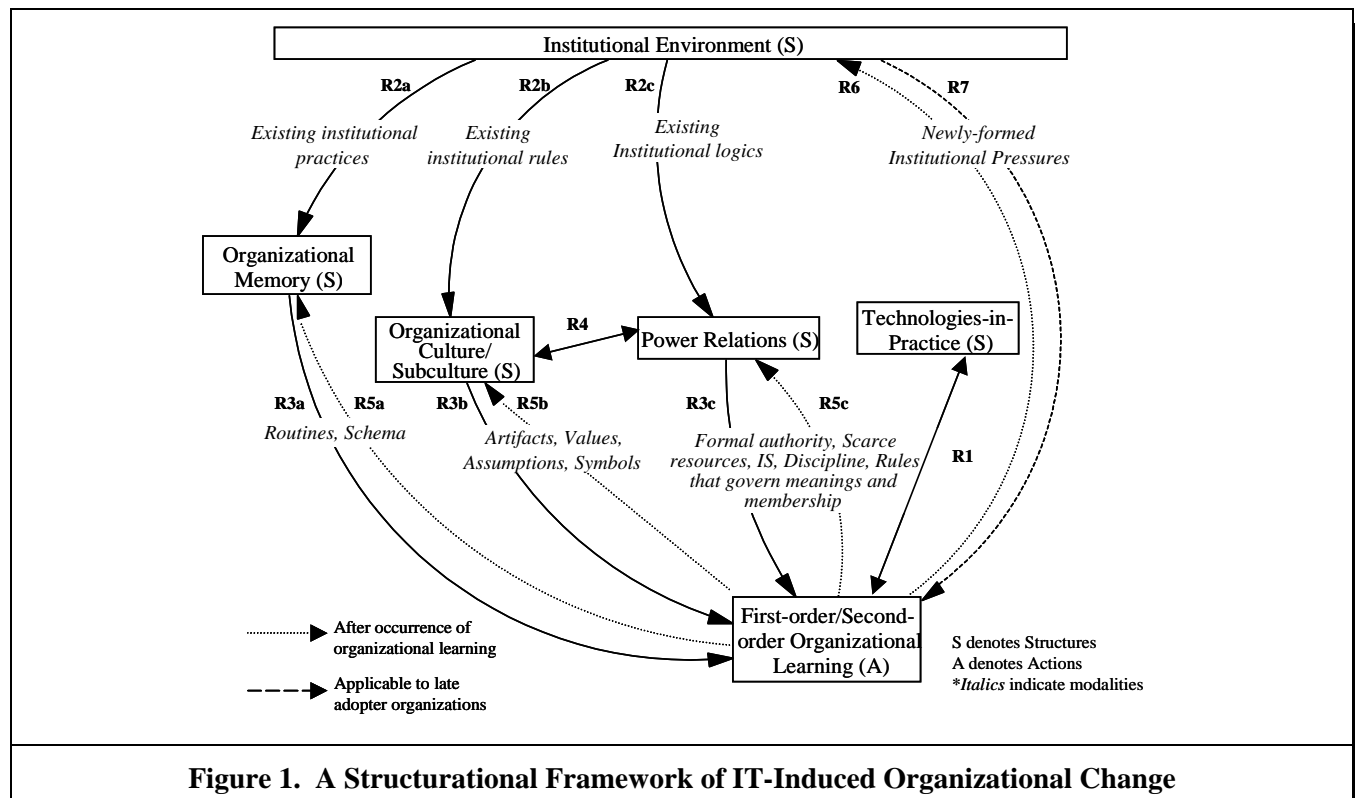|		Organizational Culture	Organizational Learning	Institutional Theory
Table 1. Concepts Pertinent to IT-Induced Organizational Change				
	Political Theory	**Organizational Culture**	**Organizational Learning**	**Institutional Theory**
Structures	Power relations	Culture, subculture	Organizational memory	Institutional environment
Modalities	Formal authority, scarce resources, IS, discipline, rules that govern meanings and membership	Artifacts, values, assumptions, symbols	Routines, schema/ mental map	Institutional rules, practices and logics, institutional pressures
Actions	Protecting own interest, applying systemic and social integration modes of power, exercising episodic mode of power	Socialization of shared meanings	First-order learning, second-order learning	Sanctioning, isomorphism, stabilizing, shaping institutional environment

related to each of the four perspectives: organizational culture (Walsham 1993), power relations (Jasperson et al. 2002), and institutions themselves (Giddens 1979) are viewed as forms of organizational structures, and organizational learning is considered as a part of the structuration process (Huysman 1999). Third, structuration theory can handle the differences in levels of analysis of the four perspectives. Organizational culture deals with organizational and group levels in its consideration of culture and subcultures. Institutional theory operates at the institutional environment level, and examines how organizations respond to institutional forces. Political theory analyzes the playing of "political games" at the individual and group levels. Last, organizational learning is a multilevel phenomenon that concerns individual, group, and organizational levels (Crossan et al. 1999). As structuration theory is devised to address multiple levels of analysis (Jones 1999), it can be used to organize the four perspectives. The elements pertinent to IT-induced change identified through our preceding discussion of the four perspectives are categorized according to the three fundamental concepts of structuration theory—structures, modalities, and actions—based on the definitions of the three concepts and previous literature (see Table 1). This categorization facilitates our discussion of the interplay among the four theoretical perspectives related to IT-induced organizational change.

Structurational Framework of IT-Induced Organizational Change

In this section, we discuss the interplay among the four theoretical perspectives in the event of IT implementation with respect to the relevant structures, modalities, and actions explicated in Table 1. We first describe why we consider organizational learning as the focus of IT-induced organizational change in our framework. We then examine the link from external organizational environment (i.e., institutional environment) to internal organizational elements followed by examination of how internal organizational elements interrelate and influence organizational learning. Subsequently, we discuss how the occurrence of organizational learning leads to organizational change in terms of internal organizational elements and implicates the external organizational environment. The identified relationships among elements of the four theoretical perspectives derived from existing literature are summarized in Figure 1.

Organizational Learning as the Focus of IT-Induced Organizational Change

We begin with a focus on *organizational learning*, as it is the collective human action directly related to organizational change induced by IT. This conceptualization is consistent with Robey and Sahay (1996), who see IT-induced organizational change as occurring through organizational learning. The implementation of new IT requires organizational members to learn the IT collectively so that its benefits can be fully exploited (Argyris 1977). The outcome of such organizational learning can be incremental change (if first-order learning occurs) or radical change (if second-order learning occurs) in terms of organizational elements (i.e., organizational culture, memory, and power relations). In a reciprocal sense, the extent of organizational learning is also influenced by the interplay of these organizational elements during the IT implementation process. Organizational learning is thus placed at the center of our framework where other organizational elements revolve around it.

Figure 1. A Structurational Framework of IT-Induced Organizational Change

In conceptualizing IT in our study, we adopt Orlikowski's (2000) notion of technologies-in-practice in our framework, recognizing that the relationship of the new IT with organizational learning is likely to be dynamic and ongoing throughout the process of organizational learning (**R1** in Figure 1). Organizational actors continuously learn and adapt to new practices introduced by the IT in their interaction with the IT and at the same time enact new structures of the IT, which shape their emergent and situated use of that IT in the process.

From External Environment to Internal Organizational Elements: The Influence of Institutional Environment on Organizational Memory, Culture, and Power Relations

Institutional environment is closely related to organizational memory, organizational culture, and power relations in an organization. *Organizational memory contains routines for thought and action* (Fiol and Lyles 1985, Walsh and Ungson 1991) *that include institutionalized practices in an industry* (**R2a**). As an organization becomes more *isomorphic* to institutions in the environment, its organizational memory tends to incorporate more institutionalized practices. For instance, in the highly institutionalized legal industry (Scott 1987), different law firms share substantial stock of knowledge in terms of the industry's standard practices and procedures for case handling. The buildup of such organizational memory becomes more prevalent as a result of implementation of IT for knowledge sharing among these firms (Gottschalk 2000).

It is argued that culture is one of the carriers of institutions (Scott 1995). Institutions, as systems of *legitimate rules*, are transported through *cultural values* to organizational members. The influence of institutions on the everyday conduct of organizational members relies on the shared meanings of values held by the members that are used to interpret rules. Consistent with the observation of culture as transporting institutions, organizational culture has been found to "imprint" an organization's early environmental conditions (Stinchcombe 1965). *Hence organizational culture is reflective of an organization's institutional environment* (**R2b**). For instance, public organizations typically have a bureaucratic organizational culture that is reflective of the hierarchical institutional environment (Bozeman 2000). This culture may be induced in part by IT implementation for reporting and approval to ensure control of employees.

Institutional environment may also influence power relations in an organization. Fincham (1992) argues that power is derived from institutional structures that mediate organizational power relations. Specifically, the existence of *institutionalized logic* of meaning for organizational interactions (e.g., hierarchies) would facilitate the effort of power holders to continue to ensure compliance from other organizational members to their power (Ranson et al. 1980, p. 8). *Institutions may thus serve to stabilize power relations* (**R2c**).

Internal Organizational Elements: The Influence of Organizational Memory, Culture, and Power Relations on Organizational Learning

Shifting our focus to within an organization, existing organizational memory, culture, and power relations may in turn have an influence on organizational learning and thus change induced by IT. Organizations with established memory face a difficult task of incorporating change amidst continuity (Bartunek 1993). Particularly, existing *routines* and *schema* in the organizational memory are thought to provide a source of resistance to organizational change (Edmondson et al. 2001). Nystrom and Starbuck (1984, p. 53) wrote, "Encased learning produces blindness and rigidity that may breed full-blown crisis." The recognition of potentially harmful encased learning led March (1972) to conclude that memory can be an enemy of an organization, that it reinforces a *first-order learning* style which maintains the status quo, instead of *second-order learning* which brings about transformative change (Argyris and Schön 1978) (**R3a**). For instance, Orlikowski (1992) reveals that standardized work processes stored in organizational memory (with the help of CASE tools) can create a "trained incapacity" for system developers to explore other ways to perform systems consulting, thus inhibiting second-order learning.

Organizational cultures and learning are also closely related. Organizational learning is considered a cultural artifact, being part of an organizational culture where learning is something that takes place not in the heads of individuals, but through the *interaction and socialization* between people (Easterby-Smith and Araujo 2000). Such a cultural perspective of organizational learning can be seen as the process of constructing and reconstructing organizational knowledge consisting of shared *values, assumptions, and symbols* (Huysman 2000). Additionally, organizational culture may encompass elements that can influence organizational learning. For instance, organizational members may uphold a culture that believes in the *value* "we can always do better" with the *assumption* that "change is always good," which may facilitate second–order learning (Sashkin 1993). Hence, organizational culture can be seen as defining the context for organizational learning (Sørenson 2002) (**R3b**).

Organizational learning has been acknowledged as a fundamentally political process (Blacker 2000). For instance, Argyris (1986) demonstrates how organizational defensive routines that reduce learning capacity arise because people need to *protect their own political interests*. On the other hand, power and politics residing in power relations may provide the social energy that fuels the processes of organizational learning (Lawrence et al. 2005). For example, to help organizational members learn about and comprehend the benefits of the new IT, organizational leaders may use their *formal authority* to guide the direction of organizational learning (*exertion of episodic power)*. Organizational leaders may also use *IS* to restrict the effective range of choices available to organizational members, thus guiding them to the direction of intended organizational learning (applying *systemic power)* (Lawrence et al. 2005). Hence power relations in the organization can have an influence on organizational learning (**R3c**).

Inter-Relationship between Organizational Culture and Power Relations

Politics and organizational culture have a mutual-influencing relationship (**R4**). Organizational culture may impart shared *values* among organizational members about what constitutes appropriate ways of playing political games, thus defining and shaping *power relations* in the organization (Walsham 1993). The exertion of power is also attainable through cultural means. Political actors may attempt to gain power by using *symbols* that embody their political intent in their communication with others (Jasperson et al. 2002). Organizational *subculture* is particularly relevant in this context, where different organizational subgroups may attempt to communicate their values to other members. In addition, *the exertion of power* by organizational actors may turn into the starting point of formation of *organizational culture*. For instance, Schein (1990) provides an example of culture formation around critical incidents: In the context of training groups, a member facing critical incidents who is emotionally charged may attack the group leader. Because everyone witnesses it and the tension is high, the immediate next set of behaviors tends to create a norm. Suppose the leader exerts power by launching a counterattack, other group members "concur" with silence or approval, and the offending member acknowledges with an apology his "mistake." In those few moments, culture has begun to be created i.e., the norm that "we do not attack the leader; authority is sacred" may eventually become an assumption if the same pattern recurs.

Implications of Organizational Learning on Culture, Memory, and Power Relations

Moving forward, the occurrence of *organizational learning* may involve incremental change such as adjustments in systems and procedures of organization (i.e., *refinement of organizational memory*) (Dutton and Dukerich 1991) or transformative change such as the search for new routines and schemas, which determine how information is interpreted (i.e., *substantial revision of organizational memory*) (Argyris and Schön 1978) (**R5a**). The latter is likely to occur if new communication and information sharing modes introduced by the IT are widely accepted by organizational members. The occurrence of organizational learning may also influence organizational culture. Several authors have conceptualized organizational culture as the product of histories of organizational learning. Organizations learn from their own experience as to which parts of their existing stock of knowledge work for the organization as a whole. The joint organizational learning then gradually creates shared assumptions, that is, organizational culture. According to Schein (1992, p. 68): "culture ultimately reflects the group's effort to cope and learn and is the residue of learning." Specifically, occurrence of *first-order learning* will involve *adjustment of existing values* in the organizational culture. This is similar to what Hatch (1993) called *retrospective realization*, which explains value realignment with a novel artifact (e.g., IT). Conversely, *second-order learning* involves a *radical change of core values or basic assumptions* introduced by the IT, which leads to a fundamental change of existing organizational culture (**R5b**). Last, organizational learning influences *power relations* by ascending those who ride on the bandwagon of organization learning to greater power. For instance, subunits of organizations that have learned to manage new contingencies resulting from adopting new IT may ascend to power (Stinchcombe 1990) (**R5c**).

From Internal Organizational Elements to External Environment: The Influence of Organizational Learning on its Institutional Environment

The occurrence of *organizational learning* and organizational change induced by IT, if successful, may in turn implicate the *institutional environment* (**R6**). Greenwood and Hinings (1988) argue that an organization that adopted a new organizational form and achieved competitive success would produce pressures on other organizations to adopt the same organizational form. Organizations, as Fligstein (1985) argues, extensively monitor one another and successful practices are mimicked and institutionalized. Such *institutional pressure* from early adopters of the IT to the late adopters may be in the form of mimetic pressure (just follow suit), normative pressure (many others have already implemented the IT), or coercive pressure (forced by tightly aligned partners to adopt) (Teo et al. 2003). Hence, in addition to organizational culture, memory, and power relations, organizational learning in the late adopter organizations may also be influenced by the newly formed institutional pressures from early adopter organizations[1] (**R7**). This may eventually lead to the gradual change of institutional practices in the industry, where the use of the new IT starts to be taken for granted. Our discussion demonstrates the interplay between the relevant structures and actions, along with the modalities (in *italics*) of the four theoretical perspectives (see Figure 1).

Discussion, Implications, and Future Research

This paper presents a structurational view of how the different organizational elements (culture, memory, institutions, and politics) may interrelate to influence organizational change in the event of IT implementation. Organizational learning is treated as a center of focus as it is directly related to organizational change. To recapitulate the structuration process in brief, the institutional environment channels its influence on IT-induced organizational change through organizational culture, memory, and power relations, which operate through the action of organizational learning. The occurrence of organizational learning induced by IT in turn causes changes to the organizational culture, memory, and power relations, and produces effects on the institutional environment.

Theoretical Implications

This paper presents an analytical framework for understanding IT-induced organizational change through the lens of structuration theory to explicate the interplay between organizational culture, learning, institutional theory, and political theory relevant to change. Our effort serves to advance theory by exploring the linkages that exist among the four theoretical perspectives related

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[1]There may be a case where government tries to promote new IT in an industry. In this case, institutional pressure of the coercive type may be applicable to early adopter organizations too.

to change. Past studies seldom use the four theoretical perspectives together in a coherent way to understand IT-induced organizational change, perhaps due to issues such as the difference in the level of analysis and the potential difficulty of managing the multitude of elements involved. By using structuration theory as an organizing device, such issues can be overcome. More importantly, the concepts offered by structuration theory—that is, structure, action, and modalities—allow us to conceptualize the pertinent elements from the four perspectives and investigate their inter-relationships in a systematic manner. By having *a priori* knowledge of the possible interplay between the different organizational elements, richer insights may be gained for research in IT-induced organizational change phenomenon. Future research may employ case study methodology to analyze the process of IT-induced organizational change using this framework. Researchers may focus on an industry where a new IT is emerging and employ a multi-case design, which includes early adopters and late adopters of the IT.

Practical Implications

This study reveals the pertinent aspects of the external elements (i.e., institutional environment) and internal organizational elements (organizational culture, memory, and power relations) that can influence IT-induced organizational change. By having an understanding of the possible interplay between the various organizational elements, practitioners can better plan for and manage the organizational change process induced by IT. Additionally, practitioners should focus on organizational learning and think of how forces from culture, memory, and politics can be manipulated to achieve the desired extent of learning for the new IT. By knowing the relevant modalities (either in the form of interpretive schemes such as schema, facilities such as formal authority, and norms such as cultural assumptions), practitioners should be better able to deploy the resources necessary to attain the desired action or structure. Overall our work can serve to provide a more holistic understanding of IT-induced organizational change.

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