Knowledge Management & New Organization Forms: A Framework for Business Model Innovation

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Abstract

The concept of knowledge management is not new in information systems practice and research. However, radical changes in the business environment have suggested limitations of the traditional information-processing view of knowledge management. Specifically, it is being realized that the programmed nature of heuristics underlying such systems may be inadequate for coping with the demands imposed by the new business environments. New business environments are characterized not only by rapid pace of change, but also discontinuous nature of such change. The new business environment, characterized by dynamically discontinuous change, requires a re-conceptualization of knowledge management as it has been understood in information systems practice and research. One such conceptualization is proposed in the form of a sense-making model of knowledge management for new business environments. Application of this framework will facilitate business model innovation necessary for sustainable competitive advantage in the new business environment characterized by dynamic, discontinuous and radical pace of change.

Keywords

Knowledge Management Systems, Business Model Innovation, E-Business Models, Information Systems Practice and Research, Philosophy of Information Systems

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1. Introduction

"People bring imagination and life to a transforming technology."
-- *Business Week*, The Internet Age (Special Report), October 4, 1999, p. 108

The traditional organizational business model, driven by pre-specified plans and goals, aimed to ensure optimization and efficiencies based primarily on building consensus, convergence and compliance. Organizational information systems – as well as related performance and control systems -- were modeled on the same paradigm to enable convergence by ensuring adherence to organizational routines built into formal and informal information systems. Such routinization of organizational goals for realizing increased efficiencies was suitable for the era marked by a relatively stable and predictable business environment. However, this model is increasingly inadequate in the e-business era that is often characterized by an increasing pace of radical and unforeseen change in the business environment (Arthur 1996, Barabba 1998, Malhotra 1998b, Kalakota & Robinson 1999, Nadler *et al.* 1995).

The new era of dynamic and discontinuous change requires continual reassessment of organizational routines to ensure that organizational decision-making processes, as well as underlying assumptions, keep pace with the dynamically changing business environment. This issue poses increasing challenge as 'best services' of the gone yesterday - - turn into 'worst practices' and core competences turn into core rigidities. The changing business environment, characterized by dynamically discontinuous change, requires a re-conceptualization of knowledge management systems as they have been understood in information systems practice and research. One such conceptualization is proposed in this article in the form of a framework for developing organizational knowledge management systems for business model innovation. It is anticipated that application of

this framework will facilitate development of new business models that are better suited to the new business environment characterized by dynamic, discontinuous and radical pace of change.

The popular technology-centric interpretations of knowledge management that have been prevalent in most of the information technology research and trade press are reviewed in the next section. The problems and caveats inherent in such interpretations are then discussed. The subsequent section discusses the demands imposed by the new business environments that require rethinking such conceptualizations of knowledge management and related information technology based systems. One conceptualization for overcoming the problems of prevalent interpretations and related assumptions is then discussed along with a framework for developing new organization forms and innovative business models. Subsequent discussion explains how the application of this framework can facilitate development of new business models that are better suited to the dynamic, discontinuous and radical pace of change characterizing the new business environment.

2. Knowledge Management: The Information Processing Paradigm

The information-processing view of knowledge management has been prevalent in information systems practice and research over the last few decades. This perspective originated in the era when business environment was less vacillating, the products and services and the corresponding core competencies had a long multi-year shelf life, and the organizational and industry boundaries were clearly demarcated over the foreseeable future. The relatively structured and predictable business and competitive environment rewarded firms' focus on economies of scale. Such economies of scale were often based on high level of efficiencies of scale in absence of impending threat of rapid obsolescence of product and service definitions as well as demarcations of existing organizational and industry boundaries.

The evolution of the information-processing paradigm over the last four decades to build intelligence and manage change in business functions and processes has generally progressed over three phases:

1. *Automation*: increased efficiency of operations;
2. *Rationalization of procedures*: streamlining of procedures and eliminating obvious bottlenecks that are revealed by automation for enhanced efficiency of operations; and,
3. *Re-engineering*: radical redesign of business processes that depends upon information technology intensive radical redesign of workflows and work processes.

The information-processing paradigm has been prevalent over all the three phases that have been characterized by technology intensive, optimization-driven, efficiency-seeking organizational change (Malhotra 1999c, 1999d, in press). The deployment of information technologies in all the three phases was based on a relatively predictable view of products and services as well as contributory organizational and industrial structures.

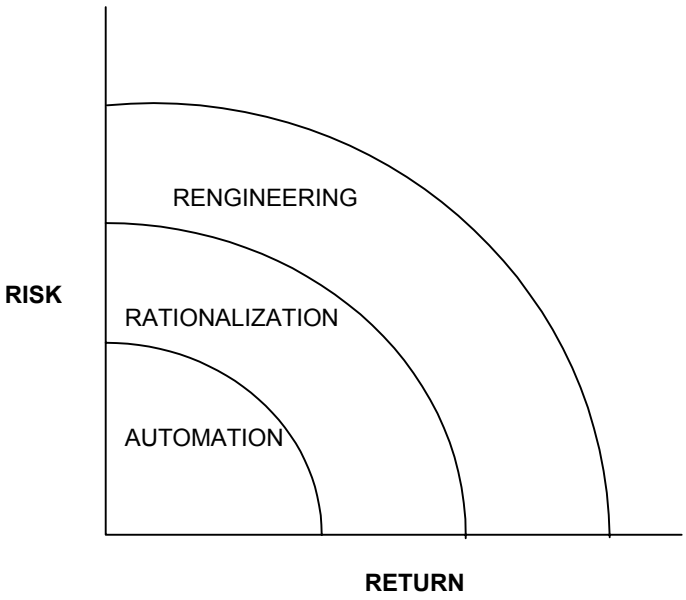


Figure 1. Information Processing Paradigm: Old World of Business

Despite increase in risks and corresponding returns relevant to the three kinds of information technology enabled organizational change, there was little, if any, emphasis on business model

innovation – 'rethinking the business' -- as illustrated in Figure 1. Based on the consensus and convergence-oriented view of information systems, the information processing view of knowledge management is often characterized by benchmarking and transfer of best practices (cf: Allee 1997, O'Dell and Grayson 1998). The key assumptions of the information-processing view are often based on the premise of the generalizability of issues across temporal and contextual frames of diverse organizations.

Such interpretations have often assumed that adaptive functioning of the organization can be based on explicit knowledge of individuals archived in corporate databases and technology-based knowledge repositories (cf: Applegate et al., 1988, p. 44; italics added for emphasis):

> "Information systems will maintain the corporate history, experience and expertise that long-term employees now hold. The information systems themselves -- *not the people* -- can become the stable structure of the organization. *People will be free to come and go, but the value of their experience will be incorporated in the systems* that help them and their successors run the business."

The information processing view, evident in scores of definitions of knowledge management in the trade press, has considered organizational memory of the past as a reliable predictor of the dynamically and discontinuously changing business environment. Most such interpretations have also made simplistic assumptions about storing *past* knowledge of individuals in the form of routinized rules-of-thumb and best practices for guiding *future* action. A representative compilation of such interpretations of knowledge management is listed in Table 1.

Table 1. Knowledge Management: The Information Processing Paradigm

The process of collecting, organizing, classifying and disseminating information throughout an organization, so as to make it purposeful to those who need it. (*Midrange Systems*: Albert, 1998)
Policies, procedures and technologies employed for operating a continuously updated linked pair of networked databases. (*Computerworld:* Anthes, 1991)
Partly as a reaction to downsizing, some organizations are now trying to use technology to capture the knowledge residing in the minds of their employees so it can be easily shared across the enterprise. Knowledge management aims to capture the knowledge that employees really need in a central repository and filter out the surplus. (*Forbes*: Bair*,* 1997)
Ensuring a complete development and implementation environment designed for use in a specific function requiring expert systems support. (*International Journal of Bank Marketing*: Chorafas, 1987)
Knowledge management IT concerns organizing and analyzing information in a company's computer databases so this knowledge can be readily shared throughout a company, instead of languishing in the department where it was created, inaccessible to other employees. (*CPA Journal*, 1998)
Identification of categories of knowledge needed to support the overall business strategy, assessment of current state of the firm's knowledge and transformation of the current knowledge base into a new and more powerful knowledge base by filling knowledge gaps. (*Computerworld*: Gopal & Gagnon, 1995)
Combining indexing, searching, and push technology to help companies organize data stored in multiple sources and deliver only relevant information to users. (*Information Week*: Hibbard, 1997)
Knowledge management in general tries to organize and make available important know-how, wherever and whenever it's needed. This includes processes, procedures, patents, reference works, formulas, "best practices," forecasts and fixes. Technologically, intranets, groupware, data warehouses, networks, bulletin boards videoconferencing are key tools for storing and distributing this intelligence. (*Computerworld*: Maglitta, 1996)
Mapping knowledge and information resources both on-line and off-line; Training, guiding and equipping users with knowledge access tools; Monitoring outside news and information. (*Computerworld*: Maglitta, 1995)
Knowledge management incorporates intelligent searching, categorization and accessing of data from disparate databases, E- mail and files. (*Computer Reseller News*: Willett & Copeland, 1998)
Understanding the relationships of data; Identifying and documenting rules for managing data; and Assuring that data are accurate and maintain integrity. (*Software Magazine*: Strapko, 1990)
Facilitation of autonomous coordinability of decentralized subsystems that can state and adapt their own objectives. (*Human Systems Management*, Zeleny, 1987)

Based primarily upon a static and 'syntactic' notion of knowledge, such representations have often specified the *minutiae of machinery* while disregarding how people in organizations actually go about acquiring, sharing and creating new knowledge (Davenport 1994). By considering the meaning of knowledge as "unproblematic, predefined, and prepackaged" (Boland 1987), such interpretations of knowledge management have ignored the human dimension of organizational knowledge creation. *Prepackaged* or *taken-for-granted* interpretation of knowledge works against the generation of multiple and contradictory viewpoints that are *necessary* for meeting the challenge posed by *wicked environments* characterized by radical and discontinuous change: this may even hamper the firm's learning and adaptive capabilities (Gill 1995). A key motivation of this article is to address the critical processes of *creation of new knowledge and renewal of existing knowledge* and to suggest a framework that can provide the philosophical and pragmatic bases for better representation and design of organizational knowledge management systems.

Philosophical Bases of the Information-Processing Model

Churchman (1971) had interpreted the viewpoints of philosophers Leibnitz, Locke, Kant, Hagel and Singer in the context of designing information systems. Mason & Mitroff (1973) had made preliminary suggestions for designing information systems based on Churchman's framework. A review of Churchman's inquiring systems, in context of the extant thinking on knowledge management, underscores the limitations of the dominant model of inquiring systems being used by today's organizations. Most technology-based conceptualizations of knowledge management have been primarily based upon heuristics -- embedded in procedure manuals, mathematical models or programmed logic -- that, arguably, capture the preferred solutions to the *given* repertoire of organization's problems.

Following Churchman, such systems are best suited for:

(a) well-structured problem situations for which there exists strong *consensual* position on the nature of the problem situation, and
(b) well-structured problems for which there exists an analytic formulation with a solution.

Type (a) systems are classified as Lockean inquiry systems and type (b) systems are classified as Leibnitzian inquiry systems. Leibnitzian systems are closed systems without access to the external environment: they operate based on *given* axioms and may fall into competency traps based on diminishing returns from the 'tried and tested' heuristics embedded in the inquiry processes. In contrast, the Lockean systems are based on consensual agreement and aim to reduce equivocality embedded in the diverse interpretations of the world-view. However, in absence of a consensus, these inquiry systems also tend to fail.

The *convergent* and *consensus building* emphasis of these two kinds of inquiry systems is suited for stable and predictable organizational environments. However, wicked environment imposes the need for variety and complexity of the interpretations that are necessary for deciphering the multiple world-views of the uncertain and unpredictable future.

3. Beyond Existing Myths About Knowledge Management

The information-processing view of knowledge management has propagated some dangerous myths about knowledge management. Simplistic representations of knowledge management that often appear in popular press may often result in misdirected investments and system implementations that never yield expected returns (Strassmann 1997, 1999).

Given the impending backlash against such simplistic representations of knowledge management (cf: Garner 1999), it is critical to analyze the myths underlying the ‘successful’ representations of knowledge management that worked in a bygone era. There are three dominant

myths based on the information-processing logic that are characteristic of most popular knowledge management interpretations (Hildebrand 1999 – Interview of the author with *CIO Enterprise* magazine).

Myth 1: ***Knowledge management technologies can deliver the right information to the right person at the right time.*** This idea applies to an outdated business model. Information systems in the old industrial model mirror the notion that businesses will change incrementally in an inherently stable market, and executives can foresee change by examining the past. The new business model of the Information Age, however, is marked by fundamental, not incremental, change. Businesses can't plan long-term; instead, they must shift to a more flexible "anticipation-of-surprise" model. Thus, it's impossible to build a system that predicts who the right person at the right time even is, let alone what constitutes the right information.

Myth 2: ***Knowledge management technologies can store human intelligence and experience.*** Technologies such as databases and groupware applications store bits and pixels of data, but they can't store the rich schemas that people possess for making sense of data bits. Moreover, information is context-sensitive. The same assemblage of data can evoke different responses from different people. Even the same assemblage of data when reviewed by the same person at a different time or in a different context could evoke differing response in terms of decision-making and action. Hence, storing a static representation of the explicit representation of a person's knowledge -- assuming one has the willingness and the ability to part with it – is not tantamount to storing human intelligence and experience.

Myth 3: ***Knowledge management technologies can distribute human intelligence***. Again, this assumes that companies can predict the right information to distribute and the right people to distribute it to. And bypassing the distribution issue by compiling a central repository of data for

people to access doesn't solve the problem either. The fact of information archived in a database doesn't ensure that people will necessarily see or use the information. Most of our knowledge management technology concentrates on efficiency and creating a consensus-oriented view. The data archived in technological 'knowledge repositories' is rational, static and without context and such systems do not account for *renewal of existing knowledge* and *creation of new knowledge*.

The above observations seem consistent with observations by industry experts such as John Seely Brown (1997) who have observed that: "In the last 20 years, US industry has invested more than $1 trillion in technology, but has realized little improvement in the efficiency of its knowledge workers and virtually none in their effectiveness."

Given the dangerous perception about knowledge management as seamlessly entwined with technology, "its true critical success factors will be lost in the pleasing hum of servers, software and pipes." (Hildebrand 1999). Hence, it is critical to focus attention of those interested in knowledge management on the critical success factors that are necessary for business model innovation.

To distinguish from the *information-processing paradigm* of knowledge management discussed earlier, the proposed paradigm will be denoted as the *sense-making paradigm* of knowledge management. This proposed framework is based on Churchman's (1971, p. 10) explicit recognition that "knowledge resides in the user and not in the collection of information… it is how the user reacts to a collection of information that matters."

Churchman's emphasis on the human nature of knowledge creation seems more pertinent today than it seemed twenty-five years ago given the increasing prevalence of 'wicked' environment characterized by discontinuous change (Nadler & Shaw 1995) and "*wide range of potential surprise*" (Landau & Stout 1979). Such an environment defeats the traditional organizational response of *predicting* and *reacting* based on pre-programmed heuristics. Instead, it demands more *anticipatory*

responses from the organization members who need to carry out the mandate of a faster cycle of knowledge-creation and action based on the new knowledge (Nadler & Shaw 1995).

Philosophical Bases of the Proposed Model

Churchman had proposed two alternative kinds of inquiry systems that are particularly suited for multiplicity of world-views needed for radically changing environments: Kantian inquiry systems and Hegelian inquiry systems. Kantian inquiry systems attempt to give multiple *explicit* views of *complementary* nature and are best suited for moderate ill-structured problems. However, given that there is no explicit opposition to the multiple views, these systems may also be afflicted by competency traps characterized by *plurality* of *complementary* solutions. In contrast, Hegelian inquiry systems are based on a synthesis of *multiple completely antithetical* representations that are characterized by intense conflict because of the contrary underlying assumptions. Knowledge management systems based upon the Hegelian inquiry systems, would facilitate multiple and contradictory interpretations of the focal information. This process would ensure that the 'best practices' are subject to *continual* re-examination and modification given the dynamically changing business environment.

Given the increasingly wicked nature of business environment, there seems to be an imperative need for consideration of the Kantian and Hegelian inquiring systems that can provide the multiple, diverse, and contradictory interpretations. Such systems, by generating multiple *semantic* views of the future characterized by increasingly rapid pace of discontinuous change, would facilitate *anticipation of surprise* (Kerr 1995) over prediction. They are most suited for dialectical inquiry based on dialogue: "meaning passing or moving through...a free flow of meaning between people..." (Bohm cited in Senge 1990). The underpinning discussion asserts the *critical role* of the individual and social processes that underlie the *creation of meaning* (Strombach 1986, p. 77), without which

dialectical inquiry would not be possible. Therein lies the crucial sense-making role of humans in facilitating knowledge creation in inquiring organizations.

Continuously challenging the current 'company way,' such systems provide the basis for 'creative abrasion' (Eisenhardt et al. 1997, Leonard 1997) that is necessary for promoting radical analysis for business model innovation. In essence, knowledge management systems based on the proposed model prevent the *core capabilities* of yesterday from becoming *core rigidities* of tomorrow (Leonard-Barton 1995). It is critical to look at knowledge management beyond its representation as "know what you know and profit from it" (Fryer, 1999) to "obsolete what you know before others obsolete it and profit by creating the challenges and opportunities others haven't even thought about" (Malhotra 1999e). This is the new paradigm of knowledge management for radical innovation required for sustainable competitive advantage in a business environment characterized by radical and discontinuous pace of change.

4. Knowledge Management for Business Model Innovation
From Best Practices to Paradigm Shifts

As discussed above, in contrast to the information-processing model based on deterministic assumptions about predictability of the future, the sense-making model is more conducive for sustaining competitive advantage in the "world of re-everything" (Arthur 1996). Without such radical innovation, one wouldn't have observed the paradigm shifts in core value propositions served by new business models.

Such rethinking of the nature of the business and the nature of the organization itself characterizes paradigm shifts that are the hallmark of business model innovation. Such paradigm shifts will be attributable for about seventy percent of the *previously unforeseen* competitive players that many established organizations will encounter in their future (Hamel 1997).

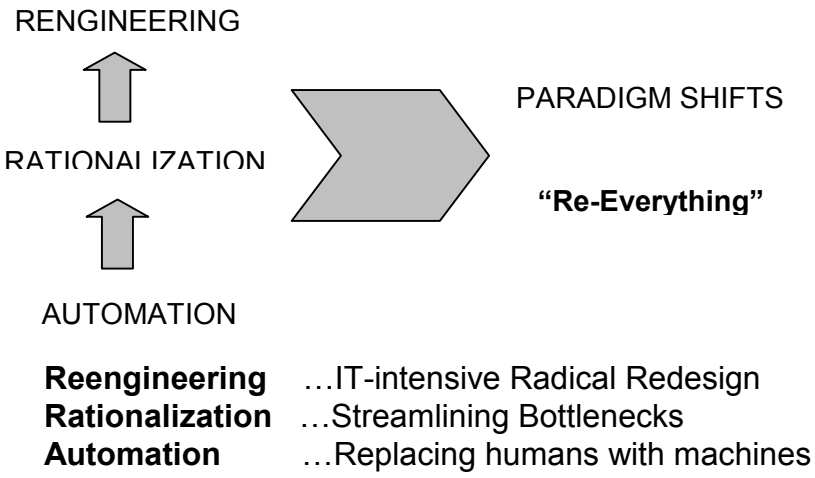
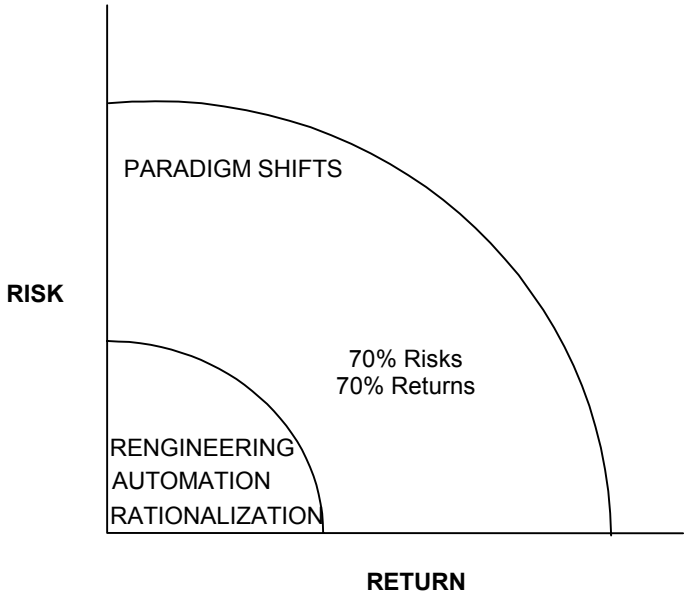


Figure 2. From Best Practices to Paradigm Shifts

Examples of such new business models include Amazon.com and e-Toys, relatively new entrants that are threatening traditional business models embodied in organizations such as Barnes and Noble and Toys R Us. Such business model innovations represent 'paradigm shifts' that characterize not transformation at the level of business processes and process workflows, but radical rethinking of the business as well as the dividing lines between organizations and industries.

Figure 3. Paradigm Shifts: New World of Business



Such paradigm shifts are critical for overcoming mangers' "blindness to developments occurring *outside* their core [operations and business segments]" and tapping the opportunities in "white spaces" that lie between existing markets and operations (Moore 1998).

The notions of 'best practices' and 'benchmarking' relate to the model of organizational controls that are "built, *a priori*, on the principal of closure" (Landau & Stout 1979, p. 150, Stout 1980) to seek compliance to, and convergence of, the organizational decision-making processes (Flamholtz et al. 1985). However, the decision rules embedded in 'best practices' assume the character of predictive 'proclamations' which draw their legitimacy from the vested authority, not because they provide adequate solutions (Hamel & Prahalad 1994, p. 145). Challenges to such decision rules tend to be perceived as challenges to the authority embedded in 'best practices' (Landau 1973).

Hence, such 'best practices' that *ensure* conformity by ensuring task definition, measurement and control also *inhibit* creativity and initiative (Bartlett & Ghoshal 1995, Ghoshal & Bartlett 1995). The system that is structured as a 'core capability' suited to a relatively static business environment

turns into a 'core rigidity' in a discontinuously changing business environment. Despite the transient efficacy of 'best practices,' the cycle of doing "more of the same" tends to result in locked-in behavior patterns that eventually sacrifice organizational performance at the altar of the organizational "death spiral" (Nadler & Shaw 1995, p. 12-13). In the e-business era, which is increasingly characterized by faster cycle time, greater competition, and lesser stability, certainty and predictability, any kind of consensus cannot keep pace with the dynamically discontinuous changes in the business environment (Bartlett & Ghoshal 1995, Drucker 1994, Ghoshal & Bartlett 1996).

With its key emphasis on the obedience of rules embedded in 'best practices' and 'benchmarks' at the cost of correction of errors (Landau & Stout 1979), the information-processing model of knowledge management limits creation of *new* organizational knowledge and impedes renewal of existing organizational knowledge.

Most of the innovative business models such as Cisco and Amazon.com didn't devolve from the best practices or benchmarks of the organizations of yesterday that they displaced, but from radical re-conceptualization of the nature of the business. These paradigm shifts are also increasingly expected to challenge the traditional concepts of organization and industry (Mathur and Kenyon, 1997) with the emergence of *business ecosystems* (Moore 1998), *virtual communities of practice* (Hagel and Armstrong 1997) and *infomediaries* (Hagel and Singer 1999).

5. Human Aspects of Knowledge Creation and Knowledge Renewal

Knowledge management technologies based upon the information-processing model are limited in the capabilities for creation of new knowledge or renewal of existing knowledge. No doubt, such technologies provide the optimization-driven efficiency-seeking behavior needed for high performance and success in a business environment characterized by a predictable and incremental pace of change. Examples of technologies that are based on a high level of integration

such as ERP technologies represent knowledge management technologies based upon the information-processing model. However, given a radical and discontinuously changing business environment, these technologies fall short of sensing changes that they haven't been pre-programmed to sense and accordingly unable to modify the logic underlying their behavior.

Until information systems embedded in technology become capable of *anticipating change* and changing their basic assumptions (heuristics) accordingly, we would need to rely upon humans for performing the increasingly relevant function of self-adaptation and knowledge creation. However, the vision of information systems that can autonomously revamp their past history based upon their anticipation of future change is yet far from reality (Wolpert 1996). Given the constraints inherent in the extant mechanistic (programmed) nature of technology, the human element assumes greater relevance for maintaining currency of the programmed heuristics (programmed routines based upon previous assumptions). Therefore, the human function of ensuring the *reality check* - by means of repetitive questioning, interpretation and revision of the assumptions underlying the information system - assumes an increasingly important role in the era marked by discontinuous change.

The human aspects of knowledge creation and knowledge renewal that are difficult -- if not impossible -- to replace by knowledge management technologies are listed below.

- Imagination and creativity latent in human minds
- Untapped tacit dimensions of knowledge creation
- Subjective and meaning making basis of knowledge
- Constructive aspects of knowledge creation and renewal

The following discussion explains these issues in greater detail and suggests how they can help overcome the limitations of the information-processing model of knowledge management.

Imagination and Creativity Latent in Human Minds: Knowledge management solutions

characterized by memorization of 'best practices' may tend to define the assumptions that are embedded not only in information databases, but also in the organization's strategy, reward systems and resource allocation systems. The *hardwiring* of such assumptions in organizational knowledge bases may lead to perceptual insensitivity (Hedberg et al. 1976) of the organization to the changing environment. Institutionalization of 'best practices' by embedding them in information technology might facilitate efficient handling of routine, 'linear,' and predictable situations during stable or incrementally changing environments. However, when this change is discontinuous, there is a persistent need for continuous renewal of the basic premises underlying the 'best practices' stored in organizational knowledge bases. The information-processing model of knowledge management is devoid of such capabilities that are essential for continuous learning *and* unlearning mandated by radical and discontinuous change. A more proactive involvement of the human imagination and creativity (March 1971) is needed to facilitate greater internal diversity [of the organization] that can match the variety and complexity of the wicked environment.

Untapped Tacit Dimensions Of Knowledge Creation: The information-processing model of knowledge management ignores tacit knowledge deeply rooted in the individual's action and experience, ideals, values, or emotions (Nonaka & Takeuchi 1995). Although tacit knowledge lies at the very basis of organizational knowledge creation, its nature renders it highly personal and hard to formalize and to communicate. Nonaka and Takeuchi (1995) have suggested that knowledge is created through four different modes: (1) *socialization* which involves conversion from tacit knowledge to tacit knowledge, (2) *externalization* which involves conversion from tacit knowledge to explicit knowledge, (3) *combination* which involves conversion from explicit knowledge to explicit knowledge, and (4) *internalization* which involves conversion from explicit knowledge to tacit knowledge. The dominant model of inquiring systems is limited in its ability to foster shared

experience necessary for relating to others' thinking processes thus limiting its utility in *socialization*. It may, by virtue of its ability to convert tacit knowledge into explicit forms such as metaphors, analogies and models, have some utility in *externalization*. This utility is however restricted by its ability to support dialogue or collective reflection. The current model of inquiring systems, apparently, may have greater role in *combination* involving combining different bodies of explicit knowledge, and *internalization* which involves knowledge transfer through verbalizing or diagramming into documents, manuals and stories. A more explicit recognition of tacit knowledge and related human aspects, such as ideals, values, or emotions, is necessary for developing a richer conceptualization of knowledge management.

Subjective and Meaning Making Bases of Knowledge Creation: Wicked environments call for interpretation of new events and ongoing re-interpretation and re-analysis of assumptions underlying extant practices. However, the information-processing model of knowledge management largely ignores the important construct of *meaning* (cf: Boland 1987) as well as its transient and ambiguous nature. 'Prepackaged' or 'taken-for-granted' interpretation of knowledge residing in the organizational memories works against generation of multiple and contradictory viewpoints necessary for ill-structured environments. Simplification of contextual information for storage in IT-enabled repositories works against the retention of the complexity of multiple viewpoints. Institutionalization of definitions and interpretations of events and issues works against the exchanging and sharing of diverse perspectives. To some extent the current knowledge management technologies, based on their ability to communicate metaphors, analogies and stories by using multimedia technologies, may offer some representation and communication of meaning. However, a more human-centric view of knowledge creation is necessary to enable the interpretative, subjective and meaning-making nature of knowledge creation. Investing in multiple and diverse interpretations is expected to enable

Kantian and Hegelian modes of inquiry and, thus, lessen oversimplification or premature decision closure.

Constructive Aspects of Knowledge Creation and Renewal: The information-processing model of knowledge management ignores the constructive nature of knowledge creation and instead assumes a pre-specified meaning of the memorized 'best practices' devoid of ambiguity or contradiction. It ignores the critical process that translates information into meaning and action that is necessary for understanding knowledge-based performance (Malhotra 1999a, Malhotra & Kirsch 1996, Bruner 1973, Dewey 1933, Strombach 1986). The dominant model of inquiring systems downplays the constructive nature of knowledge creation and action. For most ill-structured situations, it is difficult to ensure a unique interpretation of 'best practices' residing in information repositories since knowledge is created *by the individuals* in the process of using that data. Even if pre-specified interpretations could be possible, they would be problematic when future solutions need to be either thought afresh or in discontinuation from past solutions. Interestingly, the constructive aspect of knowledge creation is also expected to enable multiple interpretations that can facilitate the organization's *anticipatory response* to discontinuous change.

6. Conclusions and Recommendations for Future Research

This proposed sense making model of knowledge management enables the organizational knowledge creation process that is "both *participative* and *anticipative*" (Bennis & Nanus 1985, p. 209). Instead of a formal rule- or procedure-based step-by-step rational guide, this model favors a "set of guiding principles" for helping people understand "not how it should be done" but "how to understand what might fit the situation they are in" (Kanter 1983, p. 305-306). This model assumes the existence of "only a few rules, some specific information and a lot of freedom" (Margaret Wheatley cited in Stuart 1995). One model organization that has proven the long-term success of this approach is

Nordstrom, the retailer that has a long reputation for its high level of customer service. Surprisingly, the excellence of this organization derives from its one-sentence employee policy manual that states (Taylor 1994): "Use your good judgment in all situations. There will be no additional rules." The primary responsibility of most supervisors is to continuously coach the employees about this philosophy for carrying out the organizational pursuit of "serving the customer better" (Peters 1989 p. 379).

The proposed model, illustrated in Figure 4, is anticipated to advance the current conception of 'Knowledge-Tone' and related e-business applications (Kalakota and Robinson 1999) beyond the performance threshold of highly integrated technology-based systems. By drawing upon the strengths of both convergence-driven [Lockean-Leibnitzian] systems and divergence-oriented [Hegelian-Kantian] systems, the proposed model offers both a combination of flexibility and agility while ensuring efficiencies of the current technology architecture. Such systems are *loose* in the sense that they allow for continuous re-examination of the assumptions underlying best practices and reinterpretation of this information. Such systems are *tight* in the sense that they also allow for efficiencies based on propagation and dissemination of the best practices.

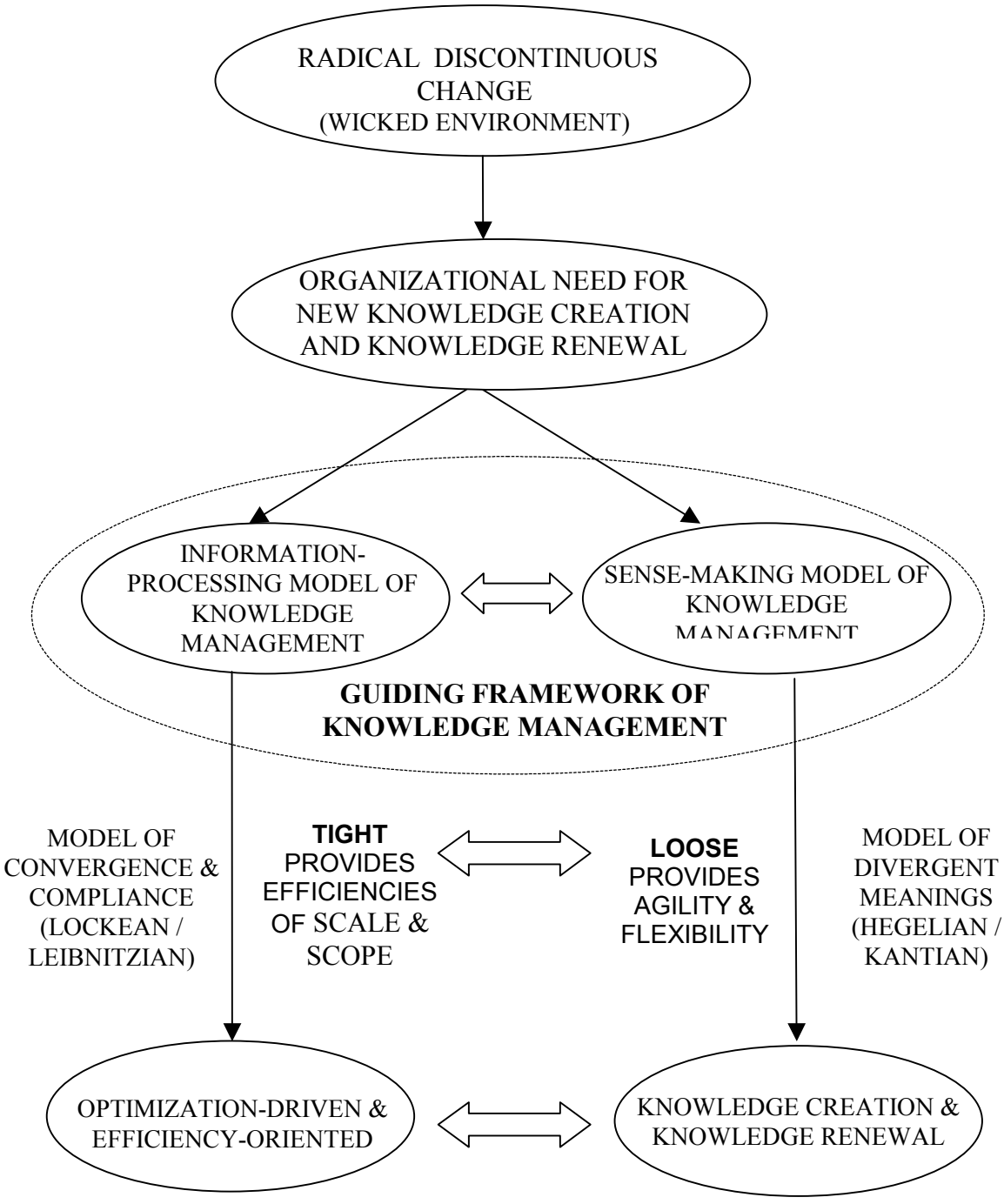


Figure 4. Knowledge Management for Business Model Innovation

The knowledge management systems based on the proposed model do not completely ignore the notion of 'best practices' per se but consider the continuous construction and reconstruction of such practices as a dynamic and ongoing process. Such *loose-tight knowledge management systems* (Malhotra 1998a) would need to provide not only for identification and dissemination of best practices, but also for continuous re-examination of such practices. Specifically, they would need to also include a simultaneous process that continuously examines the best practices for their currency given the changing assumptions about the business environment. Such systems would need to contain *both* learning and unlearning processes. These simultaneous processes are needed for assuring the efficiency-oriented optimization based on the current best practices while ensuring that such practices are continuously re-examined for their currency.

Some management experts (cf: Manville and Foote 1996) have discussed selected aspects of the proposed *sense making model of knowledge management* in terms of the shift from the traditional emphasis on transaction processing, integrated logistics, and work flows to systems that support competencies for communication building, people networks, trust-building and on-the-job learning. Many such *critical success factors* for knowledge management require a richer understanding of human behavior in terms of their perceptions about living, learning and working in technology-mediated and cyberspace-based environments.

Some experts (cf: Davenport and Prusak 1997, Romer in Silverstone 1999) have emphasized formal incentive systems for motivating loyalty of employees for sustaining firm's intellectual capital and loyalty of customers for sustaining 'stickiness' of portals. However, given recent findings in the realms of performance and motivation of individuals (cf: Malhotra 1998c, Kohn 1995) using those systems, these assertions need to be reassessed. The need for better understanding of human factors

underpinning performance of knowledge management technologies is also supported by our observation of informal 'knowledge sharing' virtual communities of practice affiliated with various Net-based businesses (cf: Knowledge Management Think Tank at: forums.brint.com) and related innovative business models. In most such cyber-communities, success, performance and 'stickiness' is often driven by *hi-touch* technology environments that effectively address core value proposition of the virtual community. It is suggested that the critical success factors of the proposed model of knowledge management for business innovation are supported by a redefinition of 'control' (Flamholtz et al. 1985, Malhotra & Kirsch 1996, Manz et al. 1987, Manz and Sims 1989) as it is relates to the new living, learning and working environments afforded by emerging business models. Hence, business model innovation needs to be informed by the proposed model of knowledge management that is based upon synergy of the information-processing capacity of information technologies and sense-making capabilities of humans.

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