

December 2004

Perspectives on Organizational Knowledge and Knowledge Management Approaches: Bridging Theory and Practice

Edmund Ng
National University of Singapore

Gek-Woo Tan
National University of Singapore

Follow this and additional works at: <http://aisel.aisnet.org/pacis2004>

Recommended Citation

Ng, Edmund and Tan, Gek-Woo, "Perspectives on Organizational Knowledge and Knowledge Management Approaches: Bridging Theory and Practice" (2004). *PACIS 2004 Proceedings*. 122.
<http://aisel.aisnet.org/pacis2004/122>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2004 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Perspectives on Organizational Knowledge and Knowledge Management Approaches: Bridging Theory and Practice

Ng Han Siong, Edmund
National University of Singapore
edng01@singnet.com.sg

Tan Gek Woo
National University of Singapore
tangw@comp.nus.edu.sg

Abstract

Knowledge management has been dominated by the knowledge-based view of the firm that views knowledge as an object to be managed as an economic resource. However, alternative views of organizational knowledge have emerged to shift this structural focus on knowledge as an object to a processual focus on knowledge as a process, i.e. knowing. Understanding organizational epistemology holds significant implications for devising approaches to knowledge management and articulating the role of IT. This paper reviews six perspectives on organizational knowledge, of which three adopt a structural focus while the other three a processual one. Each perspective is examined in terms of its epistemology, its implied approach to knowledge management, and also critiques from various authors. Critical issues for practitioners and future directions for research are also highlighted.

Keywords: Knowledge, Knowing, Organizational Knowledge, Knowledge Management, Epistemology

1. Introduction

Perhaps the most successful theory that dominates knowledge management (KM) research is the knowledge-based view of the firm (Swan & Scarbrough, 2001; Patriotta, 2003). Emergent perspectives on organizational knowledge (OK) challenge its epistemological paradigm by shifting the focus from knowledge to knowing, from content to process. This holds significant implications for conceptualizing organizational epistemology and KM approaches. However, we lack a comprehensive framework straddling both the descriptive works on OK and the prescriptive offerings on KM. While theorists probe, question, and reframe OK, practitioners mull about KM practicalities in organizational settings (Vera and Crossan, 2003).

This paper seeks to address and reconcile issues as to what knowledge is, what makes it organizational, how it may be managed, and the roles that IT plays. Clarifying and understanding different epistemologies widens our KM repertoire and hence is prerequisite to effective KM (Venzin et al., 1998). A KM framework grounded in theory is proposed and facilitates a deeper understanding of knowledge and its management. Through this work, researchers and managers will be able to interpret changes in organizational epistemology, and to engage distinct epistemological modes contingent on the situation (Venzin et al., 1998).

The following section clarifies epistemological assumptions and discusses the shift from knowledge to knowing. The next section reviews and critiques each perspective in detail. First each perspective is generally described, then its epistemological assumptions are uncovered, its implications for KM are discussed, and lastly, critique and future directions for research are provided. The last section concludes the paper with the common critical issue of culture and future directions.

2. Clarifying Epistemology

2.1 Knowledge versus Knowing

“**Knowledge** of a person, thing, or perception [is] gained through **information** or **facts** about it rather than by direct experience... **Knowing** refers to the **action** of getting to understand, or fact of **understanding**; mental **comprehension** of truths or principles... or **skill** in something.” (Oxford English Dictionary, 2nd Edition, 1989, emphasis added)Hence we observe dual aspects of knowledge and knowing: it is an object gained through processing information or practice; it is also embedded in the process itself. Two views of knowledge exist: a structural view that focuses on knowledge as object used in action and a processual view that focuses on knowledge as process that is a part of action (Cook and Brown, 1999; Newell et al., 2002). Three perspectives presented in this paper adopt a structural focus, while the other three a processual focus. Each differs in terms of epistemological assumptions and consequently, its implied approach to KM.

2.2 Structural Focus: Knowledge as Object

This view focuses on knowledge as an object and asks how knowledge may be managed (Newell et al., 2002). One approach is a hierarchy that explains the ordered relationship between data, information, and knowledge (DIK) – beginning with data as raw numbers and facts, data is processed to create information, and information is authenticated and personalized to create knowledge (Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998). However, Tuomi (1999) challenges this view with a reversed hierarchy, arguing that knowledge has to exist first and only when knowledge is articulated are information and data produced. The crux of these two hierarchical views is that processing information in the individual mind converts it to knowledge, and articulating and presenting knowledge converts knowledge to information (Alavi and Leidner, 2001). Knowledge is multi-faceted and the literature espouses numerous types. This paper highlights specific knowledge types emphasized by each perspective (see table 1).

Perspective	Knowledge Types	Definition
Cognitive	Embrained	<i>Embrained</i> knowledge is abstract and dependent upon cognitive abilities (Blackler, 1995)
	Encoded	<i>Encoded</i> knowledge is information conveyed by signs and symbols (Blackler, 1995)
	Explicit	<i>Explicit</i> knowledge is knowledge that can be articulated, codified, and communicated through symbols or text (Nonaka and Takeuchi, 1995)
Connectionist	Dispersed	<i>Dispersed</i> knowledge exists as incomplete and frequently contradictory bits of individual knowledge that cannot be concentrated in a single mind (Tsoukas, 1996)
Knowledge-Based	Embedded	<i>Embedded</i> knowledge is knowledge which resides in routines (Blackler, 1995)
	Tacit	<i>Tacit</i> knowledge is ineffable, personal, hard to formalize, and deeply rooted in the individual’s actions, experience, ideals, values and emotions (Nonaka and Takeuchi, 1995; Tsoukas, 2003)

Table 1 - Types of Knowledge

2.2 Processual Focus: Practices of Knowing

This view focuses on knowledge as a process, i.e. knowing, how knowing is embedded in practice, and asks how practices of knowing may be managed. Practice refers to the coordinated activities of individuals and groups that are informed by meaning drawn from a particular context (Cook and Brown, 1999). Knowing is thus “the epistemic work – work people must do to acquire, confirm, deploy or modify what needs to be known in order for them to do what they do – that is done as part of action or practice” (p. 387). Individuals

participate in practice in multiple ways (Gherardi, 2000) hence knowing is multi-faceted. Each perspective emphasizes different aspects of knowing (see table 2). All knowing is *personal* and *tacit*: it is a skill that involves personal participation in practice – specifically, “an ongoing process of transforming experience into subsidiary awareness that allows one to reach ever higher levels of skilful achievement” (Tsoukas, 2003).¹

Perspective	Aspects of Knowing Emphasized	Definition
Situated	Pragmatic Situated	Practice is an activity seeking a goal (Blackler, 1995) Knowing is a capability situated in and enacted by everyday practices and it emerges from the ongoing and situated actions of individuals as they engage the world (Orlikowski, 2002)
Techno-Science	Provisional and contested	Practice connects knowing with fabricating, during which it is subject to drifts and controversies (Gherardi, 2000; Patriotta, 2003)
Autopoietic	Mediated by language	Languaging reveals the ineffable element in knowing (Tsoukas, 2003) Meaning is created through participating in language games (Von Krogh and Roos, 1995)

Table 2 - Aspects of Knowing

2.3 KM: Object or Process

While the structural focus asks how to manage *knowledge*, the processual focus asks how to manage practices of *knowing* (Newell et al., 2002). These two views are not dichotomous but are inseparable aspects that, when bridged, creates new knowledge (Cook and Brown, 1999); knowledge is created only when “our knowing is punctuated in new ways through social interaction” (Tsoukas, 2003). Hence all perspectives address the nature of knowledge and knowing (to different extents), and KM will be effective only when organizations manage knowledge as both object and process (Zack, 1999). Managing OK as an object has been well-covered in KM research; managing organizational knowing is less understood. Firstly, the processual focus implies that knowledge is not easily transferable but instead shared. Hence, KM needs to turn from unreflective into reflective practice that enables knowledge sharing by elucidating these rules and shaping shared understandings (Tsoukas and Vladimou, 2001). Secondly, knowledge depends crucially on the individual’s experiences, perceptual skills, social relations, and motivation. This implies that knowledge per se cannot be managed and KM must therefore be concerned with sustaining and strengthening social practices and not managing codified knowledge (Tsoukas and Vladimou, 2001).

3. Six Perspectives on OK and Implications for KM

3.1 The Cognitive Perspective

This perspective is rooted in cognitive science that uses the computer to model the mind. The traditional cognitive approach focuses on the processing structures of the individual mind and symbolic representations of reality stored in it (Von Krogh and Roos, 1995; Patriotta, 2003). Cognitive theories are extended from the individual to the organizational level. The organization is understood as an institutionalized mind that performs information processing activities on representations of reality stored in retention structures, and hence possesses an organizational memory (OM) that transcends individuals (Walsh and Ungson, 1991).

Epistemology: Knowledge is embrained: it is abstract as symbolic representations of reality that reside in the individual mind (Von Krogh and Roos, 1995). This knowledge can be explicated and is easily transferable. Hence this perspective articulates a focus on converting

¹ A skill comprises a focal awareness and a subsidiary awareness, e.g. in hammering a nail, a person is focusing on driving the nail in but only aware of the hammer held as a tool (Tsoukas, 2003).

knowledge to information and vice versa, as propagated by the hierarchical view of DIK. Correspondingly, knowing is abstract and disembodied as a computational activity, i.e. information processing occurs in accordance with universal rules in the organization (Von Krogh and Roos, 1995). OK resides in the OM (Alavi and Leidner, 2001).

KM Approach: The information processing paradigm adopted (Malhotra, 2000) promotes a technocratic or technology-reliant approach that emphasizes the reuse and exploitation of explicit knowledge through its capture, codification, storage, and retrieval. Explicating tacit knowledge is important for knowledge reuse because when appropriately explicated, knowledge can be efficiently shared and reapplied (Zack, 1999). Knowledge repositories or OM information systems (OMIS) play a critical role in enabling individuals to acquire, store, and retrieve knowledge (Stein and Zwass, 1995). Hence knowledge management systems (KMS) architecture with a predominant repository model has emerged (e.g. Zack, 1999), enabling knowledge to be captured through artificial intelligence (Alavi and Tiwana, 2003).

Critical Issues for Practitioners: A shared understanding is important for individuals to interpret repository content (Stenmark, 2002). The hierarchical view of DIK helps to determine critical issues for effective knowledge reuse:

- Create shared knowledge space (Alavi and Leidner, 2001; Newell et al., 2002)
- Manage reduced contextual information in the OM (Ackerman, 1996)
- Design KMS to help users assign meaning to information and to capture their knowledge (Alavi and Leidner, 2001)
- Validate repository contents and understand situations of knowledge reuse (Markus, 2001)

Critique and Future Directions: Computers cannot assign meaning to events the way human minds can, hence adopting the computer metaphor confuses information processing with knowledge processes and thus overlooks meaning-making processes (Winograd and Flores, 1987). Consequently, human innovation and creativity necessary for knowledge creation is stifled (Nonaka and Takeuchi, 1995). The OM concept is also criticized for failing to specifically explain how cognition is extended to the organization level (Magalhães, 1998) and subsequently overlooking the “institutional dimension of knowledge and the role of contextual factors” (Patriotta, 2003).

Future research should reconcile the technocratic approach with sense-making and meaning creation dynamics. Malhotra (2003) proposes to complement expert systems with human sense-making processes. Understanding how information is translated to knowledge and action facilitates designing more effective KMS. We ask: *How can KMS incorporate human sense-making and meaning creation dynamics?* The OM concept remains useful in understanding OK and social psychological models of OM and OMIS have been proposed (Corbett, 2000). By incorporating social processes, these models are better able to buffer and communicate ambiguous knowledge. We ask: *How can these OMIS be practically implemented?* “Organizational forgetting” refers to the decay, preservation, and deliberate forgetting of OM that is an old issue which deserves new attention (Coffey and Hoffman, 2003; de Holan and Philips, 2003). We ask: *How can we manage organizational forgetting as part of KM?*

3.2 The Connectionist Perspective

This perspective describes cognition in terms of relationships between network components. Representationism and information processing remain prevalent, however information processing is guided by locally varying (instead of universal) rules in the organization, and

occurs in a decentralized, parallel manner Knowledge is examined in relation to network communications where the network is characterized by its number of connections, dynamics of information flow, and capacity to store information. The organization is seen as a brain with people as interconnected, interacting neurons (Von Krogh and Roos, 1995). The social network view (Nohria and Eccles, 1992) focuses on social ties, and their contents and information benefits (Van Wijk et al., 2003). The organization is thus seen as a social network that contributes to the collective social capital, which subsequently constitutes the organization's intellectual capital (Nahapiet and Ghoshal, 1998).

Epistemology: Knowledge is embraced as abstract knowledge. However, each individual's version of reality differs and hence knowledge is dispersed and inherently indeterminate – relevant knowledge cannot be determined *a priori* (Tsoukas, 1996). OK resides in network ties and is emergent and historically dependent—dependent on the firm's activities and exists as a state in the network as a result of previous knowledge (Von Krogh and Roos, 1995; Tsoukas, 1996).

KM Approach: The social network view propagates a networking approach that emphasizes the acquisition, search, and transfer of dispersed knowledge (Becker, 2001) and cultivating social capital through creating and managing social ties (Newell et al., 2002). Knowledge maps are thus utilized to capture and share explicit knowledge in organizational contexts and to identify and organize intellectual capital (Davenport and Prusak, 1998; Wexler, 2001). Communication support systems are able to establish electronic channels for the transfer of knowledge among individuals, while enterprise knowledge portals facilitate knowledge transfer between individuals and repositories (Alavi and Tiwana, 2003).

Critical Issues for Practitioners: Maintain knowledge map through dialogue and feedback (Wexler, 2001) and utilize “boundary spanning” individuals to access knowledge in external networks (Kogut and Zander, 1992; Newell et al., 2002)

Critique and Future Directions: Concepts are borrowed from the cognitive perspective, hence it also inherits problems of adopting a static view of knowledge and neglecting meaning creation. This perspective offers more of a tool to model organizational relationships than unique epistemological assumptions. Borrowing connectionist concepts, the knowledge-based perspective also advocates a networking approach that emphasizes the transfer of tacit knowledge. When used loosely, knowledge networks even include communities-of-practice.

Firms are likely to be involved in a variety of networks simultaneously (Van Wijk et al., 2003).² *How can we cross-fertilize ideas across various conceptions of networks?* Research on factors affecting knowledge processes in networks is considerable (Van Wijk et al., 2003). Future research should explore two factors: properties of the social network, and organizational boundaries (Argote, McEvily and Reagans, 2003). *How do these factors affect knowledge processes in the network?* Regarding knowledge maps, we ask: *What motivates their use and voluntary updating? How effective are knowledge maps in effecting knowledge processes?* Stenmark (2000) describes how pointers to tacit knowledge were incorporated in intranet documents through recommender systems. *How effective are these pointers in motivating knowledge search?*

² Two other views are the external network and the internal network. See review in Van Wijk et al. (2003).

3.3 The Knowledge-Based Perspective

The knowledge-based view (KBV) of the firm is an outgrowth of the resource-based view, which focuses on endogenous factors that affect organizational performance. The KBV focuses on the link between inimitable knowledge-oriented factors and competitive advantage (Nelson and Winter, 1982; Grant, 1996; Spender, 1996a, 1996b). Knowledge is recognized as an economic and strategic asset, and treated as a commodity. Organizational capabilities develop as knowledge is integrated (Grant, 1996) and replicated (Kogut and Zander, 1992) to produce goods and services. The organization is thus viewed as a body of idiosyncratic knowledge that affords capabilities (Patriotta, 2003).

Epistemology: This perspective concentrates on knowledge stocks and flows. The process of knowing is not explicated, instead emphasis is placed on knowledge as an outcome (Spender, 1996a). Knowledge is convertible, transferable between entities, and measurable. Tacit and explicit knowledge are two knowledge types that are often in the spotlight. OK is created through the interplay between tacit and explicit knowledge in a spiral that moves from individual to organizational (Nonaka and Takeuchi, 1995). OK is also embedded in organizational routines (Nelson and Winter, 1982).

KM Approach: The KBV propagates a managerialist approach that subsumes the technocratic and the networking approaches. It strives to generate and capitalize on knowledge as a commodity by managing knowledge processes (Alavi and Leidner, 2001). Particularly, knowledge application is critical for organizational performance: “value is created only when knowledge... [is] applied where it is needed” (Alavi and Tiwana, 2002). One mode of knowledge application is the use of self-contained teams (Grant, 1996). Virtual teams are increasingly used to integrate distributed knowledge bases (Alavi and Tiwana, 2002). IT plays a critical role through collaboration support systems that enhance the performance of teams (Alavi and Tiwana, 2002) and a supporting role through communication support systems that facilitates the capture, updating, and accessibility of organizational directives and codifying and automating organizational routines. (Alavi and Leidner, 2001)

Critical Issues for Practitioners: (a) ensure shared knowledge base availability for effective knowledge transfer (Grant, 1996), (b) ensure availability of knowledge and information to workers (Earl, 2001), and (c) adopt an organizational structure that is conducive for knowledge processes (Nonaka and Takeuchi, 1995)

Critique and Future Directions: Firstly, the commodification of knowledge neglects the provisional side of knowledge (see techno-science perspective). The empirical measurement of organizational capabilities (Patriotta, 2003) and the use of knowledge taxonomies (Tsoukas, 1996) are also problematic. Another criticism is that by emphasizing knowledge as an outcome, the KBV fails to explain how knowledge is achieved (Spender, 1996a). Privileging tacit over explicit knowledge also implies “equating the inability to articulate knowledge with its worth” (Alavi and Leidner, 2001). Finally, another problem is the common understanding of a tacit-explicit continuum on which knowledge can only exist at one position. Tsoukas (2003) clarifies that tacit and explicit knowledge are in fact “two sides of the same coin”.

A dynamic knowledge-based theory of the firm (Spender, 1996a) would provide grounding for managing dynamic knowledge (McInerney, 2002). *Can situated theories be borrowed to explain dynamic aspects of meaning creation and sense-making?* Knowledge creation has received considerable attention and further research in knowledge application is needed

(Alavi and Tiwana, 2002). *What affects knowledge creation and knowledge application through virtual teams?*

3.4 The Situated Perspective

Situated Cognition theory essentially understands cognitive activities as interactions between agents and with physical systems (Brown and Duguid, 1991; Lave and Wenger, 1991). Specifically, knowing and learning occur in the social fabric provided by the “community-of-practice” (CoP) – the informal community of actual work practice. The CoP refers to “a group of people with diverse viewpoints, roles, and engaged in joint work over... time in which they build things, solve problems, learn, invent, and negotiate meaning, and evolve a way of reading each other” (Brown in Else, 2003).

The organization is viewed as a community of communities (Brown and Duguid, 1991) that overlap when individuals are members of several communities. Activity theory facilitates analyzing the organization as a network of interrelated activity systems. Accordingly, activity is interpreted as practice, and human capacities develop when people act upon their surroundings (Blackler et al., 2000). An activity system has a set of distinctive task and practices, where individuals and environment engage in relationships to jointly contribute to the activity (Blackler, 1995).

Epistemology: Knowledge is dispersed and inherently indeterminate (Tsoukas, 1996). Knowledge-producing work practices and the social, situated nature of knowledge are stressed: knowledge is embodied in daily practices and contingent upon the situation. Likewise knowing, as an action-based process, is situated and distributed. It is a capability situated in and enacted by everyday practices (Orlikowski, 2002) and a social activity that occurs through participating in CoP’s through storytelling (Brown and Duguid, 1991). Narratives are essentially “thick descriptions” of events (Bartel and Garud, 2003) that act as diagnostic tools and sense-making devices and contribute to identity building (Brown and Duguid, 1991). They facilitate OK creation and dissemination between communities by functioning as boundary objects that act as common information spaces (Bartel and Garud, 2003). Through narratives, CoP’s are therefore able to develop and strengthen their unique knowledge domains and practices, and also to take the knowledge of others into account (Boland and Tenkasi, 1995).

KM Approach: This perspective advocates a community approach that emphasizes nurturing the community as a communal resource (Wenger et al., 2002; Von Krogh, 2003) and the creation, exchange, and particularly, sharing of knowledge through storytelling. This is because knowledge sharing precedes knowledge creation during innovation (Boland and Tenkasi, 1995; Leonard and Sensiper, 1998). This approach thus stresses dialogue and interaction through networking. Communication support systems support knowledge sharing within and between CoP’s (Pan and Leidner, 2003). Importantly, IT must respond to the social context, and encompass communities and the full richness of communication and collaboration by supporting the informal and cultivating true reciprocity between community members (Brown and Duguid, 1998). Socially informed KMS designs pay attention to human and social factors by incorporating social computing and storytelling (Thomas et al., 2001). “Activity-based KMS” integrates the concept of activity systems to represent actual work practices and is thus able to “accommodate the complex, distributed, context-dependent and dynamic aspects of OK” (Hasan, 2003).

Critical Issues for Practitioners: The success of CoP's is dependent on its "aliveness." However, these emergent and informal social groupings assume many forms and characteristics. They are difficult to identify, may have norms that contradict organizational ones, and thus pose many difficulties (Wenger et al., 2002; Pan and Leidner, 2003).

- Adopt social strategies to deal with fluid boundaries and to balance structural elements
- Accommodate CoP's changing needs with flexible KM strategy
- Provide multiple channels/forums for diverse knowledge needs and preferences

Critique and Future Directions: Despite numerous empirical studies, this perspective fails to consolidate a consistent theory of knowing and organizing (Patriotta, 2003). Consequently, the perspective remains in a fragmentary state. Further research is needed to understand the community as a resource (Pan and Leidner, 2003; Von Krogh, 2003). *What affects knowledge sharing within and across communities? What characterizes the formation of communities? How does IS enable communal resources?* Another area is the continued study and measure of the contributions of CoP's to OK. This is frustrated by the fluid and overlapping boundaries of CoP's (Wenger et al. 2000). As activities and activity systems evolve, communities also change and develop (Blackler et al., 2000). *How do these complex dynamics manifest?* Future research should examine various community types: *how do online and virtual communities effect knowledge sharing?* The study of narratives also beckons (Bartel and Garud, 2003). *What constitutes a powerful knowledge-generating narrative? How should these attributes be structured in storytelling? How do communities manage multiple, conflicting accounts from narratives?*

3.5 The Techno-Science Perspective

This perspective focuses on the social construction of scientific facts and technological systems (Pinch and Bijker, 1989). It studies how scientific facts and technical artifacts are fabricated in the laboratory and conceives of them as black boxes (Latour, 1987). Latour focuses on knowledge in the making; this perspective hence focuses on opening and exploring the organizational black box (OBB), and explains how controversies translate into hard facts and products and how individuals make sense of everyday practices (Patriotta, 2003). Therefore the metaphor in use here is the laboratory where the fabrication of facts and artifacts occurs through situated practices of knowledge production (Gherardi, 2000).

Actor-network theory (ANT) offers a method to examine science by following scientists and describing how the durability of knowledge is achieved (Latour, 1987). In the organizational context, ANT thus sheds light on mapping OK processes. Accordingly, the organization is an actor-network (AN) – a heterogeneous network of relations between actors with aligned interests (Doolin and Lowe, 2002). Actors (in the semiotic sense) are both human and nonhuman, i.e. individuals, peoples, technologies, scientific laws etc. "Relational materiality" is emphasized where the attributes and forms of actors are a result of their relations with other actors. A holistic, systematic approach to knowing is assumed and actors are defined in a comprehensive, indeterminate manner where conventional dichotomies of human-nonhuman, action-system, subject-action etc. are dissolved (Patriotta, 2003).

Epistemology: Knowledge is a circulation through the AN, initially contested but eventually made durable through an epistemological closure of controversies (Patriotta, 2003). Epistemological closure refers to the processes of legitimization, social acceptance, and eventual institutionalization of knowledge. Fabricating facts hence involves discourse that facilitates a process of validating knowledge (Patriotta, 2003). Once controversies resolve into facts, knowledge is closed off into a black box, hence achieving durability. However it is

continuously subject to drifts and controversies in the AN (Patriotta, 2003). OK resides in physical and social artifacts (e.g. products, technologies, routines, common sense etc) as empirical knowledge that surrounds organizational members and thus affects knowing (Hargadon and Fanelli, 2002). Patriotta conceptualizes the creation of OBB's as a knowledge cycle, consisting of everyday practices portrayed as recursive processes of knowledge creation, utilization, and institutionalization.

KM Approach: ANT implies that a KM approach should be holistic – it combines the management of strategy, human resource, technology, marketing, and IT (Steen et al., 1999). This approach highlights the empirical and controversial nature of knowledge as it is produced in the knowledge cycle. Dialogue consisting of argumentation and debate is thus necessary for epistemological closure. IT can then support dialogue through communication support systems. ANT provides mainly a method to map processes during OK production. Contemporary management accounting thus utilizes ANT to describe OK production through a diverse set of activities and actors (McNamara et al., 2004). Accordingly, ANT is able to incorporate the technical, managerial, metrical, and cultural dimensions of KM.

Critical Issues for Practitioners: (a) identify the knowledge types in each stage of the knowledge cycle, (b) manipulate physical and social artifacts to shape dynamics of knowing (Hargadon and Fanelli, 2002), (c) facilitate discourse and knowledge utilization towards epistemological closure and knowledge creation, and (d) encourage “scientific inquiry” into organizational artifacts

Critique and Future Directions: This perspective's postmodernist concepts are contentious. Criticized for its tendency towards total relativism, it consequently overlooks the material and content-related aspects of knowledge creation (Patriotta, 2003). ANT imposes a radical indeterminacy where actors are anonymous, ill-defined, and indiscernible (Doolin and Lowe, 2002; Patriotta, 2003). In leaving out problems of cognition and intentionality, these actors appear as brainless agents (Patriotta, 2003). Furthermore, Patriotta highlights that the indeterminacy of AN's blurs the boundaries of OK creation. Lastly, ANT's refusal to privilege humans is controversial: the importance of humans is diminished in elevating non-human actors to the same treatment of both actors as empirical matter (Doolin and Lowe, 2002).

Notwithstanding its application in knowledge audits, this perspective remains largely theoretical. Future research should develop a practical and acceptable KM approach by fleshing out the research and practice implications of ANT and Patriotta's knowledge cycle. Patriotta suggests that future research consider the simultaneous production of OBB's and how different knowledge types overlap. Extending this, we ask: *How can Patriotta's knowledge cycle be extended to describe how knowledge types and processes interrelate? How do organizations identify and challenge OBB's such as norms and conventions? How is OK de-institutionalized?*

3.6 The Autopoietic Perspective

Von Krogh and Roos' (1995) organizational epistemology, based on Autopoiesis theory and social autopoiesis, drives this perspective. Autopoiesis theory is a concept developed in biology to describe and distinguish living systems (Maturana and Varela, 1980). A living system is self-sufficient through self-contained mechanisms and processes, and is independent of components but dependent on their interrelations (Von Krogh and Roos, 1995). Autopoiesis theory thus examines a living system's properties and how component

interrelations enable the system to self-produce. To understand social systems, autopoiesis theory has been developed into social autopoiesis (Luhmann, 1986). Luhmann defines social systems as meaning systems reproducing autopoietically using communication as the means.

The organization is viewed as a living system; autonomous and self-organized, its rules for functioning are self-defined. It is simultaneously open – to data that is interpreted and contextualized – and closed – to information and knowledge that are constructed internally. It is self-referential, relying on historical events to maintain itself as a social system.

Epistemology: Embodied in past human experiences, knowledge is self-referencing, history-dependent, and its construction a personal and individualized process (Von Krogh and Roos, 1995). Knowledge and the world are also structurally coupled and therefore co-evolve (Maturana and Varela, 1980). It is an individual capacity that enables individuals to make distinctions in observations – to categorize and distinguish elements of the world (Von Krogh and Roos, 1995). “Knowing how to act within a domain of action is learning to... [use] the categories and the distinctions constituting that domain” (Wenger in Tsoukas and Vladimou, 2001). Through distinction making, OK is individualized into norms and distinctions, while through languaging, OK is socialized to reside in the relations among individuals. Languaging is the primary means of meaning creation and knowledge development where language brings forth the world and influences our experiences (Von Krogh and Roos, 1995). Knowledge is thus created or shared during conversations and discussions, specifically through “language games” – the usage of words governed by history-dependent rules in the organization (Wittgenstein, 1953). Each organization ultimately develops a domain of language that constitutes its tradition and core identity and coordinates all social action, allows individuals to make linguistic distinctions, and subsequently generates meaning when individuals exchange distinctions (Von Krogh and Roos, 1995; Tsoukas and Vladimou, 2001).

KM Approach: The languaging approach thus strives to shape the social practice of organizational languaging so as to facilitate the creation and sharing of knowledge. Dialogue and discussion are key characteristics of knowledge creation: it aids in articulating tacit knowledge through the use of figurative language and symbolism (i.e. metaphors and analogies) and it is a means for creating and crystallizing concepts (Nonaka and Takeuchi, 1995). Dialogue can be supported by IT through communication support systems.

Critical Issues for Practitioners: (a) raise dialogue quality by instilling creative thinking through dialectics (Nonaka and Takeuchi, 1995), and (b) discover new and instructive ways of dialogue, fresh forms of social interaction, and novel ways to distinguish and connect parts of our knowledge (Tsoukas, 2003)

Critique and Future Directions: Von Krogh and Roos’ discussion occurs mainly at an abstract and philosophical level that does not map easily to the needs of practitioners. Perhaps this is why their work is seldom mentioned in KM literature. Future research might do well to revisit Von Krogh and Roos’ work to develop a practical approach for KM. Specifically, *how is organizational languaging as a social practice amenable to managerial intervention? Which forms of dialogue are constructive and direct individual and group behaviour toward autonomous knowledge sharing and creation? Which are counter-productive or even destructive? How can organizations reconcile lingo in different business units so as to facilitate knowledge sharing among them?* The study of narratives provides an initial step towards middle ground to bridge this theoretical account of OK and practice-oriented KM. Linguistic and cultural barriers hinder global knowledge sharing (Pan and Leidner, 2003).

The study of culture and KM offers crucial insights for KM research and practice, such as how concepts and meanings get “lost in translation” across languages. Thus, research should continue to examine cross-cultural KM initiatives by borrowing insights from sociolinguistics and anthropology. Specifically, *how do different cultures conceptualize KM? How do different languages and cultures affect knowledge creation and sharing across organizational and national boundaries?*

4. Conclusion

4.1 Common Critical Issues for Practitioners

A knowledge culture is crucial to establish mindsets conducive for both knowledge work and KM (Davenport and Prusak, 1998). It refers to “an organization that offers opportunities to create knowledge and one that encourages learning and the sharing of what is known” (McInerney, 2002).

- Establish common language and mutually supporting channels for knowledge transfer (Davenport and Prusak, 1998)
- Provide mutual support and incentives to encourage content contribution (Davenport and Prusak, 1998; Earl, 2001)
- Adopt transfer method that suits culture (Davenport and Prusak, 1998)
- Identify and realize the breadth of opportunity structures (i.e. occasions and benefits) for knowledge sharing (Von Krogh, 2003)
- Create and enforce care and authenticity of knowledge shared (Von Krogh, 2003)

4.2 Future Directions

An organization’s dependence on particular knowledge types depends on the nature of their work (Blackler, 1995). *What organizational and situational characteristics determine when it is appropriate to adopt each perspective and its corresponding KM approach? Should a holistic or pluralistic KM approach be adopted?* Stenmark (2002) proposes a multi-perspective view for intranets. We extend this line to ask: *How can a corresponding holistic view of IT be practically implemented?*

4.3 Concluding Remarks

While the structural focus has been in fashion, its static view of knowledge overlooks meaning creation and the socially constructed nature of OK (Patriotta, 2003). Generally the discussion here reiterates its central limitation: managing knowledge as an object is an oxymoron where “the more management, the less knowledge to ‘manage’, and the more ‘knowledge’ matters, the less space there is for management to make a difference” (Alvesson and Kärreman, 2001). On the other hand, the processual focus is less developed and its postmodern, constructionist views are abstract and thus less easily understood and applied. Its implication that less management is needed to manage knowing only fuels the KM oxymoron. However, it has shed new light on the study of OK and KM. Its primary assertion is that mastery of managing practices of knowing will contribute greatly to improving organized human activity.

References

- Alavi, M. and Leidner D.E. “Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues,” *MIS Quarterly* (25:1), 2001, pp. 107-136.
- Alavi, M. and Tiwana, A. “Knowledge Integration in Virtual Teams: The Potential Role of KMS,” *Journal of the American Society for Information Science and Technology* (53:12), 2002, 1029-1037.

- Alavi, M. and Tiwana, A. "Knowledge Management: The Information Technology Dimension," In *The Blackwell Handbook of Organizational Learning and Knowledge Management*, M. Easterby-Smith and M.A. Lyles (eds.), Blackwell Publishing, Malden, MA, 2003, pp. 104-121.
- Alvesson, M. and Kärreman, D. "Odd Couple: Making Sense of the Curious Concept of Knowledge Management," *Journal of Management Studies* (38:7), 2001, pp. 995-1018.
- Argote, L., McEvily, B. and Reagans, R. "Managing Knowledge in Organizations: An Integrative Framework and Review of Emerging Themes." *Management Science* (49:4), 2003, 571-582.
- Bartel, C.A. and Garud, R. "Narrative Knowledge in Action: Adaptive Abduction as a Mechanism for Knowledge Creation and Exchange in Organizations," In *The Blackwell Handbook of Organizational Learning and Knowledge Management*, M. Easterby-Smith and M.A. Lyles (Eds.), Blackwell Publishing, Malden, MA, 2003, pp.324-342.
- Blackler, F. "Knowledge, Knowledge Work and Organizations: An Overview and Interpretation," *Organization Studies*, (16:6), 1995, pp. 1021-1046.
- Blackler, F., Crump, N. and McDonald, S. "Organizing Processes in Complex Activity Networks," *Organization* (7:2), 2000, pp. 277-300.
- Boland, R.J. and Tenkasi, R.V. "Perspective Making and Perspective Taking in Communities of Knowing," *Organization Science* (6:4), 1995, pp. 350-372.
- Brown, J.S. and Duguid, P. "Organizational Learning and Communities-of-Practice: Toward a Unified View of Working, Learning, and Innovation," *Organization Science* (2:1), 1991, pp.40-57.
- Brown, J.S. and Duguid, P. "Organizing Knowledge," *California Management Review* (40:3), 1998, pp. 90-111.
- Coffey, J.W. and Hoffman, R.R., "Knowledge Modeling for the Preservation of Institutional Memory," *Journal of Knowledge Management* (7:3), 2003, pp.38-52.
- Cook, S.D.N. and Brown, J.S. "Bridging Epistemologies: The Generative Dance Between Organizational Knowledge and Organizational Knowing," *Organization Science* (10:4), 1999, pp. 381-400.
- Davenport, T.H. and Prusak, L. *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Cambridge, MA, 1998.
- de Holan, P.M. and Philips, N. "Organizational Forgetting," In M. Easterby-Smith and M.A. Lyles (eds.), *The Blackwell Handbook of Organizational Learning and Knowledge Management*, Blackwell Publishing, Malden, MA, 2003, pp. 393-409
- Doolin, B. and Lowe, A. "To Reveal is to Critique: Actor–Network Theory and Critical Information Systems Research," *Journal of Information Technology*, 17, 2002, pp. 69-78.
- Earl, M. "Knowledge Management Strategies: Toward a Taxonomy," *Journal of Management Information Systems* (18:1), 2001, pp. 215-233.
- Else, S. "Practicing Knowledge Communities," *destinationKM*, April 1 2003, Available from <http://www.destinationkm.com/articles/default.asp?ArticleID=1044>, Accessed 28 February 2004.
- Gherardi, S. "Practice-based Theorizing on Learning and Knowing in Organizations," *Organization* (7:2), 2000, pp. 211-223.
- Grant, R.M., "Toward a Knowledge-based Theory of the Firm," *Strategic Management Journal* (17:Special Issue), 1996, pp. 109-122.
- Hargadon, A. and Fanelli, A. "Action and Possibility: Reconciling Dual Perspectives of Knowledge in Organizations," *Organization Science* (13:3), 2002, pp.290-302.
- Hasan, H. "An Activity-based Model of Collective Knowledge," *Proceedings of the 36th Hawaii International Conference on System Sciences*, 2003.

- Kogut, B. and Zander, U. "Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology," *Organization Science* (3:3), 1992, pp. 383-397.
- Latour, B. *Science in Action*. Harvard University Press, Cambridge, MA, 1987
- Lave, J. and Wenger, E. *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press, Cambridge, 1991.
- Luhmann, N. "The Autopoiesis of Social Systems," In F. Geyer and J. Van de Zouwen (eds.), *Sociocybernetic Paradoxes: Observation, Control and Evolution of Self-Steering Systems*, Sage, London, 1986, pp. 172-192.
- Magalhães, R. "Organizational Knowledge and Learning," In G. von Krogh, J. Roos and D. Kleine (Eds.), *Knowing in Firms: Understanding, Managing and Measuring Knowledge*, London, Sage, 1998, pp. 87-122.
- Malhotra, Y. "Expert Systems for KM: Crossing the Chasm between Information Processing and Sense Making," *Expert Systems with Applications*, 20, 2003, pp. 7-16.
- Malhotra, Y. "From Information Management to Knowledge Management: Beyond the 'Hi-Tech Hidebound' Systems," In Y. Malhotra (ed.), *Knowledge Management and Business Model Innovation*, Idea Group Publishing, Hershey, PA, 2000, pp.115-134.
- Markus, M.L. "Towards a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success," *Journal of Management Information Systems*, (18:1), 2001, 57-93.
- Maturana, H. and Varela, F.J. *Autopoiesis and Cognition: The Realization of the Living*. Reidl, London, 1980.
- McInerney, C. "Knowledge Management and the Dynamic Nature of Knowledge," *Journal of the American Society for Information Science and Technology*, (53:12), 2002, pp. 1009-1018.
- McNamara, C., Baxter, J. and Chua, W.F. "Making and Managing Organisational Knowledge(s)," *Management Accounting Research*, 15, 2004, pp. 53-76.
- Newell, S., Robertson, M., Scarbrough, H. and Swan, J. *Managing Knowledge Work*. Palgrave Macmillan, New York, 2002.
- Nohria, N. and Eccles, R.G. "Face-to-Face: Making Network Organizations Work," In N. Nohria and R.G. Eccles (eds.), *Networks and Organizations: Structure, Form, and Action*, Harvard Business School Press, Boston, MA, 1992, pp. 288-308.
- Nonaka, I. and Takeuchi, H. *The Knowledge-Creating Company*. Oxford University Press, New York, 1995.
- Orlikowski, W.J. "Knowing in Practice: Enacting a Collective Capability in Distributed Organizing," *Organization Science*, (13:3), 2002, 249-273.
- Pan, S.L. and Leidner, D.E. "Bridging Communities of Practice with Information Technology in Pursuit of Global Knowledge Sharing," *Journal of Strategic Information Systems* (12), 2003, 71-88.
- Patriotta, G. *Organizational Knowledge in the Making: How Firms Create, Use and Institutionalize Knowledge*. Oxford University Press, New York, 2003.
- Pinch, T.J. and Bijker, W.E. "The Social Construction of Facts and Artifacts: Or How Science and Technology might Benefit Each Other," In W.E. Bijker, T.P. Hughes, and T.J. Pinch (eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, MIT Press, Cambridge, MA, 1989, pp. 16-50.
- Spender, J.-C. "Making Knowledge the Basis of a Dynamic Theory of the Firm," *Strategic Management Journal*, (17:Special Issue), 1996a, pp. 45-62.
- Spender, J.-C. "Organizational Knowledge, Learning and Memory: Three Concepts in Search of a Theory," *Journal of Organizational Change*, (9:1), 1996b, 63-78.

- Steen, J.T., Hanson, D.J. and White, R.D. “‘Actor Networks’ as a Theoretical Lens for the Strategic Management of Knowledge in Organisations,” *Working Paper Series*, School of Management, University of Tasmania, Hobart, 1999.
- Stein, E.W. and Zwass, V. “Actualising Organizational Memory with Information Systems” *Information Systems Research*, (6:2), 1995, pp. 85-117.
- Stenmark, D. (2002). “Information vs. Knowledge: The Role of Intranets in Knowledge Management,” *Proceedings of the 35th Hawaii International Conference on System Sciences*.
- Swan, J. and Scarbrough, H. “Editorial: Knowledge Management: Concepts and Controversies,” *Journal of Management Studies*, (38:7), 2001, pp. 913-921.
- Thomas, J.C., Kellogg, W.A. and Erickson, T. “The Knowledge Management Puzzle: Human and Social Factors in Knowledge Management,” *IBM Systems Journal*, (40:4), 1996, pp. 863-884.
- Tsoukas, H. “Do We Really Understand Tacit Knowledge?” In M. Easterby-Smith and M.A. Lyles (eds.), *The Blackwell Handbook of Organizational Learning and Knowledge Management*, Blackwell Publishing, Malden, MA, 2003, pp. 410-427.
- Tsoukas, H. “The Firm as Distributed Knowledge System: A Constructionist Approach.” *Strategic Management Journal*, (17:Special Issue), 1996, pp. 11-25.
- Tsoukas, H. and Vladimirov, E. “What is Organizational Knowledge?” *Journal of Management Studies*, (38:7), 2001, pp. 973-993.
- Tuomi, I. “Data is More Than Knowledge: Implications of the Reversed Knowledge Hierarchy for Knowledge Management and Organizational Memory,” *Journal of Management Information Systems*, (16:3), 1999, pp. 103-117.
- Van Wijk, R., Van Den Bosch, F.A.J. and Volberda, H.W. “Knowledge and Network,” In M. Easterby-Smith and M.A. Lyles (eds.), *The Blackwell Handbook of Organizational Learning and Knowledge Management*, Blackwell Publishing, Malden, MA, 2003, pp. 428-453.
- Venzin, M., von Krogh, G. and Roos, J. “Future Research into Knowledge Management,” In G. von Krogh, J. Roos and D. Kleine (Eds.), *Knowing in Firms: Understanding, Managing and Measuring Knowledge*, Sage, London, 1998, pp. 26-66.
- Vera, D. and Crossan, M. “Organizational Learning and Knowledge Management: Toward an Integrative Framework,” In M. Easterby-Smith and M.A. Lyles (eds.), *The Blackwell Handbook of Organizational Learning and Knowledge Management*, Blackwell Publishing, Malden, MA, 2003, pp. 122-141.
- Von Krogh, G. “Knowledge Sharing and the Communal Resource,” In M. Easterby-Smith and M.A. Lyles (eds.), *The Blackwell Handbook of Organizational Learning and Knowledge Management*, Blackwell Publishing, Malden, MA, 2003, pp. 372-392.
- Von Krogh, G. and Roos, J. *Organizational Epistemology*. St. Martin’s Press, New York, 1995.
- Walsh, J.P. and Ungson, G.R. “Organizational Memory,” *Academy of Management Review*, (16:1), 1991. pp. 57-91.
- Wenger, E., McDermott, R. and Snyder, W.M. *Cultivating Communities of Practice: A Guide to Managing Knowledge*. Harvard Business School Press, Boston, Mass. 2002.
- Wexler, M.N. “The Who, What and Why of Knowledge Mapping,” *Journal of Knowledge Management*, (5:3), 2001, 249-263.
- Winograd, T. and Flores, C.F. *Understanding Computers and Cognition*. Addison-Wesley, Cambridge, MA, 1987.
- Wittgenstein, L. *Philosophical Investigations*. Blackwell, Oxford, 1953.
- Zack, M.H. “Managing Codified Knowledge,” *Sloan Management review*, (40:4), 1999, 45-58.